Exploring the immediate affective and cognitive consequences of self-affirmation

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Declaration

The thesis conforms to an ‘article format’ in which the middle chapters consist of discrete articles written in a style that is appropriate for publication in peer-reviewed journals in the field. The first and final chapters present synthetic overviews and discussions of the field and the research undertaken.

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The author contributions for the empirical chapters are as follows: Philine Harris, Peter Harris and Eleanor Miles were collectively responsible for the initial conception of the research ideas and designs. Philine Harris was responsible for creating materials, data collection, data analysis and writing of the manuscripts. Peter Harris and Eleanor Miles were responsible for providing feedback on study design and materials and corrections to the manuscripts.

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All studies reported in this thesis included a set of individual difference scales that participants completed before participating in the experimental sessions. The key findings that emerged from these measures, which were interactions with trait self-esteem, have been reported. The full analyses of results involving these scales have not been reported, as most scales that emerged as moderators correlated substantially with trait self-esteem, and any further findings replicated the pattern of results already reported. All scales have been included in the Appendix.

In addition, some outcome measures were included that are not reported on in full. Where additional outcome measures were included, the measures are described and findings summarised in footnotes. All materials can be found in full in the Appendix.

I hereby declare that this thesis has not been and will not be, submitted in whole or in part to another University for the award of any other degree.

Signature……

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Summary

Self-affirmation has been shown to alter individuals' reactions to a wide range of threats, yet comparatively little is known about its cognitive and affective consequences, especially in the immediate aftermath of self-affirmation. This thesis explored these effects and the role of trait self-esteem in moderating them.

In relation to cognition, in Study 1 (Chapter 2, N = 83), self-affirmation improved performance on two tasks (testing working memory and inhibition) related to executive function; Effects were not moderated by self-esteem. In Study 2 (Chapter 3, N = 107), self-affirmation decreased performance on a different working memory task among high self-esteem individuals. In relation to affect, a systematic review (Chapter 4) indicated that self-affirmation is not consistently associated with positive affect, despite the fact that positive affect has received much attention as a possible mediator of self-affirmation effects. Study 4 (Chapter 5, N = 161) showed that self-esteem moderated the effects of self-affirmation on positive affect: high self-esteem individuals reported more positive affect after self-affirming. Study 5 (Chapter 6, N = 270) revealed that self-affirmed (vs control) participants used more positive affective language. Participants in Study 6 (Chapter 6, N = 73) were randomised to a positive mood, self-affirmation or control condition, and read about the health consequences of fruit and vegetable consumption. At one-week follow-up, self-affirmed participants reported highest consumption, but positive affect did not mediate this effect.

Overall, the findings show some support for an impact of self-affirmation on executive function, providing a useful link between the diverse areas which self-affirmation has been known to affect. They also support the notion that positive affect can be an immediate product of self-affirmation, especially for those high in self-esteem. However, they do not support the view that positive affect is the mechanism underlying the effect of self-affirmation on the processing of self-relevant threatening information.

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Chapter 1: Introductory overview

Overview

The aim of this research programme was to explore the cognitive and affective consequences of self-affirmation, and the moderating role of trait self-esteem. The present chapter provides an integration of literature relevant to the research domains included in this thesis. It first summarises Self-Affirmation Theory and outlines manipulations frequently used in experimental self-affirmation research. Second, the chapter provides an overview of applications of self-affirmation in the health domain and in academic settings, which constitute a body of evidence showing that self-affirmation can affect behavioural outcomes. In order to better understand how self-affirmation might achieve these effects on behaviour, an overview of research on the formation of goal-directed behaviour in a cognitive context is provided, focusing on the role of executive functioning. The chapter consequently reviews evidence of self-affirmation effects on outcomes related to executive functioning, as well as what else is currently known about the cognitive effects of self-affirmation.

Next, the chapter turns to the affective consequences of self-affirmation. The focus here lies on positive affect, which has previously been proposed as an underlying mechanism of self-affirmation. In order to better understand how self-affirmation might operate through positive affect, the chapter presents an overview of research into positive affect and integrates this with what is known about the affective consequences of self-affirmation.

Finally, a brief overview of the literature regarding the moderating role of self-esteem in self-affirmation research is given. The chapter concludes with an overview of the findings of this research programme.

Self-Affirmation Theory

According to Self-Affirmation Theory (Steele, 1988), individuals are strongly motivated to uphold their self-integrity, which is their sense of being “adaptively and morally

adequate, that is, competent, good, coherent, unitary, stable, capable of free choice, capable of controlling important outcomes" (p. 262). Self-integrity can be challenged in a myriad of ways, such as being confronted with information on the negative consequences of one's actions, or doing poorly on tasks that require skill or intellect. All such challenges constitute a psychological threat, which is "the perception of an environmental challenge to the adequacy of the self" (Cohen & Sherman, 2014, p. 335). In order to protect their self-integrity, individuals defend against such threats, for example by rationalising their decisions (Aronson, Blanton & Cooper, 1995) or diminishing the personal importance or relevance of the threat (e.g. Jemmott, Ditto, & Croyle, 1986). In the short term, this "resilience" (Steele, 1988, p. 262) has the advantage that one's self-integrity remains intact, but in the longer term it may mean that individuals fail to engage with threats. This can have profound consequences, as they may miss out on important opportunities to adapt and develop themselves (Cohen & Sherman, 2014).

However, Self-Affirmation Theory also contends that the self is flexible (Sherman & Cohen, 2006) and that self-integrity can arise from multiple sources. Thus, threats to one source of self-integrity are more tolerable if global self-integrity has been strengthened, which can be achieved through making other sources of self-integrity salient. People's global self-integrity can stem from any aspect of themselves that is important to them (Sherman & Hartson, 2011), such as their roles (e.g. being a parent or an athlete), their values (e.g. being ethical or generous), or their social identities (e.g. belonging to a nationality or religion). Self-affirmation, by reminding individuals of these central self-features, reassures them of their overall adequacy and illustrates to them that their self-worth does not hinge upon the domain under threat.

In experimental self-affirmation manipulations, participants are encouraged to reflect on positive self-aspects, such as favourable character traits or the values they uphold (see

McQueen & Klein, 2009, for a review). If participants complete these integrity-strengthening activities before being confronted with a threat, the need to defend their self-integrity is less pressing, and so they are better able to engage with the threat, responding to it in a more open-minded manner (Sherman & Cohen, 2006). For example, a smoker may avoid information on the negative consequences of tobacco consumption because it reminds him or her not only of the physical threat to their health, but also that the behavioural choices in this domain are far from competent or adaptive (Steele, 1988). However, if the smoker's global self-integrity has been strengthened by affirmation of another domain, the smoker is likely to be more open towards the information (Crocker, Niiya & Mischkowski, 2008; Harris, Mayle, Mabbott & Napper, 2007).

Self-affirmation manipulations

A key feature of successful self-affirmations is that they "manifest one's adequacy" (Cohen & Sherman, 2014, p. 337) by reminding an individual of other aspects of his or her self that are not currently under threat. This not only boosts their global self-integrity but also reminds them that their self-worth derives from many different aspects and is not contingent upon the aspect that is under threat. Put differently, a self-affirmation allows a more comprehensive view of the self, and broadens the perspective under which people perceive themselves and events in their lives (Sherman, 2013). Researchers studying the effects of self-affirmation have developed a host of experimental manipulations designed to self-affirm participants (see McQueen & Klein, 2009, for a review). This section will present the methodology adopted in studies to encourage self-affirmation in participants, and review the most commonly used manipulations, which will also feature in this thesis.

In early studies (Steele, 1988; Steele & Liu, 1983), self-affirmation was induced by preselecting participants based on their values and then asking them to complete relevant scales that would make these values and accompanying self-concepts salient. Self-esteem

scales were also used, which did not require preselection, but only had self-affirming effects in individuals who were high in trait self-esteem (Steele, Spencer & Lynch, 1993). In an adaptation of this, Fein and Spencer (1997) asked participants to pick a value that was personally important to them and to write about why this value was important to them. This self-affirmation – the values essay task – is now the most frequently used self-affirmation manipulation (Cohen & Sherman, 2014; McQueen & Klein, 2006). In the experimental condition, participants write about their most important value and why it is important to them, and describe a time when it was particularly important to them (Sherman, Nelson & Steele, 2000, Study 2) or how they use it in their everyday life (Harris & Napper, 2005). In the control condition, participants write about their least important value and relate the essay to another person's life. In these studies, the most frequently picked values by those in the self-affirmation condition have related to social life, such as relationships with friends and family and being kind to others (e.g. Creswell, Dutcher, Klein, Harris & Levine, 2013; Crocker et al., 2008; Rudman, Dohn & Fairchild, 2007).

Another frequently used self-affirmation manipulation is the kindness affirmation questionnaire (Reed & Aspinwall, 1998). Instead of choosing a value, participants are asked to indicate whether or not they have performed each of ten kind behaviours, and if they have, to elaborate by describing their act of kindness. Alternative self-affirmation manipulations include providing bogus positive feedback (e.g. Blanton, Cooper, Slkurnik & Aronson, 1997; Koole & van Knippenberg, 2007) or writing about a pride-inducing experience (e.g. Klein, Blier & Janze, 2001). All such manipulations serve the purpose of reminding individuals of other sources of self-worth, to establish a global sense of adequacy, and to broaden their self-concept beyond the immediate context.

Applications of self-affirmation theory

Thus far, this chapter has provided a conceptual overview of self-affirmation theory and reviewed the methods commonly employed to experimentally induce self-affirmation in participants. The aim of the next section is to examine the evidence that self-affirmation can have effects on behaviour. To achieve this, this section will review work from two areas that have provided noteworthy evidence on the impact of self-affirmation on behavioural outcomes: health behaviours and academic achievement.

Self-affirmation and responses to health risk information

The proposition that a self-affirming activity before exposure to a threat will reduce defensive reactions towards that threat has been much tested and has received much empirical support (for reviews, see Cohen & Sherman, 2014; Sherman & Cohen, 2006). A large body of evidence in this context concerns health-risk information. Providing information on the consequences of health-related behaviours (e.g. the risks of smoking) is a core component of many health behaviour change interventions (Abraham & Michie, 2008). However, such risk-information is often met with defensive and resistant responses (Witte & Allen, 2000). Such reactions are in line with the predictions of Self-Affirmation Theory, as individuals seek to shield their sense of self-integrity against the prospect of admitting unwise lifestyle choices, and are an example of individuals ignoring important, potentially life-saving information in order to protect their self-integrity.

Encouragingly, self-affirmation can reduce these defensive reactions to self-relevant health-risk information (for reviews, see Harris, 2011; Harris & Epton, 2009; Harris & Epton, 2010). Allowing individuals to self-affirm before exposing them to health-risk information has been shown to improve cognitive precursors to behaviour, such as lowering denial or derogation of the message (Armitage, Harris & Arden, 2011), improving attitudes towards the behaviour (Jessop, Simmonds & Sparks, 2009) and increasing the perceived personal

relevance of the message (Sherman et al., 2000, Study 2). In addition, participants who have been self-affirmed before reading health-risk information have expressed stronger intentions (Klein, Harris, Ferrer, & Zajac, 2011) and motivation (Harris et al., 2007) to behave in health-protective ways. Two recent meta-analyses of the effects of self-affirmation confirmed that across available tests, self-affirmation had a small, but consistent effect on message acceptance (d = .17, with k = 32; Epton, Harris, Kane, van Koningsbruggen & Sheeran, 2015) and intentions (d = .14, with k = 64; and d = .26, with k = 14; Epton et al., 2015; Sweeney & Moyer, 2015, respectively).

Self-affirmation and health behaviour

Thus far, evidence has been presented showing that self-affirmation can reduce defensive responses to health-risk messages and can promote the formation of cognitive precursors to behaviour such as intentions. Such changes in cognitions have also been followed by changes in corresponding behaviours. For example, Epton and Harris (2008) showed that self-affirmed women, who had read a message on the health consequences of fruit and vegetable consumption, reported consuming more fruit and vegetables in the following week compared to non-affirmed women. The findings were replicated by another study (Fielden, Sillence, Little & Harris, 2016), which also showed evidence for moderation by risk status, as those who ate the least fruit and vegetables showed the biggest increases in consumption following self-affirmation. Extending the behavioural effects to alcohol, one study showed that self-affirmed students not only expressed stronger intentions to reduce their alcohol consumption, but also reported consuming less alcohol at follow-up than their non-affirmed counterparts (Scott, Brown, Phair, Westland & Schüz, 2013). Again, effects were strongest for those most at-risk (i.e. those drinking the most). Similarly, another study reported effects of self-affirmation on smoking behaviour, moderated by risk status (Memish, Schüz, Frandsen, Ferguson & Schüz, 2016): The heaviest self-affirmed smokers significantly

reduced their cigarette consumption compared to their non-affirmed counterparts. Self-affirmation has also been associated with increases in self-reported physical activity among all self-affirmed participants following exposure to a health-risk message (Cooke, Trebaczyk, Harris & Wright, 2014).

These studies provide evidence that self-affirmation does not only reduce defensive processing of health-risk information, but can also lead to changes in behaviour, particularly among those who are most at risk of negative consequences. It is important to note that in some studies, self-affirmation did not impact upon behaviour (e.g. Harris & Napper, 2005; Harris et al., 2007). However, the meta-analyses, taking available tests into account found a small, but reliable effect of self-affirmation on behaviour (d = .32 with k = 46, and d = .27 with k= 12; Epton et al., 2015; Sweeney & Moyer, 2015, respectively). While the evidence presented so far has relied on self-reports of behaviour, is also worth noting that two studies have shown self-affirmation effects on behaviour using objective measures: One study (Falk et al., 2015) allowed individuals to self-affirm by reminding them of their most important values and exposed them to information on the negative consequences of lack of physical activity. Data from pedometers revealed that self-affirmed individuals were subsequently more active than non-affirmed participants, replicating studies using self-reported physical activity (Cooke et al., 2014). In another study, women who were all dissatisfied with their weight completed a self-affirmation or control task, and were weighed and followed up on average 2.5 months later (Logel & Cohen, 2012). At follow-up, the self-affirmed women had lost more weight, had lowered their body mass index (BMI) and had smaller waistlines, both in comparison to baseline and to non-affirmed women (who had even increased their weight, BMI and waist circumference from baseline). The finding that self-affirmation effects on behaviour are confirmed using objective measures is important because it shows us that self-

affirmed individuals are not just more likely to report having engaged in more behaviour. Instead, they provide evidence that self-affirmation can truly influence behaviour.

Thus far, evidence has been presented showing that self-affirmation can lower the tendency to process threatening, self-relevant health-risk information in a defensive manner. This supports one of the central propositions of self-affirmation theory, which is that self-affirmations "reduce the pressure to diminish the threat" and "make it easier to be objective about […] self-threatening information" (Steele, 1988, p. 290). However, the studies presented also provide important evidence that these changes in self-affirmed individuals' responses to self-relevant information can be translated into behavioural changes. The next section will review further evidence showing that self-affirmation can have an impact upon behaviour from another area in which much self-affirmation research has been conducted: academic achievement.

Self-affirmation and academic achievement

A second large body of evidence documenting the beneficial effects of self-affirmation concerns its effects on academic performance. Cohen and colleagues (Cohen, Garcia, Apfel & Master, 2006) gave seventh-graders a self-affirmation task (the values-essay) or a control task at the beginning of a new term. At the end of the term, examination of students' grades showed that among African Americans (who at baseline were achieving the lowest grades), self-affirmed students had achieved significantly better grades than their non-affirmed peers. A 2-year follow-up established that the effects were still evident, particularly for the lowest-achieving students (Cohen, Garcia, Purdie-Vaughns, Apfel & Brzustoski, 2009). These findings have been replicated in other groups, such as Latin American (Sherman et al., 2013) and Hispanic students (Hanselman, Bruch, Gamoran & Borman, 2014) and women in physics classes (Miyake et al., 2010).

Similar effects have also been observed in non-academic situations where performance on tests was observed: Women who self-affirmed before completing a maths task performed better than their non-affirmed counterparts (Martens, Johns, Greenberg & Schimel, 2006; Shnabel, Purdie-Vaughns, Cook, Garcia & Cohen, 2013, Study 2), and both African American students and women performed better on a tasks requiring verbal and numerical skills after self-affirmation (Shapiro, Williams & Hambarchyan, 2013, Experiments 3 & 4).

However, it is also important to note here that not all studies of self-affirmation in academic settings have been successful in showing grade improvements. For example, Protsko and Aronson (2016) sought to replicate the work of Cohen and colleagues (Cohen et al., 2006; 2009), but failed to find any effects of self-affirmation on students' performance. Similarly, Dee (2014) was also not able to replicate the finding that self-affirmation improved academic performance. Despite some instances where effects were not replicated, on balance, the evidence suggests that self-affirmation can have an effect on students' academic grades. Such evidence indicates that self-affirmation can have effects on individuals' behaviour, as evidenced by objectively measured outcomes. It must be acknowledged that the outcome is an indirect measure of behaviour: the studies are unable to show exactly how students improved their grades. However, improving one's grades will require some effort, such as increases in studying, paying attention or participating in class. Thus, it can be assumed that improvements in grades following self-affirmation reflect an effect on behaviours related to academic achievement.

Explaining effects on behaviour: the cognitive consequences of self-affirmation

Thus far, this chapter has synthesised evidence showing that self-affirmation can have effects on behaviour. This evidence has come from two areas of research in which self-affirmation has been much applied: in the health domain and in academic settings. In neither

setting has the evidence been consistent (as self-affirmation failed to influence behaviour of participants in some studies); however, taken together it indicates that self-affirmation has the capacity to influence behaviour.

Self-affirmation has also been found to affect behaviours outside of these two domains, but these have been less extensively studied. For example, self-affirmation has been shown to increase helping behaviour (Lindsay & Creswell, 2014), improve female surgeons' medical performance (Salles, Mueller & Cohen, 2016), and boost water conservation efforts (Walter, Demetriades & Murphy, 2016). These examples serve to illustrate that self-affirmation can have effects on behaviour in a diverse variety of domains.

The question remains how a brief reflective exercise such as self-affirmation can have an impact upon behaviour. This was one of the central questions that this research programme focused on, and in order to address the question, the next section will summarise relevant research on how behaviours are formed in general. Specifically, this section will introduce the concept of executive functioning, which underlies "the expression of all aspects of behavior" (Lezak, 1982, p. 283) and – crucially – may provide a link between the diverse areas in which self-affirmation has had effects on behaviour. In addition, the next section will discuss what is currently known about the immediate cognitive consequences of self-affirmation and how these may provide a link between self-affirmation and executive functioning.

Executive functioning

Executive functioning refers to higher-order cognitive processes that underlie all "purposeful, goal-directed, and future-directed behaviour" (Suchy, 2009, p. 106), such as decision-making, planning, reasoning and problem solving. Automatic or habitual behaviours that do not require conscious attention also do not require executive functioning. Instead, executive functioning only comes into play when a situation is novel or complex and requires

deliberate responding. Executive functions include skills such as working memory, selective attention, conflict resolution, response initiation, self-monitoring, attentional vigilance, inhibition, and cognitive flexibility (Hunter & Sparrow, 2012; Jurado & Roselli, 2007; Suchy, 2009); thus, the term executive functioning describes a broad spectrum of cognitions that all guide behaviour.

Although executive functions are a crucial foundation of everyday behaviour (Jurado & Roselli, 2007), they are most often measured in the laboratory, using standardised tests and tasks. Such tasks are designed to tap into one particular aspect of executive functioning (e.g. working memory), and performance on the task therefore reflects an individuals' capacity for that aspect of executive functioning. However, it is important to note that performance on such tasks rarely requires a single executive function in isolation. Instead, each task taps into several executive functions simultaneously (the task impurity problem; Burgess, 1997). For example, working memory also requires self-monitoring and vice versa; and performance on all executive functioning tasks require attention and response selection. In line with this, it is a common finding that performance on any given executive functioning task correlates moderately with performance on other executive functioning tasks. This has led to the conclusion that executive functions are distinct, but related (Miyake et al., 2000), and that executive functioning on the whole is best understood as "general-purpose control mechanisms" (Miyake et al., 2000, p. 50), underlying and thus linking all behaviours.

Executive functioning is particularly relevant for those goal-directed behaviours that have been discussed in the context of self-affirmation effects: Health-protective behaviours are heavily dependent on executive functioning processes as individuals have to regulate their desires for short-term gratification (e.g. cigarettes or unhealthy snacks) and engage in self-control, forward-thinking and careful planning. In support of this, performance on executive functioning tasks has been found to be predictive of health behaviours such as sleep, alcohol

consumption and smoking (Hall, Elias & Crossley, 2006) as well as physical activity and fruit and vegetable consumption (Hall, Fong, Epp & Elias, 2008). Likewise, doing well academically requires high levels of executive functioning, such as the ability to maintain attention, to withstand distractions and to solve problems. Indeed, several studies have shown that performance on various executive functioning tasks predicts academic achievement across all ages (e.g. Best, Miller & Naglieri, 2011; Jarvis & Gathercole, 2003; St Clair-Thompson & Gathercole, 2006).

Executive functioning capacity is typically considered a trait that is relatively stable over the course of a person's life (except for age-related decline; Jurado & Roselli, 2007). However, research has also identified circumstances under which executive functioning capacity appears to fluctuate temporarily. For example, fatigue (Nilsson et al., 2005), hunger (Ståhle et al., 2011), pain (Abeare et al., 2010) and both positive and negative mood (Mitchell & Phillips, 2007) have all been associated with a temporary reduction in performance on executive functioning tasks, most likely due to multiple demands on attention and cognition (Hunter & Sparrow, 2012). Conversely, motivation (Gilbert & Fiez, 2004; Krawczyk, Gazzaley & D'Esposito, 2007; Sanada, Ikeda, Kimura & Hasegawa, 2013) has been associated with an improvement in performance on executive functioning tasks. This finding merits particular attention, as it suggests that individuals can make better use of their available executive functioning capacity, if they are motivated to do so.

Evidence on the link between self-affirmation and executive functioning

Executive functioning underlies all goal-directed, planned behaviour and thus may be a suitable candidate for explaining how self-affirmation achieves its effects on behaviour. The evidence presented so far demonstrating that self-affirmation can impact upon a wide variety of behaviours is consistent with the possibility that self-affirmation works through executive functioning: It appears that self-affirmation can have effects on health behaviours

(e.g. Epton et al., 2015; Falk et al., 2015; Logel & Cohen, 2012; Sweeney & Moyer, 2015) and on academic achievement (e.g. Cohen et al., 2006; 2009), and executive functioning is heavily involved in such outcomes (e.g. Best, Miller & Naglieri, 2011; Hall et al., 2006). In order to gain more insight into the role of executive functioning in self-affirmation, the next section will focus particularly on outcomes said to give an approximation of executive functioning (such as tasks designed to measure aspects of executive functioning) and will also review what direct evidence is available that supports the view that self-affirmation influences executive functioning.

In one study, participants self-affirmed (or completed a control task) before completing a Go/No-Go task (Legault, Al-Khindi & Inzlicht, 2012). In a Go/No-Go task, participants have to press a button when a previously specified target letter appears, but refrain from pressing the button when a different, non-target letter appears. Performance on this task therefore primarily measures one executive functioning skill, inhibition, as the impulse to press the button needs to be suppressed. As with most such tasks designed to tap into executive functioning, it also requires attention and self-monitoring. Electrophysiological recordings showed that self-affirmed individuals were more responsive to the errors they were making (suggesting increased engagement with self-relevant information), but that they also performed better on the tasks (Legault et al., 2012), suggesting better executive functioning.

In another study, participants were given the opportunity to self-affirm before attempting a creative problem-solving task (the Remote Associates Test), whilst being evaluated by others (Creswell et al., 2013). Problem solving is another executive functioning skill (Suchy, 2009), but again also encompasses many different aspects of executive functioning (such as setting goals, resolving conflicts, or planning actions). Those who had self-affirmed before attempting the task performed better, being able to solve more of the

problems (Creswell et al., 2013), than those who had not self-affirmed. Similar effects were also found in a sample of individuals living below the poverty line, who completed tasks of fluid intelligence and inhibition (Hall, Zhao & Shafir, 2014): those who had self-affirmed before the tasks performed better than those who had not.

A study previously mentioned in the health context, by Logel and Cohen (2012), is also relevant here. In this study, self-affirmed women had lost significantly more weight than non-affirmed women when they were followed up (on average 2.5 months later). At this point, self-affirmed women also performed better on a task measuring working memory, which is a key executive functioning skill (McCabe, Roediger, McDaniel, Balota & Hambrick, 2010). Further, performance on the task mediated the effect of self-affirmation on the women's weight loss. This finding is particularly noteworthy as it strengthens the case for self-affirmation achieving its effects on behaviour through executive functioning (although it is also important to note the lengthy time gap between self-affirmation and the working memory task; this issue will be picked up again at a later stage in this thesis).

In sum, these studies have all shown that self-affirmed individuals performed better on tasks that have been designed to measure executive functioning. Such evidence strengthens the case for improved executive functioning as one possible cognitive outcome of self-affirmation that could help to explain its effects on behaviour.

Other cognitive consequences of self-affirmation

Self-affirmation has also been shown to affect cognitive outcomes that are not related to executive functioning, but that merit some attention as they may reveal further pathways through which self-affirmation affects behaviour. In a series of studies, Schmeichel and Vohs (2009) showed that self-affirmation had effects on self-control, as self-affirmed participants performed better on a variety of self-control tasks: they kept their hand in cold water for longer (Experiment 1), persisted for longer at a word-finding task (Experiment 2), and chose

larger, but delayed rewards (Experiment 4), than non-affirmed participants. Self-control, similar to executive functioning, contributes to the regulation of behaviour (Hofmann, Schmeichel & Baddeley, 2012), in particular when willpower is required. The finding that self-affirmation improves performance on self-control tasks contributes to the evidence that self-affirmation may influence cognitive processes underlying behaviour.

Further, self-affirmation also appears to influence individuals' perceptions of themselves and their surroundings which could affect their behaviour. For example, Wakslak and Trope (2009) explored the effect of self-affirmation on mental construal. In this context, mental construal refers to the level of abstractness with which an individual perceives actions, events or objects (Trope & Liberman, 2003; Vallacher & Wegner, 1987). Wakslak and Trope (2009) showed that participants who had self-affirmed were more likely to construe actions and events in abstract terms rather than concrete terms, than non-affirmed participants. For instance, they were more likely to think of the action of locking a door as representing the goal of securing one's house, rather than as turning the key in the lock (Wakslak & Trope, 2009; see also Schmeichel & Vohs, 2009). This end-state orientation makes superordinate goals salient, and allows individuals to take a step back from goal-irrelevant details. With their superordinate (e.g. long term) goals salient, individuals may be more inclined or cued to act in ways that will achieve these goals. In this way, the high level construal induced by self-affirmation could have an influence on individuals' behaviour.

These findings show that self-affirmation can alter the way individuals perceive and approach stimuli or situations, a finding also supported by Briñol and colleagues (Briñol, Petty, Gallardo & DeMarree, 2007), who showed that an immediate consequence of self-affirmation was to increase confidence. In addition, they presented participants with either strong or weak messages promoting a new mobile phone – a neutral, non-threatening topic – and showed that whether self-affirmed individuals were convinced by the strong message

depended on the timing of the self-affirmation. Being affirmed before reading the message led to participants being less convinced by the strong message, but being affirmed after led to participants being more convinced. Both these studies demonstrate that self-affirmation can have immediate effects on cognitions and echo findings showing self-affirmation can alter the way individuals appraise and approach a situation (e.g. being confronted with personally relevant health information; Harris & Epton, 2009).

On a final note, the design of these studies investigating the cognitive consequences of self-affirmation merits further attention: In most self-affirmation studies, the self-affirmation task is closely followed by a threat (such as personally relevant health-information), which is then followed by outcome measures relating to the threat (such as intentions to make healthier lifestyle choices). However, some studies, such as Briñol et al. (2007), Schmeichel and Vohs (2009), or Wakslak and Trope (2009), have placed the relevant outcome measures immediately after the self-affirmation task, which allowed the researchers to probe in more detail the immediate processes initiated by self-affirmation. This approach has led to valuable insights into immediate effects of self-affirmation on confidence (Briñol et al.; 2007), construal level (Waklsak & Trope, 2009) and self-control (Schmeichel & Vohs, 2009) and was therefore also adopted in the studies presented in this thesis.

Aims of the current research programme: The cognitive consequences of self-affirmation

To summarise, one aim of this research programme was to explore the immediate cognitive consequences of self-affirmation, focusing in particular on outcomes related to executive functioning. Executive functioning was of particular interest because it underlies all goal-directed, purposeful behaviour (Lezak, 1982; Suchy, 2009) and may therefore provide useful insights into how self-affirmation can achieve its effects on various behaviours. In order to understand the cognitive processes set in train by self-affirmation that may relate to

executive functioning, the studies in this thesis initially focus on the immediate effects induced by self-affirmation.

The chapter will now address the second aim of this research programme: exploring the affective consequences of self-affirmation.

Affective consequences of self-affirmation

Beginning with the first self-affirmation studies, positive affect has been repeatedly considered as a possible mediator of self-affirmation effects (Steele & Liu, 1983; see McQueen & Klein, 2006). Affect has been defined as "a configuration of positively- or negatively-valenced subjective reactions that a person experiences at a given point in time and perceives as either pleasant or unpleasant feelings" (Wyer, Clore & Isbell, 1999, p. 3). Thus, the term affect refers to all feelings, and is used to encompass both mood and emotions (Hume, 2012). Mood and emotions are often used interchangeably, possibly due to lack of a standard definition (Cabanac, 2002). However, there is some consensus that emotions refer to specific feelings that are directed towards an object or a person, whereas mood refers to a more general affective state (Beedie, Terry & Lane, 2005; Hume, 2012). The biggest distinction then is that emotions refer to something or someone specific, whereas mood does not.

The distinction between mood and emotion may be difficult to make because they are closely related and from an individual's perspective seem similar (Beedie, Terry & Lane, 2005). Therefore, some studies use emotions as a measure of positive affect (e.g. Crocker et al., 2008) whereas others use mood items as a measure of positive affect (e.g. Steele & Liu, 1983). In this thesis, the term that will predominantly be used will be affect, which describes both mood and emotions (Hume, 2012). Where a distinction between mood and emotions is necessary, emphasis on this will be placed.

The next sections of this chapter will outline one theoretical account of positive affect – the Broaden and Build theory (Fredrickson, 1998; 2001) – which may help to explain why positive affect has been considered a candidate for the mechanism of self-affirmation effects. In particular, the question remains exactly how positive affect – which is typically described as a temporary, transient experience (Fredrickson & Losada, 2005) – should be able to have enduring effects such as those observed following self-affirmation (e.g. Cohen et al., 2009). The Broaden and Build theory offers one solution to this question by providing a more thorough account of how temporarily experienced positive affect might evolve into long-term changes. The chapter will consequently present empirical evidence supporting the Broaden and Build theory, as well as evidence pertaining to the effect of self-affirmation on positive affect.

Positive emotions: Broaden and Build theory

According to the Broaden and Build theory of positive emotions (Fredrickson, 1998; 2001), the adaptive function of positive emotions is to temporarily broaden people's awareness, which allows them to view events or stimuli from a wider perspective. This shift in cognition promotes a more expansive view of situations, allowing people to "connect the dots between disparate areas" (Fredrickson, 2013, p. 18), including considering temporally distant outcomes.

According to the theory, the functional value of this temporarily broadened mind set lies in the wider range of thoughts, actions and possibilities it makes available (Fredrickson, 1998). These allow individuals to approach problems or situations from a different angle and experience novel ideas, which helps them build new intellectual resources like skills and knowledge, or build up existing resources like social support (Fredrickson, 1998; 2001). Positive emotions do not immediately build such resources, or prompt a physical action, but

they trigger a momentary change in cognition that over time contributes to long-lasting changes (Fredrickson, 1998).

The Broaden and Build theory of positive emotions is highly relevant to Self-Affirmation Theory (and to this research programme), because it strengthens the case for a role of positive affect in self-affirmation. Positive affect has often been suggested as a mechanism of self-affirmation (e.g. Crocker et al., 2008; Tesser, 2000), but little attention has been paid to theoretical accounts of why positive affect should be responsible for self-affirmation effects. The Broaden and Build theory provides us with a conceptual model of exactly how self-affirmation might achieve its effects via positive affect. It suggests that positive affect caused by self-affirmation could broaden an individual's perspective on immediate threats (not unlike the finding that self-affirmation can encourage a broader construal; Wakslak & Trope, 2009) and bring to mind alternative responses, which can set in motion alternative actions.

Experimental studies inducing a positive affective state have found evidence for the Broaden and Build theory. For example, such an affective state has been associated with forward-looking and high-level thinking patterns (Pyone & Isen, 2011). Individuals experiencing positive affect also tend to take in a wider range of visual and semantic information (Rowe, Hirsh & Anderson, 2007; Schmitz, De Rosa & Anderson, 2009), suggesting their attentional field is widened beyond the immediate context. This, together with a tendency to seek out more variety (Kahn & Isen, 1993) and an openness to different information (Estrada, Isen & Young, 1997) following a positive affect induction, allows individuals to be more creative and versatile in their thoughts and actions (Fredrickson & Branigan, 2005). On a social level, positive affect increases compassion, perceived connectedness with others and perspective-taking (Nelson, 2009; Waugh & Fredrickson, 2006), indicating an urge to approach and connect with others.

Individuals may learn to channel the cognitive and affective state of positive emotions: those who are high in resilience appear to induce themselves into a better mood when stressed, thereby balancing out the stress of a demanding situation (Tugade & Fredrickson, 2004, 2007). In this way, a one-off experience of positive emotions can set in motion an upward spiral of adaptive change (Fredrickson & Joiner, 2002). Indeed, studies show that those who experienced positive affect at baseline were better able to cope with traumatic experiences (Fredrickson et al., 2003) and were more successful and resourceful (Lyubomirsky, King & Diener, 2005) at follow-up. In the long-term, positive affect is also associated with better psychological and social functioning (conceptualised by self-acceptance, purpose in life, autonomy, positive relations with others and social acceptance; Fredrickson & Losada, 2005), improved life satisfaction (Cohn et al., 2009) and more secure relationships (Gable, Gonzaga & Strachman, 2006).

Positive affect therefore sets in motion a cycle of adaptive responding to situational demands, and triggers an upward spiral fortifying these responses (Fredrickson & Joiner, 2002). This concept is not dissimilar to how self-affirmation is said to achieve its long-term effects (Cohen & Sherman, 2014), as a one-time affirmation may interrupt a maladaptive cycle of threats influencing outcomes (Sherman et al., 2013) and instead establishes a trajectory of improved coping with threats (Cohen et al., 2009). In this way, "even small inputs into the self-system can have large effects" (Cohen & Sherman, 2014, p. 337). Consequently, there are noteworthy parallels between these conceptualisations of how positive emotions and self-affirmation can have lasting impacts, despite occurring only momentarily.

Positive affect in self-affirmation

Positive affect has repeatedly been discussed as a possible mediator of self-affirmation effects, both in early (e.g. Reed & Aspinwall, 1998; Steele & Liu, 1983; Tesser,

2000; Tesser & Cornell, 1991) and more recent work (e.g. Crocker et al., 2008). For example, Tesser (2000) theorised that self-affirmation achieves its effects by increasing positive affect, which acts as a resource and can be “spent” (p. 295) to deal with threats or challenges (see also Raghunathan & Trope, 2002). An alternative, but related, suggestion has been that positive affect created by self-affirmation is misattributed to stimuli following the self-affirmation (Tesser & Cornell, 1991). That is, self-affirmation leaves individuals with a positive feeling, which conveys to the individual that everything is in order, and facilitates positive interpretations of otherwise negatively viewed events or materials.

The positive affect present in self-affirmation has been portrayed by Tesser (2000) as being implicit, or something that self-affirmed participants are not aware of. This theoretical account has received some empirical support: In Koole, Smeets, van Knippenberg and Dijksterhuis (1999), participants, who had completed a self-affirmation or a control task, responded to an implicit affect measure, disguised as a word-recognition task. This task was specifically chosen to capture the kind of non-specific, implicit affect that Tesser (2000) had suggested as the most likely mediator of self-affirmation effects. Indeed, self-affirmed participants scored higher on the implicit positive affect measure than non-affirmed participants. Koole et al. (1999) also showed that self-affirmed individuals ruminated less about negative feedback they had received, and that this effect was mediated by the implicit positive affect.

Other accounts of the role of positive affect in self-affirmation have focused on the effects of self-affirmation on more specific, other-directed positive emotions. Crocker, Niiya and Mischkowski (2008, Study 1) asked participants to self-affirm using the values-writing task or to complete a control task, and then measured 18 different emotions (11 positive, such as feeling joyful, proud or grateful, and 7 negative, such as feeling sad, angry or vulnerable). Self-affirmed participants indicated feeling all positive emotions to a greater extent than non-

affirmed participants. Two positive emotions in particular, love and connectedness, also mediated the ameliorating effect of self-affirmation on responses to a message about the negative consequences of smoking (Crocker et al., 2008, Study 2). The authors reasoned that self-affirmation can help individuals confront threats that they would normally defend against by reminding them of what is important to them (such as loved others) beyond the immediate context. Thus, there is some evidence that self-affirmation is associated with specific, mostly other-directed positive emotions and that these effects are responsible for changes in behaviour (also replicated by Lindsay & Creswell, 2014).

However, there are also many studies that have failed to find an effect of self-affirmation on positive affect (e.g. Harris & Napper, 2005; Jessop, Simmonds & Sparks, 2009; Napper, Harris & Klein, 2014; Sherman et al., 2000). For example, Lannin, Guyll, Vogel and Madon (2013) explored whether self-affirmation could reduce stigmatisation of psychotherapy and encourage stressed individuals to consider seeking psychotherapy. Participants completed the self-affirmation task (the values-writing task) or a control task, followed immediately by the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988), to test the possibility that self-affirmation would achieve its effects via increases in positive mood. Self-affirmation did indeed reduce stigmatisation and increased willingness to seek stigmatisation, but did not change mood, nor were the effects mediated by mood. Given that the evidence that self-affirmation increases positive affect is inconsistent, this research programme sought to clarify the role of positive affect in self-affirmation.

One aim of this research programme, therefore, was to review available evidence on the effects of self-affirmation on positive affect, which may help us understand why the evidence has been inconsistent. That review is reported as a systematic review in Chapter 4.

Aims of the current research programme: The affective consequences of self-affirmation

Given the parallels between how the Broaden and Build theory describes positive emotions, and Self-Affirmation Theory, it seems plausible that self-affirmation increases positive affect and that this is the underlying mechanism of its wide-ranging effects (see Tesser, 2000). Much theoretical attention has been paid to positive affect as a possible consequence and mediator of self-affirmation, but the empirical evidence has been inconsistent. There is need for an up-to-date systematic investigation of the effect of self-affirmation on positive affect. Such an investigation could establish whether positive affect can remain a contender as a mediator of self-affirmation effects. Currently, we can neither rule out nor conclude that positive affect could be a mediator, as the evidence that self-affirmation even causes positive affect is inconclusive. With this in mind, the current research programme sought to clarify the role of positive affect in self-affirmation, in particular by systematically reviewing the conflicting evidence, and by integrating it with concepts and measurements from the Broaden and Build Theory of positive emotions (Fredrickson, 1998; 2001).

Moderators of self-affirmation effects: self-esteem.

Previously in this chapter, evidence was presented suggesting that baseline risk status moderates the effects of self-affirmation on health-related outcomes (e.g. Fielden et al. 2016; Memish et al., 2016; Scott et al., 2013). This highlighted the need to consider the role of possible moderators of self-affirmation effects. It seems unlikely that self-affirmation manipulations should have the same effects on different types of individuals (Harris & Epton, 2010), and is even feasible that self-affirmation achieves its effects through different mechanisms in different people. This latter suggestion is of particular relevance for this thesis: Sherman (2013) theorised self-affirmation may work differently in people with different levels of trait self-esteem, in that it may boost resources for those low in self-

esteem, whilst broadening the perspective of those with high self-esteem. These particular mechanisms outlined by Sherman (2013) could be rooted in the kinds of immediate consequences of self-affirmation discussed in this chapter, such as improvements in executive functioning or a broadened perspective. Therefore, we may see some immediate self-affirmation effects only in some individuals, and accounting for personality differences may provide a better insight into such differential effects.

Sherman (2013) had suggested trait self-esteem as a possible moderator of self-affirmation mechanisms, and indeed, self-esteem has previously been found to moderate self-affirmation effects (Sherman & Cohen, 2006). Self-esteem is the global evaluation or attitude relating to one's self-worth (Rosenberg, 1965), and this definition highlights the relevance to self-affirmation, which is also concerned with self-worth. In parallel with the assumptions of Self-Affirmation Theory, it is believed that individuals are strongly motivated to seek feelings of self-esteem (Zeigler-Hill, 2013). Self-esteem has therefore been regarded as a possible mediator of self-affirmation effects, but the findings have failed to support this (Armitage & Rowe, 2011; Koole et al., 1999, Study 3; Sherman & Kim, 2005). Such findings also highlight the fact that self-esteem and self-integrity – although conceptually similar – are not the same thing. That is, self-esteem and self-integrity are similar in that individuals are strongly motivated to uphold and protect both, but when self-integrity has been secured by means of self-affirmation, this does not seem to automatically secure self-esteem as well, as would be suggested by mediation.

In contrast, the evidence of self-esteem as a moderator has been relatively more conclusive. That is, trait self-esteem has moderated the impact of self-affirmation over a wide range of outcomes, and individuals with different levels of self-esteem have shown different reactions to self-affirmation manipulations (Sherman & Cohen, 2006). The findings have been less conclusive regarding the direction: does self-affirmation benefit those with low self-

esteem or those with high self-esteem more? On the one hand, it has been theorised that because those with higher self-esteem have a more positive self-concept, their global self-integrity is not as easily threatened (Spencer, Josephs, & Steele, 1993). A self-affirmation therefore does not add much to their already continuously positive self-perception (Düring & Jessop, 2014). In line with this, self-affirmation has been shown to benefit only those who had low self-esteem by reducing distancing in relationships (Jaremka et al., 2011), decreasing schadenfreude (i.e., pleasure at the misfortunes of others; van Dijk, van Koningsbruggen, Ouwerkerk & Wesseling, 2011), making self-evaluation of performance more realistic (Spencer, Fein & Lomore, 2001) and lowering defensive reactions towards personally relevant health-risk information (Düring & Jessop, 2014). Collectively, these studies show that the benefits of self-affirmation may be more apparent in individuals with low self-esteem (but not high self-esteem).

On the other hand, it has been suggested that the wider array of positive self-concepts with which high self-esteem individuals can affirm makes the affirmation more effective (Steele, Spencer & Lynch, 1993). In the same vein, individuals with low self-esteem may even struggle to find the affirmation believable if they have few positive self-views on which to affirm (Cohen & Sherman, 2014). In line with this, self-affirmation in some studies only had effects in those with high self-esteem, such as lowering stress (Creswell et al., 2005), attenuating risk-taking behaviour (Landau & Greenberg, 2006, Study 2) and decreasing rationalisation of product choices (Steele, Spencer & Lynch, 1993, Study 3). These studies demonstrate that it is also possible to only observe self-affirmation effects in those with high self-esteem (but not low self-esteem).

In sum, there is strong evidence that self-esteem can moderate self-affirmation effects on a variety of outcomes, but also contradictory evidence regarding whether self-affirmation affects individuals of low or high self-esteem. It therefore seems to be important to continue

to explore self-esteem as a moderator of self-affirmation effects, as it is clear that self-affirmation effects differ markedly as a function of self-esteem. Considering the influence of self-esteem as a possible moderator therefore allows detection of effects that only occur in high or low self-esteem individuals. No study has yet considered the moderating impact of self-esteem on positive affect following self-affirmation, or on performance on tasks relating to executive functioning, yet it is important to establish whether such effects may be present in all individuals or only in a subset of individuals.

Overview of the current research programme

The aim of the current research programme was to explore the immediate cognitive and affective consequences of self-affirmation, which may provide us with clues as to how self-affirmation achieves its manifold effects. In particular, it tested the effects of self-affirmation on tasks requiring executive functioning, and used measures developed within the Broaden and Build theory to measure positive affect following self-affirmation. Self-esteem was tested as a possible moderator of these effects.

The study presented in Chapter 2 tested whether the effects of self-affirmation on performance on a working memory task that have previously been found after a lengthy gap, would be evident immediately following self-affirmation. It also tested whether the effects of self-affirmation on performance on one inhibition task would extend to a different inhibition task. On both tasks, self-affirmed participants performed better than non-affirmed participants.

Building upon the findings of this study, Chapter 3 reports the findings of a study that tested whether the effects of self-affirmation on performance on the working memory task would extend to a different working memory task. The effects were moderated by self-esteem, in that self-affirmation decreased performance on the task, only in individuals high in self-esteem. The study also tested the hypothesis that the mechanism underlying self-

affirmation may be different for individuals with different levels of self-esteem, such that performance on the working memory task may be mediated by perceived social resources in individuals low in self-esteem, and by level of mental construal in individuals high in self-esteem. No evidence was found to support this hypothesis.

Chapter 4 presents a systematic review of the evidence of the effect of self-affirmation on positive affect, which concluded that self-affirmation is more likely to increase positive affect if measures of emotions are used (compared to when general mood is measured), and if positive affect is measured immediately following self-affirmation.

The study reported in Chapter 5 developed these findings further: the study investigated the moderating impact of self-esteem on positive affect using measures from the Broaden and Build theory of positive emotions. On two measures, the effects of self-affirmation were moderated by self-esteem, in that those with high self-esteem reported more positive affect after having self-affirmed.

The studies reported in Chapter 6 sought a novel approach to identifying the role of positive affect in self-affirmation. In the first study, self-affirmation essays were content analysed. This revealed that self-affirmed participants were more likely to use positive affective language when writing, suggesting a more positive affective state. The second study reported in Chapter 6 experimentally manipulated positive affect and compared the effects to those of self-affirmation. This study was the first to include an explicit threat: a message on the health consequences of fruit and vegetable consumption. Although no differences were apparent immediately following manipulation (across the self-affirmation, positive mood, or control conditions), at one-week follow-up, the self-affirmed participants reported consuming the most fruit and vegetables. Positive affect did not mediate the effects of self-affirmation on any outcome measures. Overall, this suggests that self-affirmation does increase positive affect, but this affect does not drive its effects.

Finally, Chapter 7 presents an overview of the findings in this research programme, and discusses the implications for self-affirmation research. It considers limitations to the research and suggests avenues for future research.

Chapter 2: Self-affirmation improves performance on tasks related to executive functioning

Abstract

Objectives: The current study explored the effect of self-affirmation on two aspects of performance that have been related to executive functioning: working memory (assessed by a 2-back task) and inhibition (assessed by a Stroop task). The goal was to establish whether self-affirmation improved performance on these tasks. ***Method:*** Participants (N = 83) were randomized to either a self-affirmation or a control task and then completed the computerized tasks, in a fixed sequence. ***Results:*** Self-affirmed participants performed better than non-affirmed participants on both tasks. ***Conclusion:*** Self-affirmation can improve aspects of performance related to executive functioning. This finding may help to explain the wide range of beneficial effects that self-affirmation can have on cognition and behavior.

Keywords: Self-affirmation; Executive functioning; Working memory; Inhibition

Introduction

Self-affirmation (e.g., reflecting upon a personally important value) has elicited a broad range of positive effects in many studies in social and health psychology (for reviews, see Cohen & Sherman, 2014; Sherman & Cohen, 2006). These include beneficial effects on academic achievement (e.g., Cohen, Garcia, Purdie-Vaughns, Apfel & Brzustoski, 2009), self-control (Schmeichel & Vohs, 2009), task performance (Creswell, Dutcher, Klein, Harris & Levine, 2013), and health-related behavior (e.g. Epton, Harris, Sheeran, Kane & van Koningsbruggen, 2014).

How does self-affirmation have such diverse effects? One possibility is that it influences an underlying ability that has broad consequences. One candidate for such a general ability with broad performance implications is executive functioning. To explore this possibility, the current study tested the effects of self-affirmation on performance on two tasks that are related to executive functioning: working memory and inhibition.

Self-affirmation and executive functioning

According to self-affirmation theory (Steele, 1988), people are strongly motivated to uphold their self-integrity – their sense of being "adaptively and morally adequate" (Steele, 1988, p. 262). Self-integrity can be maintained by affirming the self, whereby individuals remind themselves of their important self-aspects through action or thought. Executive functioning refers to "those mental capacities necessary for formulating goals, planning how to achieve them, and carrying out the plans effectively" (Lezak, 1982, p. 281). It is considered essential for reasoning, maintaining focus and attention, and generating and completing goals and plans (Miyake et al., 2000).

Experimental manipulations of self-affirmation have been shown to affect outcomes that involve executive functioning. For example, self-affirmed individuals form stronger intentions to act in healthier ways than non-affirmed individuals after reading health-risk

information and may subsequently act more healthily (Epton et al., 2015; Sweeney & Moyer, 2015). Executive functioning is thought to be crucial both to forming (Allan, Johnston & Campbell, 2011) and executing (Hofmann, Schmeichel & Baddeley, 2012) the intention to act more healthily. Self-affirmation has been associated with academic achievement at school (Cohen et al., 2009) and college (Miyake et al., 2010), and with better problem-solving (Creswell et al., 2013). Executive functioning is believed to play an important role in both academic achievement (St Clair-Thompson & Gathercole, 2006) and general problem-solving (Suchy, 2009).

Executive functioning consists of many different processes. However, two broad processes have been identified as being key (Jurado & Roselli, 2007): working memory and inhibition, which interact dynamically (Roberts & Pennington, 1996). Working memory is heavily implemented in making short- and long-term plans, and successful goal achievement (Suchy, 2009). Inhibition allows the suppression of responses that may interfere with a goal (Kane & Engle, 2003). To date, however, there is only limited evidence that self-affirmation affects either. Logel and Cohen (2012) found self-affirmation improved working memory performance some 2.5 months (on average) after the self-affirmation task. Legault, Al-Khindi and Inzlicht (2012) found self-affirmation improved performance on an inhibition task (the Go/No-Go task, in which participants inhibit responses to a stimulus). These findings are promising, but have some interpretative issues that undermine the evidence that self-affirmation can improve performance on such tasks. For instance, given the time lag between manipulation and measure, it is unclear whether the improvement in working memory observed by Logel and Cohen (2012) was an immediate or delayed effect of self-affirmation, perhaps induced by changes in behavior or cognitions that also affect executive functioning, such as physical activity (Kramer & Erickson, 2007) or self-efficacy perceptions (Bouffard-Bouchard, 1990). Likewise, the Go/No-Go task is considered primarily a measure of motor

response inhibition (Nigg, 2000) and it would be useful to test the effects on a task that also assesses other aspects of inhibitory control that are key to successful self-regulation, such as the ability to focus on a goal despite distractions (Rueda, Posner & Rothbart, 2005). One such task is the Stroop task (Stroop, 1935), which is considered a measure of response inhibition, attentional vigilance, response selection (Suchy, 2009) and goal maintenance (Kane & Engle, 2003).

The current study therefore assessed the immediate impact of self-affirmation on performance on a working memory (2-back) and inhibition (Stroop) task and sought to provide laboratory-based evidence of the effects of self-affirmation on these key aspects of executive functioning. The study tested the hypothesis that self-affirmed participants would perform better than non-affirmed participants on both tasks.

Method

Participants

The sample consisted of 83 psychology undergraduates at the University of Sussex who participated for course credits. A priori power analyses indicated that the minimum required sample size to detect an effect of the size (d = 0.7) found in Logel and Cohen (2012) with 80% power would be 67 participants. To allow for potential losses through mistakes and misunderstandings, we continued data collection until the course credit deadline. Participants were between 18 and 35 years old (M = 20.27, SD = 3.00). Most were female (78.30%), white (71.10%) and British (78.30%).

Procedure and design

Participants completed an online questionnaire, followed by a face-to-face session held at least two days later. They were randomly allocated to the self-affirmation or control task (the experimenter remained blind to condition), both of which were presented as writing tasks. Participants, who were tested individually, spent 10 minutes writing and then completed the

working memory task, followed by the inhibition task (described below). The study was presented as being on 'the link between personality and cognitive skills'. A funnel debrief (Chartrand & Bargh, 1996) confirmed no participant suspected otherwise. Participants were not put under any explicit pressure to perform well on the tasks.

Materials and Measures

Baseline measures. Participants answered questions relating to their demographic information (such as age, sex, nationality) in an online questionnaire.[1]

Self-affirmation manipulation. Participants in the self-affirmation condition wrote about their most important value (why it is important to them and how it influences their behaviors or attitudes; Sherman, Nelson & Steele, 2000). In the control condition participants wrote about their least important value (why it might be important to someone else and how it might influence other people's behaviors or attitudes).

Working memory. Working memory was measured with the 2-back task, using the same instructions as Logel and Cohen (2012). Participants were presented with a sequence of 45 letters, each of which stayed on screen for 500ms, followed by a blank screen for 2.5s. For each letter, participants had to indicate whether or not the current letter matched the letter that had appeared two positions previously. The dependent measures were the proportion of correct trials, mean reaction time (RT), and inverse efficiency, which was calculated by dividing RT by the proportion of correct responses (Townsend & Ashby, 1983). It represents the time participants took per correct answer, and thus takes the trade-off between speed and accuracy into account. A lower score indicates quicker correct responding and therefore greater efficiency.

Inhibition. The Stroop task required participants to indicate the color of a string of letters. These were either a string of *X*'s or color words, resulting in three trial types: Neutral (*XXXX* in red or blue), congruent (*red* in red or *blue* in blue) and incongruent (*red* in blue or

blue in red). The task consisted of 60 trials (20 of each type, all in random order). The procedure was a replication of Jostmann and Koole (2007), with the exception that the interval blank screen was reduced from 2s to 1s to reduce inter-stimulus waiting time.

The dependent measures were the proportion of correct trials, mean RT, inverse efficiency and interference, calculated by subtracting mean accuracy and mean RT for neutral trials from the equivalent means for incongruent trials (Macleod, 1991).

Results

Preliminary analysis

Chi square analyses revealed no significant associations between condition and sex, ethnicity or nationality (all *p*s > .42). One-way ANOVA comparing age between self-affirmation (M_{SA} = 19.71 years, *SD* = 2.75) and control conditions (M_{NA} = 20.83 years, *SD* = 3.17) approached significance $F(1, 81) = 2.93$, $p = .09$, Cohen's $d = 0.38$. Controlling for age in the analysis did not alter the pattern of results.

Before analysis, the RT data were scanned for responses faster than 150ms or slower than 10000ms to identify implausible responses or participants who may have disengaged from the task (<1% of responses) (cf. Greenwald, Nosek, & Banaji, 2003). Next, any outliers (RTs ±2 *SD*s of each participant's mean) were removed (4% of responses). RT data were heavily skewed and therefore normalized using square root transformation. However, the pattern of results and the conclusions did not differ following transformation; therefore analyses reported here use the non-normalized data.

Impact of manipulation on dependent measures.

Working memory task. The data of 7 participants who had misunderstood the instructions (4 from the self-affirmation condition) were excluded from the analysis, leaving a sample of 76 (59 female). One-way ANOVAs revealed significant differences in accuracy, $F(1, 74) = 5.75$, $p = .02$, $d = 0.55$, and inverse efficiency, $F(1, 74) = 5.61$, $p = .02$, $d = 0.54$,

but not RT, $F(1, 74) = 2.41$, $p = .13$, $d = 0.36$, between conditions. Self-affirmed participants performed better on the working memory task and were more efficient (see Table 1).

Inhibition task. One-way ANOVAs revealed significant differences in overall RT, $F(1, 81) = 4.20$, $p = .04$, $d = 0.42$: self-affirmed participants reacted faster to all trials than non-affirmed participants (see Table 2). There were no significant differences in overall accuracy, $F(1, 81) = 0.13$, $p = .72$, $d = 0.01$. There were marginally significant differences in overall Inverse Efficiency, $F(1, 81) = 3.56$, $p = .06$, $d = 0.42$: self-affirmed participants responded more quickly than non-affirmed without a cost to accuracy. Moreover, self-affirmed participants showed marginally less interference than non-affirmed participants, $F(1, 81) = 3.32$, $p = .07$, $d = 0.40$.

Table 1. RT and accuracy for the working memory task. Standard deviations given in parentheses.

	Control (n = 38)	Self-affirmation (n = 38)	F[b]	p
RT (ms)	836.45 (276.07)	750.05 (203.64)	2.41	.13
Accuracy	.80 (.12)	.86 (.07)	5.75	.02
Inverse efficiency[a]	1062.81 (379.58)	884.60 (266.92)	5.61	.02

Note. [a]RT divided by accuracy; [b]Univariate *F*s testing means across conditions, $df = 1, 74$

Table 2. RT and accuracy for the inhibition task. Standard deviations given in parentheses.

	Control (n = 41)	Self-affirmation (n = 42)	F[c]	p
RT (ms)				
Overall	515.47 (133.30)	455.15 (134.91)	4.20	.04
Neutral trials	496.85 (108.71)	445.10 (114.08)	4.47	.04
Congruent trials	499.11 (135.30)	433.32 (119.26)	5.53	.02
Incongruent trials	550.45 (171.76)	487.03 (180.76)	2.68	.11
Interference[a]	53.60 (94.80)	41.93 (86.19)	0.35	.56
Accuracy				
Overall	.95 (.05)	.95 (.04)	0.13	.72

Neutral trials	.96 (.06)	.94 (.07)	2.31	.13
Congruent trials	.97 (.06)	.97 (.05)	0.03	.87
Incongruent trials	.92 (.09)	.94 (.06)	0.47	.50
Interference[a]	.04 (.08)	< .01 (.08)	3.32	.07
Inverse Efficiency[b]				
Overall	544.11 (138.65)	483.84 (151.77)	3.56	.06
Neutral trials	516.82 (107.31)	473.27 (110.96)	3.30	.07
Congruent trials	514.97 (134.68)	449.45 (128.71)	5.14	.03
Incongruent trials	600.55 (195.22)	528.81 (233.35)	2.30	.13

Note. [a]Incongruent relative to neutral; [b]RT divided by accuracy; [c]Univariate *F*s testing means across conditions, *df* = 1, 81

Discussion

This study explored the immediate impact of self-affirmation on two aspects of executive functioning: working memory and inhibition. As hypothesized, self-affirmation resulted in superior performance on both tasks. Compared to their non-affirmed counterparts, self-affirmed participants made fewer errors on the working memory task and responded faster on the Stroop task. Inverse efficiency analyses demonstrated that these performance improvements were not the result of speed-accuracy tradeoffs. Rather, self-affirmed participants responded more efficiently on both tasks.

The working memory finding replicates those of Logel and Cohen (2012) – indeed, the effect sizes in both studies are similar (Cohen's *d* = .6 vs .7 in Logel and Cohen) – and extends them by establishing that the beneficial effects of self-affirmation are evident immediately after the self-affirmation manipulation. The Stroop findings extend those of Legault et al. (2012) by demonstrating that self-affirmation can boost performance on a more complex inhibition task. These performance benefits involved a general speeding-up of response times, rather than a reduction in interference on high-conflict trials.

The improvements in efficiency evident in the working memory task were larger in magnitude than the improvements observed in the subsequent Stroop task, perhaps because

the impact of the self-affirmation manipulation wanes with time or the first task induces depletion (Baumeister, Bratslavsky, Muraven & Tice, 1998; although see Hagger et al., 2016). Nonetheless, the overall pattern of results suggests that the effects of self-affirmation are not specific to one particular ability, such as working memory or inhibition; rather, self-affirmed participants demonstrated a general increase in response speed and performance. Furthermore, these effects occurred in a context in which participants were not put under explicit pressure to perform well; that is, no attempt was made to heighten the self-evaluative concerns that participation in a face-to-face laboratory study with a performance element may entail. The findings therefore contribute to a small but growing body of evidence of self-affirmation effects in the context of naturally experienced levels of threat or conflict, rather than ones explicitly induced or heightened artificially by the experimenters (c/f. Armitage, 2016; Logel & Cohen, 2012; Nelson, Fuller & Lyubomirsky, 2014).

We examined executive functioning because it is heavily involved in self-regulatory behaviors relating to outcomes such as health or academic achievement that self-affirmation has been shown to benefit (e.g. Cohen et al., 2009; Epton et al., 2015). Theoretically, the question is *why* self-affirmation might boost performance on such tasks. This is an open question, but we hypothesize that self-affirmation boosts task engagement and, consequently, readiness to deploy one's available resources to perform well, rather than directly boosting the underlying ability itself. That is, the effects are primarily motivational. This explanation requires explicit testing but is consistent with recent theorizing about self-affirmation (e.g., Cohen & Sherman, 2014; Sherman & Hartson, 2011; Sherman, 2013) and models of self-control. For instance, Inzlicht and Schmeichel (2012) propose that whether an individual deploys available resources is determined by their motivation and their attention to the necessity to do so, and Fujita, Trope, Liberman and Levin-Sagi (2006) argue that a higher level of mental construal makes superordinate goals salient, with concomitant effects on

resource deployment; self-affirmation has been shown to induce higher levels of construal (Schmeichel & Vohs, 2009; Wakslak & Trope, 2009). Self-affirmation can also focus attention on important, self-relevant stimuli (Klein & Harris, 2009; Legault et al., 2012) and increase motivation (Harris, Mayle, Mabbot & Napper, 2007) and task engagement (Creswell et al., 2013).

Naturally, the study has limitations that need to be borne in mind when interpreting the findings. As with the previous studies of the effects of self-affirmation on performance on executive functioning tasks (Legault et al., 2012; Logel & Cohen, 2012), the sample size was relatively small and only powered to detect medium-to-large effects. Consequently, although together these three studies provide convergent evidence that self-affirmation can boost performance on executive functioningtasks, replication with larger samples is desirable. Participants were also predominantly white, female, British students. The beneficial effects of self-affirmation across domains such as alcohol consumption or task performance have been observed in both community samples (e.g. Armitage, Harris, Hepton & Napper, 2008; Logel & Cohen, 2012) and student samples (e.g. Epton & Harris, 2008), suggesting that the effects found here may not be peculiar to this sample; nevertheless, testing the effect of self-affirmation on executive functioning in larger and more diverse samples, and establishing whether changes in executive functioning mediate these beneficial outcomes, are important next steps for this research. Future research may also wish to explore whether the order of the tasks moderates the effects of self-affirmation on performance.

In sum, this study supports the notion that self-affirmation achieves its wide-ranging effects in part by influencing elements of executive functioning. The exact mechanism is unclear, but one plausible explanation is that self-affirmation facilitates better use of available executive functioning resources. Self-affirmation has been found to have beneficial effects on health-related behaviors, academic achievement and problem-solving tasks, all of which

require high levels of executive functioning. Therefore, the finding that self-affirmation facilitates better use of executive functioning resources offers a plausible link between the various areas in which self-affirmation has been found to have beneficial effects.

Footnotes

[1]All measures, manipulations, and exclusions in this study have been reported with the exception of several individual difference measures that are part of the broader program of research of which this study forms part, but that do not relate to the specific issues reported in this paper. These were measures of self-control (Tangney, Baumeister & Boone, 2004), self-esteem (Rosenberg, 1965), positive affect (Usala & Hertzog, 1989), self-integrity (Sherman et al., 2009), spontaneous self-affirmation (Harris et al., n.d.), general self-efficacy (Schwartzer & Jerusalem, 1995), self-compassion (Neff, 2003), optimism (Scheier, Carver & Bridges, 1994), heuristic/systematic processing (Griffin, Neuwirth, Giese & Dunwoody, 1999) and empathic concern (Davis, 1983). Affect was also measured immediately following the manipulation, but no main effect of self-affirmation on affect was found. (The affect findings will be reported in a separate paper; Harris, Harris & Miles, in prep.)

Chapter 3: The moderating impact of self-esteem on self-affirmation effects on performance on a working memory task

Abstract

Objectives: Self-affirmation has been shown to have beneficial effects on performance on one measure of working memory. The current study tested whether the effects generalised to a different working memory task. In addition, it tested the hypothesis that the mechanisms underlying these effects are different for people with different levels of trait self-esteem: in particular, whether in high self-esteem individuals, self-affirmation works by inducing a high-level mind set, whereas in low self-esteem individuals, it works by bringing to mind resources, such as feelings of belonging and social support. ***Method:*** Participants (N = 107) completed baseline measures of self-esteem before completing a self-affirmation or control task, followed by measures of proposed mediators (construal level and perceived social resources) and a working memory task (the automatic Operation Span task; OSPAN). ***Results:*** Self-affirmation had detrimental effects on performance on the OSPAN task, but only in high self-esteem individuals. The hypothesis that self-affirmation effects would be differentially mediated at different levels of self-esteem was not supported. Self-affirmation also lowered perceptions of social resources in low self-esteem individuals. ***Conclusion:*** The study provides further evidence for the moderating impact of trait self-esteem on self-affirmation.

Introduction

Self-affirmation (the act of bringing to mind cherished self-aspects) has had beneficial effects on a multitude of cognitions and behaviours (for a review, see Cohen & Sherman, 2014). Previous work has identified a number of viable mechanisms underlying these varied effects, with one recent finding pointing towards working memory, as self-affirmed individuals performed better on a working memory task than non-affirmed in two studies (Harris, Harris & Miles, 2017, Chapter 2; Logel & Cohen, 2012). However, the improvements in performance following self-affirmation have only been established using one working memory task, raising the question of whether the effects are peculiar to this task. It is important to establish whether the effects replicate to a different working memory task, which would increase confidence in the robustness of the effect. Further, it is not clear whether the improvements in performance were a direct result of self-affirmation, or whether they were in fact a product of other cognitive changes evoked by self-affirmation. The current study therefore tested whether self-affirmation would also improve performance on a different working memory task, and tested potential mediators of these effects. In addition, it explored the possibility that these mediators are different for people at different levels of trait self-esteem, as has previously been suggested.

Self-affirmation

According to self-affirmation theory (Steele, 1988), people are continuously motivated to preserve their self-integrity – their feeling of being a good, competent person. Any threats to their self-worth are defended against to maintain self-integrity. However, self-affirmation theory also proposes that self-integrity can stem from various sources, and that a boost from one source can offset a threat to self-integrity from another source. Hence, encouraging individuals to self-affirm (e.g. to reflect on valued self-aspects) can strengthen their self-integrity and lessen the need to defend against threats to self-integrity.

As such, self-affirmation has primarily been used as a means of reducing defensive reactions, for example to health-risk information (Harris, 2011; Harris & Epton, 2009). Research has shown that individuals who have self-affirmed before being exposed to self-relevant health-risk information tend to be more open towards the information, show stronger intentions to behave in healthier ways and consequently also behave in healthier ways (Epton et al., 2015; Sweeney & Moyer, 2015). In addition, self-affirmation can also boost academic performance (e.g. Cohen, Garcia, Purdie-Vaughns, Apfel & Brzustoski, 2009), reduce stress (e.g. Creswell et al., 2005), and increase self-control (Schmeichel & Vohs, 2009). It is clear that self-affirmation can achieve beneficial effects in both cognition and behaviour, and both when individuals are confronted with an explicit threat (e.g. health; Epton et al., 2015; Sweeney & Moyer, 2015) and in the absence of an explicit threat (e.g. self-control; Schmeichel & Vohs, 2009).

In one example of self-affirmation effecting changes in behaviour, Logel and Cohen (2012) showed that overweight women who had self-affirmed had lost more weight at follow-up (on average 2.5 months) than those who had not affirmed. The self-affirmed women also performed better on a working memory task at follow-up, and these improvements in performance mediated the effect of self-affirmation on weight loss. Thus, improvements in performance on a working memory task are both a further beneficial outcome of self-affirmation, and a possible indicator of an underlying mechanism of self-affirmation effects on cognition and behaviour. The finding that self-affirmation boosts working memory would provide a useful further insight into how self-affirmation achieves its varied effects. Working memory is a central feature of executive functioning (McCabe, Roediger, McDaniel, Balota & Hambrick, 2010), which underlies all purposeful, goal-directed behaviour (Suchy, 2009). Establishing that self-affirmation improves executive

functions such as working memory would provide a framework for explaining how self-affirmation achieves its effects on goal-directed behaviours.

The effect of self-affirmation on working memory has been replicated immediately following self-affirmation (Harris et al., 2017, Chapter 2). However, the effect has only been established using one working memory task (the 2-back task; Jonides et al, 1997). It is therefore important to replicate the study using a different working memory task in order to strengthen the case for working memory as an outcome or a mechanism of self-affirmation. The finding that the effects hold up on a different measure of working memory would indicate that self-affirmation does indeed boost working memory performance. It would rule out the possibility that the effects are restricted to the 2-back task and increase the robustness of the finding. Moreover, it is unclear how self-affirmation can boost performance on a working memory task. Although improvements in working memory can be achieved through training, these improvements are usually only evident following several training sessions (Klingberg, 2010). Logel and Cohen (2012) suggest that self-affirmation buffers against chronic threats such as the stress associated with being overweight. In this way, self-affirmation may be able to free up cognitive resources that under normal circumstances are spent on dealing with the stress. However, self-affirmation can also have beneficial effects in the absence of an explicit threat (e.g. Brinõl, Petty, Gallardo, & DeMarree, 2007; Nelson, Fuller, Choi, & Lyubomirsky, 2014; Schmeichel & Vohs, 2009; Harris et al., 2016, Chapter 2). It is therefore possible that the improvements in performance on the working memory task are not simply due to self-affirmation lessening the impact of a threat and freeing up resources. Alternatively, the improvements in performance could be caused by other cognitive and perceptual consequences of self-affirmation.

Mechanisms of self-affirmation

One such immediate consequence of self-affirmation is its effect on levels of mental construal. Construal level theory (Trope & Liberman, 2003) postulates that information and events can be construed at different levels of abstraction, such as at a high level or a low level. When in a high-level mind set, an individual will perceive events around them in terms of abstract representations, summarising the events based on their central or primary features. When in a low-level mind set, an individual will perceive the same event at a more concrete level, honing in on the details. For example, 'brushing teeth' could be construed as 'moving a brush around in one's mouth' at a low level and as 'preventing tooth decay' at a high level (Vallacher & Wegner, 1989). Events can be construed at both levels simultaneously, but under some circumstances, individuals are more likely to adopt a more abstract construal, or a more concrete construal. For example, when an event is temporally distant (i.e. in the future), the level of abstraction with which the information is represented increases (Trope & Liberman, 2003).

At a high level, individuals adopt a broader, more abstract perspective, and events and actions are represented by their goals and outcomes, which is why construal level has been proposed as a mediator of self-affirmation effects: In a high level mind set, individuals are more likely to regard their situation in the context of 'the big picture' and be reminded of the overarching, important things in their lives that transcend the momentary experience. This not only helps put any immediate threats into context, but also makes personal goals and aims more salient, which may help to follow through with one's plans, such as to engage in health-protective behaviours. In line with this, Fujita, Trope, Liberman and Levin-Sagi (2006) showed that a high-level mind set promotes self-control, and speculate that this is because exerting self-control involves making decisions in line with long-term rather than short-term outcomes. Indeed, there is evidence that self-affirmation influences mental construal, as self-affirmed individuals are more likely to think in abstract or high level terms than non-affirmed

individuals (Schmeichel & Vohs, 2009, Experiment 3; Wakslak & Trope, 2009). Moreover, Schmeichel and Vohs (2009, Experiment 4) showed that participants' level of mental construal mediated the effect of self-affirmation on a self-control task.

It is therefore possible that it is the high level mind set that self-affirmation induces that produces its varied effects on cognition and behaviour. Indeed, there is some evidence showing that an individual's level of mental construal can influence their performance on a working memory task: In one study, participants completed a writing exercise that induced either a high- or a low-level mind set and then completed a task that tapped into both self-control and working memory (Schmeichel, Vohs & Duke, 2010). Those in the high-level mind set performed better than those in the low-level mind set, arguably because their high-level, goal-oriented mind set meant the goals involved in the tasks were more easily maintained (Fujita, Trope, Liberman & Levin-Sagi, 2006).

The effects of self-affirmation on working memory may therefore be due to changes in mental construal. So far, it has been established that mental construal mediates the effect of self-affirmation on performance on a self-control task (Schmeichel & Vohs, 2009, Experiment 4), but not on performance on a working memory task. Testing this would be an important step towards linking the effects of self-affirmation on performance on a working memory task to the effects of self-affirmation on level of mental construal, and was thus done in the present study.

Another account of self-affirmation considers perceived social resources responsible for its effects. It is a common occurrence that when participants are self-affirmed by writing about the value that is most important to them personally, they are often most likely to pick a social value, such as their relationships with their friends and families (Sherman & Cohen, 2006; see e.g. Creswell, Dutcher, Klein, Harris & Levine, 2013; Crocker, Niiya & Mischkowski, 2008; Rudman, Dohn & Fairchild, 2007). In line with this, one study showed

that self-affirmation increased other-directed positive emotions such as love, and these mediated the effect of self-affirmation on smokers' acceptance of personally relevant health-risk information (Crocker et al., 2008). These increases in other-directed emotions following self-affirmation were also documented in another study, which also found that they mediated the effect of self-affirmation on prosocial behaviour (Lindsay & Creswell, 2014). Self-affirmation has also helped maintain students' feelings of belonging at school (Cook, Purdie-Vaughns, Garcia & Cohen, 2012), and writing about belonging has been associated with improvements in performance on a math test (Shnabel, Purdie-Vaughns, Cook, Garcia & Cohen, 2013) and in overall grades (Walton & Cohen, 2011).

Overall, these studies suggest that self-affirmation may achieve its effects by reminding individuals of their social resources. It is also possible that this is one mechanism behind the effects of self-affirmation on performance on the working memory task: A brief social interaction can boost performance on executive functioning tasks (Ybarra et al., 2008), including working memory tasks (Ybarra, Winkielman, Yeh, Burnstein & Kavanagh, 2011). Moreover, even simple reminders of one's relationships (e.g. by viewing a picture of loved ones) can have positive effects that parallel those of self-affirmation, such as that individuals are better able to cope with stressors, like mild electric shocks (Master et al., 2009) and unpleasant affective experiences (Selcuk, Zayas, Günaydin, Hazan & Kross, 2012). Therefore, the improvements on the working memory task that have been observed following self-affirmation may be attributable to self-affirmation activating psychosocial resources (Sherman & Cohen, 2014). This has not been tested empirically and therefore perceived social resources (operationalised by belonging and social support) was one of the mediators included in the present study.

Moderators of self-affirmation: self-esteem

This study therefore focused on two of the suggested mediators of self-affirmation effects: Construal level and perceived social resources. It is important to note that self-affirmation effects are not always evident across all types of people, but can sometimes produce effects only in a subgroup. One previously identified moderator is trait self-esteem, with self-affirmation affecting individuals with low and high levels of trait self-esteem differentially (e.g. Düring & Jessop, 2014). For example, self-affirmation was able to help low self-esteem individuals overcome social threats and improved their relationship security, but no such effects were evident in high self-esteem individuals (Jaremka, Bunyan, Collins & Sherman, 2011).

This hints at the possibility that there are different mechanisms for different people. Indeed, it has been proposed that self-affirmation may work differently in people with different levels of self-esteem, in that it may increase resources for those low in self-esteem, whilst broadening the perspective of those with high self-esteem (Sherman, 2013). This encapsulates two of the proposed mediators, construal level and perceived social resources, and suggests both could be valid mediators of self-affirmation effects, but each is only a mediator for some people. No study has yet tested the assumption that the effects of self-affirmation are driven by different mechanisms that are contingent on levels of trait self-esteem.

Rationale

The aim of the current study was to test whether the effect of self-affirmation on performance on a working memory task would generalise to a different working memory task. In addition, the study aimed to establish whether perceived social resources or construal level mediated the effect of self-affirmation on performance on the working memory task, and also whether it did so differently in individuals with different levels of self-esteem.

The operation span (OSPAN) was chosen as the working memory task. Its main function is to measure working memory resources, but it also requires participants to resist distractions and interference, and consequently taps into more executive functioning processes, such as attention control (Conway et al., 2005), compared to the 2-back task (used by Logel and Cohen, 2012, and Harris et al., 2017). It therefore represents a more demanding task than the 2-back task as it requires several executive functioning processes simultaneously.

Hypotheses

Based on previous self-affirmation work, it was predicted that self-affirmed participants would perform better on the working memory task, report more perceived social resources (operationalised by a stronger sense of belonging and more perceived social support) and report a higher level mental construal than non-affirmed participants. It was not expected that self-esteem would moderate the effect of self-affirmation on performance on the working memory task or on construal level, but that it would moderate the effect of self-affirmation on perceived social resources. In particular, it was predicted that self-affirmation would increase perceived social resources in individuals with low self-esteem (based on the finding that self-affirmation increased relational security only in those with low self-esteem; Jaremka et al., 2011). In addition, it was predicted that in participants with high levels of self-esteem, mental construal would mediate the effect of self-affirmation on performance on the working memory task, but for participants with low levels of self-esteem, perceived social resources would mediate the effect of self-affirmation on performance on the working memory task.

Method

Participants

In total, 110 undergraduate psychology students completed the study in return for course credits. Three participants were excluded because they guessed the purpose of the study, leaving a final sample of 107. Participants were aged between 18 and 41 (M = 19.68, SD = 3.39) and were mostly white (76.60%), female (83.20%) and British (74.80%).

Materials

Baseline measures. Participants first completed an online questionnaire. This consisted of questions relating to their demographic information (such as age, gender, nationality and ethnicity) and a trait measure of self-esteem, the Rosenberg Trait Self-Esteem Scale (Rosenberg, 1965). This comprises 10 items (e.g. "I feel that I have a number of good qualities", Cronbach's α = .90) on a 4-point scale, from *Strongly Disagree* to *Strongly Agree*. Scores ranged from 1.40 to 4.00 (M = 2.78, SD = 0.55).

Self-affirmation manipulation. The self-affirmation manipulation was adapted from Sherman, Nelson and Steele (2000) and presented participants with a list of 11 values, such as friendliness or spontaneity. Participants in the self-affirmation condition were asked to pick their most important value from the list (or to generate one that was not on the list) and write a short statement (2-3 paragraphs) on why this value was important to them, how it had influenced their attitudes and behaviours in the past and how they use it in their everyday life. Participants in the control condition were asked to pick their least important value (or to generate one that was not on the list) and write a short statement (2-3 paragraphs) on why this value might be important to another student, how it may have influenced their attitudes and behaviours and how they might use it in their everyday life.

Perceived social resources. Belonging was measured using 6 items (e.g. "Right now, I feel that I am valued by and important to my friends", Cronbach's α = .86), which were adapted from the Sense of Belonging scale (Hagerty & Patusky, 1995). Participants responded on a 7-point scale, from *Strongly Disagree* to *Strongly Agree.*

Two items measured perceived social support, r (105) = .91, $p < .001$: “Right now, I feel like I have a lot of social support”, on a 7-point scale, from *Strongly Disagree* to *Strongly Agree*, and one pair of semantic differentials, on a 7-point scale from *Right now, I feel like I have not got very much social support* to *Right now, I feel like I have a lot of social support*.

Because Belonging and Social Support were strongly and positively correlated, r (105) = .71, $p < .001$, they were combined into one variable: perceived social resources.

Construal Level. Level of mental construal was measured using the Construal Level Identification Form (Allard & Griffin, 2013). This scale presents participants with 14 word pairs that correspond to low and high levels of mental construal (e.g. “Near-Far”, “Certainly-Possibly”, “Now-Future”, Cronbach’s α = .67) and asks them to pick the word that best fits their frame of mind right now. Possible scores range from 0 to 1, with smaller values representing a low (or concrete) level of mental construal and larger values representing a high (or abstract) level of mental construal.

Working memory task. Working memory was measured using the automated operation span (OSPAN) task produced by the Attention & Working Memory Lab of the Georgia Institute of Technology (Unsworth, Heitz, Schrock and Engle, 2005). In this task, participants are required to solve a simple mathematical equation (e.g. “(2*5) + 3 = ?”) and are then presented with a letter that they have to remember (e.g. “F”). This process is repeated and another set of an equation and a letter are presented. At the end of a sequence, participants are asked to recall the letters they had seen (in the correct order). The main dependent variable (the OSPAN score) is the number of letters correctly recalled. Sequences are 3, 4, 5, 6 or 7 sets long, and each set size occurs three times (in random order), resulting in a maximum OSPAN score of 75. Participants completed a brief practice trial before self-affirming, including 6 pairs of equations and letters.

Procedure

The study consisted of two parts. In the first part, participants completed the online questionnaire. The second part was a face-to-face laboratory session, which was held at least two days after the first part, to minimise any influence from the baseline measures. Participants completed the second part individually and were randomly allocated to either the self-affirmation or control condition, which were both presented as pen-and-paper writing tasks. The instructions that determined the condition were printed on the second page of the materials, meaning the experimenter, who could only see the first page, was blind to condition. In both conditions, participants were asked to spend 10 minutes writing. Immediately after the writing tasks, participants completed computerised measures of the proposed mediators, followed by the OSPAN task. Finally, participants were debriefed using the funnel debrief procedure (Chartrand & Bargh, 1996). Participants who at this point guessed the purpose of the study were excluded (n = 3).

Results

Randomisation checks

Chi square analyses showed no association between condition and any of the variables gender, ethnicity or nationality (all ps > .24). A series of one-way ANOVAs showed that participants did not differ significantly across conditions in age, $F(1, 105) = 0.27$, $p = .60$, Cohen's $d = 0.10$, or in performance on the practice trials for the OSPAN task, $F(1, 105) = 1.77$, $p = .19$, Cohen's $d = 0.27$, or in trait self-esteem $F(1, 105) = 2.43$, $p = .12$, Cohen's $d = 0.30$.

Tests for main effects and for moderation by self-esteem

A series of hierarchical multiple regression analyses was conducted to test whether self-esteem moderated the effect of condition on all outcomes (see Table 1). Condition (dummy coded as control = 0 and self-affirmation = 1) was entered as a predictor at step 1,

self-esteem (mean-centred) was entered at step 2 and the interaction between condition and self-esteem was entered at step 3. These analyses revealed the following pattern of results:

Perceived social resources. Condition at step 1 was not a significant predictor of perceived social resources, $F(1, 102) = 1.34$, $p = .25$, $R^2 = .01$ ($\beta = -.11$, $p = .25$). The addition of self-esteem at step 2, $\Delta F(1, 101) = 41.03$, $p < .001$, $\Delta R^2 = .30$, was a significant predictor. The beta weight associated with self-esteem ($\beta = .54$, $p < .001$) suggested that individuals with high self-esteem reported more perceived social resources. The interaction of self-esteem and condition, added at step 3, was also a significant predictor, $\Delta F(1, 100) = 5.94$, $p = .02$, $\Delta R^2 = .04$, suggesting self-esteem moderated the impact of self-affirmation ($\beta = .20$, $p = .02$). Simple slopes analyses (see Figure 1) showed that for those with low self-esteem, condition had an effect on perceived social resources, with those in the self-affirmation condition reporting fewer perceived social resources compared to those in the control condition, $\beta = -.23$, $t(103) = -1.95$, $p = .05$. There was no effect of condition on perceived social resources in those with high levels of self-esteem, $\beta = .19$, $t(103) = 1.54$, $p = .13$, or those with mean levels of self-esteem, $\beta = -.02$, $t(103) = -.24$, $p = .81$.

Construal level. Condition at step 1 was not a significant predictor of construal level, $F(1, 102) = 0.59$, $p = .45$, $R^2 = .01$ ($\beta = .08$, $p = .45$). The addition of self-esteem at step 2, $\Delta F(1, 101) = 14.03$, $p < .001$, $\Delta R^2 = .12$, was a significant predictor. The beta weight associated with self-esteem ($\beta = -.35$ $p < .001$) suggested that individuals with high self-esteem reported lower levels of mental construal. The interaction of self-esteem and condition, added at step 3, was not a significant predictor, $\Delta F(1, 100) = 2.53$, $p = .12$, $\Delta R^2 = .02$, suggesting self-esteem did not moderate the impact of self-affirmation ($\beta = -.15$, $p = .12$).

OSPAN score. Condition at step 1 was not a significant predictor of OSPAN score, $F(1, 105) = 1.39$, $p = .24$, $R^2 = .01$ ($\beta = -.11$, $p = .24$), nor was the addition of self-esteem at

step 2, $\Delta F(1, 104) = 0.18$, $p = .68$, $\Delta R^2 < .01$ ($\beta = .04$, $p = .68$). The interaction of self-esteem and condition, added at step 3, was a significant predictor, $\Delta F(1, 103) = 4.47$, $p = .04$, $\Delta R^2 = .04$, suggesting self-esteem moderated the impact of self-affirmation ($\beta = -.21$, $p = .04$) on performance on the OSPAN task. Simple slopes analyses (see Figure 2) showed that for those with high self-esteem, there was a significant effect of condition on performance on the OSPAN task, with those in the self-affirmation condition achieving higher OSPAN scores compared to those in the control condition, $\beta = -.33$, $t(106) = -1.31$, $p = .02$. There was no effect of condition on OSPAN score in those with low levels of self-esteem, $\beta = .10$, $t(106) = 0.70$, $p = .48$, or those with mean levels of self-esteem, $\beta = -.12$, $t(106) = -1.19$, $p = .24$.

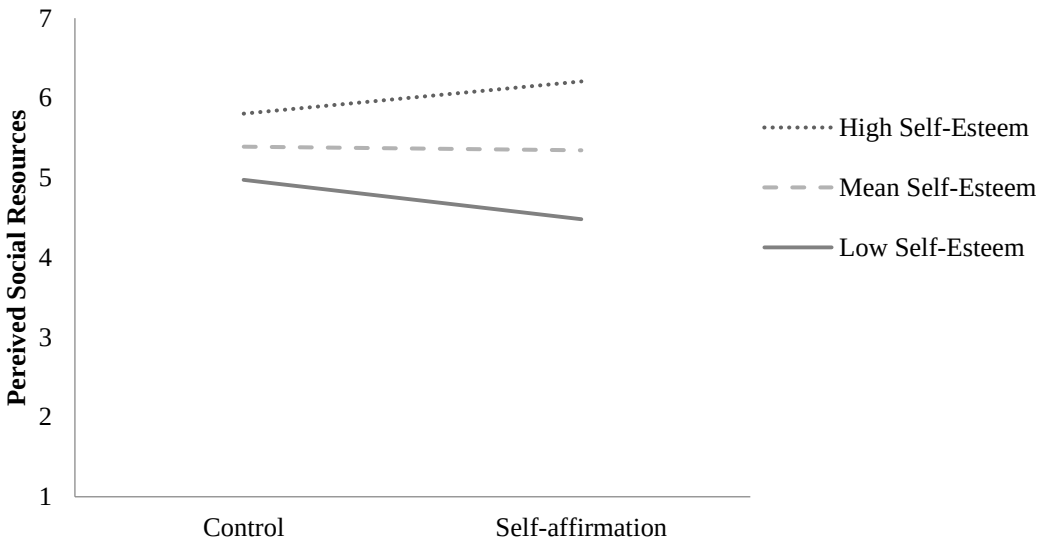

Figure 1: Interaction between self-affirmation and baseline self-esteem on perceived social resources

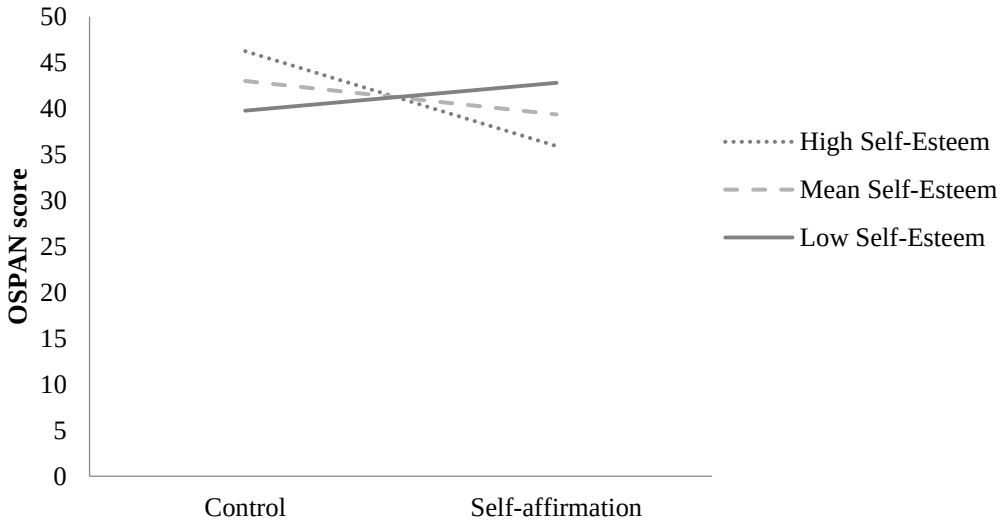

Figure 2: Interaction between self-affirmation and baseline self-esteem on OSPAN score

Table 1. Moderated regression analyses for all outcome variables

	Perceived social resources			Construal level			OSPAN score		
	β	β	β	β	β	β	β	β	β
Variables entered	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Condition	-.11	-.03	-.02	.08	.02	.01	-.11	-.11	-.12
Self-esteem	-	.54***	.59***	-	-.35***	-.39***	-	.04	-.01
Condition x Self-esteem	-	-	.20*	-	-	-.15	-	-	-.21*
R^2	.01	0.30	0.34	.01	.13	.15	.01	.02	.07
Model F	1.34	21.45***	16.98***	0.59	7.34**	5.81**	1.39	0.78	2.03
ΔR^2	.01	0.29	0.04	.01	.12	.02	.01	.00	.04
ΔF	1.34	41.03***	5.94*	0.59	14.03***	2.53	1.39	0.18	4.47*

*$p < .05$, **$p < .01$, *** $p < .001$

Moderated mediation. Moderated mediation was carried out to test the hypothesis that the mechanism underlying self-affirmation is different for individuals with different levels of self-esteem. This was tested using the PROCESS macro for SPSS (Model 14; Hayes, 2013), which allows tests of mediation at different levels of a moderator[2]. Condition was entered as the independent variable, OSPAN score as the dependent variable, and self-esteem as the moderator (see Figure 3). The model was run twice, once for each proposed mediator (perceived social resources and construal level). If the mechanism of self-affirmation is indeed different for individuals with different levels of self-esteem, there would be evidence of mediation at one level of self-esteem, but not on all. However, this was not the case.

There was no evidence that perceived social resources mediated the effect of self-affirmation on OSPAN score at levels of low, β = 0.61, SE = 0.77, 95% CI [-0.19; 3.05], mean, β = 0.35, SE = 0.67, 95% CI [-0.31; 2.80], or high self-esteem β = 0.10, SE = 0.78, 95% CI [-1.11; 2.35]. Thus, the confidence intervals for the index for moderated mediation crossed zero, β = -0.46, SE = 0.69, 95% CI [-2.72; 0.29].

For construal level, the same pattern emerged: There was no evidence that construal level mediated the effect of self-affirmation on OSPAN score at levels of low, β = -0.05, SE = 0.55, 95% CI [-1.39; 0.80], mean, β = -0.18, SE = 0.53, 95% CI [-2.13; 0.39], or high self-esteem, β = -0.32, SE = 0.73, 95% CI [-3.36; 0.45]. The confidence intervals for the index of moderated mediation again crossed zero, β = -0.24, SE = 0.65, 95% CI [-2.49; 0.51].

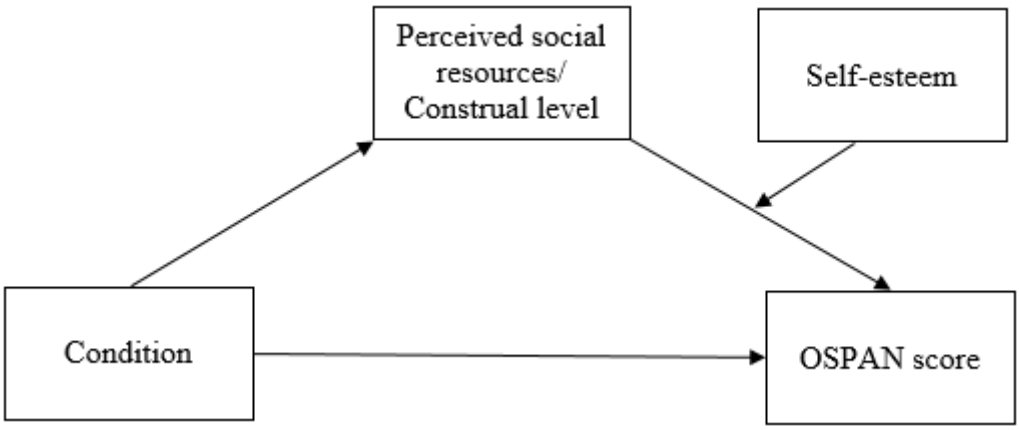

Figure 3: Moderated mediation model of the effect of self-affirmation on OSPAN score through perceived social resources or construal level, at different levels of self-esteem.

Discussion

The current study sought to test the effect of self-affirmation on performance on the OSPAN task, which is a measure of working memory. In addition, the study measured two proposed mediators of self-affirmation effects – level of mental construal and perceived social resources (operationalised by feelings of belonging and perceived social support) – and a known moderator of self-affirmation effects, trait self-esteem. Self-affirmation had a detrimental effect on performance on the OSPAN task among individuals with high self-esteem. Self-affirmation had no significant effect on perceived social resources or construal level. Both the proposed mediators were strongly predicted by self-esteem: low self-esteem was associated with a higher level of mental construal and lower perceptions of social resources. However, self-affirmation appeared to amplify this natural tendency, leaving individuals with low self-esteem reporting even lower feelings of social resources. However, there was no evidence that perceived social resources or construal level mediated the effect of self-affirmation on OSPAN score at any levels of self-esteem.

Two previous studies (Harris et al., 2016, Chapter 2; Logel & Cohen, 2012) have found that self-affirmed participants performed better than non-affirmed participants on a working memory task (the 2-back task). Based on this, it was hypothesised that self-affirmed

participants would perform better on a different working memory task (the OSPAN task). This was not the case: There was no significant difference in performance on the OSPAN task between self-affirmed and non-affirmed participants. However, there was evidence that self-affirmation affected individuals with different levels of self-esteem differently. In general, a link has been found between working memory and self-esteem, in that individuals with low working memory capacity also have low self-esteem and vice versa (Alloway, Gathercole, Kirkwood & Elliott, 2009). This is the pattern found in the control condition of the current study: those with high self-esteem achieved marginally higher OSPAN scores and those with low self-esteem achieved slightly lower OSPAN scores ($r = .24$, $p = .08$). In the self-affirmation condition, this pattern was reversed, with high self-esteem individuals achieving the lowest scores.

The findings of this study suggest something important about the effects of self-affirmation on performance on tasks that measure aspects of executive functioning. Two previous studies (Harris et al., 2017, Chapter 2; Logel and Cohen; 2012) found that self-affirmation improved performance on the 2-back task, which could suggest *more* working memory resources. However, in the current study, the only effects of self-affirmation on performance on the OSPAN were detrimental, which would suggest *fewer* working memory resources. These opposing effects, taken together with the finding that any improvements in working memory capacity are usually only evident after extensive training sessions (Klingberg, 2010), support the notion that self-affirmation does not influence working memory capacity itself. Instead, it is more likely that self-affirmation influences engagement with the task, or motivation to perform well on the task (see also Harris et al., 2017, Chapter 2). It is a common finding that motivation leads to improvements in performance on working memory tasks (Gilbert & Fiez, 2005; Krawczyk et al., 2007; Sanada et al., 2013) and, more generally, other executive functioning tasks (Taylor et al., 2003). Further, self-affirmation in

the health domain has been shown to increase motivation to behave in healthier ways (Napper, Harris & Klein, 2014) and engagement with a health-risk message (Kamboj et al., 2016). Thus, the effects of self-affirmation on performance on working memory tasks (both beneficial and detrimental) may be a product of participants' willingness to use their working memory resources. That is, self-affirmed individuals were previously more motivated to use their working memory resources, and in the present study, less motivated to use their working memory resources.

The question remains why self-affirmation only had a (detrimental) effect on performance in high self-esteem participants. It has been suggested that high and low self-esteem individuals' performance is driven by different motives (Baumeister & Tice, 1985): whereas low self-esteem individuals are content with performing averagely, high self-esteem individuals strive to surpass the average and be "outstanding" (Tice, 1991, p. 712). As a result, they persist more at tasks (Baumeister, Campbell, Krueger & Vohs, 2003) and their performance has stronger implications for their self-worth (Crocker & Park, 2004). However, much research has also shown that high self-esteem individuals (but not low self-esteem individuals) are responsive to information that communicates that failing at the task is an acceptable outcome (Janoff-Bulman & Brickman, 1982; McFarlin, 1985; Sandelands, Brockner & Glynn, 1988), resulting in reduced effort. It is therefore possible that the self-affirmation had a similar effect, which would be in line with the finding that self-affirmation can result in disengagement from a demanding task (Vohs, Park & Schmeichel, 2013). Under normal circumstances, feelings of self-worth may be contingent upon doing well at a task (Crocker, Brook, Niiya & Villacorta, 2006), and this may be particularly important for individuals with high self-esteem who are more strongly motivated to enhance their self-esteem (Crocker & Park, 2004).

When self-affirmed and having been reminded of other sources of self-worth, failure does not have the same implications for one's feelings of self-worth. This, in combination with a more honest, realistic self-assessment of one's abilities induced by self-affirmation (Vohs et al., 2013) may have opened up high self-esteem individuals to the possibility of giving up more easily on the demanding task. The effects of self-affirmation – uncoupling performance on the task from self-integrity – may therefore have been stronger in individuals for whom performance on the task had stronger links to self-integrity (Crocker & Park, 2004). Put differently, under normal circumstances, high self-esteem individuals are particularly driven to do well on such tasks and would not easily consider giving up. The self-affirmation made them realise that their self-worth does not hinge upon performing well on this task, and opened them up to the possibility of disengaging from the task. For those with low self-esteem, the task may not have been an indicator of their self-worth to begin with, and thus self-affirmation had little effect on them.

This study also tested two proposed mediators of self-affirmation effects: construal level and social resources (perceived social support and belonging), at different levels of the moderator self-esteem (see Sherman, 2013), but did not find support of moderated mediation. There was an indication that self-affirmation affected social resources differently in individuals with different levels of self-esteem, but not in the hypothesised direction. Individuals with low self-esteem in the control condition reported fewer social resources (in accordance with previous findings; Pillow, Malone & Hale, 2015), and this was amplified by self-affirmation.

Why did self-affirmation reduce perceived social resources in low self-esteem individuals? One possible explanation is that self-affirmation may have backfired for these individuals: It has been suggested that if low self-esteem individuals are asked to write about positive self-aspects that they are not convinced they possess, then the affirmation may lack

credibility (Cohen & Sherman, 2014). Low self-esteem individuals naturally tend to perceive fewer social resources (Pillow et al., 2015), and writing about social relationships may make this more salient. To test this possibility, the relationship between social resources and participants' choices of value in the self-affirmation condition were analysed further. The values chosen by self-affirmed participants were categorised into social values (e.g. honesty, kindness, compassion; $n = 41$) and non-social values (e.g. hedonism, creativity, intelligence; $n = 12$). Regression analyses were run to test whether self-esteem moderated the impact of type of value (social or non-social) on social resources; more specifically, to test whether perceived social resources are particularly low for low self-esteem individuals if they wrote about social values. However, this was not the case: perceived social resources were not affected by the type of value participants wrote about, and the interaction between type of value and self-esteem was not significant.

An alternative explanation is that self-affirmation simply reduced low self-esteem individuals' need for social resources: low self-esteem individuals are more concerned with issues such as social rejection (Leary & Baumeister, 2000), compared to high self-esteem individuals who are more confident in their social relationships (Leary, Tambor, Terdal, & Downs, 1995). The low self-esteem participants' answers to the social resources measures in the control condition may therefore have been a reflection of their need for social resources, and in a way, served to alleviate their concerns with social rejection. In the self-affirmation condition, participants have been assured of other sources of self-worth, reducing the need for social recognition and self-presentation (Vohs et al., 2013). This hypothesis requires direct testing but also represents a conundrum in self-affirmation research: If self-affirmed participants report more negative outcomes relative to non-affirmed participants (such as giving up on a task; Vohs et al., 2013), are they genuinely experiencing the negative

outcome, or are they simply more honest and prepared to answer the question in a less favourable way?

The study found no evidence that perceived social resources or construal level mediated the effects of self-affirmation on performance on the OSPAN task at any level of self-esteem. However, that is not to say that these variables should be ruled out as mediators. It is possible that they do play a role in the effects of self-affirmation on other outcomes and in other contexts. For example, the idea that self-affirmation may operate by increasing feelings of belonging originated from research looking at negatively stereotyped groups of children (e.g. ethnic minorities) who feel they do not belong, which has a negative impact on their academic performance (Cook et al., 2012). Self-affirmation helped improve academic performance by protecting against further drops in belonging. In this context, self-affirmation was able to improve performance through belonging because performance was contingent upon belonging. In the current study, performance on the OSPAN task may simply not have been affected by feelings of belonging, social support or construal, but perhaps by unmeasured constructs such as task (dis)engagement, as discussed earlier. The constructs that were measured may therefore still be suitable candidates for the effects of self-affirmation in situations where they influence an outcome.

In this respect, the sample of the current study – predominantly white university students – represents a limitation because it may have been unsuited to detecting any mediation effects through belonging on OSPAN performance. That is, if self-affirmation did improve OSPAN performance by increasing a sense of belonging, such effects would only be detectable in a sample who were suffering from a lack of belonging[3]. Moreover, use of only one sample may limit the generalisability of the findings to other samples. However, the moderating impact of self-esteem on self-affirmation has been evident in both community samples (Spencer, Fein & Lomore, 2001) and student samples (Düring & Jessop, 2014),

supporting the notion that the findings regarding the moderating effect of self-esteem will apply to other samples as well.

A further limitation is that the construal level measure may not have been sensitive enough to detect participants' level of mental construal. The scale was chosen because it is much shorter than other construal level measures: For example, the Behavioural Identification Form (Vallacher & Wegener, 1989) is lengthy because it describes each of 25 actions in two possible ways, resulting in much text that participants have to read through. Other measures have asked participants to read through product descriptions (Wakslak & Trope, 2009, Study 3) or attempt picture-completion tasks (Wakslak & Trope, 2009, Study 4). What also distinguished these measures is that they ask participants to apply their level of mental construal to something specific. In other words, the effects of self-affirmation on construal level have been clearest when self-affirmed individuals construed an action or an object (Wakslak & Trope, 2009). In contrast, the measure used in the current study asked participants to indicate which of 14 word pairs best suited their frame of mind right now, and these words were representative of a high or low level mind set. Crucially, it did not ask them to refer their frame of mind to an action or object. Self-affirmation is said to change the way people approach information (Harris & Epton, 2010), so it is possible that if self-affirmed individuals are not asked to approach anything in particular, the change goes unmeasured.

In sum, the current study was unable to replicate the finding that self-affirmed participants would perform better on a working memory task. It did, however, provide further evidence for the moderating role of trait self-esteem in self-affirmation effects: self-affirmation affected individuals with different levels of self-esteem differently on measures of perceived social resources, and on performance on the working memory task.

Footnotes

[1.] The analyses were also run with belonging and social support separately, and the pattern of findings did not differ from those obtained when using the combined measure.

[2.] Model 14 tests a model in which self-esteem moderates the relationship between the mediating variable (perceived social resources or construal level) and the outcome variable (performance on the OSPAN task; see Figure 3). Model 7 (Hayes, 2013) was also run; this tests a model in which self-esteem moderates the relationship between the independent variable (condition) and the mediating variable (perceived social resources or construal level). The results were the same, in that there was no evidence for moderated mediation.

[3] Studies that have found an effect of self-affirmation on belonging have typically only seen these effects in minority groups (Cook et al., 2012). To test the possibility that belonging mediates the effect of self-affirmation on OSPAN performance, the moderated mediation analysis was rerun only in participants who had indicated that they were not white (N = 25). As before, there was no evidence that belonging mediated the effect of self-affirmation on OSPAN score at levels of low, β = 1.45, SE = 1.45, 95% CI [-3.13; 14.95], mean, β = 1.52 (SE = 3.50), 95% CI [-2.50; 13.53], or high self-esteem β = 1.58, SE = 4.20, 95% CI [-4.37; 13.02]. Thus, the confidence intervals for the index for moderated mediation crossed zero, β = 0.11, SE = 4.26, 95% CI [-7.23; 9.00]. However, the results should be treated with caution due to the small sample size.

Chapter 4: Systematic review of the effect of self-affirmation on positive affect

Abstract

Objectives: Positive affect has frequently been discussed as a possible mechanism of self-affirmation effects on a wide variety of outcomes. However, evidence that self-affirmation increases positive affect appears inconclusive. The aim of this systematic review therefore was to provide an overview of the available evidence regarding the effect of self-affirmation on positive affect. ***Method:*** A literature search yielded 45 eligible articles (54 studies, N = 5378 participants). ***Results:*** Most studies (n = 36) found no significant effect of self-affirmation on positive affect; however study characteristics were identified that increased the likelihood that self-affirmation had an effect on positive affect. In particular, self-affirmation was more likely to increase positive affect if the study 1) specified that the participant should relate their answers to their feelings during the self-affirmation task, 2) measured positive affect immediately after the self-affirmation task, 3) used emotion items rather than mood or general affect items, 4) used more items to measure positive affect, 5) used unipolar rather than bipolar response scales, and 6) did not include a threat. ***Conclusion:*** The results suggest that positive affect can be an immediate consequence of self-affirmation and should not be discounted as a possible mechanism underlying some of the effects of self-affirmation.

Introduction

Self-affirmation – the act of reflecting on valued aspects of the self – has been found to have positive effects on a wide range of cognitive and behavioural outcomes, across diverse domains (for reviews, see Cohen & Sherman, 2014; Sherman & Cohen, 2006). It has been frequently proposed that self-affirmation achieves its wide-ranging effects via positive affect (e.g. Crocker Niiya & Mischkowski, 2008; Tesser, 2000) and, consequently, many studies have included measures of positive affect following a self-affirmation task. The results concerning the effect of self-affirmation on positive affect have been inconsistent, according to early reviews (McQueen & Klein, 2006; Sherman & Cohen, 2006). However, interest in the role of positive affect in self-affirmation has persisted, and many new studies have included a variety of positive affect measures (e.g. Crocker et al., 2008; Nelson, Fuller, Choi & Lyubomirsky 2014). Therefore the aim of this systematic review was to synthesise the available evidence and to identify whether self-affirmation does increase positive affect, and if possible, the circumstances under which self-affirmation leads to increases in positive affect.

Self-affirmation and positive affect

A central tenet of self-affirmation theory (Steele, 1988) is that people are fundamentally motivated to protect their sense of self-integrity, which is the feeling of being "adaptively and morally adequate" (p. 262). When their sense of self-integrity is threatened, people often seek to guard it by defending against any threats. For example, doing poorly in school may have a negative impact upon a student's sense of self-integrity, as it implies lack of competence. The student may therefore defend against this negative impact by finding an excuse for their poor performance or by downplaying the importance of academic achievement (Sherman & Cohen, 2006). However, another central tenet of self-affirmation theory is that the self is flexible, and that self-integrity can be anchored in various domains.

By reflecting on a domain in their life that gives rise to self-integrity, people can better tolerate threats to other domains in their life (Steele, 1988).

In many self-affirmation studies people are encouraged to reflect on a personally valued aspect of themselves (for a review of self-affirmation manipulations, see McQueen & Klein, 2006). This activity has been linked to a plethora of beneficial outcomes. For example, being self-affirmed before viewing threatening health-risk information increases participants' engagement with such information and even encourages healthier behaviours (Epton, Harris, Kane, van Koningsbruggen & Sheeran, 2015; Sweeney & Moyer, 2015). Self-affirmation has been linked to improvements in academic achievement in minority students (e.g. Cohen, Garcia, Purdie-Vaughns, Apfel & Brzustoski, 2009; Cohen, Garcia, Apfel & Master, 2006), more prosocial behaviour (Lindsay & Creswell, 2014), and reductions in stress (Creswell, Dutcher, Klein, Harris & Levine 2013).

It is clear that self-affirmation can help individuals respond to a wide variety of situations more adaptively (for a review of self-affirmation effects, see Cohen & Sherman, 2014). The underlying mechanism, on the other hand, is much less clear. One recurring contender for such a mechanism has been positive affect (Tesser, 2000; Tesser & Cornell, 1991). Broadly speaking, affect refers to "a configuration of positively- or negatively-valenced subjective reactions that a person experiences at a given point in time and perceives as either pleasant or unpleasant feelings" (Wyer, Clore & Isbell, 1999, p. 3). Affect is an umbrella term used to describe both mood and emotions, but all three terms are often used interchangeably (Hume, 2012). The key distinction between mood and emotions is that emotions describe specific feelings that are directed towards a person or an object and that mood describes a more general positive or negative affective state (Beedie, Terry & Lane, 2005; Hume, 2012).

It seems feasible that spending time thinking about oneself in a positive light should elicit a positive affective state. It is therefore not surprising that many studies that have investigated the effects of self-affirmation have included measures of positive affect, to test whether positive affect is driving self-affirmation effects. Some of these studies have found evidence that self-affirmation increases positive affect (e.g. Creswell et al., 2013) and even that it mediates the effects of self-affirmation on outcomes such as acceptance of a threatening health-message (Crocker et al., 2008). However, other studies have failed to support the hypothesis that self-affirmation increases positive affect (e.g. Klein, Harris, Ferrer & Zajac, 2011).

Overall, the evidence that self-affirmation increases positive affect is mixed and inconsistent. To date, two reviews of self-affirmation literature have considered and synthesised the evidence on the link between self-affirmation and positive affect: McQueen and Klein (2006) provided a narrative synthesis of studies that have included positive mood measures and whether these studies showed increases in positive mood following self-affirmation. They found more studies in which self-affirmation did not have a significant effect on positive mood, than studies in which self-affirmation increased positive mood. Sherman and Cohen (2006) also provide a brief narrative synthesis of studies that have failed to find a significant effect of self-affirmation on positive mood (but do not consider studies in which self-affirmation did have a significant effect on positive mood). However, since both these reviews have been carried out, a considerable number of new studies have been published that show self-affirmation can increase positive affect (e.g. Creswell et al., 2013; Crocker et al., 2008; Nelson et al., 2014).

Currently, we cannot be sure that positive affect can be considered a mechanism of self-affirmation, because it has not been conclusively established that self-affirmation reliably increases positive affect. However, we can also not exclude positive affect as a mechanism,

as there is some evidence pointing towards a link between self-affirmation and positive affect (e.g. Crocker et al., 2008). The objective of this systematic review therefore was to assimilate all available evidence from studies that have included both a self-affirmation manipulation and a positive affect measure and to provide an up-to-date review of whether the available evidence, taken together, suggests that self-affirmation increases positive affect.

The ultimate aim of this review is not to answer the question of whether positive affect is a mechanism of self-affirmation, but to establish whether self-affirmation leads to increases in positive affect. This is the first step in testing positive affect as a mechanism of self-affirmation effects, as it is important to know what the immediate impact of self-affirmation on positive affect is.

Method

Search strategy and inclusion criteria

Three databases (Web of Science, PsycInfo and PubMed) were used to search for relevant articles. Articles published before 1988 (when the article outlining self-affirmation theory was published; Steele, 1988) and articles published in languages other than English were filtered out of these searches. The key search term used was self affirm* in combination with mood OR positive affect* OR positive emoti*. Articles and theses published before August 2016 were included. Due to resource constraints, no unpublished studies were included, nor were authors of published authors' contacted in cases where information was not reported.

Figure 1 shows the flow of studies found, excluded and included (created using the PRISMA framework; Liberati et al., 2009). Articles were eligible for inclusion in the review if they had compared a group of participants who had received a self-affirmation task to a group of participants who had received a control task, and if they had measured some form of positive affect (mood, or general affect, or emotions) after the self-affirmation manipulation.

Studies that had included both positive and negative items, and had created a global affect score by combining the positive affect items and the reverse-scored negative affect items (e.g. Brief Mood Introspection Scale; Mayer & Gaschke, 1988; see Table 1 for all measures to which this applies), were included. The rationale for this was that this measure is designed to capture whether an individual is globally experiencing more positive than negative affect. Positive and negative affect can be inversely correlated (Watson, Clark & Tellegen, 1988), meaning that if an individual is experiencing negative affect, this may lower their positive affect. However, the two are not ends of a continuum, but rather independent processes (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009; Tellegen, Watson & Clark, 1999). This means that reverse scoring a negative affect score only indicates the absence of negative affect, but this does not automatically infer the presence of positive affect. Consequently, studies that only measured negative affect were excluded, as they do not provide information on the presence of positive affect. Where studies had included positive and negative affect scales separately (as is the case with Positive and Negative Affect Schedule; Watson, Clark & Tellegen, 1988), only the results of the positive affect scale was considered.

Studies were excluded if the self-affirmation was paired with another manipulation (e.g. exercise; Lee, Ashman, Shang, & Suzuki, 2014), because any effects on positive affect could not be solely attributed to self-affirmation.

The initial search returned 346 articles, with 22 articles identified through other sources (see Figure 1). Duplicates (n = 68) across the databases were removed, leaving 300 articles. Abstracts of these were screened for eligibility, and 202 were excluded (mostly due to lack of a self-affirmation manipulation; see Figure 1). This left 98 articles for which the full text was accessed to assess eligibility. Another 52 articles were excluded at this stage, leaving a final sample of 46 articles, with 55 studies and a total of 7672 participants.

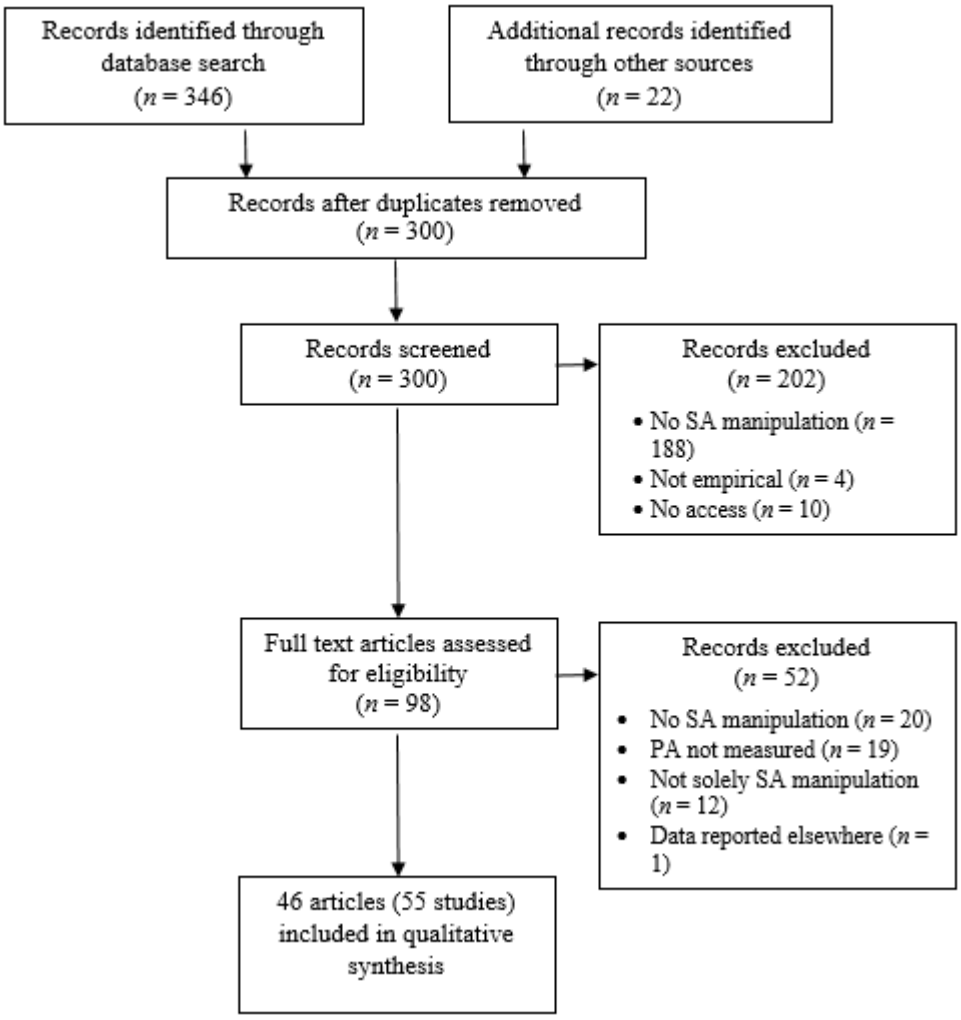

Figure 1. Flow chart of articles included in the systematic review (SA = self-affirmation; PA = positive affect).

Coding of studies

Content from the eligible studies was coded according to the following categories:

Threat: It is likely that the presence of a threat would influence participants' feelings and may interact with self-affirmation. In particular, self-affirmation is said to encourage individuals to engage more with threatening information (e.g. Klein & Harris, 2009; Legault, Al-Khindi & Inzlicht, 2012), which in turn could dampen any positive affect. Therefore, studies were coded according to whether or not they included a threat component. Specifically, studies were coded as including 'no threat' if they either did not include any

threat component, or if they introduced the threat to participants after both the self-affirmation manipulation and the positive affect measure (in which case, the threat should not have an impact on the effect of self-affirmation on positive affect). A threat component was either an explicit threat such as personally relevant health-risk information (e.g. a leaflet on the effects of alcohol consumption on breast cancer; Harris & Napper, 2005), or a challenging or demanding situation, such as being rejected by others (Burson, Crocker, & Mischkowski, 2008) or recalling unresolved conflicts (Schumann, 2014).

Type of threat: The studies were coded according to what type of threat, if any, they included. Physical threat, such as threat to one's health, may cause more anxiety than other types of threat (Endler, Parker, Bagby & Cox, 1991), which in turn could interfere with any positive affect present. Therefore, the studies were coded into 'health threat' (which describes studies in which participants were given health-risk information), 'stereotype threat' (which describes studies in which participants who may worry about being negatively stereotyped were exposed to situations where the stereotype might be particularly salient), 'social conflict' (which describes studies in which participants were exposed to or reminded of a challenging social situation), 'other' (which describes studies in which the threat did not fit into the previous categories, such as making participants' dissatisfaction with their appearance salient; Park, 2007) and 'no threat' (which describes studies that either did not have a threat, or that introduced the threat to participants after both the self-affirmation manipulation and the positive affect measure).

Timing of measurement: Studies were coded according to whether positive affect was measured immediately following the self-affirmation manipulation, or not. The first category, studies that measured positive affect immediately following self-affirmation, overlaps somewhat with the 'no threat' categories in other codes. However, this code also considers the possibility that asking participants to fill out a questionnaire or engage in any

kind of activity might interfere with positive affect. Therefore, studies in which participants were given any kind of scale, measure, activity or stimuli (including threats) between the self-affirmation and positive affect measure, were grouped in one category here, which was compared to all studies in which positive affect was measured immediately after self-affirmation, with no interruption whatsoever between self-affirmation and positive affect measure. If self-affirmation is more likely to increase positive affect when this was measured without interruption, it could indicate that exposing participants to something else interferes with the positive affect, such as by distracting them.

Answer scale: Positive affect can be measured using both bipolar (e.g. *happy* to *sad*) and unipolar scales (e.g. *agree* to *disagree*). Bipolar scales capture the valence of participants' feelings, indicating whether, on the whole, they are feeling more positive or negative. However, it has been argued that positive and negative affect are not polar opposites, and indeed can occur simultaneously (Cohn et al., 2009; Fredrickson, 2013; Tellegen et al., 1999). Forcing participants to choose between the two ends of the positive-negative spectrum could mean any effects are cancelled out if participants are feeling both positive and negative affect. Studies were therefore coded according to whether they used unipolar or bipolar scales.

Number of items: Although there have been attempts to identify a concise number of 'basic emotions' (e.g. love, joy, anger, sadness, fear, and surprise; Shaver, Schwartz, Kirson & O'Connor, 1987), it is clear that in reality, individuals display a much wider range of emotions (e.g. "anger, contempt, enthusiasm, envy, fear, frustration, disappointment, embarrassment, disgust, happiness, hate, hope, jealousy, joy, love, pride, surprise, and sadness"; Humes, 2012, p.262). Thus, using only a limited number of items to capture affect may run the risk of overlooking other possible emotions (Pekrun & Linnenbrink-Garcia, 2014). The number of items that studies used to capture positive affect was counted for each

study. An item using a bipolar scale (e.g. *happy* to *sad*) was counted as one item. Where studies had included reverse-scored negative items (as was the case with the BMIS), these items were counted, as they contributed to the final result being evaluated. Where studies had used positive and negative affect items in separate scales (e.g. the PANAS), only the positive items were counted, as the effect of self-affirmation on these items constituted the final result being evaluated.

Type of measurement: As described earlier, the terms affect, emotions and mood are often used interchangeably, although emotions tend to refer to specific feelings that are directed towards a person or an object, whereas mood refers to a more general, non-specific, non-directed affective state. With such a distinction in mind, studies were coded according to what type of affect they measured. The categories were as follows: Initially, all studies that had used previously validated and commonly used affect measures were coded according to what measure they used. These were the PANAS (Watson et al., 1988) and the BMIS (Mayer & Gaschke, 1988). The remaining studies used a variety of different items to measure positive affect, and were coded according to type of items as follows: First, 'mood', which describes studies in which affect was measured as general mood (e.g. "How would you describe your mood right now?", from *extremely bad* to *extremely good*, Cohen, Aronson & Steele, 2000, Experiment 3). Second, 'specific positive emotions', which describes studies in which positive affect was measured using specific emotion items that were either self- or other-directed (e.g. "*love, joy, giving, connectedness, and pride*", Armitage & Rowe, 2011). Third, 'positive affect', which describes studies in which the positive affect measure was either a mixture of mood items and emotion items, or which were more non-specific emotions that were not other- or self-directed (e.g. "*good, friendly, pleasant, happy*", Hales, Wesselmann & Williams, 2016). Finally, 'affirmation-related emotions' describes studies in

which participants were asked to describe what emotions they felt during the self-affirmation task (as opposed to ‘currently’ or ‘right now’).

Results

The studies (*n* = 55) were categorised into whether they showed an effect of self-affirmation on positive affect or not. The data extracted in this way is presented in text and in table form. Around two thirds of studies (*n* = 37) did not find a significant difference in positive affect between the self-affirmation and control group. Of the remaining studies, most (*n* = 16) found that self-affirmation increased positive affect, with a small number of studies (*n* = 2) finding a decrease in positive affect following self-affirmation. In order to identify any patterns associated with whether studies found an increase or decrease in positive affect following self-affirmation or no effect, the studies were further categorised into the following variables:

Threat. Studies were coded according to whether they had included a threat, such as personally relevant health-risk information or a challenging situation (*n* = 33) or whether they had no threat component or the threat was presented after both the self-affirmation manipulation and the positive affect measure (*n* = 22). A pattern emerged suggesting positive affect was more likely to emerge in the absence of a threat. Among those studies that did not find an effect of self-affirmation on positive affect, more studies had included a threat (see Table 1). Likewise, among those studies that found self-affirmation increased positive affect, a small majority had not included any threat (*n* = 10 out of 16). Further, the two studies that found self-affirmation decreased positive affect had both included a threat.

Type of threat. Studies were coded according to the type of threat they included. The categories were no threat (*n* = 22), health threat (*n* = 8), stereotype threat (*n* = 4), social conflict (e.g. remembering a past transgression; *n* = 12) and other (e.g. sources of dissatisfaction with appearance made salient; *n* = 9; see Table 1). Self-affirmation was less

likely to increase positive affect in the presence of a health threat, compared to other threats: Studies that had tested the effect of self-affirmation on positive affect after presenting a health threat either found no effect of self-affirmation (*n* = 6) or that self-affirmation decreased positive affect (*n* = 2).

Timing of measurement. The studies were coded according to whether positive affect was measured immediately following self-affirmation (*n* = 19), or whether participants were exposed to anything else between the self-affirmation and the positive affect measure (such as to a threat, any other manipulations, or any other outcome measures; *n* = 33; see Table 1). In a small number of studies (*n* = 3), the timing of the positive affect measurement was unclear. Timing of the positive affect measure had an association with whether or not studies found an effect of self-affirmation on positive affect. In particular, of those studies that measured positive affect immediately following self-affirmation (*n* = 19), a small majority (*n* = 11) found that self-affirmation increased positive affect. Of those studies that had exposed participants to something in between self-affirmation and measuring affect (*n* = 33), the majority (*n* = 26) reported no effect of self-affirmation, or a detrimental effect on self-affirmation (*n* = 2), hinting at the possibility that exposing participants to something else interferes with their positive affect.

Answer scale. The studies were coded according to whether they used a unipolar response scale (e.g. *agree* to *disagree*; *n* = 39) or a bipolar response scale (e.g. *happy* to *sad*; *n* =12; see Table 1) to measure positive affect. One study used an implicit mood measure and three studies did not specify the type of scale used. Of particular note is the fact that none of the studies that found self-affirmation increased positive affect (*n* = 16) used bipolar scales. Further, the only studies to report a reduction of positive affect following self-affirmation used bipolar scales (*n* = 2).

Number of items. The number of items used to measure positive affect was extracted from each study (see Table 1). Studies used on average 7.06 items (*SD* = 5.36), ranging from 1 to 20. A clear pattern emerged in that those studies that had found that self-affirmation increased positive affect used more items (*M* = 9.69, *SD* = 5.29) than those that had failed to find an effect of self-affirmation (*M* = 6.18, *SD* = 5.03) and those that had found that self-affirmation decreased positive affect (*M* = 1.00, *SD* = 0.00).

Type of measurement. There was much heterogeneity in the types of measures used to capture positive affect following self-affirmation. The 55 studies used 29 different measures (see Table 2 for an overview of all studies). The most commonly used scale was the PANAS (Watson et al., 1988; *n* = 10), followed by the Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988; *n* = 5; see Table 1). The remaining measurements were coded according to the types of items they used: simple mood items (e.g. "How would you describe your mood right now?", from *extremely bad* to *extremely good*, Cohen et al., 2000, Experiment 3; *n* = 10), specific positive emotions (other- or self-directed, e.g. "*love, joy, giving, connectedness, and pride*", Armitage & Rowe, 2011; *n* = 13) and positive affect items (a mix of mood and emotions items, or non-directed items, e.g. "*good, friendly, pleasant, happy*", Hales et al., 2016; *n* = 9). Finally, some studies asked participants to relate their emotions to the self-affirmation task (affirmation-related emotions; *n* = 4). One study used an implicit mood measure and three studies did not specify the type of items used. A pattern emerged suggesting that using specific positive emotion items was associated with finding that self-affirmation increased positive affect, as the majority of studies that had used such items reported an increase in positive affect following self-affirmation (*n* = 8). Further, all studies (*n* = 4) that had used emotion items but had asked participants to relate their answers back to the time when they had been completing the task showed an increase in positive affect following self-affirmation.

Table 1. Overview of findings of systematic review on the effect of self-affirmation (SA) on positive affect (PA)

	No effect of SA *n* = 37	SA increased PA *n* = 16	SA decreased PA *n* = 2
Threat			
No threat, *n* = 21	11 (20.0%)	10 (18.5%)	0 (0.0%)
Threat, *n* = 34	26 (47.3%)	6 (10.9%)	2 (3.6%)
Threat type			
No threat, *n* = 21	11 (20.0%)	10 (18.2%)	0 (0.0%)
Health threat, *n* = 8	6 (10.9%)	0 (0.0%)	2 (3.6%)
Stereotype threat, *n* =4	4 (7.3%)	0 (0.0%)	0 (0.0%)
Social conflict, *n* = 12	9 (16.4%)	3 (5.1%)	0 (0.0%)
Other, *n* = 10	7 (12.7%)	3 (5.1%)	0 (0.0%)
Timing of PA measure			
PA measured immediately after SA, *n* = 19	8 (14.5%)	11 (20.0%)	0 (0.0%)
PA not measured immediately after SA, *n* = 33	26 (47.3%)	5 (9.1%)	2 (3.6%)
Not clear, *n* = 3	3 (5.1%)	0 (0.0%)	0 (0.0%)
Type of measurement			
PANAS, *n* = 10	9 (16.4%)	1 (1.8%)	0 (0.0%)
BMIS, *n* = 5	4 (7.3%)	1 (1.8%)	0 (0.0%)
Mood (e.g. good, positive), *n* = 10	8 (14.5%)	0 (0.0%)	2 (3.6%)
Affect (e.g. happy, pleasant), *n* = 9	8 (14.5%)	1 (1.8%)	0 (0.0%)
Specific emotions (e.g. love, pride), *n* = 13	5 (9.1%)	8 (14.5%)	0 (0.0%)
Emotions during SA task, *n* = 4	0 (0.0%)	4 (7.3%)	0 (0.0%)
Implicit, *n* = 1	0 (0.0%)	1 (1.8%)	0 (0.0%)
Not specified, *n* = 3	3 (5.1%)	0 (0.0%)	0 (0.0%)
Scale format			
Unipolar (e.g. agree-disagree), *n* = 39	24 (43.6%)	15 (27.3%)	0 (0.0%)
Bipolar (e.g. happy-sad), *n* = 12	10 (18.2%)	0 (0.0%)	2 (3.6%)
Other (implicit), *n* = 1	0 (0.0%)	1 (1.8%)	0 (0.0%)
Not specified, *n* = 3	3 (5.1%)	0 (0.0%)	0 (0.0%)
Number of items			
M	6.18	9.69	1.00
SD	5.03	5.29	0.00

Notes. PA = Positive Affect; SA = Self-affirmation; PANAS = Positive And Negative Affect Schedule (Watson, Clark & Tellegen, 1988); BMIS = Brief Introspective Mood Scale (Mayer & Gaschke, 1988)

Table 2. Overview and details of studies that have tested the effect of self-affirmation (SA) on positive affect (PA)

Reference	*N*	Study location	Threat	Timing: PA immediately after SA?	Measure used	Number of items	Scale type	Did SA have an effect?	Details of items
Armitage & Rowe, 2011, Experiment 1	84	UK	None	Yes	Emotions	5	Unipolar	SA condition more positive	Love, joy, giving, connectedness, pride
Armitage & Rowe, 2011, Experiment 2	344	UK	None	Yes	Emotions	5	Unipolar	SA condition more positive	love, joy, giving, connectedness, pride
Binning et al. 2015, Study 2	159	USA	Social conflict	No	Affect	4	Unipolar	None	Glad, unhappy, sad, happy[a]
Brinõl et al., 2007, Experiment 3	87	Spain	None	No	Mood	2	Bipolar	None	Sad–happy, unpleasant–pleasant
Bucchianeri & Corning, 2012	86	USA	Other	Yes	Mood	1	Bipolar	None	Extremely bad–extremely good
Burgess et al., 2014	100	USA	Stereotype Threat	Yes	PANAS	10	Unipolar	None	PANAS
Burson et al., 2012	92	USA	Social conflict	No	Emotions during SA	3	Unipolar	SA condition more positive	Loving, compassionate, connected
Cehajić-Clancy et al., 2011, pre-test	57	Israel	Social conflict	Not clear	Not clear		Not specified	None	Not specified
Cohen et al., 2000, Study 3	64	USA	Social conflict	No	Mood	1	Bipolar	None	Extremely bad–extremely good
Creswell et al., 2013	73	USA	None	Yes	PANAS	8	Unipolar	SA condition more positive	Proud, content, joyful, love, grateful, sad, angry, scared
Crocker et al., 2008, Study 1	139	USA	None	Yes	Emotions during SA	11	Unipolar	SA condition more positive	Love, joyful, giving, empathic, connected, sympathy, grateful, proud, content, clear, humble
Crocker et al., 2008, Study 2	102	USA	None	Yes	Emotions during SA	10	Unipolar	SA condition more positive	Loving, strong, connected, admirable, powerful, proud, in control, humble, empathic, superior
Dillard et al., 2005	130	USA	Health	No	Mood	2	Bipolar	None	Extremely bad–extremely good, extremely unhappy–extremely happy

(continued)

Table 2 *(continued)*

Exline & Zell, 2009	167	USA	Social conflict	No	Emotions during SA	166	Unipolar	SA condition more positive	Happy, positive, good, strong, Shamed, embarrassed, guilty, empathic toward the other person, gentle toward the other person, happy, positive, good, sad, angry, strong
Hales et al., 2016, Study 1	179	USA	Social conflict	No	Affect	4	Unipolar	None	Good, friendly, pleasant, happy
Harris & Napper, 2005	82	UK	Health	No	Mood	1	Bipolar	SA condition more negative	Negative–positive
Havranek et al., 2012	99	USA	Stereotype Threat	No	PANAS	10	Unipolar	None	PANAS
Huynh et al., 2014	80	USA	Other	Yes	BMIS	16	Unipolar	None	BMIS[a]
Inman, 2014	56	USA	None	Yes	Emotions	7	Unipolar	None	Loved, accepted, at peace, validated, encouraged, happy, reassured
Jessop et al., 2009	162	UK	Health	No	Mood	1	Bipolar	SA condition more negative	Extremely sad–extremely happy
Johnson et al., 2016	434	USA	None	No	PANAS	10	Unipolar	None	PANAS
Kamboj et al., 2016	528	UK	None	Yes	Emotions	4	Unipolar	SA condition more positive	Love, connectedness, affection and joy
Klein et al., 2001, Study 1	194	USA	None	Yes	PANAS	10	Unipolar	None	PANAS
Klein et al., 2011, Experiment 1	120	USA	Health	No	Affect	6	Bipolar	None	Bad/good, sad/happy, displeased/pleased, calm/excited, tired/energetic, sedate/aroused
Klein et al., 2011, Experiment 2	99	USA	Health	No	Emotions	4	Unipolar	None	Eager, enthusiastic, elated, proud
Koole & van Knippenberg, 2007	58	Netherlands	None	No	PANAS	10	Unipolar	None	PANAS
Koole et al., 1999, Study 3	70	Netherlands	None	No	Implicit	10	Other (implicit)	SA condition more positive	Implicit
Lannin et al., 2013	84	USA	Stereotype Threat	No	PANAS	10	Unipolar	None	PANAS

(continued)

Table 2 *(continued)*

Lindsay & Creswell, 2014, Study 1	58	USA	None	Yes	Emotions	12	Unipolar	SA condition more positive	Trusting, sympathy, loving, grateful, joyful, hopeful, secure, open, confident, proud, content, connected
Morgan & Atkin, 2016	42	UK	Other	No	Emotions	10	Unipolar	SA condition more positive	Motivation, pride, confidence, satisfaction, happiness
Napper et al., 2009, Study 1	400	UK	None	No	Affect	2	Unipolar	None	Happy, elated
Napper et al., 2009, Study 2	246	UK	None	No	Affect	2	Unipolar	None	Happy, elated
Napper et al., 2014	80	UK	Health	No	Mood	1	Bipolar	None	Negative–positive
Nelson et al., 2014, Study 1	70	South Korea	None	Yes	Emotions	20	Unipolar	SA condition more positive	Amused, awe, grateful, hopeful, inspired, interested, joyful, love, proud, serene, stressed, sad, guilty, hateful, disgust, embarrassed, angry, contemptuous, ashamed[a]
Nelson et al., 2014, Study 2	65	USA	None	Yes	Emotions	20	Unipolar	SA condition more positive	Amused, awe, grateful, hopeful, inspired, interested, joyful, love, proud, serene, stressed, sad, guilty, hateful, disgust, embarrassed, angry, contemptuous, ashamed[a]
Nyhan & Reifler, 2016, Study 1	1000	USA	Social conflict	not clear	Not clear		Not specified	None	Not specified
Park, 2007, Study 3	130	USA	Other	No	Emotions	5	Unipolar	SA condition more positive	Happy, pleased, cheerful, proud, content
Pauketat et al., 2016, Experiment 1	61	USA	Other	No	Affect	2	Unipolar	None	Happy, sad[a]
Pauketat et al., 2016, Experiment 2	47	USA	None	No	Affect	2	Unipolar	None	Happy, sad[a]
Schmeichel & Vohs, 2009, Study 1	63	USA	Other	Yes	BMIS	16	Unipolar	SA condition more positive	BMIS[a]
Schmeichel & Vohs, 2009, Study 2	76	USA	Other	Yes	PANAS	10	Unipolar	None	PANAS

(continued)

Table 2 *(continued)*

Schumann, 2014, Study 2	96	USA	Social conflict	No	BMIS	16	Unipolar	None	BMIS[a]
Schumann, 2014, additional data	53	USA	Social conflict	No	BMIS	16	Unipolar	None	BMIS[a]
Shea & Masicampo, 2014	70	USA	Other	No	BMIS	16	Unipolar	None	BMIS[a]
Sherman et al., 2000, Study 1	60	USA	Health	No	Mood	1	Bipolar	None	Extremely bad mood – extremely good mood
Shrira & Martin, 2005, Study 1	101	USA	None	No	PANAS	10	Unipolar	None	PANAS
Stone et al., 2011, Experiment 2	107	USA	Stereotype Threat	No	Affect	2	Unipolar	None	Happy, excited
Toma, 2010, Study 1	98	USA	None	No	Emotions	10	Unipolar	None	Loving, joyful, giving, proud, content, empathic, grateful, connected, loved, supported
Toma, 2013	159	USA	Other	Yes	Emotions	3	Unipolar	None	feeling joyful, grateful, loving
Townsend & Sood, 2012, Study 1	159	USA	None	Yes	PANAS	4	Bipolar	None	PANAS: sad – happy; bad mood – good mood; irritable – pleased; depressed – cheerful
Vance, 1998	112	USA	Social conflict	Yes	Affect	10	Unipolar	SA condition more positive	friendly, happy, energetic, optimistic, content, good, pleased with self, good about self, satisfied with self, proud
Wakslak & Trope, 2009	111	USA	None	not clear	Not clear		Not specified	None	Not specified
Ward et al., 2011, Study 1	52	USA	Social conflict	No	Mood	1	Bipolar	None	Extremely negative–extremely positive
Ward et al., 2011, Study 2	111	USA	Social conflict	No	Mood	1	Bipolar	None	Extremely negative–extremely positive
Zhao et al., 2014	116	USA	Health	No	Emotions	4	Unipolar	None	Inspired, alert, determined, interested

Notes. USA = United States of America; UK = United Kingdom; PA = Positive Affect; SA = Self-affirmation; PANAS = Positive And Negative Affect Schedule (Watson, Clark & Tellegen, 1988); BMIS = Brief Introspective Mood Scale (Mayer & Gaschke, 1988); [a] Negative items were reverse scored and a combined score was calculated.

Discussion

This systematic review has revealed several differences in study design and the way positive affect was measured, which influenced whether self-affirmation was more or less likely to increase positive affect. In particular, studies were more likely to show that self-affirmation resulted in higher positive affect if: 1) they asked participants to report on the emotions they had felt during the self-affirmation task, 2) they measured positive affect immediately after the self-affirmation task, 3) they used emotion items rather than mood or general affect items, 4) they used more items to measure positive affect, 5) they used unipolar rather than bipolar response scales, and 6) they did not include a threat, in particular a health threat.

These findings have important implications for the debate concerning whether self-affirmation increases positive affect. The general picture that has emerged is that self-affirmation does increase positive affect, but only certain types of positive affect (such as more specific positive emotions). This calls into question the prevalent conclusion that self-affirmation does not increase positive affect (Sherman & Cohen, 2006; McQueen & Klein, 2006). In addition, it can help us understand the boundary conditions of the link between self-affirmation and positive affect: when does self-affirmation increase positive affect and what "kind" of positive affect does it produce?

When does self-affirmation increase positive affect?

Self-affirmation was more likely to increase positive affect if positive affect was measured immediately after the self-affirmation task and in the absence of a threat. Further, participants reported feeling positive affect *during* the self-affirmation writing tasks. This suggests that positive affect is indeed an immediate consequence of self-affirmation, but is typically short-lived: After participants were faced with a threat, or had completed other outcome measures, positive affect was often not detected. There are several possible

explanations for this finding. First, the threat may have induced negative affect which could have interfered with participants' positive affect. Second, the intervening threats or outcome measures may simply have diverted participants' attention away from their affective states caused by self-affirmation and onto the threat. Positive affect can be fleeting (Fredrickson & Losada, 2005) and self-affirmation has been shown to steer attention towards threats (Klein & Harris, 2009; Legault et al., 2012).

A third possible explanation is that positive affect acts as a resource, which is used up when dealing with a threat (Raghunathan & Trope, 2002; Tesser, 2000). Here, the idea is that facing negative, self-relevant information incurs an emotional cost, as it dampens individuals' mood. Individuals therefore avoid such threatening information in favour of protecting their mood. Being in a positive mood, then, may make more in-depth processing of threatening information more likely, as it provides individuals with an emotional buffer with which they can cope with the information. The positive mood, as a resource, gets used up in this process (as shown experimentally by Raghunathan & Trope, 2002). Some evidence for the mood-as-a-resource explanation comes from the observation in the current review that self-affirmation was more likely to increase positive affect in the absence of a threat, and was even reduced following health threats. However, all possible explanations warrant direct testing.

Of particular note is the finding that health threats were never associated with increases in positive affect following self-affirmation (and were even associated with decreases in positive affect following self-affirmation in two instances). This may be due to a combination of factors: Firstly, it seems likely that health threats evoke more negative emotional reactions than the other types of threats. Physical threat is associated with more anxiety than other types of threat (Endler et al., 1991) and the messages employed in such studies typically outline the negative consequences of health-relevant behaviours to participants' physical health. Such messages are often designed to invoke fear or concern

(Witte, 1992) and thus a drop in positive affect would be expected when participants read these messages. Secondly, it hints at evidence for reduced fear control (Leventhal, 1970): self-affirmation reduces the need to shield self-integrity from potential threats, and lets individuals engage with threats more than they would otherwise. Individuals are no longer trying to defend against such threats and consequently experience negative emotions such as fear, or worry, which reduces the likelihood of participants experiencing positive affect. Indeed, self-affirmed individuals report more negative emotions such as worry when presented with a personally relevant health risk, in studies that were not included in this review because they only measured negative affect (e.g. Griffin & Harris, 2011). The presence of such negative emotions may be responsible for the finding that self-affirmation was associated with less positive affect in two studies of this systematic review. Of note, these studies used bipolar scales, suggesting that the scales (which could otherwise have been 'positive' following self-affirmation) were tipped in favour of 'negative' by these discrete negative emotions. However, it must be acknowledged that these conclusions are based on only two studies that were included in the present review because they used global measures of affect.

What kind of positive affect does self-affirmation produce?

There was some initial evidence that self-affirmation was capable of producing negative affect when combined with a health threat. This suggests that self-affirmation can result in both positive and negative affect, and highlights the need for measures that can accurately capture both independently. Indeed, the idea that individuals can only feel one emotion in an opposite pair (e.g. happy or sad) has recently been contested (Larson, McGraw & Cacioppo, 2011). In line with this, the systematic review found that none of the studies that had used bipolar scales found that self-affirmation increased positive affect. It appears that forcing self-affirmed participants to decide between positive and negative affect on a single,

continuous scale either causes the two to cancel each other out, or causes strong discrete emotions to influence the valence. It is recommended to measure positive and negative affect using two separate scales, to allow for the possibility that both are occurring simultaneously.

In addition, the systematic review found that studies in which self-affirmation had increased positive affect had used more items (both positive items and reverse-scored negative items) than studies that had not found an effect of self-affirmation on positive affect. This adds strength to the argument that it is not enough to simply look at the valence of feelings, but that the kind of positive affect that self-affirmation produces is multifaceted. Further, studies that measured specific emotions, such as other-directed or self-directed emotions, were more likely to detect an overall increase on these measures following self-affirmation. It is important to acknowledge that these two findings may be confounded, as studies that used specific emotion items may also have used more items as a result of using emotion items. However, taken together, the findings highlight the importance of using specific emotion items (which may incidentally mean more items) when measuring the effect of self-affirmation on positive affect.

Limitations

One limitation of this systematic review that must be acknowledged is that the coding and reviewing of studies has currently only been carried out by one researcher. It would be prudent to validate the coding by another researcher and to test for inter-rater agreement. Further, the review has currently not included unpublished data. This may increase the risk of a publication bias, whereby results are generally positive because only positive findings are published. However, given that the majority of the studies (all except Crocker et al., 2008) were primarily interested in testing the effect of self-affirmation on outcomes that were not positive affect, the findings regarding positive affect should be unaffected by this. Indeed, the fact that two thirds of studies did not find an effect of self-affirmation on positive affect

speaks to this point. Nonetheless, tracking down and including unpublished data could be a beneficial addition to this review. These limitations notwithstanding, the review provides an initial, up-to-date picture of the evidence that self-affirmation can induce positive affect.

Future research

Taken together, the review has found that self-affirmation may be causing momentary positive emotions (as opposed to long-lasting positive moods). This has implications for how future studies may wish to measure positive affect in self-affirmation studies, as positive emotion measures may more accurately capture the affective consequences of self-affirmation. Further, it has implications for theories on the role of positive affect as a mechanism of self-affirmation effects: it suggests that we may need to consider specific positive emotions, rather than general positive mood, as a possible mechanism. It may be fruitful for future research to consider existing frameworks of positive emotions, which may help to explain how positive emotions could drive self-affirmation effects. For example, the Broaden and Build Theory of positive emotions (Fredrickson, 1998; 2001) proposes that experiencing positive emotions momentarily broadens one's attention and flexibility and in the long-term, builds one's resources by making available alternative ways of responding to situations. It is intriguing that the Broaden and Build theory outlines the short-lived nature of positive emotions, which are momentary and fleeting, but help build personal resources that are "durable" (Fredrickson, 2004, p. 1369).

Applying the concepts of the Broaden and Build theory to self-affirmation also taps into a noteworthy debate about the durability of self-affirmation effects. In the health domain, self-affirmation effects on attitude and motivation have been shown to last up to a month (Harris, Mayle, Mabbott & Napper, 2007; Harris & Napper, 2005), and in the education setting, self-affirmation was associated with improved grades in minority pupils up to two years later (Brady et al., 2016; Cohen et al., 2009). To explain how a brief task such as self-

affirmation can have such long-lasting effects, it has been suggested that self-affirmation interrupts a habitual cycle of threat interpretation (Cohen et al., 2009; Logel & Cohen 2012). The relatively momentary act of self-affirming develops into a more adaptive cycle as it teaches individuals to evaluate threats in the context of their broad self. Similarly, the Broaden and Build theory proposes that individuals can learn to harness the relatively momentary experience of positive emotions and use them to respond to demanding situations (Fredrickson, 1998). Positive affect may not be durable, but the momentary positive emotions experienced after self-affirmation may influence how individuals respond when faced with a demanding situation, and perhaps individuals learn to use positive affect as a resource whenever a demanding situation occurs. In sum, it may be fruitful for future research to consider self-affirmation effects from the viewpoint of the Broaden and Build theory of positive emotions.

Further, there is potential to explore further moderators of the effect of self-affirmation on positive affect. The current reviews explored study design and measurements as possible moderators and thereby contributed to our understanding of what kind of positive affect may be caused by self-affirmation. However, there are still some residual inconsistencies. As one example, the same measure (the BMIS) detected increases in positive affect following self-affirmation in one study (Schmeichel & Vohs, 2009, Study 1), but failed to do so in another (Huynh et al., 2014). It is therefore important to also consider factors other than study design and type of measurement, which might moderate the effect of self-affirmation on positive affect. One possibility is that some participants are more likely to experience positive affect after self-affirming than others. Future research may wish to consider individual differences as a moderator of self-affirmation effects.

Conclusion

The present systematic review has shown that positive affect can be an immediate consequence of self-affirmation, but may be short-lived, as the effects seem to lessen when participants are presented with threats or other measures. The review also showed that self-affirmation is more likely to increase specific positive emotions, compared to non-specific, general mood. Overall, the results suggest that positive affect (in particular positive emotions) can remain a candidate for a possible mechanism underlying self-affirmation effects.

Chapter 5: Self-esteem moderates the effect of self-affirmation on positive affect.

Abstract

Objectives: Positive affect has been often proposed as a mechanism underlying self-affirmation effects, but studies testing the effect of self-affirmation on positive affect have produced inconsistent results. The current study tested the assumption that such effects are moderated by trait self-esteem, using a detailed affect measure. ***Method:*** Data from two studies were combined. In both studies, participants (N_{Total} = 161) were randomised to either a self-affirmation or a control task. Positive affect (taken from the modified Differential Emotions Scale) was measured immediately after the self-affirmation or control task, and after participants completed a series of cognitively demanding computer tasks. ***Results:*** Self-esteem moderated the impact of self-affirmation on positive affect: those high in self-esteem reported more positive affect if they had self-affirmed. This held true immediately after the self-affirmation manipulation, as well as after the demanding tasks. ***Conclusion:*** Findings suggest that self-affirmation manipulations may evoke different mechanisms in individuals with different levels of self-esteem.

Introduction

Self-affirmation has been found to have beneficial effects across many outcomes (for reviews, see Cohen & Sherman, 2014; Sherman & Cohen, 2006). Although much attention has been paid to the potential mediators of the effects of self-affirmation on e.g. message uptake (e.g. Armitage, Harris, Hepton & Napper, 2008), the mechanisms are still unclear. One plausible candidate is its effect on affect, in particular positive affect. However, the evidence for the effect of self-affirmation on positive affect is inconclusive. It was hypothesised that effects differ as a function of individual differences in trait self-esteem, resulting in moderation effects that have gone undetected. A further hypothesis under test in this study was that the positive affect invoked by self-affirmation is akin to the positive emotions central to the Broaden and Build theory.

Self-affirmation theory

At the centre of self-affirmation theory (Steele, 1988) is the idea that people are inherently motivated to uphold a positive self-image and protect their sense of self-integrity – of being good and competent. In the everyday environment, people encounter events or information that challenge the idea that they are truly good and competent, such as information that highlights lack of healthy life choices. In order to protect their sense of self-integrity, people react defensively to these encounters, making persuasion or behaviour change difficult. Self-affirmation allows people to reinforce their sense of self-integrity, for example by writing about a cherished value such as compassion or generosity (Sherman, Nelson & Steele, 2000) and about how they have acted upon this value in the past. In this way, self-affirmation can boost self-integrity and allows people to engage with events or information that would otherwise conflict with their sense of self-integrity and dampen their positive self-worth.

Self-affirmation has become a promising method that has been applied for example in health psychology, where it has been found to improve attitudes towards health-risk information (Jessop, Simmonds & Sparks, 2009), increase intentions to engage in health-protective behaviours (Sherman et al., 2000) and even result in increased engagement in these behaviours (Epton, Harris, Kane, van Koningsbruggen & Sheeran, 2015; Sweeney & Moyer, 2015). Moreover, self-affirmation has been associated with increases in academic achievement (Cohen, Garcia, Apfel & Master, 2006; Cohen et al, 2009; Myake et al, 2010), superior problem solving under stress (Creswell et al., 2013), better working memory (Logel & Cohen, 2012) and inhibition (Harris, Harris & Miles, 2017; Chapter 2), higher resistance to self-control depletion (Schmeichel & Vohs, 2009), and reduced prejudice (Fein & Spencer, 1997) and self-stigmatizing (Lannin, Guyll, Vogel & Madon, 2013). In sum, self-affirmation has been applied to a diverse range of psychological outcomes, with promising beneficial effects. The exact mechanism underlying these diverse effects remains unclear, but one possible mediator has been repeatedly proposed: affect.

Self-affirmation and affect

The idea that self-affirmation achieves its effects by influencing affect, or mood, is one that has been discussed in many instances (e.g. Crocker et al., 2008; McQueen & Klein, 2006; Sherman & Cohen, 2006; Tesser, 2000). More specifically, it has been speculated that self-affirmation induces positive affect and that such positive affect is the driving mechanism underlying self-affirmation effects. Consequently, affect has been included as an outcome measure in many self-affirmation studies with the aim of establishing a link between self-affirmation and positive affect. Whilst self-affirmation did increase positive affect in some studies (e.g. Creswell et al., 2013), it failed to do so in other studies (e.g. Dillard et al., 2005), and in some studies, it was associated with negative affect (e.g. Harris & Napper, 2005) following exposure to threatening health-risk information. A systematic review examining

the effect of self-affirmation on positive affect (Chapter 4) found that there was much heterogeneity in the way self-affirmation studies have measured positive affect, but that self-affirmation was more likely to be associated with increases in positive affect if positive affect was measured immediately following the affirmation. However, the review concluded that the evidence that self-affirmation increases positive affect is inconsistent.

The role of self-esteem

One possible explanation for the lack of consistent evidence that self-affirmation boosts positive affect may be that previous studies have disregarded the influence of dispositional moderators on the effect of self-affirmation on affect. It has been suggested that individuals with different levels of trait self-esteem may react differently to self-affirmation manipulations (Harris & Epton, 2010; McQueen & Klein, 2006). In particular, although those high in self-esteem may find the self-affirmation exercise easier, because they have a more positive self-image that they continuously identify with (Steele, Spencer & Lynch, 1993), those with low self-esteem are the ones who benefit more from the self-affirmation. For instance, those with low self-esteem may need the self-affirmation prompt to remind themselves of their positive self-images, whereas those with high self-esteem may do this more naturally, without the help of self-affirmation prompts. Indeed, there is evidence that low self-esteem individuals benefit more from self-affirmation manipulations, resulting in less distancing from a partner (Jaremka et al., 2011), less schadenfreude (Van Dijk, van Koningsbruggen, Ouwerkerk & Wesseling, 2011) and less defensive processing of a self-threatening message (Düring & Jessop, 2014; Spencer, Fein & Lomore, 2001). However, it is important to note that some studies have found that high self-esteem individuals benefit more from self-affirmation than low self-esteem individuals: High self-esteem individuals were less stressed after delivering a speech, whereas low self-esteem individuals actually reported the most stress (Creswell et al., 2005) following affirmation. High self-esteem individuals

made riskier decisions after their mortality was made salient to them (compared to low self-esteem individuals), but this effect was attenuated by self-affirmation (Landau & Greenberg, 2006, Study 2). Finally, high self-esteem individuals made fewer self-justifying attitude changes after being primed to think of their self-esteem resources by filling out a self-esteem scale (Steele, Spencer & Lynch, 1993, Study 2), whilst low self-esteem individuals self-justified more strongly after filling out the self-esteem scale. To summarise, the evidence suggests self-affirmation has different effects in individuals with different levels of self-esteem. Indeed, it has been suggested that self-affirmation may evoke different underlying mechanisms in individuals with different levels of self-esteem, for example by increasing self-resources in those with low levels of self-esteem and by broadening the perspective of those with high levels (Sherman, 2013). Thus, self-esteem may be an important moderator of the effects of self-affirmation. This may be the reason why self-affirmation studies often fail to find an effect of self-affirmation on affect: because individuals with different levels of self-esteem experience different levels of affect following a self-affirmation manipulation. The current study therefore tested whether individuals with high or low self-esteem have a different affective experience following a self-affirmation manipulation.

Positive Psychology framework: Broaden and Build

The systematic review of the effect of self-affirmation on positive affect (Chapter 4) found that self-affirmation was more likely to be associated with an increase in positive affect if this was measured as specific emotions (e.g. other- or self-directed emotions, e.g. "*love, joy, giving, connectedness, and pride*", Armitage & Rowe, 2011), compared to more general mood items (e.g. "How would you describe your mood right now?", from *extremely bad* to *extremely good*, Cohen et al., 2000, Experiment 3). It is therefore also possible that any positive affect in self-affirmation is caused by specific positive emotions, rather than a comparatively vague sense of a good or bad mood. This could be another reason why the

evidence that self-affirmation causes positive affect has been inconsistent: because measures targeting specific emotions are more likely to pick it up than simple mood measures.

Despite this, little attention has been paid to theoretical frameworks of positive emotions and how these may help to explain the role of positive affect in self-affirmation. Among these is the Broaden and Build framework of Fredrickson (1998, 2001), which proposes that the adaptive function of positive emotions is to temporarily broaden people's perspectives and make available a wider range of thoughts, actions and possibilities (Fredrickson, 2001). When in this broadened mind set, people may approach problems from a different angle and experience novel ideas, allowing them to build new resources like new skills and knowledge, or build up existing resources like social support or resilience (Fredrickson, 2013). Numerous studies have provided evidence that inducing positive affect results in a broader, more flexible mind set (Fredrickson & Joiner, 2002) and more creative thoughts and actions (Fredrickson & Branigan, 2005).

Parallels between Broaden and Build and Self-affirmation

The Broaden and Build theory offers a framework which can help to explain how self-affirmation may be able to have effects on cognition and behaviour through positive affect: Positive emotions broaden people's awareness and perspective, bringing to mind a wider array of thoughts and behaviours. Indeed, self-affirmation has also been associated with a broadened, more abstract mind set, which has been theorised as one possible mechanism of self-affirmation effects (Schmeichel & Vohs, 2009; Wakslak & Trope, 2009). Thus, there is notable overlap between how the Broaden and Build theory suggests positive emotions influence cognition and behaviour, and how self-affirmation may also exert its influence on cognition and behaviour. With these parallels in mind it is possible that self-affirmation causes those positive emotions that are central to the Broaden and Build theory. The next logical step then is to test the effects of self-affirmation on exactly those positive emotions

that are central to the Broaden and Build theory of positive emotions. These emotions are measured using the modified Differential Emotions Scale (mDES; Fredrickson, Tugade, Waugh & Larkin, 2003), which comprises ten positive and ten negative emotions (described in the Method section). These are averaged and give an indicator of someone's positive and negative affect stemming from positive and negative emotions.

Methodology: Bipolar scales

It is also important to note in this context that the systematic review of the effect of self-affirmation on positive affect (Chapter 4) found that self-affirmation was more likely to be associated with increases in positive affect if studies used unipolar, rather than bipolar, scales to measure positive affect. Many studies have used bipolar mood scales and assessed valence and arousal (Briñol, Petty, Gallardo & DeMarree, 2007; Fein & Spencer, 1997; Schmeichel & Vohs, 2009). This serves to determine whether an individual is broadly experiencing negative or positive affect, but may fail to capture more fine-tuned emotions. In particular, as Tellegen, Watson and Clark (1999) suggested, positive and negative affect are not ends of a continuum but rather independent processes (meaning participants could experience both; Fredrickson, 2013). Using bipolar scales to capture whether participants are experiencing positive or negative affect could lead to such effects being cancelled out, as it is impossible for participants to indicate what they are feeling.

Other studies – although using unipolar scales – have used few mood items, e.g. just two positive and two negative items (Napper, Harris & Epton, 2009) or even just a single item to measure general mood (on a scale from *extremely negative* to *extremely positive*; Ward, Atkins, Lepper & Ross, 2011; Cohen et al., 2000; Sherman et al., 2000; Dillard et al., 2005; Cohen et al., 2007). However, the systematic review (Chapter 4) found that those studies that had shown that self-affirmation increased positive affect used on average 9.69 items (*SD* = 5.29), whereas the studies that had not shown any effect of self-affirmation on

positive affect had used on average 6.18 (*SD* = 5.03) items, and studies that showed that self-affirmation decreased positive affect had all measured affect using one item. It seems that the positive affect that occurs in self-affirmation is not easily reduced to simplistic representations such as *extremely negative* or *extremely positive*, but stems from a diverse range of positive feelings.

The potential advantages of using the mDES, the affect scale at the heart of the Broaden and Build theory of positive emotions, are two-fold: First, it may be more sensitive to the positive affect in self-affirmation because it utilises unipolar scales and tests a range of different possible emotions. Second, it also has the potential to connect self-affirmation to a theoretical account of positive affect that can help to explain how positive affect may drive self-affirmation effects.

Indeed, there is preliminary evidence that the mDES is a suitable scale to detect changes in positive affect following self-affirmation. Nelson, Fuller, Choi and Lyubomirsky (2014) asked participants to complete a weekly self-affirmation or control task, followed by wellbeing measures that included the mDES. In Study 1, no effect of self-affirmation on the mDES was present after two weeks, but it did emerge in Study 2, which had a longer follow-up of six weeks: Self-affirmed participants scored higher on the mDES in almost all weeks. The effects were also moderated by baseline wellbeing, with those with lowest overall wellbeing scoring highest on the mDES after self-affirmation. Thus, these promising findings show that self-affirmation may indeed have an impact on those positive emotions at the centre of the Broaden and Build theory and that the mDES is a suitable scale to detect these. However, due to the longitudinal design of Nelson et al.'s (2014) study, it is difficult to say with certainty whether the positive affect was a direct product of self-affirmation, or whether it only emerged over time. For example, self-affirmation may have helped participants in dealing with everyday stress (c/f Armitage, 2016; Logel & Cohen, 2012), which in turn could

have caused the increased positive affect. It is therefore important to test whether the findings replicate immediately following self-affirmation.

Rationale

The inconsistent results in previous studies regarding the effect of self-affirmation upon positive affect may be due to their failure to account for individual differences in trait self-esteem, despite previous calls for "future studies employing self-affirmation manipulations [to] assess mood, self-esteem, and other potential mediators and moderators using reliable measures" (McQueen & Klein, 2006, p. 304). The current study will therefore test whether trait self-esteem moderates the effect of self-affirmation on positive affect. Positive affect will be measured using the modified Differential Emotions Scale (mDES; Fredrickson et al., 2003), which has been developed within the Broaden and Build theory of positive emotions. The Broaden and Build theory offers an account of positive emotions that could also help to explain how positive affect may drive self-affirmation effects. Establishing that self-affirmation influences those emotions central to the Broaden and Build theory would be the first step towards using the Broaden and Build theory to explain self-affirmation effects.

In the study presented here, participants responded to the mDES both in conventional pen-and-paper form and in a novel, computerised form as a reaction time task. Asking participants to react quickly to the emotion items may promote intuitive responses, over slow, deliberate responses. Indeed, emotions are characterised as fast and intuitive mental processes (rather than slow and deliberate; Kahneman, 2011) and when individuals spend time contemplating positive emotions such as happiness, the mental effort required can interfere with the answer (Studer & Winkelmann, 2014). Trait self-esteem was measured prior to testing, to add to our knowledge of the role of self-esteem as a moderator of the effects of self-affirmation.

Hypotheses

We can make competing predictions regarding the outcome: It may be possible that high self-esteem individuals find it easier to self-affirm (as they have more positive self-images available to them, Sherman & Cohen, 2006), meaning the self-affirmation should be a more positive affective experience for them. This, together with their tendency to maintain positive affect, rather than dampen it (Wood, Heimpel & Michela, 2003), may mean that the self-affirmation task will result in high self-esteem, but not low self-esteem, individuals reporting more positive affect.

Likewise, considering previous studies' findings, it is also possible that low self-esteem individuals benefit more from the self-affirmation and report more positive affect. Considering that high self-esteem individuals have chronically more positive affect (Brown & Marshall, 2001), it is possible that the self-affirmation does not add much to their natural state, whereas low self-esteem individuals benefit from the artificial prompt to think of themselves in positive terms.

Method

Participants

The data from two studies that used comparable design and participants was combined (see Table 1). Participants in both studies were all University of Sussex students. Chi square analyses showed that there was no association between the study participants were in and their gender, ethnicity, or nationality, all *p*s > .28. A series of one-way ANOVAs showed that participants did not differ in their age, $F(1, 161) = 0.77$, $p = .38$, Cohen's $d = 0.14$ or their trait self-esteem, $F(1, 161) = 0.31$, $p = .58$, Cohen's $d = 0.09$, suggesting the samples were comparable.

Table 1. Sample characteristics.

Variable	Combined sample (n = 163)	Study 1 (n = 83)	Study 2 (n = 80)
Age			
M	20.45	20.27	20.65
SD	2.80	3.00	2.58
Gender	77% female	78% female	75% female
Ethnicity	74% white	71% white	76% white
Nationality	75% British	78% British	71% British
Condition	51% Affirmation	51% Affirmation	51% Affirmation

Procedure and design

Participants, who were told the studies were on "Personality and cognitive skills", first completed a set of online questionnaires to gather demographic information and baseline measures of individual differences. This was followed by a face-to-face session that occurred a minimum of two days later (to ameliorate the possibility that baseline questionnaires altered participants' self-perceptions) in which participants were tested individually. Upon arrival, participants were led to a private experimental cubicle, where they were randomly allocated to the self-affirmation or control task, which were both presented as writing tasks. Participants immediately started with the writing tasks, in which they were asked to spend 10 minutes writing and to write as much as they could. Immediately after the writing task, participants completed the first computer task that was measuring positive affect. This was followed by a short series of computer-based, cognitively demanding tasks, the data of which was collected as part of a bigger study. Finally, participants completed a pen-and-paper version of the modified Differential Emotions Scale (see below), also measuring positive affect.

Materials and Measures

Baseline measures. Participants first answered questions relating to their demographic information (such as age, gender, nationality) in an online questionnaire. Trait self-esteem was measured using the Rosenberg Self-Esteem Scale (Rosenberg, 1965). Participants indicated on a 4-point *Strongly Disagree* to *Strongly Agree* Likert scale the extent to which they agreed that each of 10 items (e.g. "I am able to do things as well as most other people") was relevant to them. The scale was found to have an acceptable level of internal reliability, $\alpha = .90$. A mean score was calculated for each participant, with higher scores representing higher self-esteem. Mean scores ranged from 1.10 to 4.00 across the sample ($M = 2.79$, $SD = .51$).

Self-affirmation manipulation. Participants completed the self-affirmation manipulation developed by Sherman et al. (2000, Study 2), in which participants are presented with a list of 10 values (such as conscientiousness, friendliness, or spirituality/religiousness). In the self-affirmation condition, participants were asked to pick a value that is most important to them and to write about why the value is important to them and how it influences their past behaviours or attitudes. Correspondingly, participants in the control condition were asked to pick a value that was least important to them and to write about why this value might be important to another student and how it might influence their behaviours or attitudes. In both conditions, participants were instructed to write for 10 minutes.

Positive affect immediately after self-affirmation. Participants were presented with 20 emotion words that each appeared on the computer screen along with the question "Are you feeling this emotion RIGHT NOW?". Each emotion stayed on screen until participants either pressed the "Y" ("Yes") key to indicate they were currently feeling the emotion, or the "N" ("No") key to indicate they were not currently feeling the emotion, then the next emotion appeared immediately. The order was randomised. The emotions were based on the mDES

emotion clusters (see below; *Amusement, Anger, Awe, Contempt, Disgust, Embarrassment, Fear, Gratitude, Guilt, Hate, Hope, Inspiration, Interest, Joy, Love, Pride, Sadness, Serenity, Shame* and *Stress*; Fredrickson et al., 2003). It was hoped that presenting participants with a computerised version of the scale, as well as asking them to respond as quickly as possible, would promote more automatic, intuitive responding, and prevent participants from spending too much time on analysing their affective state, which has been shown to alter responses (Studer & Winkelmann, 2014)

Cognitively demanding tasks. Participants in both studies completed a short series of cognitively demanding, computer-based tasks (working memory tasks and reaction time tasks) that were identical, except for the duration: the series of tasks in Study 1 lasted for about 4 minutes, whereas the series of tasks in Study 2 lasted for about 8 minutes because the tasks were longer.. The cognitively demanding tasks used in Study 1 are described in more detail in Chapter 2. The data for performance on this task can also be found in Chapter 2. The tasks and data for Study 2 are not presented in this thesis.

Positive affect after demanding tasks. Participants completed a pen-and-paper version of the mDES (Fredrickson et al., 2003), which asks participants the extent to which they are experiencing positive and negative emotions right now, on a 5-point *Not at all* to *Extremely* Likert scale. The emotions are presented in clusters of three and consist of 10 positive (*Amusement, Awe, Gratitude, Hope, Inspiration, Interest, Joy, Love, Pride, Serenity*) and 10 negative (*Stress, Sadness, Fear, Guilt, Hate, Disgust, Embarrassment, Anger, Contempt, Shame*) clusters. These clusters matched the emotions participants responded to in the first affect measure, but this second measure represented a more detailed measure of the same affect (e.g. *Gratitude* in the first measure corresponded to *grateful, appreciative or thankful* in the second measure). The response options across the two positive affect measures

were deliberately different to prevent participants selecting the same response out of familiarity.

Results

Preliminary analysis

Randomization checks. Chi square analyses revealed that there was no association between condition and any of the variables gender, ethnicity or nationality (all *p*s > .25). A series of one-way ANOVAs showed self-affirmed and non-affirmed participants did not differ systematically in terms of their age, $F(1, 161) = 1.09$, $p = .30$, Cohen's $d = 0.16$, or their trait self-esteem, $F(1, 161) = 0.01$, $p = .94$, Cohen's $d = 0.01$.

Values chosen. There was a significant association between condition and value chosen, χ^2 (20) = 111.05, $p < .001$. Most notably, non-affirmed participants were more likely to write about religiousness/spirituality ($n = 54$) than self-affirmed participants ($n = 5$), whereas self-affirmed participants were more likely to write about kindness ($n = 18$), trustworthiness ($n = 10$) and friendliness ($n = 10$) – all values which no control participant chose. Trait self-esteem did not influence the value chosen in either condition: A two-way ANOVA with condition and value as independent factors showed that levels of self-esteem did not differ by value chosen, $F(1, 135) = 1.04$, $p = .43$, nor by the interaction of condition and value chosen, $F(1, 135) = 0.42$, $p = .86$.

Main Analysis

Positive affect immediately after self-affirming. A series of hierarchical multiple regression analyses was conducted to test whether self-esteem moderated the effect of condition on positive affect reported after the writing task (see Table 2). Condition (dummy coded as control = 0 and self-affirmation = 1) was entered as a predictor at step 1, self-esteem (mean-centred) was entered at step 2 and the interaction between condition and self-esteem was entered at step 3. These analyses revealed the following pattern of results: Condition at

step 1, $F(1, 161) = .04$, $p = .84$, $R^2 < 0.01$, was not a significant predictor of positive affect. The addition of self-esteem at step 2, $\Delta F(1, 160) = 3.61$, $p = .06$, $\Delta R^2 = .02$, was a marginally significant predictor of positive affect. The beta weight associated with self-esteem ($\beta = 0.15$, $p = .059$) suggested that individuals with higher trait self-esteem reported marginally higher positive affect. Furthermore, there was significant moderation of the effect of self-affirmation on positive affect, $\Delta F(1, 159) = 5.49$, $p = .02$, $\Delta R^2 = .03$, indicating that the self-affirmation x self-esteem interaction was a significant predictor of positive affect, ($\beta = 0.18$, $p = .02$). Simple slopes analyses (see Figure 1) showed that for those with high self-esteem, there was a marginally significant effect of condition on positive affect, with those in the self-affirmation condition reporting more positive affect compared to those in the control condition, $\beta = .20$, $t(162) = 1.82$, $p = .07$. There was no effect of condition on positive affect in those with low levels of self-esteem, $\beta = -0.12$, $t(162) = -1.11$, $p = .27$, or those with mean levels of self-esteem $\beta = .04$, $t(162) = 0.51$, $p = .61$.

Positive affect after demanding tasks. Hierarchical multiple regression analyses were carried out to test whether self-esteem moderated the effect of self-affirmation on positive emotions reported after the computer tasks had been completed, using the same procedure as described above for the positive emotions immediately after the self-affirmation (see Table 2). Analyses revealed a similar pattern of results: Condition at step 1, $F(1, 161) = 0.24$, $p = .62$, $R^2 < 0.01$, was not a significant predictor of positive affect, nor was the addition of self-esteem at step 2, $\Delta F(1, 160) = 1.56$, $p = .21$, $\Delta R^2 = .01$. Furthermore, there was significant moderation of the effect of self-affirmation on positive affect, $\Delta F(1, 159) = 4.21$, $p = .04$, $\Delta R^2 = .03$, whereby the interaction of self-affirmation and self-esteem was a significant predictor of positive affect**,** $\beta = 0.16$, $p = .04$. Simple slopes analyses (see Figure 2) showed that for those with high self-esteem, there was a marginally significant effect of condition on positive affect, with those in the self-affirmation condition reporting more

positive affect compared to those in the control condition, $\beta = .20$, $t(162) = 1.81$, $p = .07$. There was no effect of condition on positive affect in those with low levels of self-esteem, $\beta = -0.17$, $t(162) = -1.54$, $p = .13$, or those with mean levels of self-esteem $\beta = .02$, $t(162) = 0.19$, $p = .85$.

Table 2. Moderated regression analyses for positive affect, immediately after the writing task, and after the computer tasks

	Positive emotions after self-affirmation			Negative emotions after self-affirmation			Positive emotions after tasks			Negative emotions after tasks		
	β	β	β	β	β	β	β	β	β	β	β	β
Variables entered	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Condition	.02	.02	.01	-.06	-.06	-.06	.04	.04	.04	.01	-.01	-.01
Self-esteem		.15	.18*		-.38***	-.36***		.10	.13		-.23***	-.24***
Condition x Self-esteem			.19*			-.08			.16*			-.03
R^2	.00	.02	.06	.00	.14	.15	.00	.01	.04	.00	.05	.05
Model F	.04	1.83	3.08	.52	13.30**	9.22	.24	.90	2.02	.01	7.52**	5.06**
ΔR^2	.00	.02	.03	.00	.14	.01	.00	.01	.03	.00	.05	.00
ΔF	.04	3.61	5.49*	.52	25.99***	1.05	.24	1.56	4.21*	.01	15.04***	.18

*$p < .05$, **$p < .01$, *** $p < .001$

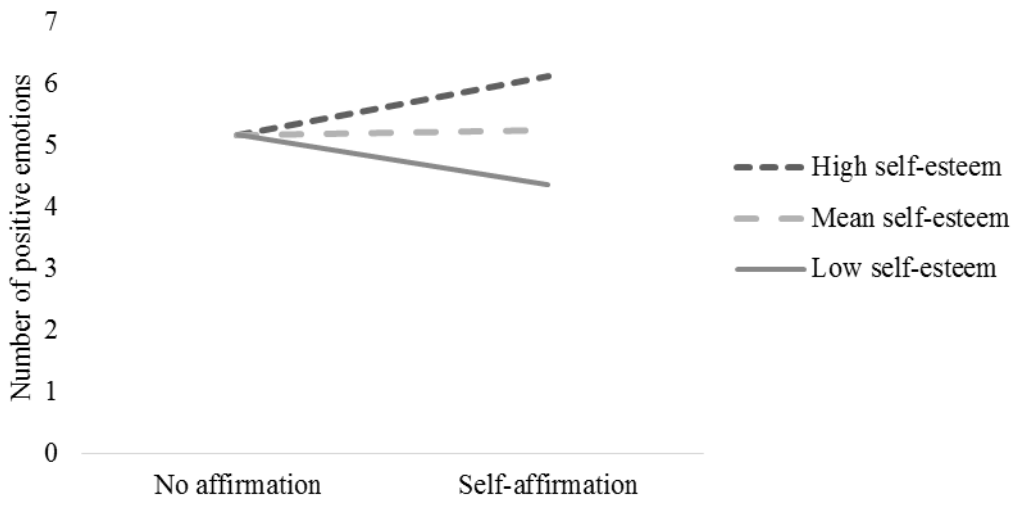

Figure 1. Interaction between self-affirmation and baseline self-esteem on the number of positive emotions felt after completing the writing task

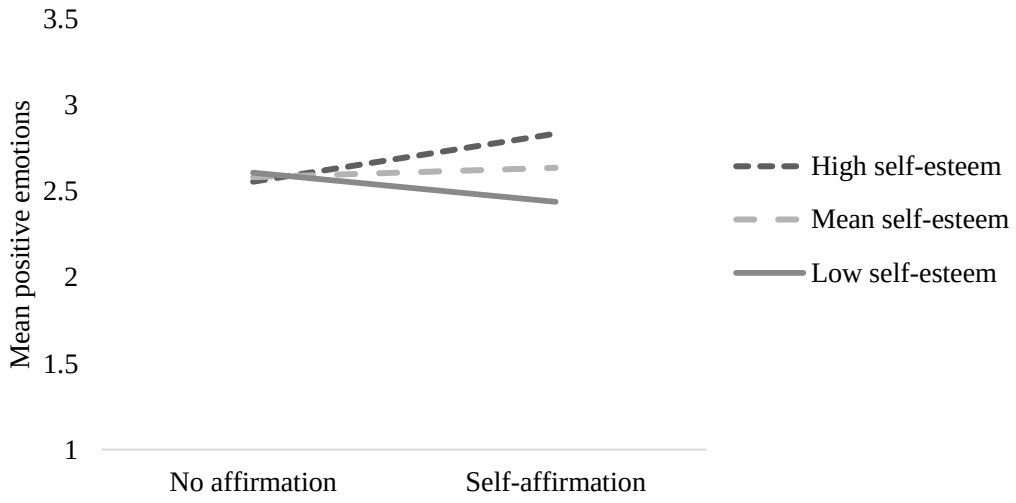

Figure 2. Interaction between self-affirmation and baseline self-esteem on positive affect felt after the computer tasks

Negative affect after self-affirming. Hierarchical multiple regression analyses were carried out to test whether self-esteem moderated the effect of self-

affirmation on negative affect reported immediately after the self-affirmation, using the same procedure as described above for positive affect (see Table 2). Condition at step 1, $F(1, 161) = .52$, $p = .47$**,** $R^2 < 0.01$**,** was not a significant predictor of negative affect. The addition of self-esteem at step 2, $\Delta F(1, 160) = 25.99$, $p < .001$, $\Delta R^2 = .14$, was a significant predictor of negative affect. The beta weight associated with self-esteem ($\beta = -.38$, $p < .001$) suggested that individuals with higher trait self-esteem reported less negative affect. There was no significant moderation of the effect of self-affirmation on negative affect, $\Delta F(1, 159) = 1.05$, $p = .31$, $\Delta R^2 = .01$, although self-esteem remained a significant predictor of negative affect, showing that individuals with higher trait self-esteem reported less negative affect ($\beta = -.36$, $p < .001$).

Negative affect after demanding tasks. Further regression analyses revealed a similar pattern of results for negative affect after participants had completed the cognitively demanding tasks: Condition at step 1, $F(1, 161) = .01$, $p = .94$, $R^2 < 0.01$, was not a significant predictor of negative affect. The addition of self-esteem at step 2, $\Delta F(1, 160) = 15.04$, $p < .001$, $\Delta R^2 = .05$, was a significant predictor of negative affect, again suggesting individuals with higher self-esteem reported less negative affect, $\beta = -.23$, $p < .001$. There was also no significant moderation of the effect of self-affirmation on negative affect, $\Delta F(1, 159) = .18$, $p = .68$, $\Delta R^2 < .01$, although self-esteem again remained a significant predictor of negative affect, indicating that individuals with higher self-esteem reported less negative affect ($\beta = -.24$, $p < .001$).

There was also no main effect of self-affirmation, $p = .94$, nor an interaction of self-affirmation and self-esteem on negative affect after the cognitively demanding tasks, $p = .68$.

Mediation analyses. To test for the possibility that positive affect mediated the effect of self-affirmation on performance on the cognitively demanding tasks,

mediation analyses were run with 5,000 bootstrap samples (Hayes, 2013, Model 4). Condition was entered as the predictor variable, positive affect (immediately following self-affirmation) was entered as the mediating variable and performance on the cognitively demanding tasks was entered as the outcome variable. The 95% confidence interval of the indirect effect of positive affect on performance on the tasks included zero, suggesting that positive affect was not a mediator of any effect of self-affirmation on performance on the cognitively demanding tasks.

Discussion

This study explored the effect of self-affirmation on positive affect using an established measure from the positive affect literature and tested whether these effects were moderated by trait self-esteem. Self-affirmation resulted in increased positive affect immediately after the self-affirmation manipulation and following cognitively demanding computer tasks, an effect that was only evident in individuals who were high in trait self-esteem. There was also no evidence that participants with different levels of trait self-esteem chose to write about different topics.

It appears that individuals with different levels of self-esteem choose to write about similar values, yet those high in self-esteem emerge from the affirmation task feeling more positive than those with low self-esteem. This suggests individuals with different levels of self-esteem engage differently with a self-affirmation exercise and experience it differently. High self-esteem is characterised by more positive self-knowledge and positive views about the self (Baumeister, 1997) and it has been suggested that reflecting on favorable aspects of the self is therefore easier for high self-esteem individuals (Steele et al., 1993). Not only do these individuals have a broader spectrum of positive self-aspects (or affirmational resources; Sherman & Cohen, 2006) on which they can affirm, but the experience in itself may be more

pleasant for them because the topic of the affirmation – the self – is a positive one for them. In contrast, low self-esteem individuals are less likely to think of themselves in positive terms and so the self-affirmation exercise for them is a different affective experience compared to high self-esteem individuals. In sum, this explanation suggests that self-affirmation is an affectively different experience for individuals with high and low self-esteem.

An alternative explanation is that individuals with both high and low self-esteem experience positive affect during the self-affirmation task, but that those with high self-esteem are more likely to consciously maintain the positive feeling. Indeed, it has been found that high self-esteem individuals have a tendency to "savor" (Wood, Heimpel & Michela, 2003) positive feelings, which means that they regulate their emotions in order to experience a positive feeling for longer. This may intensify their positive affective experience of self-affirmation. Moreover, high self-esteem individuals may be more aware of the benefits of self-affirmation: In the study by Creswell and colleagues (2005), all participants who had been asked to give an impromptu speech benefitted from the self-affirmation and showed reduced levels of the stress hormone cortisol – an objective measure. Participants also reported how stressful they expected giving the speech would be, and afterwards, how stressful they had perceived giving the speech to be. In the control condition, levels of expected and perceived stress were equally moderate among all individuals, regardless of self-esteem. In the affirmation condition, those with high self-esteem reported much lower expected and perceived stress, but those with low self-esteem reported the highest expected and perceived stress (even though that was not reflected in their cortisol levels which were uniformly low amongst self-affirmed participants). It appears that self-affirmation had a stress reducing effect among all participants, but only those

with high self-esteem were aware of these benefits. Similarly, in the current study, all participants may have experienced positive affect, but those with high self-esteem were more aware of it. In line with this, Koole, Smeets, van Knippenberg and Dijksterhuis (1999) found a main effect of self-affirmation on positive affect using an implicit measure, which may have been sensitive enough to capture the positive affect of both low and high self-esteem individuals. Future studies should investigate whether high and low self-esteem individuals are differentially aware of their affective state when self-affirming.

In sum, the findings of the present study add weight to the argument that self-affirmation can produce very different effects in those with different levels of self-esteem. Positive affect was measured using the mDES scale from the Broaden and Build theory of positive emotions, with the aim of linking self-affirmation to those positive emotions central to the Broaden and Build theory. The evidence points towards only high self-esteem individuals experiencing these emotions following self-affirmation. Perhaps self-affirmation has different mechanisms through which it operates in low and high self-esteem individuals. For example, self-affirmation may increase resources for those low in self-esteem, whilst broadening the perspective of those with high self-esteem (Sherman, 2013). The finding that those high in self-esteem experience more positive affect after self-affirming supports this, as positive affect has been linked to a broadened perspective (Fredrickson, 2001). Future research needs to further investigate whether there are indeed different mechanisms and if so, what they are. This would help us identify how and when high or low self-esteem individuals are more likely to benefit from self-affirmation.

The findings from this study highlight the need to pay attention to trait self-esteem as a moderator of self-affirmation, as important effects of self-affirmation may

otherwise go unnoticed if they only occur in individuals with low or high self-esteem. Studies that fail to find a main effect of self-affirmation may reveal an entirely different picture if they take trait self-esteem into account (Düring & Jessop, 2014). Many studies have used mood as an outcome measure and, upon finding no difference in mood (and other outcome measures), may have erroneously concluded that the self-affirmation was not effective (e.g. Dillard et al., 2005; Havranek et al., 2012; Huynh et al., 2014).

One limitation of this study is the nature of the sample, which consisted of students. This raises questions of generalizability and representativeness of the sample (although self-affirmation effects have been shown in community samples; Armitage et al., 2008; Jessop et al., 2009; van Koningsbruggen & Das, 2009). The sample was also characterised by comparatively low self-esteem. The mean self-esteem score was below average for a UK sample (Schmitt & Allik, 2005), which may due to the sample being young and predominantly female, as it has been found that self-esteem is lower in young adults, particularly in young women (Orth, Trzesniewski & Robins, 2010). Further, the study has only revealed the moderating impact of self-esteem in the immediate aftermath of self-affirmation. Although it is encouraging that the effects held up both immediately after self-affirmation and after the demanding tasks, it would still be necessary to test the effects in the long term. Self-affirmation has been said to change the way individuals construe their environment and thus is an ongoing experience (Sherman et al., 2013). It would be interesting to see what the role of positive affect is in the long term effects of self-affirmation: whether high self-esteem individuals continue to experience higher positive affect than low self-esteem individuals or whether the effect diminishes in intensity. Despite these limitations, the study has its strength as it is the first study to test the moderating impact of trait self-

esteem on effects of self-affirmation on positive affect, which can help to explain the inconsistent evidence that self-affirmation induces positive affect. It also used a novel approach to measuring positive affect by presenting it as a computer task and asking participants to respond as quickly as possible to each item of the scale, which may have promoted a more impulsive response in participants.

In conclusion, the present study has shown that self-affirmation has different effects on individuals with different levels of self-esteem. Those with high self-esteem emerged from the self-affirmation task feeling more positive than those with low self-esteem. The findings highlight the need to incorporate dispositional moderators such as self-esteem into self-affirmation studies to account for different effects and potentially different mechanisms through which self-affirmation achieves these effects.

Chapter 6: Comparing the effects of self-affirmation and positive affect on reactions to a health message

Abstract

Objectives: Many studies have tested positive affect as a possible mediator of the broad range of beneficial effects of self-affirmation, yet the evidence that self-affirmation increases positive affect is inconsistent. The current research therefore sought to clarify the role of positive affect in self-affirmation. ***Methods and results:*** In Study 1, content analysis of self-affirmation and control essays (N = 270) found that self-affirmed participants were more likely to use words related to positive emotions, suggesting they experienced a more positive affective state. This effect was replicated in Study 2, where participants (N = 73) also completed a self-affirmation task, a control task, or a positive mood induction, completed positive affect measures, and then read a message outlining the health consequences of fruit and vegetable consumption. Participants in the two experimental conditions reported more positive affect than in the control condition; the experimental conditions did not differ in positive affect. At one-week follow-up, self-affirmed participants showed the biggest increases in fruit and vegetable consumption. Positive affect did not mediate the relationship between self-affirmation and the outcome measures, including consumption. ***Conclusion:*** Overall, the findings support the idea that self-affirmation may boost positive affect, but that such affect is not a primary determinant of the effects of self-affirmation.

Introduction

Self-affirmation has been found to have beneficial effects on a wide range of outcomes (Cohen & Sherman, 2014). Yet key questions remain concerning the mechanisms underlying these effects. One plausible mediator – positive mood – has long been advocated, not least because positive mood inductions appear to have similar effects to self-affirmation (for a review, see Isen, 1987). However, evidence concerning the effects of self-affirmation on positive affect and the subsequent role of positive affect on outcomes affected by self-affirmation is mixed. The current studies address both the effects of self-affirmation on positive affect and the impact of positive affect on subsequent outcomes.

Self-affirmation

Self-affirmation theory (Steele, 1988) proposes that people are strongly motivated to maintain their self-integrity – their sense of being a competent, sensible, good person who is "adaptively and morally adequate" (Steele, 1988, p. 262). This sense of self-integrity can be threatened in a variety of ways and, in order to protect it, people may react defensively. For example, confronting a smoker with the negative health consequences of nicotine consumption may threaten their self-integrity because it reminds them of their harmful behavioural decisions. As a result, the smoker might claim the information is inaccurate (Dillard et al., 2005) or of low personal relevance (Harris, Mabbott & Napper, 2007), in order to shield their self-integrity from the negative implications of the information. However, the theory proposes that because feelings of self-worth arise from multiple sources, reminding people of their other sources of self-worth enables them to be less defensive to threats. Evidence has accumulated supporting this hypothesis: reminding individuals of other sources of self-worth (e.g. asking them to reflect on cherished values or personality aspects)

reduces defensive responding to otherwise threatening information, such as negative health risk information (Epton, Harris, Kane, van Koningsbruggen & Sheeran, 2015). Similarly, self-affirmation has been shown to help individuals overcome chronic stressors such as experiencing stereotype threat (Cohen, Garcia, Purdie-Vaughns, Apfel & Brzustoski, 2009) or anxieties surrounding body weight (Logel & Cohen, 2012). Furthermore, self-affirmation has been associated with beneficial outcomes, such as increased confidence (Briñol, Petty, Gallardo & DeMarree, 2007) and self-control (Schmeichel & Vohs, 2009), in the absence of explicit threats. In sum, self-affirmation has been associated with a wide range of positive outcomes in self-relevant areas.

A key question that has yet to be definitively answered concerns the mechanisms underlying self-affirmation. It is highly likely that self-affirmation achieves its wide-ranging effects in several ways (Cohen & Sherman, 2014). Not surprisingly, among the proposed mediators is positive affect. Common sense suggests that reflecting on positive personal attributes or values and recalling instances in which these attributes have been manifested or the values successfully acted upon (means by which self-affirmation is most commonly induced experimentally) will generate positive affect. Indeed, in the research literature this idea has been advanced by several researchers (e.g., Crocker et al., 2008; Tesser, 2000). Although the precise mechanisms proposed vary in detail, in broad terms there are two aspects: (a) self-affirmation induces positive affect and (b) it is this positive affect that mediates the beneficial effects of self-affirmation on outcomes such as responses to personally relevant health-risk information. Both aspects are the focus of the current paper.

Self-affirmation and positive affect

Positive affect can be described as "a mild happy feeling state that has an important impact on people's thinking, motivation, behaviour and ability to cope with stressful events" (Phillips-Caesar et al., 2015, p. 122). Experimental inductions of positive affect show striking parallels to experimental inductions of self-affirmation in their effects on outcomes. For example, both those who have been self-affirmed (e.g. Harris & Napper, 2005; Harris et al., 2007; van Koningsbruggen et al., 2009) and those who have been placed in a positive mood (Das & Fennis, 2008; Das, Vonkemann & Hartmann, 2012) are better able to process negative health information (compared to those in control conditions), resulting in better recall of such information in those self-affirmed (Reed & Aspinwall, 1998) and those in a positive mood (Raghunathan & Trope, 2002). Both types of manipulation have been found to affect health behaviour, although self-affirmation effects are typically evident in conjunction with relevant health-promotion materials (Epton et al., 2015) and positive mood effects are only evident for some health behaviours such as smoking or diet (Cameron, Bertenshaw & Sheeran, 2014). Both self-affirmation (Schmeichel & Vohs, 2009) and positive mood (Tice, Baumeister, Shmueli & Muraven, 2007) can increase resistance to the effects of ego-depletion, suggesting better self-control. Studies have also shown lower stress levels in both those who had been self-affirmed (Sherman, Bunyan, Creswell & Jaremka, 2009) and those whose mood had been lifted (Fredrickson & Levenson, 1998). Moreover, both self-affirmation (Wakslak & Trope, 2009) and positive mood (Fredrickson & Joiner, 2002) have been associated with a more abstract mind set, which is one postulate for a mediator of the effects of self-affirmation (Cohen & Sherman, 2014; Schmeichel & Vohs, 2009).

It is no surprise, therefore, that many studies have included measures of positive affect following a self-affirmation manipulation. Yet results reveal only limited support: some studies have found evidence that self-affirmation promotes positive affect (Crocker et al., 2008; Schmeichel & Vohs, 2009, Study 1; Nelson et al., 2014), but others have not (e.g. Fein & Spencer, 1997; Napper, Harris & Epton, 2009; Ward, Atkins, Lepper & Ross, 2011). Consequently, early reviews of self-affirmation have retained positive affect as a potential mechanism (e.g., Sherman & Cohen, 2006) but noted that more research is needed (e.g., McQueen & Klein, 2006). The inconsistent results have been confirmed by a more recent systematic review (Chapter 4): out of the studies included in the review (n = 55), around two thirds had reported that self-affirmation had no effect on positive affect, while one third had found that self-affirmation had increased positive affect.

Notably, the review also concluded that self-affirmation was more likely to increase positive affect if the positive affect measure followed immediately after the self-affirmation task (rather than after a delay or after other outcome measures), suggesting that participants may be experiencing positive affect immediately after self-affirming, but this may be short-lived. In addition, all four studies in which participants had indicated how they had felt *during* the self-affirmation task found that self-affirmed participants reported more positive affect. For example, Crocker, Niiya and Mischkowski (2008, Study 1) found that self-affirmed participants reported feeling 11 positive emotions (e.g. proud, joyful) significantly more during the self-affirmation writing task than did non-affirmed participants during the control writing task. Indeed, one emotion in particular (love) mediated the beneficial effect of self-affirmation on smokers' acceptance of negative health information (Crocker et al., 2008, Study 2). In sum, the review (Chapter 4) suggested that self-affirmation was

more likely to increase positive affect if positive affect was measured immediately after the self-affirmation manipulation, or if participants were asked about their feelings during the task. It is therefore possible that participants experience positive affect during the self-affirmation task, but that this affective state does not endure.

Analyses of writing: positive emotion words

To verify this further, we could ask participants how they are feeling whilst they are actually completing the self-affirmation task. However, this will present methodological challenges, as interrupting the task in this way could interfere with participant engagement (Kahneman, 1973) and undermine the act of self-affirmation. A less intrusive alternative is to utilise the output that is already available: the essays that participants write during the self-affirmation and control tasks. Text analysis software such as the Linguistic Inquiry and Word Count program (LIWC; Francis & Pennebaker, 1993) can offer useful insights into the language used in written content. The software calculates the frequency with which different types of words are used, with categories ranging from functional words, such as pronouns, to affective words, such as positive emotion words (e.g. happy, joy, pleasant). Studies in which participants' written responses have been analysed using LIWC have found that naturally higher use of positive emotion words predicted a range of positive outcomes, such as relationship stability (Slatcher & Pennebaker, 2006) or better health (Pennebaker & Chung, 2007), including fewer physician visits and fewer reported symptoms (Pennebaker, Mayne &Francis, 1997), less physical limitation due to illness (Hamilton-West & Quine, 2007) and reduced risk of mortality (Danner, Snowdon & Friesen, 2001). Positive emotive language usage is therefore associated with measurable outcomes. Of importance for current purposes, using positive emotion words has been shown to be an index of positive affect: Participants

experimentally induced into a positive mood not only scored higher on self-reports of positive mood, but also used more positive emotion words when talking afterwards, compared to a negative or neutral mood induction (Kahn et al., 2007).

Analysing participants' text output may therefore provide some understanding of the emotional state they experience while writing, as well as giving insights into how mood effects are produced. Initial promising findings can be seen in studies that have used free writing tasks. For example, Creswell and colleagues (2007) asked cancer survivors to write about their experience of the illness and then coded their essays for whether the content was of a self-affirming nature or not. Self-affirming writing strongly correlated with using positive emotion words and was associated with fewer physical symptoms at 3-month follow-up. Niles et al. (2015) replicated this finding in a non-clinical sample and found that self-affirming writing correlated (marginally) with positive emotion words, and that both self-affirming writing and positive emotion words correlated with fewer physical symptoms at 3-month follow-up.

Thus, there may be links between self-affirming writing and the use of positive emotion language (suggesting a positive affective state). However, these are correlational data, so those who are likely to write self-affirming content may also be more likely to use positive emotion words in general. It is therefore important to test whether a prompt to write self-affirming content (i.e. a self-affirmation manipulation) produces the same effect. One study to date has attempted this: Woolf, McManus, Gill and Dacre (2009) asked participants to complete a task similar to a self-affirmation manipulation (or a control task) and analysed the essays participants wrote using LIWC. Those in the self-affirmation condition were more likely to use positive emotion words than those in the control condition. However, the wording of the task

instructions may have influenced this result. In particular, the self-affirmation task asked participants to think about an event in their life that had made them feel proud and to relate their values to this event by describing why it had made them feel proud of their values (Woolf et al., 2009, p. 3). In the control condition, participants were asked to write about a time when they had recognised someone else had different values to their own – but not how this may have made the other person experience pride. Therefore, those in the self-affirmation condition may well have used words related to pride more often, words that belong to the positive emotion category (see LIWC 2007 dictionary; Pennebaker, Booth & Francis, 2007). The finding that 'self-affirmed' participants were more likely to use positive emotion words may therefore, at least in part, have been driven by their increased use of these words. Consequently, Study 1 reports the content analysis of essays that had been written following a conventional self-affirmation procedure. Critically, the self-affirmation task used in Study 1 does not direct participants to recall and write about a positive affective experience, but instead to reflect on a personally treasured value.

Study 1

The current study analysed essays that participants had produced after completing a standard essay-based self-affirmation procedure. Essays written in three separate self-affirmation studies which used the same self-affirmation task, were carried out by the same experimenter, in the same location, and followed the same procedure, were pooled and assessed to enhance reliability. LIWC was used to code the essays, in order to test the hypothesis that self-affirmed participants would be more likely to use positive emotion words in their writing than non-affirmed participants.

Method

Participants

In total, 270 students, aged between 18 and 41 years (*M* = 20.15 years, *SD* = 3.07 years) took part in the studies. They participated for either payment (7.78%) or course credit and were mostly female (79.30%), white (74.80%), and British (74.80%). Chi square analyses showed no association between the study participants were in and gender, ethnicity, or nationality (all *p*s > .26). One-way ANOVA showed a trend for participants to differ in age across studies, $F(1, 267) = 2.39$, $p = .09$, $\eta p^2 = .02$ (see Table 1). Controlling for study in the main analysis did not alter the results.

Table 1. Sample characteristics.

Variable	Study 1 (*n* = 83)	Study 2 (*n* = 107)	Study 3 (*n* = 80)	Combined sample (*n* = 270)
Age				
M	20.27	19.68	20.65	20.15
SD	3.00	3.39	2.58	3.07
% female	78.30	83.20	75.00	79.30
% white	71.10	76.60	76.30	74.80
% British	78.30	74.80	71.30	74.80
% Affirmation	50.60	50.50	51.30	50.70

Procedure

Participants first completed an initial online questionnaire in which they provided demographic information and responded to various measures of individual differences. These measures differed slightly between studies, but in all cases there was a gap between the initial questionnaire and the self-affirmation task of at least two days (*M* = 8.37 days, *SD* = 5.81 days) to reduce the chances that completing the

questionnaire would influence participants' responses during the rest of the study. A funnel debrief carried out at the end of each study showed that no participant felt their answers to the online questionnaire had influenced the writing task. When participants met the experimenter in the laboratory for the face-to-face session, they were led to a cubicle in which they were tested individually. They were randomly allocated to either the self-affirmation or control condition. In both conditions, participants completed a writing task (described below) in which they spent 10 minutes writing. At this stage, the experimenter was blind to condition. The handwritten essays were typed up (by the experimenter and research assistants) and analysed using LIWC software.

Materials

Baseline measures. Participants provided demographic information (such as age, sex, nationality) in an online questionnaire.

Self-affirmation manipulation. The self-affirmation manipulation (e.g., Sherman, Nelson & Steele, 2000, Study 2) was a standard values writing task. Participants were presented with a list of values, such as kindness, trustworthiness or creativity. Participants in the self-affirmation condition were asked to pick their most important value from the list (or choose one that was not on the list) and to write why this value was important to them, how it had influenced their past behaviours or attitudes, and how they had used the value in their everyday life. Participants in the control condition were asked to pick their least important value from the list (or choose one that was not on the list) and to write about why this value might be important to another student, how it might influence that person's behaviours or attitudes and how that person might use this value in everyday life. All participants were given a maximum of 10 minutes to complete the task.

Essay content analysis. The self-affirmation and control essays were analysed using the Linguistic Inquiry and Word Count software (LIWC; Francis & Pennebaker, 1993). The LIWC category 'positive emotion' includes words such as love, nice, pleasant, caring, comfort and sweet. The LIWC category 'negative emotion' includes words such as sad, angry, stress, suffer and tense. The LIWC category 'negations' includes words such as not, never, don't and didn't. This category was included in the analysis to test whether participants tended to use affective words in combination with negating words, indicating nullification of affective words (e.g. "I was not happy").

Results

Randomization checks

Chi square analyses showed no association between condition and gender, ethnicity or nationality (all *p*s > .57). One-way ANOVA showed participants were of similar ages across conditions, $F(1, 268) = 0.14$, $p = .71$, $\eta p^2 < .01$.

Essay content analysis using LIWC

One-way ANOVA showed that self-affirmed participants used a higher percentage of positive emotion words in their essays than did non-affirmed participants, $F(1, 268) = 48.42$, $p < .001$, $\eta p^2 = .15$ (Table 2). Self-affirmed participants also used a higher percentage of negative emotion words, $F(1, 268) = 4.28$, $p = .04$, $\eta p^2 = .02$, a higher percentage of negation words, $F(1, 268) = 16.49$, $p < .001$, $\eta p^2 = .06$, and also wrote significantly more words than did non-affirmed participants, $F(1, 268) = 12.73$, $p < .001$, $\eta p^2 = .05$.

Table 2. Percentage of words written for emotion word categories

	Control (*n* = 133)	Self-affirmation (*n* = 137)
Positive emotion words[a]		
M	7.19%	10.03%
SD	3.05%	3.63%
Negative emotion words[b]		
M	1.08%	1.37%

SD	1.07%	1.26%
Negations[c]		
M	0.84%	1.33%
SD	0.97%	1.02%
Word count		
M	150.17	169.55
SD	42.70	46.40

[a] e.g. love, nice, sweet, [b] e.g. sad, angry, stress, [c] e.g. not, never, don't

Use of negation words

To explore the possibility that positive emotion words were used with negations, correlations were run between the categories, for self-affirmed and non-affirmed participants separately. Among the self-affirmed participants, use of positive emotion words correlated marginally and negatively with use of negation words, $r(135) = -.16$, $p = .055$, and use of negative emotion words correlated positively with use of negation words, $r(135) = .31$, $p < .001$. In the non-affirmed participants, use of negation words did not correlate with use of positive emotion words, $r(132) = -.01$, $p = .95$, or negative emotion words, $r(132) = .09$, $p = .33$. This suggests that as self-affirmed individuals used negative emotion words, they also used negation words, and as they used more positive emotion words, they used fewer negation words.

Discussion

Self-affirmed participants were more likely to use positive emotion words (such as happy, joy, pleasant) than were non-affirmed participants. Self-affirmed participants were also more likely to use negative emotion words than non-affirmed participants, although both groups used fewer of these terms overall. Kahn et al. (2007) found that a positive mood induction resulted in a substantial increase in both self-reported positive affect and the use of positive emotion words. Based on this, the finding that self-affirmation increased use of positive emotion words may reflect an increase in positive affect. Kahn et al. (2007) also found a small increase in use of negative emotion words following a positive affect induction, but no increase in self-

reported negative affect. Equally, self-affirmed participants in the current study were more likely to use negative emotion words, but this may not necessarily reflect an increase in negative affect (cf. Kahn et al., 2007). Furthermore, among self-affirmed participants, use of negation words correlated negatively with use of positive emotion words and positively with use of negative emotion words, suggesting that self-affirmed participants may have negated at least some of these negative emotion words. Use of positive emotion words is therefore likely to be a true reflection of positive emotional content. Indeed, Alpers et al., (2005) showed that the results of the LIWC analysis of positive and negative emotion words correlated moderately with the ratings of positive and negative emotional content judged by humans, who would take such language complexities into account. The use of positive emotion words therefore probably reflects positive emotional content in the self-affirmation essays.

Importantly, this use of a non-intrusive, post-manipulation means of investigating the emotional state of self-affirmed participants is consistent with findings using ratings obtained by Crocker et al. (2008), who found that self-affirmed participants reported feeling more positive emotions than non-affirmed participants during the writing task. The findings provide preliminary evidence of the first step of the implied mediational model – that self-affirmation induces positive affect. Study 2 addressed the next step: whether such affect mediates the impact of self-affirmation on subsequent outcomes.

Study 2

To strengthen the findings of Study 1, Study 2 assessed the impact of self-affirmation on positive affect ratings and the mediating role of positive affect on outcomes, and experimentally manipulated positive affect, to compare its effects to those of self-affirmation on responses to a health threat. Crucially, the proposed

mediator, positive affect, was experimentally manipulated. This represents a stronger approach to mediation analysis than measurement-only approaches, as it allows for causal inferences to be made about the mediator and the outcome variable (Bullock, Green & Ha, 2010). More specifically, measurement-only approaches to mediation analyses can be biased by the presence of unmeasured covariates of the mediator: a measurement-only mediation model may conclude that a given variable mediated the effect of an independent variable on an outcome, when in fact the mediation effect was due to an unmeasured covariant. Manipulating the mediator increases confidence that mediators are uncorrelated with other variables (Bullock et al., 2010).

Thus, positive affect was induced and its effects compared to those of self-affirmation on responses to a health threat. Responses to a health threat have been the focus of both self-affirmation studies (Epton et al., 2015) and studies of the effects of experimentally induced positive affect (e.g. Das & Fennis, 2008; Das, Vonkemann & Hartmann, 2012), suggesting that this is an area where parallel mechanisms in self-affirmation and positive mood may be evident.

This is the first study to compare a positive mood induction to a self-affirmation manipulation in a health context. There have been studies testing the effects of self-affirmation and positive affect in health contexts such as weight loss (Phillips-Caesar et al., 2015), lowering blood pressure in patients with hypertension (Boutin-Foster et al., 2013; Boutin-Foster et al., 2016), or promoting healthy behaviours in patients with cardiopulmonary diseases (Charlson et al., 2007) or with asthma (Mancuso et al., 2012), but these have combined self-affirmation together with positive affect into one intervention, making it impossible to disentangle their effects from one another. Thus, none of these studies can answer the question of whether

positive affect is a driving factor in self-affirmation effects on the health-related outcomes.

Further, only two self-affirmation studies have previously adopted the approach of comparing a self-affirmation manipulation to a positive affect induction (Schmeichel & Vohs, 2009; Steele, Spencer and Lynch, 1993), but neither of these studies focused on health-related outcomes[1]. The current study therefore is the first to test the idea that positive affect mediates the effect of self-affirmation on health-related outcomes by manipulating positive affect. Positive affect was manipulated by asking participants to read an uplifting story (Wegener, 1991), a technique used previously to induce a positive mood (Garcia-Marques, Mackie, Claypool & Garcia-Marques, 2004; Kuykendall & Keating, 1990; Wegener & Petty, 1994; Wegener, Petty & Smith, 1995). Indeed, reading an uplifting story has been found to be one of the most effective positive mood inductions (Gerrards-Hesse, Spies & Hesse, 1994; Westermann, Spies, Stahl & Hesse, 1996).

To measure positive affect, the modified Differential Emotions Scale (mDES; Fredrickson et al., 2003) was adapted to create a computer task in which participants indicated as quickly as possible whether or not they were feeling the emotion items from the mDES. The mDES has emerged from the Broaden and Build literature on positive emotions and thus is well suited for capturing positive affect.

This affect measure represents an advantage on existing self-affirmation studies for two reasons: First, only one previous study has used the scale from the Broaden and Build framework to assess the effect of self-affirmation on positive affect (Nelson et al., 2014). This has had promising results, as self-affirmed participants scored higher on the mDES than non-affirmed participants over time, suggesting the mDES provides a better insight into positive affect in self-affirmation

than using simple mood measures. This is in line with the systematic review of the effect of self-affirmation on positive affect (Chapter 4), which also found that self-affirmation was more likely to increase positive affect if the affect measure consisted of specific emotion items (such as those used in the mDES), compared to more general mood items (e.g. “How would you describe your mood right now?”, from *extremely bad* to *extremely good*, Cohen et al., 2000, Experiment 3).

Second, presenting the positive affect items in a reaction-time style computer task may encourage participants to answer intuitively, rather than to deliberate over their answer. Emotions have been thought of as fast and intuitive, rather than slow and deliberate mental processes (Kahneman, 2011), and thus encouraging participants to respond intuitively may capture these mental processes more accurately. Indeed, ratings of happiness have been found to be negatively affected by time spent completing the rating as well as by mental effort involved (Studer & Winkelmann, 2014). Any positive affect present after a self-affirmation manipulation may therefore be diminished through deliberate mental processes, an idea supported by the finding that self-affirmed individuals score higher on an implicit positive affect measure than non-affirmed individuals (Koole, Smeets, van Knippenberg & Dijksterhuis, 1999). Participants were therefore presented with the positive affect measure (the mDES) on a computer and were asked to respond as quickly as possible to each item in order to promote fast, intuitive responding.

Drawing from existing literature, it was predicted that participants in both experimental conditions (self-affirmation and positive mood induction) would engage more with the health threat (operationalised by more positive attitudes towards the health behaviour, higher intentions to engage in the health behaviour, and more fruit and vegetable consumption; see Method section for full description) than those in the

control condition. If positive affect is the key to the effectiveness of self-affirmation, indices of affect (emotional language use, explicit mood ratings) should mediate the effect of self-affirmation on outcomes, and the positive mood induction should be at least as effective in terms of its impact on outcomes. Fruit and vegetable consumption was chosen as the target health behaviour because it has been positively affected by both self-affirmation (e.g. Epton & Harris, 2008; Harris et al., 2014) and positive mood inductions (e.g. Labroo & Mukhopadhyay, 2009).

Method

Participants

The sample consisted of 74 students from a variety of courses, who took part in the study for either course credit (50%) or payment. Participants who reported consuming the recommended daily five portions of fruits and vegetables were excluded from the analysis of primary outcome variables, so that all participants reported consuming less than the recommended amount. One participant did not complete the one-week follow-up, leaving a final sample of 73 who completed all measures, including follow-up (Figure 1). A post-hoc power analysis showed 70% power was achieved.

Age ranged from 18 to 48 years (M = 21.55, SD = 5.81), with the majority of the sample being female (77.0%), white (70.3%) and British (63.0%).

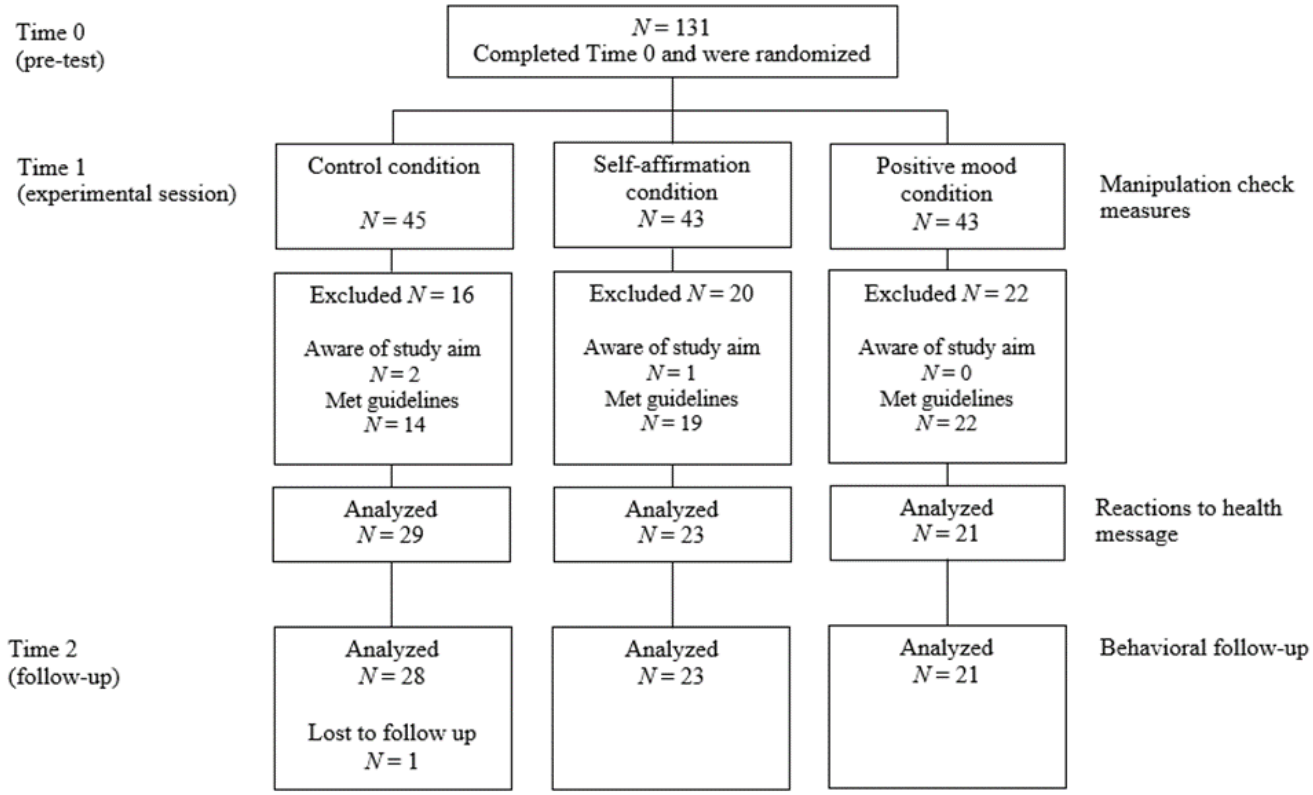

Figure 1. Flowchart of participants through the study

Materials

Time 1 questionnaire.

At Time 1, participants filled out an online questionnaire that consisted of the following measures:

Demographic information. Participants' age, gender, nationality, subject studied and ethnicity were recorded.

Baseline fruit and vegetable consumption. Three measures assessed fruit and vegetable consumption (Harris et al., 2014). On each page of the measures, a link to the UK National Health Service portion guide was provided to remind participants what constitutes a portion of fruits or vegetables. The first measure asked participants to indicate their typical daily consumption, with an item each for fruit and vegetables (e.g. 'How many portions of fruit - of any kind - do you eat on a typical day?';

Steptoe et al., 2003). The second measure was a weekly food checklist, which provided participants with a list of different types of foods (Wardle, Parmenter, & Waller, 2000). Participants indicated how many portions of each type of food they consumed in a typical week using a 7-point scale (*None; less than 1 a week; 1 to 2 a week; 3 to 5 a week; 6 to 7 a week; 8 to 11 a week; 12 or more a week*). The third measure was a daily food checklist (Bingham et al., 1994), which provided participants with an extensive list of types of fruits and vegetables and asked them to indicate how many portions of each they had eaten in the last 24 hours. As these measures had different response scales, they were standardised before being combined (α = .67). Principal component analysis revealed all variables loaded onto a single factor (with factor loadings between .49 and .72), accounting for 41% of the variance.

Attitude towards fruit and vegetable consumption. Attitudes towards eating at least five portions of fruit and vegetables every day in the next 7 days were measured using eight pairs of semantic differentials assessing this behaviour on a 7-point scale (*Unenjoyable* to *Enjoyable*, *Boring* to *Fun*, *Painful* to *Pleasurable*, *Bad* to *Good*, *Foolish* to *Wise*, *Harmful* to *Beneficial*, *Useless* to *Useful*, *Unimportant* to *Important*; Cronbach's α = .90).

Time 2

The Time 2 session was conducted face-to-face and consisted of the following sections.

Manipulations. The self-affirmation and control conditions were identical to those used in Study 1. Participants picked their most important (self-affirmation condition) or least important value (control condition) and spent 10 minutes writing, following the same instructions as in Study 1. In the positive mood condition,

participants read an article about old friends reuniting (Wegener, 1991). To adapt the story to a sample from a British university, the names of people and places and some expressions in the story (e.g. parking lot to car park) were changed. Participants in the positive mood condition spent 5 minutes reading the story.

Affect before the health risk information. Positive and negative affect were measured immediately following the manipulations. Participants were required to indicate whether or not they were feeling each of 20 emotions that were based on the emotion clusters in the modified Differential Emotions Scale (Fredrickson et al., 2003). The items consisted of 10 positive (*Amusement, Awe, Gratitude, Hope, Inspiration, Interest, Joy, Love, Pride* and *Serenity*) and 10 negative emotions (*Anger, Contempt, Disgust, Embarrassment, Fear, Guilt, Hate, Sadness, Shame* and *Stress*). The items were displayed on a computer screen, appeared in random order and each stayed on screen until the participant had pressed a key to indicate whether or not they were feeling each emotion (yes/no). The resultant dependent variables are number of positive emotions felt and number of negative emotions felt.

In addition, participants reported their current mood using one 5-point item ("At this moment, my mood is …" *Very bad* to *Very good;* Trope & Neter, 1994) and a further mood scale from Raghunathan and Trope (2002), which consisted of two positive mood items (happy, elated; $r = .55$, $p < .01$), two negative mood items (sad, depressed; $r = .49$, $p < .01$), and four filler items, all measured on a 4-point scale (*Definitely does not apply to my feelings at this moment* to *Definitely does apply to my feelings at this moment*).

Health risk information. Next, participants read the health risk information on fruit and vegetable consumption. This information was based on the message used by Harris et al. (2014), updated to include recent evidence relating to the effectiveness

of fruit and vegetable consumption in preventing various cancers (i.e. that fruit and vegetable consumption may not protect against breast or prostate cancer but that evidence suggests it does protect against pancreatic cancer, lung cancer, bladder cancer and some subtypes of head-neck cancers). The information was presented over 9 pages (1-2 paragraphs per page; on average 108 words per page) and participants were able to read and advance to the next page at their own pace.

Primary outcome measures. Intentions to eat at least five portions of fruit and vegetables in the next 7 days were measured using two items, $r(74) = .87$, $p < .001$. Participants responded twice to the statement "I intend eating at least 5 portions of fruit and vegetables every day in the next 7 days" on two 7-point scales, from *Strongly disagree* to *Strongly agree*, and from *Definitely yes* to *Definitely no.*

Stability of intention was measured using one item ("How likely is it that you will eat at least 5 portions of fruit and vegetables every day in the next 7 days?"; 7-point scale, *Very unlikely* to *Very likely*; c/f Cooke & Sheeran, 2013).

Attitudes towards eating at least five portions of fruit and vegetables every day in the next 7 days were measured using the same eight pairs of semantic differentials as at Time 1 (Cronbach's $\alpha = .91$).

Subjective norms were measured using six items (e.g. "Most people who are important to me think that I should eat at least 5 portions of fruit and vegetables every day in the next 7 days", on a 7-point scale, *Strongly disagree* to *Strongly agree;* Cronbach's $\alpha = .72$).

Perceived behavioural control was measured using three items (e.g. "How much control do you have over whether or not you will eat at least 5 portions of fruit and vegetables every day in the next 7 days?", on a 7-point scale, *No control* to *Complete control*; Cronbach's $\alpha = .85$).

Self-efficacy was measured using three items (e.g. “If I wanted to, I could easily eat at least 5 portions of fruit and vegetables every day in the next 7 days”, on a 7-point scale, *Strongly disagree* to *Strongly agree*; see Epton & Harris, 2008; Cronbach’s α = .78).

Action control was measured using six items (e.g. “During the next 7 days, I will... consistently monitor whether I eat at least 5 portions of fruit and vegetables every day”, on a 7-point scale, *Strongly agree* to *Strongly disagree*; Sniehotta, Scholz & Schwarzer, 2005; Cronbach’s α = .93).

Negative feelings about fruit and vegetable consumption were measured using two items (e.g. “While reading the article… I felt anxious”, on a 7-point scale, *Not at all* to *Extremely*; Harris & Napper, 2005; s r (74) = .83, $p < .001$). Positive feelings about fruit and vegetable consumption were measured using two items (“While reading the article…” “…I felt positive about eating at least 5 portions of fruit and vegetables every day” and “….I felt happy at the thought of eating at least 5 portions of fruit and vegetables every day”, on a 7-point scale, *Not at all* to *Extremely; r* (74) = .75, $p < .001$.

Worry was measured using three items (e.g. “I worry about the consequences of not eating at least 5 portions of fruit and vegetables every day”, on a 7-point scale, *Strongly agree* to *Strongly disagree*; c/f. Griffin & Harris, 2011; Cronbach’s α = .75).[2]

Affect after the health risk information. Affect was measured again using the same measures as previously (the mDES; Fredrickson et al., 2003; and two mood measures; Raghunathan & Trope, 2002; Trope & Neter, 1994), but were presented as pen-and-paper questionnaires (rather than as computerised measures as before).

Manipulation check. All participants completed a two-item manipulation check: "Doing the task about values [imagination] made me aware of …" "…who I am" and "…my values (the principles and standards by which I try to live my life)", on a 7-point scale, *Strongly agree* to *Strongly disagree*; Napper et al., 2009; r (74) = .74, $p < .001$. In addition, participants in the self-affirmation and control conditions indicated how important the value they had chosen to write about had been, on a 7-point scale, *Not very important* to *Extremely important*.

Time 3

Primary outcome measure: behavior. Fruit and vegetable consumption at follow-up was measured using the same scales as baseline.[3]

Debrief. Participants were probed for suspicion using a funnel debrief (Chartrand & Bargh, 1996).

Procedure

At pre-test, participants completed an online questionnaire that recorded their demographic information and baseline fruit and vegetable consumption. The experimental session was conducted in the experimental cubicles in the Psychology Department and took place at least two days after the pre-test. Participants were tested individually and randomly allocated to one of the three experimental conditions: Self-affirmation (writing task), control (writing task), or positive mood induction (reading task). The experimenter was blind to which of the two writing conditions (self-affirmation or control) a participant was in, but was aware if a participant was in the reading condition (positive mood) because the materials, time spent and verbally delivered instructions differed slightly. In the writing conditions (self-affirmation or control), participants were given 10 minutes to write as much as they could. In the reading condition (positive mood), participants were given 5 minutes to read the story.

The time allowed for the self-affirmation or control task was based on the previously used methodology (Study 1) and the time allowed for the reading task was based on the average time taken to read the passage, which was determined in a pre-test (*N* = 4).

After the appropriate time had passed, the experimenter returned and prompted the participants to move onto the computer task. Immediately after the computerised measures of positive affect, participants were presented with the health risk information, which appeared over several pages on the computer screen. Participants were able to move onto the next page by pressing a button on the keyboard. At the end of the health risk information, they were able to indicate if they wanted to receive an electronic version of the information they had just read by email. Everyone then moved onto the final questionnaire, which had been placed on the participant's desk in a folder before the start of the session. The folder also contained a colourful, double sided A5 flyer that consisted of the practical tips and advice on how to increase fruit and vegetable consumption that had been part of the health risk information, as well as the encouragement to take the flyer with them if they might find it useful. Once they had completed the final questionnaire, participants were free to leave. For those participants who had indicated they would like to receive an electronic version of the information they had read, an email with the information was sent immediately after the session. Seven days after the session, the follow up questionnaire was emailed to participants. Participants who had not completed this questionnaire one day after it was sent, were resent the email (to a maximum of three times). Most participants (64.9%) completed the final questionnaire exactly 7 days after the experimental session, and the overall average gap between Time 2 and Time 3 was 7.69 days (*SD* = 1.47 days). One participant did not complete the final

questionnaire. The handwritten essays from the self-affirmation and no-affirmation conditions were typed up and analysed using LIWC software as in Study 1.

Results

Randomization checks and manipulation checks

Chi square analyses showed no association between condition and gender, ethnicity or nationality (all *p*s > .60). One-way ANOVA showed participants were of similar ages across conditions, $F(2, 71) = 0.54$, $p = .58$, $\eta p^2 = .02$, and consumed similar amounts of fruit and vegetable at baseline, $F(2, 71) = 0.69$, $p = .51$, $\eta p^2 = .02$

There was a significant effect of condition on the affirmation manipulation checks, measuring the extent to which participants felt self-affirmed, $F(2, 70) = 16.03$, $p < .001$, $\eta p^2 = .31$. Planned contrasts indicated that those in the positive mood condition ($M = 3.40$, $SD = 1.65$) scored significantly lower compared to those in the self-affirmation condition ($M = 5.54$, $SD = 0.95$, $p < .001$), and compared to those in the control condition ($M = 5.18$, $SD = 1.33$, $p < .001$). Unexpectedly, the self-affirmation and control condition did not differ significantly on this manipulation check ($p = .59$), although the pattern of means were in the predicted direction. Further, self-affirmed participants rated the value they had chosen as significantly more important ($M = 6.30$, $SD = 0.63$) than control participants ($M = 2.53$, $SD = 1.76$), $F(1, 51) = 96.02$, $p < .001$, $\eta p^2 = .65$.

Impact of manipulations on affect before the health risk information. There was only a marginal omnibus effect of condition on positive affect when measured as positive emotions (the mDES), $F(2, 71) = 2.31$, $p = .11$, $\eta p^2 = .06$; however simple planned contrasts indicated that the combined experimental conditions reported more positive affect than the control condition, $p = .047$, but that the experimental conditions did not differ from each other, $p = .44$. Participants in the

positive mood condition reported the most positive affect (M = 5.62, SD = 2.46), followed by those in the self-affirmation condition (M = 5.04, SD = 2.67), and by those in the control condition (M = 4.17, SD = 2.21)[4].

There was a significant effect of condition on negative affect, $F(2, 71) = 3.30$, $p = .04$, $\eta p^2 = .09$. Planned contrasts indicated that participants in the control condition reported significantly more negative affect (M = 1.57, SD = 1.33) than the combined experimental conditions, $p = .03$, but that participants in the self-affirmation condition (M = 1.17, SD = 1.23) and the positive mood condition (M = 0.71, SD = 0.78) did not differ in terms of their negative affect, $p = .20$.

There was no significant effect of condition on affect when using the simple mood measure by Trope and Neter (1994), $F(2, 71) = 0.95$, $p = .39$, $\eta p^2 = .03$. There was also no significant effect of condition on affect when using the measure by Raghunathan and Trope (2002), neither for positive affect, $F(2, 71) = 0.77$, $p = .50$, $\eta p^2 = .02$, nor for negative affect, $F(2, 71) = 0.08$, $p = .92$, $\eta p^2 < .01$.

Essay content analysis using LIWC. The comparisons reported here are between self-affirmed participants and control participants only because participants in the positive mood did not produce written content. Self-affirmed participants were more likely to use a higher percentage of positive emotion words in their essays than were non-affirmed participants, $F(1, 50) = 29.71$, $p < .001$, $\eta p^2 = .37$ (M_{NA} = 5.79%, SD_{NA} = 2.29%, M_{SA} = 10.34%, SD_{SA} = 3.75%). Self-affirmed and non-affirmed participants did not differ significantly in their use of negative emotion words, $F(1, 50) = 1.51$, $p = .23$, $\eta p^2 = .03$, or in their use of negation words, $F(1, 50) = 2.24$, $p = .14$, $\eta p^2 = .04$, or in their overall word count, $F(1, 50) = 1.27$, $p = .28$, $\eta p^2 = .02$. The findings regarding correlations among negation words and emotion words replicated the pattern found in Study 1, but did not reach significance (that is, among self-

affirmed participants, use of negation words coincided with slightly reduced use of positive emotion words, r (23) = -.34, p = .12, and slightly increased use of negative emotion words, r (23) = .26, p = .23). Among non-affirmed participants, the findings replicated those of Study 1, in that use of negation words was not associated with use of positive, r (29) = -.12, p = .53, or negative emotion words, r (29) = -.11, p = .58.

Impact of manipulations on primary outcome measures

A series of one-way ANOVAs was carried out with condition (control, self-affirmation, positive mood) as the between-subjects independent variable and measures from Time 2 (intentions, stability of intention, norms, perceived behavioural control, self-efficacy, positive and negative feelings about fruit and vegetable consumption, worry, action control and time spent reading) as the dependent variables. For attitude towards fruit and vegetable consumption, a one-way ANCOVA was carried out with condition as the between-subjects independent variable, attitude at Time 2 as the dependent variable and attitude at Time 1 as the covariate. None of these analyses showed significant effects of condition on any measure (see Table 3).

A one-way ANCOVA was carried out with condition (control, self-affirmation, positive mood) as the between-subjects independent variable, fruit and vegetable consumption at Time 3 as the dependent variable, and fruit and vegetable consumption at Time 1 as the covariate. This showed a significant effect of condition, $F(2, 69) = 3.85$, $p = .03$, $\eta p^2 = .10$[3]. Bonferroni post-hoc analysis showed that participants in the self-affirmation condition differed significantly from those in the positive mood condition, $p = .03$, but there were no further significant differences, ps $> .18$[5].

Impact of manipulations on secondary outcome measures

There was no significant association between condition and whether or not participants took a flyer with the information they had read, χ^2 (2, N = 74) = 2.85, p = .24. In the control condition, 33.33% of participants took a flyer, as did 47.8% of participants in the self-affirmation condition and 23.80% of participants in the positive mood condition. There was also no significant association between condition and whether or not participants requested an email with the information they had read to be sent to them, χ^2(2, N = 74) = 3.00, p = .22. In the control condition, 14.3% of participants requested an email, as did 17.4% in the self-affirmation condition and 9.5% of participants in the positive mood condition.

There were no significant effects of condition on affect after participants had read the health-risk information; neither when measured by the positive emotions scale of the mDES, F(2, 71) = 0.08, p = .92, $\eta p^2 < .01$, or the positive emotions scale of the mDES, F(2, 71) = 0.19, p = .83, $\eta p^2 = .01$; nor when measured by the mood item by Trope and Neter (1994), F(2, 67) = 0.47, p = .63, $\eta p^2 = .01$; nor when measured by the positive, F(2, 70) = 0.72, p = .49, $\eta p^2 = .02$, or negative affect, F(2, 70) = 0.36, p = .70, $\eta p^2 = .01$, by Raghunathan and Trope (2002).

Mediation analyses

Mediation analysis: positive affect. In order to test the mediating role of positive affect, a mediation analysis with 5,000 bootstrap samples was conducted (Hayes, 2013, Model 4). Condition was entered as the predictor variable, positive affect (as measured by the affect measure immediately following the manipulations, which was the computerised mDES) was entered as the mediating variable and each outcome (intentions, stability of intention, attitudes, norms, perceived behavioural control, self-efficacy, positive / negative feelings about fruit and vegetable consumption, worry, action control, reading time and fruit and vegetable consumption

at follow-up) was entered in turn as the outcome variable (see Figure 2). Condition was dummy-coded because it was multi-categorical (following the guidelines by Hayes & Preacher, 2014), and two sets of mediation analyses were carried out. First, the predictor variable consisted of self-affirmation as the independent variable, with the positive mood condition as the covariate and the control condition as the reference category. This tests whether positive affect mediates the effect of self-affirmation on any outcome variables. Second, the predictor variable consisted of the positive mood condition as the independent variable, with the self-affirmation condition as the covariate and the control condition as the reference category. This tests whether positive affect mediates the effect of the positive mood condition on any outcome variables. For each outcome, the 95% confidence interval of the indirect effect of positive affect on all outcomes included zero, both for self-affirmation and the positive mood condition (see Table 4). This suggests that positive affect was *not* a mediator of any effects of the self-affirmation or positive mood condition on any of the outcome variables.

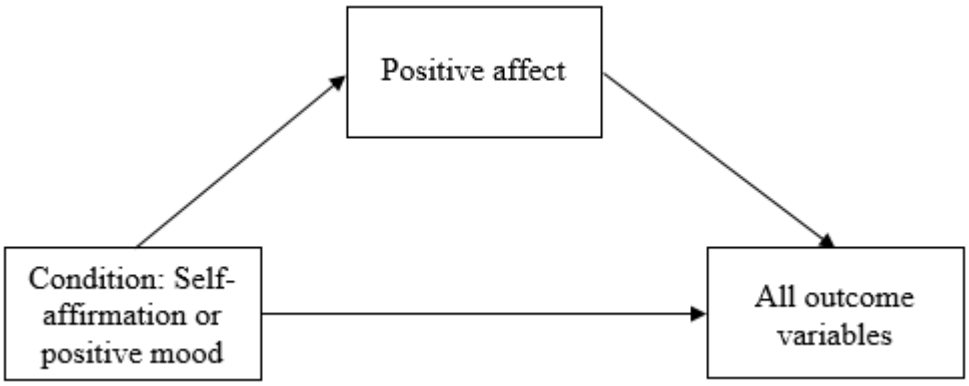

Figure 2. Schematic model of positive affect as the mediator in the relationship between self-affirmation (vs. control) or positive mood (vs. control) and all outcome variables.

Mediation analysis: positive emotion words. Further mediation analyses were carried out to test whether the number of positive emotion words used (as a potential proxy-indicator of positive affect) mediated the effect of self-affirmation on any outcome variables. The procedure was as above (5,000 bootstrap samples; Hayes, 2013, Model 4), except that the positive mood condition was not included, as participants in this condition did not write any essays (see Figure 3). As before, the 95% confidence interval of the indirect effect of the number of positive emotion words used on all outcomes included zero (see Table 5). This suggests that the higher usage of positive emotion words in the self-affirmation condition did *not* mediate the effect of self-affirmation on any of the outcome variables.

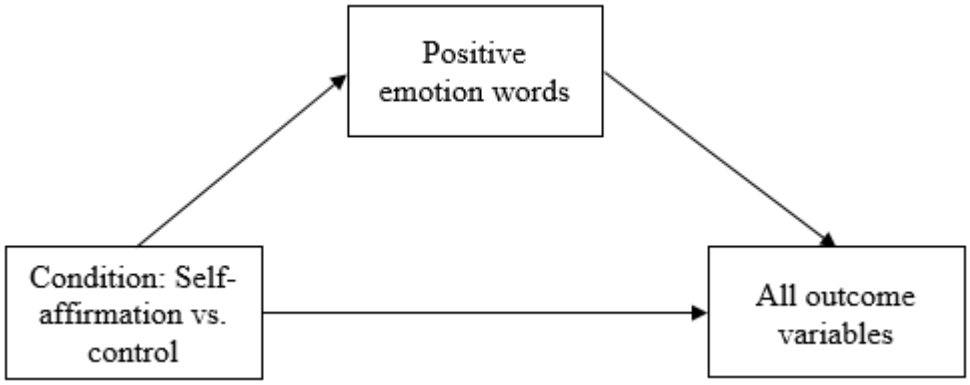

Figure 3. Schematic model of use positive emotion words as the mediator in the relationship between self-affirmation and all outcome variables.

Table 3. Effect of condition on primary outcome variables. Standard deviations in parentheses

	Condition					
Variable	Control (*N* = 30)	Self-affirmation (*N* = 23)	Positive mood (*N* = 21)	*F*	*p*	ηp^2
Intentions	4.85 (1.31)	5.07 (1.56)	5.19 (1.15)	0.42[a]	.66	.01
Stability of intention	3.63 (1.59)	4.00 (1.78)	4.33 (1.15)	1.29[a]	.28	.04
Attitudes[c]	5.63 (0.19)	5.68 (0.22)	6.08 (0.23)	1.25[a]	.29	.03
Norms	4.33 (1.08)	4.00 (0.87)	4.37 (0.63)	1.16[a]	.32	.03
Perceived behavioural control	5.49 (1.43)	5.93 (0.98)	5.75 (1.27)	0.78[b]	.46	.02
Self-efficacy	5.14 (1.18)	5.57 (0.98)	5.32 (1.36)	0.85[b]	.43	.02
Positive feelings about fruit and vegetable consumption	5.17 (1.51)	5.05 (1.53)	5.10 (2.07)	.03[b]	.97	<.01
Negative feelings about fruit and vegetable consumption	2.67 (1.95)	2.09 (1.35)	1.86 (1.28)	1.76[a]	.18	.05
Worry	4.90 (1.19)	4.52 (1.40)	4.32 (1.47)	1.25[a]	.29	.03
Action control	4.70 (1.41)	4.54 (1.54)	4.73 (1.22)	0.12[b]	.88	<.01
Time spent reading (sec)	238.79 (94.84)	285.76 (107.43)	238.54 (105.31)	1.69[a]	.19	.05
Fruit and vegetable consumption at Time 3[d]	-0.05 (0.11)	0.26 (0.12)	-0.21 (0.13)	3.85	.03	.10

Notes. [a] *degrees of freedom*: 2, 71; [b] *degrees of freedom*: 2, 69; [c] Adjusted for baseline attitudes, with standard error in parentheses; [d] Z-scores adjusted for baseline consumption, with standard error in parentheses.

Table 4. Indirect effect of self-affirmation or positive mood condition via positive affect.

	Self-affirmation vs. control			Positive mood vs. control		
Outcome (from Table 3)	Effect (SE)	LLCI[a]	ULCI[b]	Effect (SE)	LLCI[a]	ULCI[b]
Intentions	0.04 (0.10)	-0.13	0.30	0.13 (0.11)	-0.01	0.46
Stability of intention	0.03 (0.08)	-0.09	0.28	0.09 (0.10)	-0.03	0.42
Attitudes[c]	0.02 (0.05)	-0.05	0.15	0.05 (0.05)	-0.02	0.21
Norms	0.01 (0.03)	-0.04	0.11	0.01 (0.05)	-0.09	0.14
Perceived behavioural control	-0.01 (0.05)	-0.16	0.04	-0.03 (0.07)	-0.27	0.05
Self-efficacy	0.01 (0.05)	-0.04	0.19	0.04 (0.07)	-0.05	0.25
Positive feelings about fruit and vegetable consumption	0.03 (0.09)	-0.08	0.33	0.10 (0.12)	-0.06	0.45
Negative feelings about fruit and vegetable consumption	0.01 (0.06)	-0.06	0.22	0.05 (0.10)	-0.08	0.38
Worry	0.02 (0.07)	-0.07	0.26	0.11 (0.10)	-0.01	0.45
Action control	0.04 (0.09)	-0.11	0.31	0.11 (0.10)	-0.03	0.44
Reading time	160.03 (3161.16)	-5155.83	9057.99	1985.88 (5867.43)	-7648.34	17142.80
Fruit and vegetable consumption at Time 3[d]	-0.01 (0.03)	-0.12	0.04	-0.04 (0.05)	-0.18	0.03

Notes. [a] 95% Lower-limit confidence interval; [b]95% Upper-limit confidence interval; [c]Adjusted for baseline attitudes; [d]Z-scores adjusted for baseline consumption.

Table 5. Indirect effect of self-affirmation via positive emotion words.

	Self-affirmation vs. control		
Outcome (from Table 3)	Effect (SE)	LLCI[a]	ULCI[b]
Intentions	-0.14 (0.31)	-0.70	0.51
Stability of intention	-0.10 (0.41)	-0.90	0.75
Attitudes[c]	0.19 (0.25)	-0.20	0.82
Norms	-0.14 (0.17)	-0.55	0.14
Perceived behavioural control	0.11 (0.30)	-0.41	0.82
Self-efficacy	0.18 (0.28)	-0.29	0.84
Positive feelings about fruit and vegetable consumption	-0.01 (0.31)	-0.60	0.60
Negative feelings about fruit and vegetable consumption	-0.01 (0.36)	-0.63	0.77
Worry	-0.08 (0.31)	-0.82	0.43
Action control	-0.37 (0.34)	-1.01	0.35
Reading time	8128.08 (18624.82)	-30478.79	43569.24
Fruit and vegetable consumption at Time 3[d]	-0.19 (0.17)	-0.57	0.09

Notes. [a]95% Lower-limit confidence interval; [b]95% Upper-limit confidence interval; [c]Adjusted for baseline attitudes; [d]Z-scores adjusted for baseline consumption.

Discussion

Study 2 compared the impact of a self-affirmation manipulation on responses to a message about fruit and vegetable consumption to that of a positive mood induction. The immediate impact did not differ across conditions: participants from the self-affirmation, positive mood and control conditions all responded similarly to the message. However, at one-week follow-up, participants in the self-affirmation condition reported consuming more fruit and vegetables than those in the positive mood condition. This effect of self-affirmation on fruit and vegetable consumption was not mediated by positive affect, or by the number of positive emotion words written during the self-affirmation task.

The study used three different questionnaire measures to assess affect: A simple mood item following Trope and Neter (1994), a positive and a negative affect scale following Raghunathan and Trope (2002), and a positive and a negative emotion scale (the mDES) following Fredrickson et al. (2003). Of note, the only measures that showed significant differences across the three conditions were the positive and negative emotion scales. This is in line with the findings of the systematic review of the effect of self-affirmation on positive affect (Chapter 4), which concluded that self-affirmation was more likely to influence positive affect if this was measured using emotion scales such as the mDES. Further, any differences across conditions were eradicated after participants had read the health-risk information. Again, the findings of the systematic review mirror this, as it showed that self-affirmation was more likely to have a significant effect on positive affect if positive affect was measured immediately following self-affirmation. In sum, the pattern of findings regarding positive affect raise the possibility that manipulations such as self-affirmation or the positive mood induction employed in this study do not simply lift overall mood, but induce specific positive emotions, such as those captured by the mDES. However, such

positive emotions are not long lasting, but can be diminished by other materials such as health-risk messages.

General discussion

In Study 1, content-analyses of essays showed that self-affirmed participants used more positive emotion words than non-affirmed participants when writing their essays. In Study 2, self-affirmed participants reported consuming more fruit and vegetables at one-week follow-up than participants who had completed a control task or a positive mood induction, an effect not mediated by measured positive affect. These findings contribute to our knowledge regarding the role of positive affect in self-affirmation. Study 1 showed that self-affirmed participants are more likely to use a positive emotional language when writing their essays than control participants. Taken together with previous findings (e.g. Crocker et al., 2008; Koole et al., 1999), this supports the notion that the act of self-affirming does involve some positive affect. Indeed, in Study 2, those in the self-affirmation condition and those in the positive mood condition reported more positive affect than those in the control condition. Crucially, Study 2 revealed that positive affect is unlikely to be the sole mechanism driving self-affirmation effects. The findings from Study 2 provide evidence that self-affirmation is capable of inducing behaviour change to a greater extent than a positive mood induction. Put differently, the evidence suggests that self-affirmation may well be able to lift mood or boost positive affect, but when it comes to behaviour change, self-affirmation does something more than lift mood or boost positive affect.

The interwoven nature of positive affect and self-affirmation is also highlighted by the manipulation checks in Study 2: the positive mood condition and self-affirmation conditions did not differ significantly from each other in terms of positive affect. They did, however, differ on the affirmation manipulation check, with self-affirmed participants scoring higher. In fact, participants in the positive mood condition scored considerably lower on the

manipulation check, which is encouraging evidence that the positive mood induction was not self-affirming. The key conclusion of the current findings, therefore, is that while positive affect may play a role in both, it is the focus on oneself and one's values that is the active ingredient that allows self-affirmation to produce greater behaviour change than positive affect alone.

It is interesting to note that there were no differences between any conditions on immediate responses to the message on fruit and vegetable consumption in Study 2. This runs contrary to expectations: based on self-affirmation theory and on previous findings, it was expected that at least the self-affirmation and control conditions would differ significantly, with self-affirmed participants being more open towards the message. This was not the case as participants across conditions were equally open towards the message. This was perhaps due to the nature of the health behaviour: consuming fruit and vegetables is not necessarily something that individuals are particularly opposed to, as it has few negative implications compared to other health behaviours (e.g. the inconvenience of reducing alcohol or tobacco intake, or the discomfort of physical activity). Participants' engagement with the message was high throughout, as reflected by the generally high mean scores. It seems that participants were already persuaded by the message and self-affirmation did not have to lower defensive reactions. Self-affirmation did, however, result in greater behaviour change, which suggests that even when there is no need for self-affirmation to lower defences, it still has beneficial implications for behaviour.

It is not uncommon for self-affirmation effects on behaviour to be separate from effects on responses to a message. For example, Wileman et al. (2016) found no significant effect of self-affirmation on responses to a message, but on subsequent behaviour (using both self-report and objective measures). Similarly, Epton and Harris (2008) found no effect of self-affirmation on intentions to consume fruit and vegetables, but on subsequent

consumption. Indeed, responses to a message such as attitudes and intentions to engage in the behaviour do not always mediate the effect of self-affirmation on subsequent behaviour (Cooke et al., 2014). These findings and those of Study 2 suggest something very important about self-affirmation: self-affirmation can work on several different levels; it is just as capable of lowering defensive processing where necessary, as it is capable of promoting successful behaviour change where individuals are already open to the message.

The current studies showed that although it is possible for self-affirmation to increase positive affect, in this study, affect was not the underlying mechanism of self-affirmation on responses to health-risk information. The current findings can therefore show that self-affirmation does something more than positive affect does, but are unable to identify what exactly it does. Previous self-affirmation work has suggested a more abstract level of mental construal (Schmeichel & Vohs, 2009; Wakslak & Trope, 2009), allowing a generally broader perspective on the self and the current situation (Sherman, 2013), or an increased motivation to deploy available cognitive resources (Harris, Harris & Miles, 2017) as potential mediators of the effects of self-affirmation. Future work may wish to explore if these mediators are driving the effects of self-affirmation on health-related outcomes.

Some limitations of the current research need to be acknowledged. For example, Study 2 relied on self-report measures of fruit and vegetable consumption, raising the possibility that self-affirmed individuals over-reported their consumption (perhaps prompted by thinking about themselves in positive, praiseworthy terms). However, strong correlations between self-report and objective measures of fruit and vegetable consumption (Bogers, Van Assema, Kester, Westerterp & Dagnelie, 2004) indicate reliability of self-report measures. A further limitation may be that we cannot be sure that the control condition is truly a control condition and is not having its own unique influence. This is an issue for the broad self-affirmation literature, as it is common practice to ask control participants to complete a task

that is similar to the self-affirmation task, yet assumed to be not affirming. It is less common practice to employ a no-treatment control condition (for an exception, see e.g. Klein et al., 2010). However, in Study 1, the use of such a control task was necessary in order to be able to compare writing. In Study 2, the focus was mostly on comparing the self-affirmation and positive mood conditions, although this issue should be borne in mind when looking at any comparisons with the control condition. Similarly, there is the possibility that the positive mood condition induced feelings other than positive affect, for example self-related thoughts. The induction used here was chosen in part because it seemed the least likely to produce self-related thoughts, compared to many commonly used positive mood inductions such as giving participants bogus feedback on their performance or asking participants to recall moments in their lives that had made them happy (Schwarz & Clore, 1983). Finally, as mentioned earlier, the choice of targeted health behaviour may have meant engagement with the materials was already high, negating the need for either conditions to overcome any defensiveness. Future research may wish to test this using a behaviour that is met with more resistance to change, such as smoking. Reducing nicotine intake arguably requires more effort and has more negative short-term implications (such as withdrawal symptoms) than increasing fruit and vegetable consumption.

In a related vein, the current findings have only ruled out positive affect as a mediator of self-affirmation effects on fruit and vegetable consumption. The possibility remains that different mediational pathways exist for different behaviours, and that positive affect mediates the effect of self-affirmation on other behaviours. Replication of the current findings with different health threats and different outcome behaviours would be desirable to rule out this possibility. A suitable candidate could be physical activity, which has been shown to be increased by both self-affirmation (Cooke et al., 2014; Falk et al., 2015) and positive affect (e.g. Peterson et al., 2012).

Despite these limitations, the current studies have provided further insight into the role of positive affect within self-affirmation. Together with previous research, the findings suggest positive affect may well be present in self-affirmed individuals. However, positive affect is not the single driving mechanism behind self-affirmation effects. In addition, the findings provide valuable support for the efficacy of self-affirmation to translate high levels of motivation and engagement into behaviour change.

Footnotes

[1] Schmeichel and Vohs (2009) found that self-affirmed participants reported slightly more positive affect than non-affirmed participants (Experiment 1) and compared the effects of self-affirmation and a positive mood induction on ego-depletion, finding that self-affirmation (but not positive mood) counteracted ego-depletion (Experiment 2). Steele, Spencer and Lynch (1993) found that self-affirmation reduced self-justifying attitude changes, but positive mood did not (although it is important to note that they compared the two conditions across the separate studies, meaning self-affirmation and positive mood were not directly compared).

[2] Depth of thought (c/f. Griffin & Harris, 2011) was measured using 3 items. However, this scale had low reliability (α = 0.4) and was therefore not included in analyses.

[3] In addition, responses to the health message (intentions, stability of intention, attitudes, norms, perceived behavioural control, self-efficacy and action control) and participants' stage of health action (Wiedemann et al., 2009; also at Time 1) were measured at this point. Mirroring participants' reactions immediately after having read the message, these were high across all conditions at one-week follow-up, indicating agreement and engagement with the message, but did not differ across conditions.

[4] When analysed in the full sample (i.e. not excluding those who already eat the recommended daily amount of fruit and vegetable), the main analysis (which here is not

significant) and the follow-up analyses are all significant. This suggests that the manipulations were successful.

[5] When analysed in the full sample (i.e. not excluding those who already eat the recommended daily amount of fruit and vegetables), the main analysis (which here is significant) is marginally significant, $F(3, 123) = 2.39$, $p = .10$, $\eta p2 = .04$. This indicates that the strongest effects were evident for those most at-risk, i.e. those not eating the recommended daily amount of fruit and vegetables.

Moderation analyses confirmed that participants with different baseline consumption were differently affected by the manipulations, but also did not reach significance.

Chapter 7: Discussion

Overview of background literature and research aims

Self-affirmation has been shown to have wide-ranging effects on a plethora of diverse outcomes. The aims of this research programme were to identify the immediate, general cognitive and affective consequences of self-affirmation. Being able to identify how self-affirmation broadly affects aspects of cognition or affect may help to explain how it achieves its specific effects and may help to connect the many diverse outcomes it is known to influence. Particular attention was paid to the effects of self-affirmation on executive functioning, which is heavily involved in goal-directed behaviour and may provide valuable insights into the mechanisms underlying effects of self-affirmation on such behaviours. Further, the research programme aimed to clarify the role of positive affect in self-affirmation effects, which has repeatedly been suggested as a broad mechanism of self-affirmation effects. In addition, the research programme explored the influence of a previously identified moderator, trait self-esteem, on these potential mediators of self-affirmation.

Summary of findings

Cognitive consequences of self-affirmation

The study reported in Chapter 2 found effects of self-affirmation on two tasks related to executive functioning: a working memory task and an inhibition task. Self-affirmed participants showed improvements in performance on both tasks, suggesting that self-affirmation may enable better use of executive functioning resources. Performance on these tasks was not moderated by self-esteem. The main aim of the study reported in Chapter 3 was to extend these effects to a different working memory task. Here, there was no main effect of self-affirmation on performance, but the effects were moderated by self-esteem. Specifically, individuals with high self-esteem performed worse on the working memory task if they had been self-affirmed. The performance of individuals with low self-esteem remained unaffected

by self-affirmation. The study also explored two previously suggested mediators of self-affirmation effects: construal level and perception of social resources. Low self-esteem individuals reported fewer social resources following self-affirmation, but level of mental construal was not affected by self-affirmation across individuals of all levels of self-esteem. There was no evidence that perceived social resources or construal level mediated the effects of self-affirmation on performance on the working memory task in Study 2. In sum, the findings in relation to the cognitive effects of self-affirmation provided some evidence that self-affirmation improved performance on executive functioning tasks, but such effects may differ for different people.

Affective consequences of self-affirmation

The systematic review of the effect of self-affirmation on positive affect (Chapter 4) indicated that whether or not a study showed a significant increase in positive affect after self-affirmation depended on a number of factors. Studies were more likely to show that self-affirmation increased positive affect if positive affect was measured immediately after self-affirmation (and in the absence of a threat), if they used unipolar rather than bipolar scales, and the measures consisted of positive emotion items (rather than relating to more general affect or mood), and if they used more items to capture positive affect. Studies in which participants were asked to report what they were feeling during the self-affirmation task all reported more positive affect following self-affirmation. These results show that whether or not self-affirmation increases positive affect depends on how and when it is measured, and although there is strong evidence that participants experience positive affect during a self-affirmation task, this does not always last. Crucially, the results of the systematic review showed that self-affirmation does not consistently cause positive affect.

In order to explore further why self-affirmation does not consistently increase positive affect, the study reported in Chapter 5 investigated the moderating impact of self-esteem on

positive affect following self-affirmation. Self-esteem has repeatedly emerged as a moderator of self-affirmation effects, both in previous studies (e.g. moderating the effect of self-affirmation on acceptance on health-risk information; Düring & Jessop, 2014), and in this research programme (moderating the effect of self-affirmation on performance on a working memory task; Chapter 3). The study found that only high self-esteem individuals reported an increase in positive affect following self-affirmation. Studies 1 and 2 reported in Chapter 6 further explored the role of positive affect in self-affirmation effects: Study 1 (Chapter 6) compared the language used in self-affirmation and control essays and showed that self-affirming participants were more likely to use positive affective language. In Study 2 (Chapter 6), the effects of self-affirmation were compared to those of a positive mood induction (as well as a control condition). Participants in the self-affirmation and the positive mood condition reported more positive affect than those in the control condition, but did not differ from each other in their reported affect. This study was also the first in the thesis to introduce an explicit threat: After they had completed the self-affirmation, positive mood or control task, participants read a message on the health consequences of fruit and vegetable consumption. Participants across all three conditions did not differ in their immediate responses to the message, but at one-week follow-up, self-affirmed participants reported consuming more fruit and vegetables than participants from the positive mood and control condition. Further, positive affect did not mediate the relationship between self-affirmation and the outcome measures, including consumption. Moderation analyses showed that self-esteem did not moderate the effect of self-affirmation on any of the outcome variables included in Chapter 6.

Overall, the findings in relation to the affective effects of self-affirmation have shown that positive affect can be an immediate consequence of self-affirmation, but is unlikely to be the sole underlying mechanism of the effects of self-affirmation. In parallel with the findings

regarding the cognitive consequences of self-affirmation, trait self-esteem emerged as a potential moderator of these effects: high self-esteem individuals were particularly likely to experience positive affect after self-affirmation.

Theoretical and practical implications of the research findings

In sum, the current research has shown that self-affirmation can boost performance on tasks requiring executive functioning, but can also hinder it in individuals with high self-esteem. In addition, the findings support the notion that positive affect can be an immediate product of self-affirmation, especially for those high in self-esteem, but that such positive affect is unlikely to be the underlying mechanism of the effect of self-affirmation on the processing of self-relevant threatening information and on subsequent behaviour. Overall, then, the findings have revealed evidence for both cognitive and affective effects of self-affirmation that, to some extent, differ in different people. Further, the affective consequences do not appear to mediate the effects of self-affirmation on behaviour. The findings of this thesis contribute to our understanding of self-affirmation effects. This section will discuss the implications for self-affirmation theory, first for the findings regarding the cognitive consequences of self-affirmation, including the implications for research on executive functioning, second for the findings regarding the affective consequences of self-affirmation.

Implications for self-affirmation theory: cognitive consequences of self-affirmation

The studies reported in Chapters 2 and 3 both showed that self-affirmation can affect performance on executive functioning tasks. The findings reported in Chapter 2 are consistent with previous studies (e.g. Legault, Al-Khindi & Inzlicht, 2012; Logel & Cohen, 2012) showing that self-affirmed participants performed better than non-affirmed participants on tasks of executive functioning. They extend previous findings by showing that the improvements in performance on the working memory task are evident immediately following self-affirmation (rather than at a lengthy follow-up; Logel & Cohen, 2012). It has

previously been proposed that self-affirmation puts individuals in a better position to cope with everyday demands and chronic stressors, and that this will help free up working memory resources in individuals' day-to-day dealings with threats (Logel & Cohen, 2012). The findings reported in Chapter 2 suggest that self-affirmation immediately enables individuals to make better use of their executive functioning resources to perform well on the task.

The findings reported in Chapter 2 also extend previous findings by showing that the improvements in performance on one inhibition task (the Go/No Go task; Legault et al., 2012) replicate with a different inhibition task (the Stroop task). This demonstrates that the effects are also evident in a task that measures slightly different aspects of executive functioning resources: The Go/No Go task requires the initiation or inhibition of a motor response, whereas the Stroop task requires individuals to select from different possible responses and to direct attention to a less central feature of the stimuli (Suchy, 2009) in order to maintain the goal to identify the colour of the words (Kane & Engle, 2003). Together, the Go/No Go task and the Stroop task therefore both require various aspects of executive functioning that all underlie purposeful, goal-directed behaviour (Jurado & Roselli, 2007). The consistency of self-affirmation effects across both tasks therefore suggests that self-affirmation affects not only an aspect of executive functioning that a given task is designed to measure, but that it influences all aspects of an individual's executive functioning.

However, the findings reported in Chapter 3 were inconsistent with the findings reported in Chapter 2, as self-affirmation did not improve performance on a different working memory task. Instead, self-affirmation had detrimental effects on performance on a working memory task in high self-esteem individuals. The picture that emerges is that self-affirmation is able to enhance performance on executive functioning tasks under some circumstances, but not all. In order to identify the boundary conditions, the circumstances of the study in Chapter 2 and the study in Chapter 3 can be compared: Both studies used the same self-affirmation

manipulation (the values-essay; Sherman, Nelson & Steele, 2000) and the samples originated from the same population (students from the University of Sussex). However, one difference lies in the executive functioning tasks used: The study in Chapter 2 used the 2-back task, whereas the study in Chapter 3 used the OSPAN task. The OSPAN task not only requires participants to remember a sequence of letters but also to solve arithmetic equations. It is therefore considered a 'storage-plus-processing task' (Bunting, 2006) that primarily requires working memory, but also requires processing of an unrelated task and places an additional burden on attention.

One possibility therefore is that self-affirmation can improve performance on working memory or inhibition tasks, but not on more complex tasks such as the OSPAN that require slightly different executive functions, such as dual-task processing and switching between unrelated tasks. However, executive functioning tasks overlap extensively in what they measure (the 'task impurity problem'; Burgess, 1997) and tasks often trigger several executive processes simultaneously (Hughes & Graham, 2002). Indeed, performance on tasks that supposedly measure distinctive executive functioning processes have been found to be at least moderately (Miyake et al., 2000), if not strongly (McCabe et al., 2010) correlated. Therefore, it is unlikely that self-affirmation would impact upon one type of executive function, but not others. The difference in task complexity between the studies reported in Chapters 2 and 3 does not seem to account for the differences in findings.

Another notable difference between the tasks used in Chapters 2 and 3 is the level of threat they may pose to participants. The tasks in Chapter 2 were presented in conditions of minimal threat. That is, there was no explicit threat component and participants were not pressured to perform to any particular standard. The only threat that could be speculated to have been present is that entailed in completion of such tasks (Autin & Croizet, 2012). The OSPAN (Chapter 3), on the other hand, gives participants feedback on their arithmetic

performance and asks them to maintain a minimum level of accuracy when solving the equations. This is necessary to ensure participants attempt to solve the arithmetic equations (rather than just memorise the letters), but may also make the task more threatening than the 2-back (Chapter 2). Indeed, Legault et al. (2012) also made their participants aware of their errors and theorise that this is the threat that self-affirmation targets. In other words, Legault et al. (2012) assume that participants' performance is hampered by the threatening implication of committing errors, but self-affirmation reduces the impact of this threat by placing it in a narrative of overall self-worth, which allows participants to focus on the task at hand and perform better. Based on this, it seems feasible that the OSPAN task (Chapter 3) had a similar threatening impact upon participants as the task employed by Legault et al. (2012), and that self-affirmation should have improved performance on it. This was not the case, as the only self-affirmation effects found were detrimental (and only in individuals high in self-esteem). If self-affirmation does achieve its effects on performance on executive functioning tasks by reducing threat, then this would imply that high self-esteem individuals were *more* threatened after being self-affirmed (as they performed worse than their non-affirmed counterparts). In light of theory (Steele, 1988) and evidence (for a review, see Cohen & Sherman, 2014), it seems unlikely that self-affirmation should increase the impact of a threat. It is therefore also unlikely that the inconsistent findings across Study 1 and Study 2 were due to differences in how threatening the tasks were.

A further possible explanation for the inconsistencies across Chapters 2 and 3 is that self-affirmation did not affect performance on the executive functioning tasks directly. Instead, there may have been another step between self-affirmation and performance, which differed across the studies in Chapters 2 and 3. One candidate for this intermediate step is participants' motivation to do well on the task. Self-affirmation has been shown to boost motivation (Creswell et al., 2013; Harris, Mayle, Mabbot & Napper, 2007; Napper, Harris &

Klein, 2013), and performance on executive functioning tasks is also influenced by motivation (Gilbert & Fiez, 2005; Krawczyk et al., 2007; Sanada et al., 2013), suggesting self-affirmation could have improved performance on the tasks in Chapter 2 by boosting participants' motivation. This motivation may also have been present in the study in Chapter 3, but the task used in the study in Chapter 2 is comparatively more difficult than those in Study 1 (as evidenced by the different average accuracy) and thus motivation may not have been sufficient to improve performance. In other words, a potential explanation for the inconsistency between the findings presented in Chapters 2 and 3 is that self-affirmation does not directly influence an individual's executive functioning ability, but their motivation to make use of their available executive functioning resources, and this motivation is also influenced by other factors. An alternative candidate would be participants' confidence in their ability to perform well on such tasks. Confidence, as motivation, has previously been identified as a cognitive consequence of self-affirmation (Briñol et al., 2007) and correlates with performance (Woodman & Hardy, 2003). However, the hypotheses that self-affirmation affects motivation to expend effort in executive functioning tasks, or confidence in one's abilities to perform well, requires testing.

Taken together, the research findings reported in Chapters 2 and 3 contribute to the literature suggesting self-affirmation can improve performance on tasks relating to executive functioning. They extend the literature by showing that such effects occur immediately following self-affirmation. However, the effects did not replicate to another executive functioning task, and findings even indicated that self-affirmation can have detrimental effects (in individuals with high self-esteem). Thus, the findings also attest to the importance of identifying the boundary conditions to the effects of self-affirmation on performance on executive functioning tasks.

Implications for research on executive functioning

The findings also have important theoretical and practical implications for research on executive functioning, as they attest to the flexible nature of executive functioning and shows it can fluctuate temporarily following brief manipulations: Although executive functioning capacity is largely hereditary (Heutink, Verhulst & Boomsma, 2006) and therefore relatively stable over the life span (Polderman et al., 2007), it is clear that external influences and situational circumstances can temporarily improve or deteriorate the ability to use available executive functioning resources. An emerging line of research shows that performance on executive functioning tasks is influenced by situational cues, such as reminder of unfulfilled goals (Masicampo & Baumeister, 2010) or the mere suggestion of fatigue (without actually being fatigued; Clarkson, Hirt, Chapman & Jia, 2010). Such findings suggest that the ability to use executive functioning resources is, to some extent, fluid and may be influenced by other psychological processes. According to the current findings, one such psychological process is self-affirmation.

This has implications for practice: First, it is highly relevant for behaviour change interventions that use of executive functioning resources is not fixed but can be influenced by a brief manipulation. Second, it highlights the need to carefully evaluate the circumstances under which future studies administer executive functioning tasks. Performance on such tasks may be influenced by how participants perceive the task or by other situational factors, particularly self-focus inducing activities that participants engaged in prior to completing the task. Over- or underestimating people's performance on such tasks could have meaningful consequences: For example, there is evidence that performance on executive functioning tasks could be used to predict an individual's likelihood of developing alcoholism (Nigg et al., 2004) or a Parkinson's patient likelihood of developing dementia (Woods & Tröster, 2001), or even to predict mortality among older adults (Johnson, Lui & Yaffe, 2007). Studies

using such methods would benefit from ensuring that participants' performance is not unintentionally influenced by other activities.

Implications for self-affirmation theory: affective consequences of self-affirmation

A key contribution this thesis makes to self-affirmation theory is that it helps to clarify the role of positive affect in self-affirmation. As a first step, the systematic review (Chapter 4) provides an up-to-date overview of studies that have tested the impact of self-affirmation manipulations on positive affect. Positive affect has been much discussed as a potential mechanism underlying self-affirmation (e.g., Crocker et al., 2008; Tesser, 2000), and it is clear from the number of studies included in the systematic review that there has also been considerable empirical interest in the role of positive affect in self-affirmation. The systematic review has implications for self-affirmation research, as it highlights that positive affect (in particular positive emotions) can be an immediate outcome of self-affirmation, and can therefore remain a contender for a possible mediator of self-affirmation effects. However, there are still inconsistencies in the literature that need to be better understood, as not all studies found that self-affirmation increased positive affect.

The study reported in Chapter 5 offers one solution to these inconsistencies by showing that positive affect is evident in some, but not all, people following self-affirmation. Specifically, self-affirmation boosted positive affect in individuals with high self-esteem, but not with low self-esteem. This may help to explain why there is often no main effect of self-affirmation on measures of positive affect, as the effects are only measurable in a subgroup of individuals. It also provides novel empirical support for the view that positive affect should not yet be disregarded as an outcome of self-affirmation, and consequently, as a mediator of its effects.

The systematic review also suggested that positive affect may be more likely to be detected *during* a self-affirmation task than when measured at a later stage. This was

supported by the findings of Study 1 (Chapter 6), which showed that self-affirmed participants were more likely to use positive emotion terms when writing their self-affirmation essays, compared to non-affirmed participants writing their control essays. One implication for self-affirmation theory therefore is that the self-affirmation task is indeed a positive affective experience, but that the positive affect does not endure in everyone. Instead, high self-esteem individuals 'savour' the experience, whereas low self-esteem individuals 'dampen' their emotions (Wood, Heimpel & Michela, 2003). Savouring involves attending to and focusing on positive feelings in order to maintain them or prolong the duration of the positive experience (Bryant, Chadwick & Kluwe, 2011). Individuals with low self-esteem, on the other hand, are less inclined to actively seek positive affect (Heimpel, Wood, Marshall & Brown, 2002) and are more likely to down-regulate feelings of positive affect (Wood et al., 2003). It may therefore be the case that both high and low self-esteem individuals experienced positive affect during the self-affirmation task, but high self-esteem individuals savoured the feeling and thus self-affirmation effects on positive affect measures were evident only in this subgroup of participants. Thus, the implication for self-affirmation theory is that these findings further strengthen the case for positive affect as an immediate outcome of self-affirmation, but that whether this is detectable post-affirmation depends on both the type of affect measurement and on the level of trait self-esteem of the participant.

In sum, the findings reported in the systematic review (Chapter 4), in Chapter 5 and Study 1 in Chapter 6 provide evidence that self-affirmation can result in positive affect. However, an important implication of the findings of Study 2 in Chapter 6 is that this positive affect is unlikely to be the sole mechanism of self-affirmation effects, as self-affirmation promoted more fruit and vegetable consumption than a positive affect induction, and positive affect did not mediate the effect of self-affirmation on any outcomes. It is possible that positive affect is one crucial ingredient in self-affirmation, but not the only crucial ingredient

(Cohen, Aronson & Steele, 2000). Perhaps positive affect is merely a side effect of the self-affirmation that helps to make it a pleasant experience, but an important side effect because it makes participants engage more with the task. After all, it has been suggested that a rudimentary function of positive affect is to signal that something is safe to be engaged with (in contrast to negative affect, which signals that something should be avoided; Cacioppo, Gardner, & Berntson, 1999; Carver & Scheier, 1990). A further basic feature of positive affect is that it makes an activity enjoyable and rewarding (Schwarz & Bohner, 1996), and thus worth engaging with. Indeed, it has been found that in laboratory settings, positive affect is related to engagement with tasks (Salanova, Llorens & Schaufeli, 2011) and with intrinsic motivation to complete tasks (Isen & Reeve, 2005). Put simply, the positive affect in self-affirmation may be an important component because it makes the task more enjoyable and more attractive, thereby increasing participants' engagement with it. If self-affirmation was an affectively neutral (or negative) task, participants might only complete it in a perfunctory manner, without truly engaging with it. The implication for self-affirmation theory therefore is that positive affect does not drive self-affirmation effects, but may make important contributions to its effectiveness.

Crucially, the finding that self-affirmation had effects on behaviour where a positive affect induction did not (Study 2, Chapter 6), shows that self-affirmation does something that positive affect in isolation does not. More specifically, the difference may lie in how positive affect and self-affirmation change the way individuals approach a threat (such as the health-risk information in Study 4): Positive affect may make individuals feel better about the threat, but due to the fleeting nature of positive affect (Fredrickson, 2013), this is only temporary. Simply making people think more positively about a threat is not sufficient to engender behaviour change (Cameron, Bertenshaw & Sheeran, 2014). Self-affirmation, on the other hand, changes the way individuals think about a threat more deeply. In particular, self-

affirmed individuals have been found to process threatening messages more systematically (Correll, Spencer, & Zanna, 2004; Harris & Napper, 2005) and to focus their attention on the threat (Reed & Aspinwall, 1998; van Koningsbruggen, Das & Roskos-Ewoldsen, 2009) – all indicators that self-affirmation promotes more careful and deliberate consideration of self-relevant threats. It seems that getting people to think critically about a threat (in combination with thinking about it more positively) is necessary to promote behaviour change.

To summarise, the evidence presented in this thesis suggests that positive affect is unlikely to be the sole underlying mechanism of self-affirmation. Nonetheless, positive affect may play an important role in the effectiveness of self-affirmation as it helps to make the experience positive and promotes engagement with the task. The findings therefore contribute to self-affirmation theory by suggesting that task engagement induced by positive affect could be a potential mechanism of self-affirmation effects.

Self-esteem moderates the effects of self-affirmation: Implications for theory

The studies presented Chapters 3 and 5 both showed the potential for trait self-esteem to moderate self-affirmation effects on affective and cognitive outcomes. The findings are consistent with previous studies showing that self-esteem can moderate self-affirmation effects (e.g. Düring & Jessop, 2014; Jaremka et al., 2011), and have implications for the role of self-esteem in self-affirmation. Self-esteem has previously been tested as a mediator of self-affirmation effects (Armitage & Rowe, 2011; Koole et al., 1999, Study 3; Sherman & Kim, 2005), but this has yielded inconclusive results. Future research should also focus on its role as a moderator, as it is clear that self-affirmation affects individuals with different levels of self-esteem differently, based on the findings reported in this thesis (Chapters 3 and 5) and previous findings (e.g. Düring & Jessop, 2014; Jaremka et al., 2011).

An important question that has arisen from the findings of this thesis, together with those of previous studies, is whether self-affirmation is more likely to benefit individuals with

low or high self-esteem. High self-esteem consists of a highly favourable and positive evaluation of the self, whereas the self-concept of someone with low self-esteem is comparatively less favourable (Baumeister, Campbell, Krueger & Vohs, 2003). Consequently, it seems that the higher one's self-esteem, the stronger one's sense of overall adequacy (Steele, Spencer & Lynch, 1993). This means that a self-affirmation manipulation, which fortifies one's global sense of adequacy (Sherman & Cohen, 2006), may not offer much benefit to an individual with high self-esteem. Low self-esteem individuals, on the other hand, are characterised by self-evaluations that are either uncertain or neutral to negative (Campbell et al., 1996), and hence their sense of overall self-worth is less secure. A self-affirmation manipulation provides low self-esteem individuals with an opportunity to bolster their self-worth in a way they do not naturally do. In this way, a self-affirmation manipulation may benefit only those with low self-esteem (and not those with high self-esteem) because it is an artificial prompt for them to think about themselves in the way that high self-esteem individuals routinely think about themselves. Indeed, some studies find that self-affirmation benefits only those with low self-esteem (Düring & Jessop, 2014; Jaremka et al., 2011; Spencer, Fein & Lomore, 2001; van Dijk et al., 2011). However, this reasoning also implies that having high self-esteem is equal to being self-affirmed, as self-affirmation supposedly puts low self-esteem individuals in the same position as high self-esteem individuals (Düring & Jessop, 2014). Yet some studies show self-affirmation benefits only those high in self-esteem (and not those with low self-esteem; Creswell et al., 2005; Landau & Greenberg, 2006, Study 2; Steele, Spencer & Lynch, 1993, Study 3), which is inconsistent with this assumption. An explanation that has been put forward for self-affirmation being more effective in individuals with high self-esteem is that these individuals have a larger selection of positive self-concepts at their disposal with which they can affirm (Steele, Spencer & Lynch, 1993), and that individuals with low self-esteem may even be unpersuaded

by an affirmation if they have few positive self-views on which to affirm (Cohen & Sherman, 2014).

Thus, previous studies have found that self-affirmation affects high self-esteem individuals under some circumstances, and low self-esteem individuals in others. Indeed, the findings of Studies 2 and 3 replicate this: In Study 2, self-affirmation had detrimental effects on the performance of high self-esteem individuals, but also negatively affected low self-esteem individuals, who reported feeling fewer social resources when self-affirmed. In Study 3, high self-esteem individuals reported more positive affect following self-affirmation. It is clear that self-affirmation will affect high self-esteem individuals on some outcomes, but low self-esteem individuals on other outcomes. Further, it is noteworthy that self-esteem moderated the effect of self-affirmation on only some outcome variables. Self-esteem was tested as a moderator of self-affirmation effects on all outcomes presented in this thesis (including those in Chapters 2 and 6), but only moderated those discussed in Chapters 3 and 5. Future research needs to carefully explore the circumstances under which self-affirmation will affect individuals with different levels of self-esteem.

Self-esteem moderates the effects of self-affirmation: Implications for practice

Trait self-esteem has emerged as a moderator of self-affirmation effects, both in previous studies and in the current thesis. Such findings attest to the importance of taking trait self-esteem into account when conducting self-affirmation research. Studies in which self-esteem moderated the effect of self-affirmation would have concluded that self-affirmation did not have any effect if they had not taken self-esteem into account. For example, if the study presented in Chapter 5 had not controlled for self-esteem, the erroneous conclusion would have been that self-affirmation does not cause positive affect in any individuals. The same applies to all studies that have found that self-affirmation effects were contingent on levels of self-esteem (Creswell et al., 2005; Düring & Jessop, 2014; Jaremka et al., 2011;

Landau & Greenberg, 2006, Study 2; Spencer, Fein & Lomore, 2001; Steele, Spencer & Lynch, 1993, Study 3; van Dijk et al., 2011). It is feasible that studies failing to find a main effect of self-affirmation (e.g. Ferrante, 2016) are not detecting the effects if self-esteem is not included in the analysis. Nonetheless, self-esteem did not moderate self-affirmation on all outcomes in this thesis. It is clear that further research is needed to establish when self-esteem is likely to moderate self-affirmation effects.

Perhaps our finding that positive affect is higher among high self-esteem individuals after self-affirmation can provide a step towards unravelling this: it may be the case that self-esteem will moderate the effects of self-affirmation if positive affect is somehow related to the outcome under test. For example, Creswell and colleagues (Creswell et al., 2005) found that self-affirmation lowered stress, but only in individuals with high self-esteem. Positive affect has been known to buffer stress (Robles, Brooks & Pressman, 2009). On the other hand, van Dijk, van Koningsbruggen, Ouwerkerk and Wesseling (2011) report that self-affirmation decreased schadenfreude, but only among those with low self-esteem. Again, schadenfreude and positive affect have been found to be linked, which perhaps is not unsurprising given that schadenfreude translates as ‘joy at the misfortune of others’: when people experience schadenfreude, they experience a form of joy, which is positive affect (Cikara & Fiske, 2012; 2013). The fact that self-affirmation was unable to reduce schadenfreude in those with high self-esteem may have been due to those individuals experiencing positive affect more strongly. Thus, identifying how the outcome of interest relates to positive affect may be a crucial step in determining whether the effects of self-affirmation will be moderated by self-esteem, and how.

Self-affirmation and health: implications

The findings from Study 2 reported in Chapter 6 also have a number of implications for self-affirmation theory in the context of health. First, they further strengthen the evidence

base that self-affirmation is able to promote health-protective behaviours by increasing fruit and vegetable consumption, in at-risk individuals (Epton & Harris, 2008; Epton et al., 2015; Sweeney & Moyer, 2015). Second, they suggest that self-affirmation achieves its effects on health-behaviours not just through message acceptance. There was no evidence that self-affirmation had a beneficial impact on cognitive precursors to behaviour in response to the health message, as message acceptance and intentions to increase fruit and vegetable consumption were uniformly high in all conditions. However, self-affirmed individuals reported consuming the most fruit and vegetables at follow-up.

The discrepancy between the effects of self-affirmation on message acceptance and on the behaviour itself suggests that self-affirmation does not solely operate by lowering participants' defensiveness and increasing their message engagement. Instead, other mechanisms may contribute to the effects on behaviour. For example, self-affirmation may have operated at a different point in the cognition-behaviour relationship. The execution of health behaviours involves a complex interplay of psychological processes. For instance, the Protection Motivation Theory (Norman, Boer & Seydel, 2005) proposes that threat appraisal is one of the key determinants of intentions to perform health-behaviours, which in turn determine the behaviour. Similarly, the Theory of Planned Behaviour (Ajzen, 1991) suggests that intentions to engage in a behaviour are (in part) predicted by an individual's attitudes towards the health behaviour and its consequences. According to both models of behaviour, intentions are only reliably formed if individuals carefully consider the possible threat to their health and respond to it in a non-defensive manner. Put differently, the process of successfully acting on intentions does not take place if individuals fail to engage with the threat sufficiently.

Based on this, it is assumed (Sherman & Cohen, 2006) that self-affirmation achieves its effects early on in this process: by lowering the defensive processing of health-threats. The

findings reported in Study 2 (Chapter 6) provide evidence that self-affirmation may also affect the process leading to behaviour at a later stage, such as after intentions have been formed. In light of the findings of this thesis in relation to the cognitive consequences of self-affirmation (Chapters 2 and 3), it is feasible that self-affirmation changed the extent to which individuals are prepared to use their cognitive resources (such as executive functioning) to achieve the goals they set out upon receiving the health message. In other words, the health message in the study reported in Chapter 6 was generally well received, and participants from all conditions (self-affirmation, positive mood and control) expressed strong intentions to increase their fruit and vegetable consumption. However, self-affirmed individuals were better able to translate these intentions into behaviours, possibly by making better use of their cognitive resources. This hypothesis should be tested in future research (see also *Suggestions for Future Research*).

Naturally, it is important to consider the possibility that the effects on self-reported behaviour are merely an artefact of reporting bias in self-affirmed participants: perhaps the self-affirmation prompts participants to present themselves in a positive light and cues them to inflate their self-reported behaviour. However, previous studies employing objective measures of behaviours have attested to the ability of self-affirmation to influence behaviours such as physical activity (Falk et al., 2015) or weight control (Logel & Cohen, 2012). This provides preliminary evidence that self-affirmation effects on health-related behaviour are reliable, but this remains to be tested with fruit and vegetable consumption.

Self-affirmation and threat: implications

Threat is at the heart of self-affirmation theory, which was primarily devised to explain how individuals are able to cope with the implications of a threat to their self-integrity (Steele, 1988). Consequently, the assumption is that self-affirmation produces the biggest benefits if the self-affirming person perceives some form of threat, and if the threat

relates to the outcome being measured (Cohen & Sherman, 2014, p. 358). Self-affirmation studies therefore tend to examine the effects of self-affirmation in the context of a clearly-defined threat to self-integrity, such as inclusion of an explicit threat, like a threatening health message (e.g. Epton & Harris, 2008), or by targeting a chronically threatened population (e.g. Armitage, 2016; Logel & Cohen, 2012).

In the studies showing self-affirmation effects on performance on executive functioning tasks, the authors (Hall et al., 2014; Creswell et al., 2013; Legault et al., 2012; Logel & Cohen, 2012) suggest that the effects are due to self-affirmation reducing the impact of a threat. The assumption is that a threat, or a stressful situation, demands individuals' attention and distracts them from the task. Self-affirmation lessens the impact of a threat by placing it in the context of a narrative of assured self-worth (Sherman, 2013), and can reduce the performance impairment by the threat. For example, the study by Logel and Cohen (2012), which found improvements in working memory performance following self-affirmation, targeted overweight women who were all dissatisfied with their weight. The authors reason that these women are likely to be continually experiencing weight-related stress, which preoccupies and distracts them. Self-affirmation presumably improved performance by alleviating this stress.

Similarly, Hall et al. (2014) assumed that their self-affirmed participants performed better on tasks related to executive functioning because they were normally distracted by the threat of belonging to a stigmatised group. Creswell and colleagues interpret their effects on problem solving in a similar way (Creswell et al., 2013), as they propose that the stress of being watched while trying to complete the task interfered with performance on the task. Self-affirmation presumably improved performance by diminishing the impact of the stress (Creswell et al., 2013). Lastly, the Go/No Go task used by Legault et al. (2012) gave participants negative feedback whenever they made a mistake. The authors suggest that self-

affirmed participants were able to process this threatening feedback in a less defensive manner and could use the information to improve their performance.

The studies in the current research programme did not include an explicit threat (except for the health-risk message in Chapter 6), nor were the participants selected on the basis that they should be chronically threatened. Therefore, one possible way of interpreting the current findings is that self-affirmation effects were observed in the absence of a threat. In other words, self-affirmation did not improve performance by reducing the impact of the threat, as is the theoretical explanation of such effects in previous studies (Hall et al., 2014; Creswell et al., 2013; Legault et al., 2012; Logel & Cohen, 2012). Indeed, research into executive functioning tasks has also shown that performance on tasks measuring executive functions can be influenced by fatigue (Nilsson et al., 2005), mood (Mitchell & Phillips, 2007) and motivation (e.g. Gilbert & Fiez, 2005). This supports the possibility that the observed improvements in performance are not due to self-affirmation reducing the negative impact of a threat, but are independent of any threat and could be due to other factors. This would also offer an alternative interpretation of all previously observed effects of self-affirmation on performance.

However, we cannot be certain that participants were not threatened at all. For example, simply completing the relevant outcome measures, such as the executive functioning tasks, may have been inherently threatening, as performance on these reflects one’s competence and may have implications for one’s self-integrity (Autin & Croizet, 2012; Legault et al., 2012). Thus, the possibility that participants were threatened cannot be ruled out entirely. The main conclusion that it is possible to draw is that self-affirmation had effects on cognition and on affect in a situation in which participants were not intentionally threatened (such as by being put under explicit pressure to perform well on the tasks; see Harris, Harris & Miles, 2017, Chapter 2).

A growing number of studies are exploring the effects of self-affirmation in the absence of explicit threats (e.g. Armitage, 2016; Logel & Cohen, 2012; Nelson et al., 2016). However, as with the current findings, it is not certain that participants in these studies were not threatened in a way that was not set out by the study design. It will be important for future studies to explore this further and to try to establish whether a threat was present. This may prove challenging, as individuals are not always aware of a psychological threat affecting them (Boden & Baumeister, 1997), even if they show a cognitive bias towards the threat (Mogg & Bradley, 1998). Probing for perceptions of threat would make the threat salient and may not reflect participants' natural reactions to the threat, or could attenuate self-affirmation effects by raising awareness of its processes (Sherman et al., 2009). Indirect measures (such as increases in blood pressure; e.g. Blascovich, Spencer, Quinn & Steele, 2001) may provide some insight into whether participants feel threatened, and future research could consider including such measures in order to test whether self-affirmation effects such as improved performance on executive functioning tasks can be attributed to a reduction in threat (see Sherman, Bunyan, Creswell & Jaremka, 2009). This may help answer the question of whether self-affirmation only works by reducing the impact of a threat, or whether it can also have effects in situations with no threat.

In doing so, it will be also important to bear in mind the possibility that self-affirmation effects may differ depending on the presence or absence of a threat. That is, self-affirmation may interact with threats, and so it may be expected that any effects put in motion by self-affirmation when no threat is present operate through different mechanisms than when a threat is present. The research presented in this thesis has provided evidence that self-affirmation effects may not always be the same for all people, and it is similarly feasible that self-affirmation effects are also not the same in all situations.

In sum, most of the studies presented in this thesis were not designed to threaten participants in any way, raising the possibility that the observed effects did not occur as a consequence of self-affirmation interacting with a threat. However, it is impossible to say for certain that participants were experiencing no threat at all, and it cannot be concluded at this stage that the findings provide evidence of self-affirmation effects in the absence of a threat. Nonetheless, this has brought to light important questions about the relationship between self-affirmation and threat, such as how and whether we might be able to observe self-affirmation effects in the absence of threat and how these differ from effects in the presence of threat.

Limitations of the current research programme

The current research programme has a number of limitations that need to be borne in mind. Whilst the preceding chapters have already discussed these to some extent in the context of the individual studies, the current section will examine some of the limitations that may apply to findings across the thesis.

Generalisability of findings

It is important to acknowledge the lack of diversity in the samples used in this research programme. All samples came from the same population – university students. A strength of this in the context of self-affirmation literature is that previous studies have frequently used student samples, making this research programme comparable to a large proportion of existing self-affirmation studies. Moreover, some of the effects observed in this research programme have also been observed in non-student samples: For example, the beneficial effects of self-affirmation on performance on the 2-back task (Chapter 2) were originally observed in a non-student, community sample (Logel & Cohen, 2012). Similarly, the finding that self-affirmation increased fruit and vegetable consumption has been replicated in community samples (Fielden, Sillence, Little & Harris, 2016) and other student samples (Epton & Harris, 2008; van Koningsbruggen et al., 2014), supporting robustness of

the effects. However, other findings that have emerged as part of this research programme, such as the moderating impact of self-esteem on self-affirmation effects on positive affect (Chapter 5) and performance on the OSPAN task (Chapter 3) need to be tested using more diverse samples. It is particularly noteworthy that all self-affirmation studies that have shown moderation by trait self-esteem, inclusive of those in this thesis, used undergraduate student samples (Creswell et al., 2005; Düring & Jessop, 2014; Jaremka et al., 2011; Landau & Greenberg, 2006, Study 2; Spencer, Fein & Lomore, 2001; Steele, Spencer & Lynch, 1993, Study 3; van Dijk et al., 2011). Individuals of student age have been found to have lower trait self-esteem (Robins, Trzesniewski, Tracy, Gosling & Potter, 2002) and less stable trait self-esteem (Trzesniewski, Donnellan & Robins, 2003) than older adults. Self-affirmation may interact differently with samples of other age groups and other self-esteem profiles. Future research is therefore necessary to establish whether these effects are peculiar to the population used in this research programme or not.

All studies employed the same self-affirmation manipulation: the values-essay task, in which self-affirming participants write about their most important value, and control participants write about their least important value (e.g. Sherman, Nelson & Steele, 2000). This type of self-affirmation is the most widely used (Cohen & Sherman, 2014; McQueen & Klein, 2006), which facilitates comparison of this research programme to a large proportion of previous self-affirmation studies. However, it would be prudent to test whether effects generalise to other self-affirmation manipulations. Many different self-affirmation manipulations have been developed and they vary greatly in their methodology (McQueen & Klein, 2006). It would limit the usefulness of the current findings if they only applied to one particular type of self-affirmation task. For example, a line of research in self-affirmation has been concerned with developing self-affirmation manipulations that do not require participants to engage in writing tasks (e.g. Napper, Harris & Epton, 2008). These brief

manipulations represent an important step towards implementing self-affirmation manipulations on a wider scale, and it seems that they can have effects on some outcomes, such as to ameliorate defensive reactions to health messages (Arpan, Lee &Wang, 2016; Dijkstra, 2014; Jessop, Simmonds & Sparks; 2009; Napper, Harris & Epton, 2008). However, it will be important to establish whether the effects of self-affirmation on outcomes specific to this research programme will also extend to tasks that do not require participants to write. The writing may constitute an important process of self-affirmation: A study investigating expressive writing found that participants who had written about a personal experience performed better on a working memory task, compared to those who wrote about a trivial topic (Klein & Boals, 2001). Such benefits of introspective writing have been attributed to activating cognitive processes required to structure and verbalise self-relevant thoughts (Pennebaker, Mayne & Francis, 1997). It is therefore important to test whether effects of self-affirmation specific to this research programme are contingent upon the self-affirmation manipulation involving a writing task or not.

What did the control condition do?

A further issue relating to interpretation of findings concerns the role of the control condition. The task control participants were asked to do is considered a matched filler task, in that it involves some elements of the same activity as the experimental condition (e.g., writing about values) and is of the same duration, but does not so readily invite self-reflective thoughts. In this way, the task represents a ‘neutral’ control task, which was designed to avoid participants self-affirming. This is the conventional approach to testing self-affirmation effects (McQueen & Klein, 2006) and to enable best-possible comparison with previous studies, this was also the approach adopted throughout this research programme.

The assumption is that the control task does not exert self-affirmative influence on participants, who therefore are in a neutral, or baseline, state. However, it is not clear that this

is indeed the case. The control task still requires engagement and effort, and we do not know for sure that the task does not have its own impact on participants. Differences between self-affirmed and control participants could be explained in terms of the control task having an effect on control participants (rather than the self-affirmation task having an effect on self-affirmed participants). For example, asking participants to adopt the perspective of another student and write about a potentially unfamiliar topic may be ego-depleting or tedious, resulting in fatigue and loss of interest. Under this interpretation, non-affirmed participants in Harris et al. (2017, Chapter 2) performed worse than self-affirmed participants on the executive functioning tasks because they were drained or had lost interest in the study.

Equally, we also do not know for sure that all control essays are free from self-affirming content. Any writing task can be used as an opportunity to self-affirm (Cohen, Aronson & Steele, 2000). Thus, null effects of self-affirmation manipulations could also be explained in terms of control participants having written self-relevant and affirming essays. In order to clearly attribute self-affirmation effects to the self-affirmation task and eliminate the possibility of control participants inadvertently affirming, future studies should consider including a no-task control condition.

Suggestions for future research

A number of recommendations for further research building on the current findings have already been advanced in this thesis. This section will propose further avenues of research that may serve to contribute to our understanding of self-affirmation, by investigating some aspects in more detail and by integrating the findings with related fields of interest.

Assessing mediation of effects

One methodological feature that limits the interpretation of findings concerns the design of studies, which did not allow tests of whether the cognitive consequences of self-

affirmation (i.e. performance on the executive functioning tasks) would mediate effects of self-affirmation on behavioural outcomes, such as health-related behaviours, because only one study (Study 2 in Chapter 6) included a behavioural follow-up and this study also did not measure performance on executive functioning tasks. Designing each study to incorporate health messages, measures of cognitive precursors to behaviour and a behavioural follow-up to explore how self-affirmation effects unfold over time was beyond the scope of these studies. However, the findings of this research programme may be seen as a building block to further research, which could further investigate how the effects of self-affirmation on executive functioning tasks relate to the effects of self-affirmation on behaviour.

Executive functioning: temporal self-regulation theory

There is scope to integrate the current findings with Temporal Self-Regulation Theory (Hall, 2001; Hall & Fong, 2007), which offers a conceptual framework for health behaviours and may extend the current findings. The Temporal Self-Regulation Theory proposes that intentions to engage in a health behaviour are a function of two cognitions: First, connectedness belief, which is the extent to which an individual is convinced that their behaviour will have an impact on their health. Second, temporal valuation, which refers to how close or distant the individual perceives the health outcome to occur in relation to the behaviour.

Critically, Temporal Self-Regulation Theory contends that behaviour is not solely predicted by the intention to engage in the behaviour. Instead, the link between intention and behaviour is moderated by a further two cognitive constructs: First, the individual's behavioural prepotency, which is determined by the presence of environmental cues to action (e.g. hunger) and by an individual's past behaviour. Second – and most relevant to the current thesis – the individual's self-regulatory capacity. This refers to the individual's ability to perform the behaviour and may hinge upon their energy levels and their executive

functioning abilities. If an individual has the energy levels and executive functioning resources in place to perform the behaviour, then intentions can be translated into behaviours. But, because energy levels and executive functioning resources fluctuate (as discussed above), intentions are not always successfully converted into behaviour, resulting in the intention-behaviour gap (Orbell & Sheeran, 1998). Indeed, empirical studies have supported the theory and shown that performance on executive functioning tasks moderates the intention-behaviour gap (Allan, Johnston & Campbell, 2011; Hall, Fong, Epp & Elias, 2008; Mullan, Wong, Allum & Pack, 2011).

Given our understanding of self-affirmation effects, Temporal Self-Regulation Theory may offer a useful framework with which to explain how self-affirmation affects behaviour. In the first instance, self-affirmation impacts connectedness beliefs and temporal valuations, the cognitive precursors to intention-formation: self-affirmed individuals are more likely to entertain the idea that they are personally responsible for their health outcomes through their behaviour, which they normally refuse to acknowledge in an effort to shield their self-integrity. In addition, self-affirmation promotes a higher level appraisal of information (Wakslap & Trope, 2006), allowing individuals to integrate future consequences with current behaviour (Vallacher & Wegener, 1989). Thus, according to the Temporal Self-Regulation model, self-affirmation may encourage intention-formation by making salient the connection between current behaviour and distant health outcomes. However, when a well-meaning individual is in a situation where they could translate their intentions into behaviour (e.g. being offered an alcoholic drink when they had intended not to drink), they may fail if their executive functioning capacity at that particular moment is not in place. Self-affirmation may therefore also influence the proposed moderator of the intention-behaviour link, by contributing to individuals making better use of their executive functioning resources (Harris et al., 2017, Chapter 2). The findings of Study 2 reported in Chapter 6 present some

preliminary evidence for this effect of self-affirmation, as self-affirmed participants appeared better able to translate their intentions into fruit and vegetable consumption, suggesting executive functioning resources may have moderated the link between intentions and behaviours.

Considering the findings of this research programme under the Temporal Self-Regulation model may therefore provide useful insights into how self-affirmation achieves its effects on behaviour. A promising extension of this research would be to explore the effects of self-affirmation on the variables outlined by the Temporal Self-Regulation model, which self-affirmation may influence at several stages.

Goal setting and goal pursuit

An area of research that could be developed further in the context of self-affirmation is goal setting and goal pursuit, which are both crucial steps towards the successful execution of goal-directed behaviours such as health behaviours (Mann, de Ridder & Fujita 2013). It is well documented that self-affirmation enables goal pursuit, as indicated by stronger intentions to engage in desirable health behaviours (Epton et al., 2015; Sweeney & Moyer, 2015). However, some evidence also shows that self-affirmation can hinder goal pursuit when the task at hand is beset with failure (Vohs, Park & Schmeichel, 2013), and the study reported in Chapter 3 proposed this as a reason why self-affirmation had detrimental effects on performance on the OSPAN task (in high self-esteem individuals). The idea is that under normal circumstances, individuals strive to succeed at tasks as a means of confirming their sense of self-integrity. When self-affirmed, their self-integrity is strengthened and therefore failing at a task does not have such severe implications for their overall feeling of self-worth. A self-affirmed individual might then disengage from a difficult task more easily than a non-affirmed individual (Vohs et al., 2013). The concept that self-affirmation can lead to suspension of goal pursuit under conditions of failure needs to be tested in a health context.

This would be highly relevant to health behaviours that require curbing of consumption, such as smoking cessation: There is ample evidence that self-affirmation increases smokers' engagement with relevant health risk information (Armitage et al., 2008; Crocker et al., 2008; DiBello, Neighbors & Ammar, 2015; Memish, Schüz, Frandsen, Ferguson & Schüz, 2016; Zhao & Nan, 2010; Zhao, Peterson, Kim & Rolfe-Redding, 2014) and promotes initial goal striving, such as intending to reduce cigarette consumption (Harris, Mayle, Mabbott & Napper, 2007). However, attempts at smoking cessation are rife with setbacks and experiences of failures (e.g. Zhou et al., 2009), and the evidence that self-affirmed smokers reduce their cigarette consumption is limited, as only one study to date has shown a significant reduction in self-reported smoking following self-affirmation (Memish et al., 2016). It may be the case that self-affirmation impacts upon motivation, but whether or not individuals pursue their goal depends on whether they experience failure in the process. Self-affirmation may not make individuals more likely to persist in the face of failure, as is the case when attempting to curb cigarette consumption. Future research should consider how the experience of failure differs between self-affirmed and non-affirmed individuals, and how this may impact upon goal pursuit.

In addition, it would be of merit for future research to explore whether self-affirmation affects goal setting. Goal setting is a crucial step preceding goal pursuit, however it is not only important that an individual sets goals, but also what type of goals they set (Mann et al., 2013). For example, work on goal setting suggests that goals can be conceptualised as being performance- or mastery-oriented (Elliot & Dweck, 1988). The primary aim of a performance goal is to demonstrate capability and competence, whereas a mastery goal focuses on learning a skill or mastering a new behaviour. Mastery goals are generally associated with more successful goal pursuit (Bell & Kozlowski, 2002; Lee, Ning & Goh, 2013), as failures are interpreted as an opportunity to learn, not as an indicator of

incompetence (Mann et al., 2013). It is therefore feasible that self-affirmation enables better goal pursuit by influencing the type of goal that is set. Specifically, self-affirmation may lessen the need to present oneself in a favourable light, and thus may make adoption of mastery goals more likely over adoption of performance goals (which are often fuelled by self-presentational concerns; Senko & Harackiewicz, 2002). The findings presented in Chapter 3 could also be interpreted with the distinction between performance and mastery goals in mind: participants were required to maintain a minimum level of accuracy when solving the arithmetic equations of the OSPAN task, which may have imposed a performance goal. Self-affirmed individuals may not have performed better than non-affirmed because they were less motivated to fulfil the performance goal. Future research may wish to explore whether self-affirmation promotes more mastery-focused goals, which could add to our understanding of how self-affirmation effects behaviour change in individuals. Indeed, research from the effects of self-affirmation on level of mental construal (Wakslak & Trope, 2009) may provide support for such hypotheses: self-affirmed individuals tend to construe actions in terms of the superordinate goal they achieve, rather than the means by which the goal is achieved (for example, they tend to describe the action of locking a door as meaning "securing the house", rather than "turning a key in the lock"; Wakslak & Trope, 2009, p. 929). This may indicate a preference for achieving superordinate goals over intermediate steps in the process to the goal.

Understanding how self-esteem moderates self-affirmation effects

In the current studies, self-affirmation had different effects on individuals with different levels of trait self-esteem: Those with high self-esteem reported more positive affect following self-affirmation (Chapter 4), but performed worse on the OSPAN task (Chapter 3). In contrast, those with low self-esteem perceived fewer social resources compared to their non-affirmed counterparts (Chapter 3). This mirrors the patterns of previous studies in that

self-affirmation, in some instances, had effects only in those with high self-esteem (Creswell et al., 2005; Landau & Greenberg, 2006, Study 2; Steele, Spencer & Lynch, 1993, Study 3), and in other instances, only in those with low self-esteem (Düring & Jessop, 2014; Jaremka et al., 2011; Spencer, Fein & Lomore, 2001; van Dijk et al., 2011). It is evident that the exact circumstances under which self-affirmation is more likely to affect individuals with high or low self-esteem need to be investigated further. As a first step, future research should explore in more detail how the self-affirmation experience itself differs among individuals with low and high self-esteem. The current findings suggest self-affirmation is a more pleasant affective experience for high self-esteem individuals, but the implication – that self-affirmation is not a pleasant affective experience for low self-esteem individuals – needs to be better understood.

One avenue of research would be to integrate self-affirmation theory with work on self-awareness. It seems plausible that self-affirmation increases self-awareness (Zárate & Garza, 2002), and that this contributes to its differential effects on individuals with different levels of self-esteem. Heightened self-awareness has been identified as an unpleasant experience for those with low self-esteem (Brockner & Wallnau, 1981), likely because they are also more prone to feeling self-conscious (Turner, Scheier, Carver & Ickes, 1978). However, self-awareness has benefits, such as prompting the setting of and striving towards self-standards (Baumeister, 1998). Thus, self-affirmation may make people more self-aware, a pleasant experience only for high self-esteem individuals, but engender important shifts in cognition that manifest themselves on a variety of outcomes. This may help to explain why self-affirmation is not a positive affective experience for low self-esteem individuals, who nonetheless experience the benefits of self-affirmation such as better coping with a threat (e.g. Düring & Jessop, 2014). In addition, the positive affect high self-esteem individuals are experiencing may act as an indicator that everything is in order and no change is necessary

(Carver, 2003); hence self-affirmation sometimes does not affect high self-esteem individuals, or the effects even backfire (e.g. on performance on the OSPAN task, Chapter 3). Future research should endeavour to explore how low and high self-esteem individuals engage with self-affirmation, which may shed light on why self-affirmation affects these individuals differentially.

Conclusion

The findings of the current thesis have revealed some of the immediate cognitive and affective consequences of completing a self-affirmation task. First, it showed that self-affirmation can improve performance on tasks relating to executive functioning, suggesting that self-affirmation may enable better use of executive functioning resources. However, findings were mixed as self-affirmation had detrimental effects among individuals with high self-esteem on another task relating to executive functioning. The inconsistent findings suggest that self-affirmation is unlikely to achieve its effects by influencing an individual's underlying executive functioning capabilities. Rather, it seems feasible that its effects are due to changes in other mediators, such as motivation.

Second, the thesis provided evidence, both empirically and by systematically reviewing existing literature, that self-affirmation can increase positive affect. Crucially, the thesis further presented evidence that such positive affect is unlikely to be the sole underlying mechanism of self-affirmation effects. This is one of the key contributions of this thesis to self-affirmation theory and research, as it reveals more about the role of positive affect in self-affirmation and helps rule it out as a mediator, at least of effects on responses to threatening health information.

In addition, the current programme of research has highlighted the importance of considering the role of trait self-esteem when interpreting self-affirmation effects. Self-esteem moderated the impact of self-affirmation across a range of outcomes that were both

cognitive and affective. A key recommendation for future research that has arisen from this thesis therefore is to take self-esteem into account as self-affirmation evidently affects individuals with levels of low and high self-esteem differently.

In sum, this programme of research has furthered our understanding of self-affirmation by showing it is capable of influencing performance on tasks related to executive functioning, by ruling out positive affect as a mediator of the effects of self-affirmation on responses to health information, and by highlighting the need to consider that self-affirmation effects may differ for individuals with different levels of trait self-esteem. Taken together, these findings open up avenues for further research, such as the possibility that self-affirmation influences an individual's motivation to use their executive functioning resources when engaging in health-related behaviours.

References

Abeare, C. A., Cohen, J. L., Axelrod, B. N., Leisen, J. C., Mosley-Williams, A., & Lumley, M. A. (2010). Pain, executive functioning, and affect in patients with rheumatoid arthritis. *The Clinical Journal of Pain*, *26*(8), 683-689. http://dx.doi.org/10.1097/AJP.0b013e3181ed1762

Abraham, C., & Michie, S. (2008). A taxonomy of behavior change techniques used in interventions. *Health Psychology*, *27*(3), 379-387. http://dx.doi.org/10.1037/0278-6133.27.3.379

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179-211. http://dx.doi.org/10.1016/0749-5978(91)90020-T

Allan, J. L., Johnston, M., & Campbell, N. (2011). Missed by an inch or a mile? Predicting the size of intention–behaviour gap from measures of executive control. *Psychology & Health*, *26*(6), 635-650. http://dx.doi.org/10.1080/08870441003681307

Allard, T., & Griffin, D. (2013). A fluency account of how price operates as a cue to psychological distance. *NA - Advances in Consumer Research*, 41, eds. Simona Botti and Aparna Labroo, Duluth, MN: Association for Consumer Research.

Alloway, T. P., Gathercole, S. E., Kirkwood, H., & Elliott, J. (2009). The cognitive and behavioral characteristics of children with low working memory. *Child Development*, *80*(2), 606-621. http://dx.doi.org/10.1111/j.1467-8624.2009.01282.x

Alpers, G. W., Winzelberg, A. J., Classen, C., Roberts, H., Dev, P., Koopman, C., & Taylor, C. B. (2005). Evaluation of computerized text analysis in an Internet breast cancer support group. *Computers in Human Behavior*, *21*(2), 361-376. http://dx.doi.org/10.1016/j.chb.2004.02.008

Armitage, C. J. (2016). A brief psychological intervention to protect subjective well-being in a community sample. Quality of Life Research, 25(2), 385-391. http://dx.doi.org/10.1007/s11136-015-1076-6

Armitage, C. J., & Rowe, R. (2011). Testing multiple means of self-affirmation. *British Journal of Psychology*, *102*(3), 535-545. http://dx.doi.org/10.1111/j.2044-8295.2010.02014.x

Armitage, C. J., Harris, P. R., & Arden, M. A. (2011). Evidence that self-affirmation reduces alcohol consumption: randomized exploratory trial with a new, brief means of self-affirming. *Health Psychology*, *30*(5), 633-641. http://dx.doi.org/10.1037/a0023738

Armitage, C. J., Harris, P. R., Hepton, G., & Napper, L. (2008). Self-affirmation increases acceptance of health-risk information among UK adult smokers with low socioeconomic status. *Psychology of Addictive Behaviors*, *22*(1), 88-95. http://dx.doi.org/10.1037/0893-164X.22.1.88

Aronson, J., Blanton, H., & Cooper, J. (1995). From dissonance to disidentification: Selectivity in the self-affirmation process. *Journal of Personality and Social Psychology*, *68*(6), 986-996. http://dx.doi.org/10.1037/0022-3514.68.6.986

Arpan, L. M., Lee, Y. S., & Wang, Z. (2017). Integrating self-affirmation with health risk messages: effects on message evaluation and response. *Health Communication*, *32*(2), 189-199. http://dx.doi.org/10.1080/10410236.2015.1113483

Autin, F., & Croizet, J. C. (2012). Improving working memory efficiency by reframing metacognitive interpretation of task difficulty. *Journal of Experimental Psychology: General*, *141*(4), 610-618. http://dx.doi.org/10.1037/a0027478

Baumeister, R. F. (1997). Identity, self-concept, and self-esteem: The self lost and found. In R. Hogan, J. A. Johnson, & S. R. Briggs (Eds.), *Handbook of personality psychology* (pp. 681-710). San Diego, CA: Academic Press.

Baumeister, R. (1998). The self. In D. Gilbert, S. Fiske, & G. Lindzey (Eds.), *Handbook of social psychology* (Vol. 1, pp. 680–740). New York: Oxford University Press.

Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: is the active self a limited resource?. *Journal of Personality and Social Psychology, 74*(5), 1252-1265. http://dx.doi.org/10.1037/0022-3514.74.5.1252

Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles?. *Psychological Science in the Public Interest, 4*(1), 1-44. https://doi.org/10.1111/1529-1006.01431

Baumeister, R. F., & Tice, D. M. (1985). Self-esteem and responses to success and failure: Subsequent performance and intrinsic motivation. *Journal of Personality, 53*(3), 450-467. http://dx.doi.org/10.1111/j.1467-6494.1985.tb00376.x

Beedie, C., Terry, P., & Lane, A. (2005). Distinctions between emotion and mood. *Cognition & Emotion*, *19*(6), 847-878. http://dx.doi.org/10.1080/02699930541000057

Bell, B. S., & Kozlowski, W. J. (2002). Goal orientation and ability: Interactive effects on self-efficacy, performance, and knowledge. *Journal of Applied Psychology*, *87*(3), 497-505. http://dx.doi.org/10.1037/0021-9010.87.3.497

Best, J. R., Miller, P. H., & Naglieri, J. A. (2011). Relations between executive function and academic achievement from ages 5 to 17 in a large, representative national sample. *Learning and Individual Differences*, *21*(4), 327-336. http://dx.doi.org/10.1016/j.lindif.2011.01.007

Bingham, S. A., Gill, C., Welch, A., Day, K., Cassidy, A., Khaw, K. T., ... & Day, N. E. (1994). Comparison of dietary assessment methods in nutritional epidemiology: weighed records v. 24 h recalls, food-frequency questionnaires and estimated-diet

records. *British Journal of Nutrition*, *72*(04), 619-643. https://dx.doi.org/10.1079/BJN19940064

Binning, K. R., Brick, C., Cohen, G. L., & Sherman, D. K. (2015). Going along versus getting it right: The role of self-integrity in political conformity. *Journal of Experimental Social Psychology*, *56*, 73-88. http://dx.doi.org/10.1016/j.jesp.2014.08.008

Blanton, H., Cooper, J., Slkurnik, I., & Aronson, J. (1997). When bad things happen to good feedback: Exacerbating the need for self-justification with self-affirmations. *Personality and Social Psychology Bulletin*, *23*(7), 684-692. https://doi.org/10.1177/0146167297237002

Blascovich, J., Spencer, S. J., Quinn, D., & Steele, C. (2001). African Americans and high blood pressure: The role of stereotype threat. *Psychological Science*, *12*(3), 225-229. https://doi.org/10.1111/1467-9280.00340

Boden, J. M., & Baumeister, R. F. (1997). Repressive coping: distraction using pleasant thoughts and memories. *Journal of Personality and Social Psychology*, *73*(1), 45-62. http://dx.doi.org/10.1037/0022-3514.73.1.45

Bogers, R. P., Van Assema, P., Kester, A. D., Westerterp, K. R., & Dagnelie, P. C. (2004). Reproducibility, validity, and responsiveness to change of a short questionnaire for measuring fruit and vegetable intake. *American Journal of Epidemiology*, *159*(9), 900-909. https://dx.doi.org/10.1093/aje/kwh123

Boutin-Foster, C., Offidani, E., Kanna, B., Ogedegbe, G., Ravenell, J., Scott, E., ... & Charlson, M. (2016). Results from the Trial Using Motivational Interviewing, Positive Affect, and Self-Affirmation in African Americans with Hypertension (TRIUMPH). *Ethnicity & disease*, *26*(1), 51-60. https://dx.doi.org/10.18865/ed.26.1.51

Boutin-Foster, C., Scott, E., Rodriguez, A., Ramos, R., Kanna, B., Michelen, W., ... & Ogedegbe, G. (2013). The trial using motivational interviewing and positive affect and self-affirmation in African-Americans with hypertension (TRIUMPH): From theory to clinical trial implementation. *Contemporary Clinical Trials, 35*(1), 8-14. http://dx.doi.org/10.1016/j.cct.2013.02.002

Bouffard-Bouchard, T. (1990). Influence of self-efficacy on performance in a cognitive task. *The Journal of Social Psychology*, *130*(3), 353-363. http://dx.doi.org/10.1080/00224545.1990.9924591

Brady, S. T., Reeves, S. L., Garcia, J., Purdie-Vaughns, V., Cook, J. E., Taborsky-Barba, S., ... & Cohen, G. L. (2016). The psychology of the affirmed learner: Spontaneous self-affirmation in the face of stress. *Journal of Educational Psychology*, *108*(3), 353-373. http://dx.doi.org/10.1037/edu0000091

Briñol, P., Petty, R. E., Gallardo, I., & DeMarree, K. G. (2007). The effect of self-affirmation in nonthreatening persuasion domains: Timing affects the process. *Personality and Social Psychology Bulletin*, *33*(11), 1533-1546. https://doi.org/10.1177/0146167207306282

Brockner, J., & Wallnau, L. B. (1981). Self-esteem, anxiety, and the avoidance of self-focused attention. *Journal of Research in Personality*, *15*(3), 277-291. http://dx.doi.org/10.1016/0092-6566(81)90026-X

Brown, J. D., & Marshall, M. A. (2001). Self-esteem and emotion: Some thoughts about feelings. *Personality and Social Psychology Bulletin*, *27*(5), 575-584. https://doi.org/10.1177/0146167201275006

Bryant, F. B., Chadwick, E. D., & Kluwe, K. (2011). Understanding the processes that regulate positive emotional experience: Unsolved problems and future directions for

theory and research on savoring. *International Journal of Wellbeing*, *1*(1). http://dx.doi.org/10.5502/ijw.v1i1.18

Bucchianeri, M. M., & Corning, A. F. (2012). An Experimental Test of Women's Body Dissatisfaction Reduction through Self-Affirmation. *Applied Psychology: Health and Well-Being*, *4*(2), 188-201. http://dx.doi.org/10.1111/j.1758-0854.2012.01068.x

Bullock, J. G., Green, D. P., & Ha, S. E. (2010). Yes, but what's the mechanism?(don't expect an easy answer). *Journal of Personality and Social Psychology*, *98*(4), 550-558 http://dx.doi.org/10.1037/a0018933

Bunting, M. (2006). The role of processing difficulty in the predictive utility of working memory span. *Psychonomic Bulletin & Review*, *13*(6), 998-1004. http://dx.doi.org/10.3758/BF03213915

Burgess, D. J., Taylor, B. C., Phelan, S., Spoont, M., Ryn, M., Hausmann, L. R., ... & Gordon, H. S. (2014). A Brief Self-Affirmation Study to Improve the Experience of Minority Patients. *Applied Psychology: Health and Well-Being*, *6*(2), 135-150. http://dx.doi.org/10.1111/aphw.12015

Burgess, P. W. (1997). Theory and methodology in executive function research. In P. Rabbitt (Ed.), *Methodology of frontal and executive function* (pp. 81–116). Hove, UK: Psychology Press.

Burson, A., Crocker, J., & Mischkowski, D. (2012). Two types of value-affirmation: Implications for self-control following social exclusion. *Social Psychological and Personality Science*, *3*(4), 510-516. https://doi.org/10.1177/1948550611427773

Cabanac, M. (2002). What is emotion?. *Behavioural Processes*, *60*(2), 69-83. http://dx.doi.org/10.1016/S0376-6357(02)00078-5

Cameron, D. S., Bertenshaw, E. J., & Sheeran, P. (2014). The impact of positive affect on health cognitions and behaviours: a meta-analysis of the experimental

evidence. *Health Psychology Review*, *9*(3), 345-365. http://dx.doi.org/10.1080/17437199.2014.923164

Cacioppo, J. T., Gardner, W. L., & Berntson, G. G. (1999). The affect system has parallel and integrative processing components: Form follows function. *Journal of Personality and Social Psychology*, *76*(5), 839-855. http://dx.doi.org/10.1037/0022-3514.76.5.839

Campbell, J. D., Trapnell, P. D., Heine, S. J., Katz, I. M., Lavallee, L. F., & Lehman, D. R. (1996). Self-concept clarity: Measurement, personality correlates, and cultural boundaries. *Journal of Personality and Social Psychology*, *70*(1), 141-156. http://dx.doi.org/10.1037/0022-3514.70.1.141

Carver, C. (2003). Pleasure as a sign you can attend to something else: Placing positive feelings within a general model of affect. *Cognition & Emotion*, *17*(2), 241-261. http://dx.doi.org/10.1080/02699930302294

Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control-process view. *Psychological Review*, *97*(1), 19-35. http://dx.doi.org/10.1037/0033-295X.97.1.19

Charlson, M. E., Boutin-Foster, C., Mancuso, C. A., Peterson, J. C., Ogedegbe, G., Briggs, W. M., ... & Translational Behavioral Science Research Consortium. (2007). Randomized controlled trials of positive affect and self-affirmation to facilitate healthy behaviors in patients with cardiopulmonary diseases: rationale, trial design, and methods. *Contemporary Clinical Trials*, *28*(6), 748-762. http://dx.doi.org/10.1016/j.cct.2007.03.002

Chartrand, T. L., & Bargh, J. A. (1996). Automatic activation of impression formation and memorization goals: Nonconscious goal priming reproduces effects of explicit task instructions. *Journal of Personality and Social Psychology*, *71*(3), 464-478. http://dx.doi.org/10.1037/0022-3514.71.3.464

Čehajić-Clancy, S., Effron, D. A., Halperin, E., Liberman, V., & Ross, L. D. (2011). Affirmation, acknowledgment of in-group responsibility, group-based guilt, and support for reparative measures. *Journal of Personality and Social Psychology*, *101*(2), 256-270. http://dx.doi.org/10.1037/a0023936

Cikara, M., & Fiske, S. T. (2012). Stereotypes and schadenfreude affective and physiological markers of pleasure at outgroup misfortunes. *Social Psychological and Personality Science*, *3*(1), 63-71. https://doi.org/10.1177/1948550611409245

Cikara, M., & Fiske, S. T. (2013). Their pain, our pleasure: stereotype content and schadenfreude. *Annals of the New York Academy of Sciences*, *1299*(1), 52-59. https://doi.org/10.1111/nyas.12179

Clarkson, J. J., Hirt, E. R., Chapman, D. A., & Jia, L. (2010). The impact of illusory fatigue on executive control: Do perceptions of depletion impair working memory capacity?. *Social Psychological and Personality Science*, 2(3), 231-238 https://doi.org/10.1177/1948550610386628

Cohen, G. L., Aronson, J., & Steele, C. M. (2000). When beliefs yield to evidence: Reducing biased evaluation by affirming the self. *Personality and Social Psychology Bulletin*, *26*(9), 1151-1164. https://doi.org/10.1177/01461672002611011

Cohen, G. L., Garcia, J., Apfel, N., & Master, A. (2006). Reducing the racial achievement gap: A social-psychological intervention. *Science*, *313*(5791), 1307-1310. http://dx.doi.org/10.1126/science.1128317

Cohen, G. L., Garcia, J., Purdie-Vaughns, V., Apfel, N., & Brzustoski, P. (2009). Recursive processes in self-affirmation: Intervening to close the minority achievement gap. *Science*, *324*(5925), 400-403. http://dx.doi.org/10.1126/science.1170769

Cohen, G. L., & Sherman, D. K. (2014). The psychology of change: Self-affirmation and social psychological intervention. *Annual Review of Psychology*, *65*, 333-371. http://dx.doi.org/10.1146/annurev-psych-010213-115137

Cohen, G. L., Sherman, D. K., Bastardi, A., Hsu, L., McGoey, M., & Ross, L. (2007). Bridging the partisan divide: Self-affirmation reduces ideological closed-mindedness and inflexibility in negotiation. *Journal of Personality and Social Psychology*, *93*(3), 415-430. http://psycnet.apa.org/doi/10.1037/0022-3514.93.3.415

Cohn, M. A., Fredrickson, B. L., Brown, S. L., Mikels, J. A., & Conway, A. M. (2009). Happiness unpacked: positive emotions increase life satisfaction by building resilience. *Emotion*, *9*(3), 361-368. http://dx.doi.org/10.1037/a0015952

Conway, A. R., Kane, M. J., Bunting, M. F., Hambrick, D. Z., Wilhelm, O., & Engle, R. W. (2005). Working memory span tasks: A methodological review and user's guide. *Psychonomic Bulletin & Review*, *12*(5), 769-786. http://dx.doi.org/10.3758/BF03196772

Cook, J. E., Purdie-Vaughns, V., Garcia, J., & Cohen, G. L. (2012). Chronic threat and contingent belonging: protective benefits of values affirmation on identity development. *Journal of Personality and Social Psychology*, *102*(3), 479-496. http://dx.doi.org/10.1037/a0026312

Cooke, R., Trebaczyk, H., Harris, P., & Wright, A. J. (2014). Self-affirmation promotes physical activity. *Journal of Sport and Exercise Psychology*, *36*(2), 217-223. https://dx.doi.org/10.1123/jsep.2013-0041

Correll, J., Spencer, S. J., & Zanna, M. P. (2004). An affirmed self and an open mind: Self-affirmation and sensitivity to argument strength. *Journal of Experimental Social Psychology*, *40*(3), 350-356. http://dx.doi.org/10.1016/j.jesp.2003.07.001

Creswell, J. D., Dutcher, J. M., Klein, W. M., Harris, P. R., & Levine, J. M. (2013). Self-affirmation improves problem-solving under stress. *PloS one, 8*(5), e62593. http://dx.doi.org/10.1371/journal.pone.0062593

Creswell, J. D., Lam, S., Stanton, A. L., Taylor, S. E., Bower, J. E., & Sherman, D. K. (2007). Does self-affirmation, cognitive processing, or discovery of meaning explain cancer-related health benefits of expressive writing?. *Personality and Social Psychology Bulletin*, *33*(2), 238-250. https://doi.org/10.1177/0146167206294412

Creswell, J. D., Welch, W. T., Taylor, S. E., Sherman, D. K., Gruenewald, T. L., & Mann, T. (2005). Affirmation of personal values buffers neuroendocrine and psychological stress responses. *Psychological Science, 16*(11), 846-851. https://doi.org/10.1111/j.1467-9280.2005.01624.x

Crocker, J., Brook, A. T., Niiya, Y., & Villacorta, M. (2006). The pursuit of self-esteem: contingencies of self-worth and self-regulation. *Journal of Personality, 74*(6), 1749-1772. https://doi.org/10.1111/j.1467-6494.2006.00427.x

Crocker, J., Niiya, Y., & Mischkowski, D. (2008). Why does writing about important values reduce defensiveness? Self-affirmation and the role of positive other-directed feelings. *Psychological Science, 19*(7), 740-747. https://doi.org/10.1111/j.1467-9280.2008.02150.x

Crocker, J., & Park, L. E. (2004). The costly pursuit of self-esteem. Psychological bulletin, 130(3), 392-414. http://dx.doi.org/10.1037/0033-2909.130.3.392

Danner, D. D., Snowdon, D. A., & Friesen, W. V. (2001). Positive emotions in early life and longevity: findings from the nun study. *Journal of Personality and Social Psychology*, *80*(5), 804-813. http://dx.doi.org/10.1037/0022-3514.80.5.804

Das, E., & Fennis, B. M. (2008). In the mood to face the facts: When a positive mood promotes systematic processing of self-threatening information. *Motivation and Emotion*, *32*(3), 221-230. http://dx.doi.org/10.1007/s11031-008-9093-1

Das, E., Vonkeman, C., & Hartmann, T. (2012). Mood as a resource in dealing with health recommendations: How mood affects information processing and acceptance of quit-smoking messages. *Psychology & Health*, *27*(1), 116-127. http://dx.doi.org/10.1080/08870446.2011.569888

Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, *44*(1), 113-126. http://dx.doi.org/10.1037/0022-3514.44.1.113

Dee, T. S. (2015). Social identity and achievement gaps: Evidence from an affirmation intervention. *Journal of Research on Educational Effectiveness*, *8*(2), 149-168. http://dx.doi.org/10.1080/19345747.2014.906009

DiBello, A. M., Neighbors, C., & Ammar, J. (2015). Self-affirmation theory and cigarette smoking warning images. *Addictive Behaviors*, *41*, 87-96. http://dx.doi.org/10.1016/j.addbeh.2014.09.026

Dillard, A. J., McCaul, K. D., & Magnan, R. E. (2005). Why is such a smart person like you smoking? Using self-affirmation to reduce defensiveness to cigarette warning labels. *Journal of Applied Biobehavioral Research*, *10*(3), 165-182. http://dx.doi.org/10.1111/j.1751-9861.2005.tb00010.x

Düring, C., & Jessop, D. C. (2015). The moderating impact of self-esteem on self-affirmation effects. *British Journal of Health Psychology*, *20*(2), 274-289. http://dx.doi.org/10.1111/bjhp.12097

Elliott, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology*, *54*(1), 5-12.http://dx.doi.org/10.1037/0022-3514.54.1.5

Endler, N. S., Parker, J. D., Bagby, R. M., & Cox, B. J. (1991). Multidimensionality of State and Trait Axiety: Factor Structure of the Endler Multidimensional Anxiety Scales. *Journal of Personality and Social Psychology*, *60*(6), 919-926.

Epton, T., & Harris, P. R. (2008). Self-affirmation promotes health behavior change. *Health Psychology*, *27*(6), 746-752. http://dx.doi.org/10.1037/0278-6133.27.6.746

Epton, T., Harris, P. R., Kane, R., van Koningsbruggen, G. M., & Sheeran, P. (2015). The Impact of Self-Affirmation on Health-Behavior Change: A Meta-Analysis. *Health Psychology*, *34*(3), 187-196. http://dx.doi.org/10.1037/hea0000116

Estrada, C. A., Isen, A. M., & Young, M. J. (1997). Positive affect facilitates integration of information and decreases anchoring in reasoning among physicians. *Organizational Behavior and Human Decision Processes*, *72*(1), 117-135. http://psycnet.apa.org/doi/10.1006/obhd.1997.2734

Exline, J. J., & Zell, A. L. (2009). Empathy, self-affirmation, and forgiveness: The moderating roles of gender and entitlement. *Journal of Social and Clinical Psychology*, *28*(9), 1071-1099. http://dx.doi.org/10.1521/jscp.2009.28.9.1071

Falk, E. B., O'Donnell, M. B., Cascio, C. N., Tinney, F., Kang, Y., Lieberman, M. D., ... & Strecher, V. J. (2015). Self-affirmation alters the brain's response to health messages and subsequent behavior change. *Proceedings of the National Academy of Sciences*, *112*(7), 1977-1982. http://dx.doi.org/10.1073/pnas.1500247112

Fein, S., & Spencer, S. J. (1997). Prejudice as self-image maintenance: Affirming the self through derogating others. *Journal of Personality and Social Psychology*, *73*(1), 31-44. http://dx.doi.org/10.1037/0022-3514.73.1.31

Ferrante, A. C. (2016). Examining the protective effects of self-positivity on information avoidance. *Honors Theses.* Paper 89. http://ecommons.udayton.edu/uhp_theses/89

Fielden, A. L., Sillence, E., Little, L., & Harris, P. R. (2016). Online Self-Affirmation Increases Fruit and Vegetable Consumption in Groups at High Risk of Low Intake. *Applied Psychology: Health and Well-Being*, *8*(1), 3-18. http://dx.doi.org/10.1111/aphw.12059

Francis, M. E., & Pennebaker, J. W. (1993). *LIWC: Linguistic Inquiry and Word Count.* Dallas, TX: Southern Methodist University.

Fredrickson, B. L. (1998). Cultivated emotions: Parental socialization of positive emotions and self-conscious emotions. *Psychological Inquiry*, *9*(4), 279-281. http://dx.doi.org/10.1207/s15327965pli0904_4

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, *56*(3), 218-226. http://dx.doi.org/10.1O37//0OO3-O66X.56.3.218

Fredrickson, B. L. (2013). Positive emotions broaden and build. In P. Devine & A. Plant (Eds.), *Advances in experimental social psychology* (Vol. 47, pp. 1–54). San Diego, CA: Academic Press.

Fredrickson, B. L., & Branigan, C. (2005). Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition & Emotion*, *19*(3), 313-332. http://dx.doi.org/10.1080/02699930441000238

Fredrickson, B. L., & Joiner, T. (2002). Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science*, *13*(2), 172-175. https://doi.org/10.1111/1467-9280.00431

Fredrickson, B. L., & Levenson, R. W. (1998). Positive emotions speed recovery from the cardiovascular sequelae of negative emotions. *Cognition & Emotion*, *12*(2), 191-220. http://dx.doi.org/10.1080/026999398379718

Fredrickson, B. L., & Losada, M. F. (2005). Positive affect and the complex dynamics of human flourishing. *American psychologist*, *60*(7), 678-686.

Fredrickson, B. L., Tugade, M. M., Waugh, C. E., & Larkin, G. R. (2003). What good are positive emotions in crisis? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *Journal of Personality and Social Psychology*, *84*(2), 365-376. http://dx.doi.org/10.1037/0022-3514.84.2.365

Fujita, K., Trope, Y., Liberman, N., & Levin-Sagi, M. (2006). Construal levels and self-control. *Journal of Personality and Social Psychology*, *90*(3), 351-367. http://dx.doi.org/10.1037/0022-3514.90.3.351

Gable, S. L., Gonzaga, G. C., & Strachman, A. (2006). Will you be there for me when things go right? Supportive responses to positive event disclosures. *Journal of Personality and Social Psychology*, *91*(5), 904-917. http://dx.doi.org/10.1037/0022-3514.91.5.904

Garcia-Marques, T., Mackie, D. M., Claypool, H. M., & Garcia-Marques, L. (2004). Positivity can cue familiarity. *Personality and Social Psychology Bulletin*, *30*(5), 585-593. https://doi.org/10.1177/0146167203262856

Gerrards-Hesse, A., Spies, K., & Hesse, F. W. (1994). Experimental inductions of emotional states and their effectiveness: A review. *British Journal of Psychology*, *85*(1), 55-78. http://dx.doi.org/10.1111/j.2044-8295.1994.tb02508.x

Gilbert, A. M., & Fiez, J. A. (2004). Integrating rewards and cognition in the frontal cortex. *Cognitive, Affective, & Behavioral Neuroscience*, *4*(4), 540-552. http://dx.doi.org/10.3758/CABN.4.4.540

Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the implicit association test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology, 85*(2), 197-216. http://dx.doi.org/10.1037/0022-3514.85.2.197

Griffin, D. W., & Harris, P. R. (2011). Calibrating the response to health warnings: Limiting both overreaction and underreaction with self-affirmation. *Psychological Science, 22*(5), 572-578. https://doi.org/10.1177/0956797611405678

Griffin, R. J., Neuwirth, K., Giese, J., & Dunwoody, S. (1999). The Relationship of Risk Information Processing to Consideration of Behavioral Beliefs. *Proceedings of the Annual Meeting of the Association for Education in Journalism and Mass Communication*. New Orleans, Louisiana: August, 3-8.

Hagerty, B. M., & Patusky, K. (1995). Developing a measure of sense of belonging. *Nursing Research, 44*(1), 9-13. http://dx.doi.org/10.1097/00006199-199501000-00003

Hagger, M. S., Chatzisarantis, N. L. D., Alberts, H., Angonno, C. O., Batailler, C., Birt, A., … Zwienenberg, M. (2016). A multi-lab pre-registered replication of the ego-depletion effect. *Perspectives on Psychological Science*, 2, 546–573. http://dx.doi.org/10.1177/1745691616652873

Hales, A. H., Wesselmann, E. D., & Williams, K. D. (2016). Prayer, self-affirmation, and distraction improve recovery from short-term ostracism. *Journal of Experimental Social Psychology*, *64*, 8-20. http://dx.doi.org/10.1016/j.jesp.2016.01.002

Hall, P. A. (2001). Examining the role of time perspective in the promotion of healthy behavioural practices. Unpublished doctoral dissertation, University of Waterloo, Waterloo.

Hall, P. A., Elias, L. J., & Crossley, M. (2006). Neurocognitive influences on health behavior in a community sample. *Health Psychology*, *25*(6), 778-782. http://dx.doi.org/10.1037/0278-6133.25.6.778

Hall, P. A., & Fong, G. T. (2007). Temporal self-regulation theory: A model for individual health behavior. *Health Psychology Review*, *1*(1), 6-52. http://dx.doi.org/10.1080/17437190701492437

Hall, P. A., Fong, G. T., Epp, L. J., & Elias, L. J. (2008). Executive function moderates the intention-behavior link for physical activity and dietary behavior. *Psychology and Health*, *23*(3), 309-326. http://dx.doi.org/10.1080/14768320701212099

Hall, C. C., Zhao, J., & Shafir, E. (2014). Self-affirmation among the poor: Cognitive and behavioral implications. *Psychological Science*, *25*(2), 619-625. https://doi.org/10.1177/0956797613510949

Hamilton-West, K. E., & Quine, L. (2007). Effects of written emotional disclosure on health outcomes in patients with ankylosing spondylitis. *Psychology and Health*, *22*(6), 637-657. http://dx.doi.org/10.1080/14768320601020246

Hanselman, P., Bruch, S. K., Gamoran, A., & Borman, G. D. (2014). Threat in context: School moderation of the impact of social identity threat on racial/ethnic achievement gaps. *Sociology of Education*, *87*(2), 106-124. https://doi.org/10.1177/0038040714525970

Harris, P. R. (2011). Self-affirmation and the self-regulation of health behavior change. *Self and Identity*, *10*(3), 304-314. http://dx.doi.org/10.1080/15298868.2010.517963

Harris, P. R., Brearley, I., Sheeran, P., Barker, M., Klein, W. M., Creswell, J. D., ... & Bond, R. (2014). Combining self-affirmation with implementation intentions to promote fruit and vegetable consumption. *Health Psychology*, *33*(7), 729-736. http://dx.doi.org/10.1037/hea0000065

Harris, P. R., & Epton, T. (2009). The impact of self-affirmation on health cognition, health behaviour and other health-related responses: a narrative review. *Social and*

Personality Psychology Compass, 3(6), 962-978. http://dx.doi.org/10.1111/j.1751-9004.2009.00233.x

Harris, P. R., & Epton, T. (2010). The Impact of Self-Affirmation on Health-Related Cognition and Health Behaviour: Issues and Prospects. *Social and Personality Psychology Compass, 4*(7), 439-454. http://dx.doi.org/10.1111/j.1751-9004.2010.00270.x

Harris, P. R., Griffin, D.W., Napper, L., Schüz, B., Stride, C., & Bond, R. (2016). Individual differences in self-affirmation: distinguishing self-affirmation and positive self-regard. *Manuscript in preparation (in preparation).*

Harris, P. S., Harris, P. R., & Miles, E. (2017). Self-affirmation improves performance on tasks related to executive functioning. *Journal of Experimental Social Psychology, 70,* 281-285. http://dx.doi.org/10.1016/j.jesp.2016.11.011

Harris, P. S., Harris, P. R., & Miles, E. (in prep.). Self-esteem moderates the effect of self-affirmation on positive affect. *Manuscript in preparation (in preparation).*

Harris, P. R., Mayle, K., Mabbott, L., & Napper, L. (2007). Self-affirmation reduces smokers' defensiveness to graphic on-pack cigarette warning labels. *Health Psychology*, *26*(4), 437-446. http://dx.doi.org/10.1037/0278-6133.26.4.437

Harris, P. R., & Napper, L. (2005). Self-affirmation and the biased processing of threatening health-risk information. *Personality and Social Psychology Bulletin*, *31*(9), 1250-1263. https://doi.org/10.1177/0146167205274694

Havranek, E. P., Hanratty, R., Tate, C., Dickinson, L. M., Steiner, J. F., Cohen, G., & Blair, I. A. (2012). The effect of values affirmation on race-discordant patient-provider communication. *Archives of internal medicine*, *172*(21), 1662-1667. http://dx.doi.org/10.1001/2013.jamainternmed.258

Hayes, A. F. (2013). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. New York, NY: Guilford Press.

Hayes, A. F., & Preacher, K. J. (2014). Statistical mediation analysis with a multicategorical independent variable. *British Journal of Mathematical and Statistical Psychology*, *67*(3), 451-470. http://dx.doi.org/10.1111/bmsp.12028

Heutnik P., Verhuls, F. C., & Boomsma, D. I. (2006). A longitudinal twin study on IQ, executive functioning, and attention problems during childhood and early adolescence. *Acta Neurologica Belgica, 106*(4), 191-207.

Hofmann, W., Schmeichel, B. J., & Baddeley, A. D. (2012). Executive functions and self-regulation. *Trends in cognitive sciences*, *16*(3), 174-180. http://dx.doi.org/10.1016/j.tics.2012.01.006

Hughes, C., & Graham, A. (2002). Measuring executive functions in childhood: Problems and solutions?. *Child and Adolescent Mental Health*, *7*(3), 131-142. http://dx.doi.org/10.1111/1475-3588.00024

Hume, D., 2012. Emotions and Moods. In: Robbins, S.P., Judge, T.A. (eds.) *Organizational behavior*, pp. 258–297. Essex, UK: Pearson Education.

Hunter, S. J., & Sparrow, E. P. (2012). *Executive function and dysfunction: Identification, assessment and treatment*. Cambridge, UK: Cambridge University Press.

Huynh, S., Stefanucci, J. K., & Aspinwall, L. G. (2014). Self-affirmation counters the effects of self-regulatory resource depletion on height perception. *Journal of Experimental Social Psychology*, *52*, 96-100. http://dx.doi.org/10.1016/j.jesp.2014.01.003

Inman, M. L. (2014). The effects of religious-body affirmations and religious commitment on men's body esteem. *Psychology of Religion and Spirituality*, *6*(4), 330-337. http://dx.doi.org/10.1037/a0036795

Inzlicht, M., & Schmeichel, B. J. (2012). What is ego depletion? Toward a mechanistic revision of the resource model of self-control. *Perspectives on Psychological Science*, *7*(5), 450-463. http://dx.doi.org/10.1177/1745691612454134

Isen, A. (1987). Positive affect, cognitive processes, and social behavior. *Advances in Experimental Social Psychology*, *20*, 203-253. http://dx.doi.org/10.1016/S0065-2601(08)60415-3

Isen, A. M., & Reeve, J. (2005). The influence of positive affect on intrinsic and extrinsic motivation: Facilitating enjoyment of play, responsible work behavior, and self-control. *Motivation and Emotion*, *29*(4), 295-323. http://dx.doi.org/10.1007/s11031-006-9019-8

Janoff-Bulman, R., & Brickman, P. (1982). Expectations and what people learn from failure. In: Feather, N.T. (Ed.), *Expectations and Actions: Expectancy-Value Models in Psychology*. Hillsdale, NJ: Erlbaum.

Jaremka, L. M., Bunyan, D. P., Collins, N. L., & Sherman, D. K. (2011). Reducing defensive distancing: Self-affirmation and risk regulation in response to relationship threats. *Journal of Experimental Social Psychology*, *47*(1), 264-268. http://dx.doi.org/10.1016/j.jesp.2010.08.015

Jarvis, H. L., & Gathercole, S. E. (2003). Verbal and non-verbal working memory and achievements on national curriculum tests at 11 and 14 years of age. *Educational and Child Psychology*, *20*(3), 123-140.

Jemmott, J. B., Ditto, P. H., & Croyle, R. T. (1986). Judging health status: effects of perceived prevalence and personal relevance. *Journal of Personality and Social Psychology*, *50*(5), 899-905. http://dx.doi.org/10.1037/0022-3514.50.5.899

Jessop, D. C., Simmonds, L. V., & Sparks, P. (2009). Motivational and behavioural consequences of self-affirmation interventions: A study of sunscreen use among

women. *Psychology and Health*, *24*(5), 529-544. http://dx.doi.org/10.1080/08870440801930320

Johnson, J. K., Lui, L. Y., & Yaffe, K. (2007). Executive function, more than global cognition, predicts functional decline and mortality in elderly women. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, *62*(10), 1134-1141. https://doi.org/10.1093/gerona/62.10.1134

Johnson, B. K., Slater, M. D., Silver, N. A., & Ewoldsen, D. R. (2016). Entertainment and expanding boundaries of the self: Relief from the constraints of the everyday. *Journal of Communication*, *66*(3), 386-408. https://doi.org/10.1111/jcom.12228

Jonides, J., Schumacher, E., Smith, E., Lauber, E., Awh, E., Minoshima, S., & Koeppe, R. (1997). Verbal working memory load affects regional brain activation as measured by PET. *Journal of Cognitive Neuroscience*, 9(4), 462-475. http://dx.doi.org/10.1162/jocn.1997.9.4.462)

Jostmann, N. B., & Koole, S. L. (2007). On the regulation of cognitive control: action orientation moderates the impact of high demands in Stroop interference tasks. *Journal of Experimental Psychology: General*, *136*(4), 593-609. http://dx.doi.org/10.1037/0096-3445.136.4.593

Jurado, M. B., & Rosselli, M. (2007). The elusive nature of executive functions: a review of our current understanding. *Neuropsychology Review*, *17*(3), 213-233. http://dx.doi.org/10.1007/s11065-007-9040-z

Kahn, B. E., & Isen, A. M. (1993). The influence of positive affect on variety seeking among safe, enjoyable products. *Journal of Consumer Research*, *20*(2), 257–270. https://doi.org/10.1086/209347

Kahn, J. H., Tobin, R. M., Massey, A. E., & Anderson, J. A. (2007). Measuring emotional expression with the Linguistic Inquiry and Word Count. *The American Journal of Psychology*, *120*(2), 263-286.

Kahneman, D. (1973). *Attention and effort*. Englewood Cliffs, NJ: Prentice-Hall.

Kahneman, D. (2011). *Thinking, fast and slow.* New York, NY: Farrar, Straus and Giroux.

Kamboj, S. K., Place, H., Barton, J. A., Linke, S., Curran, H. V., & Harris, P. R. (2016). Processing of alcohol-related health threat in at-risk drinkers: an online study of gender-related self-affirmation effects. *Alcohol and Alcoholism, agw013.* http://dx.doi.org/10.1093/alcalc/agw013

Kane, M. J., & Engle, R. W. (2003). Working-memory capacity and the control of attention: the contributions of goal neglect, response competition, and task set to Stroop interference. *Journal of Experimental Psychology: General*, *132*(1), 47-70. http://dx.doi.org/10.1037/0096-3445.132.1.47

Klein, W. M., Blier, H. K., & Janze, A. M. (2001). Maintaining positive self-evaluations: Reducing attention to diagnostic but unfavorable social comparison information when general self-regard is salient. *Motivation and Emotion*, *25*(1), 23-40. http://dx.doi.org/10.1023/A:1010607821908

Klein, K., & Boals, A. (2001). Expressive writing can increase working memory capacity. *Journal of Experimental Psychology: General*, *130*(3), 520-533. http://dx.doi.org/10.1037/0096-3445.130.3.520

Klein, W. M., & Harris, P. R. (2009). Self-affirmation enhances attentional bias toward threatening components of a persuasive message. *Psychological Science*, *20*(12), 1463-1467. http://dx.doi.org/10.1111/j.1467-9280.2009.02467.x

Klein, W. M., Harris, P. R., Ferrer, R. A., & Zajac, L. E. (2011). Feelings of vulnerability in response to threatening messages: Effects of self-affirmation. *Journal of Experimental Social Psychology*, *47*(6), 1237-1242. http://dx.doi.org/10.1016/j.jesp.2011.05.005

Klein, W. M., Lipkus, I. M., Scholl, S. M., McQueen, A., Cerully, J. L., & Harris, P. R. (2010). Self-affirmation moderates effects of unrealistic optimism and pessimism on reactions to tailored risk feedback. *Psychology and Health*, *25*(10), 1195-1208. http://dx.doi.org/10.1080/08870440903261970

Klingberg, T. (2010). Training and plasticity of working memory. *Trends in Cognitive Sciences, 14(*7), 317-324. http://dx.doi.org/10.1016/j.tics.2010.05.002

Koole, S. L., & van Knippenberg, A. (2007). Controlling your mind without ironic consequences: Self-affirmation eliminates rebound effects after thought suppression. *Journal of Experimental Social Psychology*, *43*(4), 671-677. http://dx.doi.org/10.1016/j.jesp.2006.07.001

Koole, S. L., Smeets, K., Van Knippenberg, A., & Dijksterhuis, A. (1999). The cessation of rumination through self-affirmation. *Journal of Personality and Social Psychology*, *77*(1), 111. http://dx.doi.org/10.1037/0022-3514.77.1.111

Kramer, A. F., & Erickson, K. I. (2007). Capitalizing on cortical plasticity: influence of physical activity on cognition and brain function. *Trends in Cognitive Sciences*, *11*(8), 342-348. http://dx.doi.org/10.1016/j.tics.2007.06.009

Krawczyk, D. C., Gazzaley, A., & D'Esposito, M. (2007). Reward modulation of prefrontal and visual association cortex during an incentive working memory task. *Brain Research, 1141,* 168-177. http://dx.doi.org/10.1016/j.brainres.2007.01.052

Kuykendall, D., & Keating, J. P. (1990). Mood and persuasion: Evidence for the differential influence of positive and negative states. *Psychology & Marketing*, *7*(1), 1-9. http://dx.doi.org/10.1002/mar.4220070102

Landau, M. J., & Greenberg, J. (2006). Play it safe or go for the gold? A terror management perspective on self-enhancement and self-protective motives in risky decision making. *Personality and Social Psychology Bulletin*, *32*(12), 1633-1645. https://doi.org/10.1177/0146167206292017

Lannin, D. G., Guyll, M., Vogel, D. L., & Madon, S. (2013). Reducing the stigma associated with seeking psychotherapy through self-affirmation. *Journal of Counseling Psychology*, *60*(4), 508-519. http://dx.doi.org/10.1037/a0033789

Labroo, A. A., & Mukhopadhyay, A. (2009). Lay theories of emotion transience and the search for happiness: A fresh perspective on affect regulation. *Journal of Consumer Research*, *36*(2), 242-254. http://dx.doi.org/10.1086/597159

Larsen, J. T., McGraw, A. P., & Cacioppo, J. T. (2001). Can people feel happy and sad at the same time?. *Journal of Personality and Social Psychology*, *81*(4), 684-696. http://dx.doi.org/10.1037/0022-3514.81.4.684

Leary, M. R., & Baumeister, R. F. (2000). The nature and function of self-esteem: Sociometer theory. *Advances in experimental social psychology* (Vol. 32, pp. 1–62). San Diego, CA: Academic Press. http://dx.doi.org/10.1016/S0065-2601(00)80003-9

Leary, M. R., Tambor, E. S., Terdal, S. K., & Downs, D. L. (1995). Self-esteem as an interpersonal monitor: The sociometer hypothesis. Journal of Personality and Social Psychology, 68(3), 518-530. http://dx.doi.org/10.1037/0022-3514.68.3.518

Lee, Y. S. C., Ashman, T., Shang, A., & Suzuki, W. (2014). Brief report: Effects of exercise and self-affirmation intervention after traumatic brain injury. *NeuroRehabilitation*, *35*(1), 57-65. http://dx.doi.org/10.3233/NRE-141100

Lee, K., Ning, F., & Goh, H. C. (2014). Interaction between cognitive and non-cognitive factors: The influences of academic goal orientation and working memory on

mathematical performance. *Educational Psychology*, *34*(1), 73-91. http://dx.doi.org/10.1080/01443410.2013.836158

Legault, L., Al-Khindi, T., & Inzlicht, M. (2012). Preserving integrity in the face of performance threat self-affirmation enhances neurophysiological responsiveness to errors. *Psychological Science. 23*(12), 1455-1460. http://dx.doi.org/10.1177/0956797612448483

Leventhal, H. (1970). Findings and theory in the study of fear communications. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 5, pp. 119-186). New York, NY: Academic Press.

Lezak, M. D. (1982). The problem of assessing executive functions. *International Journal of Psychology*, *17*(1-4), 281-297. http://dx.doi.org/10.1080/00207598208247445

Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P., ... & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *PLoS Med*, *6*(7), e1000100. http://dx.doi.org/10.1371/journal.pmed.1000100

Lindsay, E. K., & Creswell, J. D. (2014). Helping the self help others: self-affirmation increases self-compassion and pro-social behaviors. *Frontiers in Psychology, 5*, 421, http://dx.doi.org/10.3389/fpsyg.2014.00421.

Logel, C., & Cohen, G. L. (2012). The role of the self in physical health testing the effect of a values-affirmation intervention on weight loss. *Psychological Science*, *23*(1), 53-55. http://dx.doi.org/10.1177/0956797611421936

Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success?. *Psychological Bulletin*, *131*(6), 803-855. http://dx.doi.org/10.1037/0033-2909.131.6.803

MacLeod, C. M. (1991). Half a century of research on the Stroop effect: an integrative review. *Psychological Bulletin*, *109*(2), 163-203. http://dx.doi.org/10.1037/0033-2909.109.2.163

Mann, T., De Ridder, D., & Fujita, K. (2013). Self-regulation of health behavior: social psychological approaches to goal setting and goal striving. *Health Psychology*, *32*(5), 487-498 https://doi.org/10.1001/10.1037/a0028533.

Mancuso, C. A., Choi, T. N., Westermann, H., Wenderoth, S., Hollenberg, J. P., Wells, M. T., ... & Charlson, M. E. (2012). Increasing physical activity in patients with asthma through positive affect and self-affirmation: a randomized trial. *Archives of Internal Medicine*, *172*(4), 337-343, https://doi.org/10.1001/archinternmed.2011.1316.

Martens, A., Johns, M., Greenberg, J., & Schimel, J. (2006). Combating stereotype threat: The effect of self-affirmation on women's intellectual performance. *Journal of Experimental Social Psychology*, *42*(2), 236-243. http://dx.doi.org/10.1016/j.jesp.2005.04.010

Master, S. L., Eisenberger, N. I., Taylor, S. E., Naliboff, B. D., Shirinyan, D., & Lieberman, M. D. (2009). A picture's worth partner photographs reduce experimentally induced pain. *Psychological Science*, *20*(11), 1316-1318. https://doi.org/10.1111/j.1467-9280.2009.02444.x

Masicampo, E. J., & Baumeister, R. F. (2011). Unfulfilled goals interfere with tasks that require executive functions. *Journal of Experimental Social Psychology*, *47*(2), 300-311. http://dx.doi.org/10.1016/j.jesp.2010.10.011

Mayer, J. D., & Gaschke, Y. N. (1988). The experience and meta-experience of mood. *Journal of personality and social psychology*, *55*(1), 102-111. http://dx.doi.org/10.1037/0022-3514.55.1.102

McCabe, D. P., Roediger III, H. L., McDaniel, M. A., Balota, D. A., & Hambrick, D. Z. (2010). The relationship between working memory capacity and executive functioning: evidence for a common executive attention construct. *Neuropsychology, 24*(2), 222- 243. http://dx.doi.org/10.1037/a0017619

McFarlin, D. B. (1985). Persistence in the face of failure: The impact of self-esteem and contingency information. *Personality and Social Psychology Bulletin, 11*(2), 153-163. https://doi.org/10.1177/0146167285112004

McQueen, A., & Klein, W. M. (2006). Experimental manipulations of self-affirmation: A systematic review. *Self and Identity, 5*(4), 289-354. http://dx.doi.org/10.1080/15298860600805325

Memish, K. E., Schüz, N., Frandsen, M., Ferguson, S. G., & Schüz, B. (2016). Using self-affirmation to increase the effects of emotive health warnings on smoking: A randomised exploratory trial. *Nicotine & Tobacco Research*, ntw167. https://doi.org/10.1093/ntr/ntw167

Mitchell, R. L., & Phillips, L. H. (2007). The psychological, neurochemical and functional neuroanatomical mediators of the effects of positive and negative mood on executive functions. *Neuropsychologia*, *45*(4), 617-629. http://dx.doi.org/10.1016/j.neuropsychologia.2006.06.030

Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The unity and diversity of executive functions and their contributions to complex “frontal lobe” tasks: A latent variable analysis. *Cognitive psychology, 41*(1), 49-100. http://dx.doi.org/10.1006/cogp.1999.0734

Miyake, A., Kost-Smith, L. E., Finkelstein, N. D., Pollock, S. J., Cohen, G. L., & Ito, T. A. (2010). Reducing the gender achievement gap in college science: A classroom study

of values affirmation. *Science, 330*(6008), 1234-1237. http://dx.doi.org/10.1126/science.1195996

Mogg, K., & Bradley, B. P. (1998). A cognitive-motivational analysis of anxiety. *Behaviour Research and Therapy, 36*(9), 809-848. http://dx.doi.org/10.1016/S0005-7967(98)00063-1

Morgan, J., & Atkin, L. (2016). Expelling Stress for Primary School Teachers: Self-Affirmation Increases Positive Emotions in Teaching and Emotion Reappraisal. *International Journal of Environmental Research and Public Health, 13*(5), 500. http://dx.doi.org/10.3390/ijerph13050500

Mullan, B., Wong, C., Allom, V., & Pack, S. L. (2011). The role of executive function in bridging the intention-behaviour gap for binge-drinking in university students. *Addictive Behaviors, 36*(10), 1023-1026. http://dx.doi.org/10.1016/j.addbeh.2011.05.012

Napper, L.E., Harris, P. R., & Epton, T. (2009). Developing and testing a self-affirmation manipulation. *Self and Identity, 8*(1), 45-62. http://dx.doi.org/10.1080/15298860802079786

Napper, L. E., Harris, P. R., & Klein, W. M. (2014). Combining self-affirmation with the extended parallel process model: The consequences for motivation to eat more fruit and vegetables. *Health Communication, 29*(6), 610-618. http://dx.doi.org/10.1080/10410236.2013.791962

Neff, K. D. (2003). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*(3), 223–250. http://dx.doi.org/10.1080/15298860309027

Nelson, D. W. (2009). Feeling good and open-minded: The impact of positive affect on cross cultural empathic responding. *The Journal of Positive Psychology, 4*(1), 53-63. http://dx.doi.org/10.1080/17439760802357859

Nelson, S. K., Fuller, J. A., Choi, I., & Lyubomirsky, S. (2014). Beyond Self-Protection Self-Affirmation Benefits Hedonic and Eudaimonic Well-Being. *Personality and Social Psychology Bulletin, 40*(8), 998-1011. http://dx.doi.org/10.1177/0146167214533389

Nigg, J. T. (2000). On inhibition/disinhibition in developmental psychopathology: views from cognitive and personality psychology and a working inhibition taxonomy. *Psychological Bulletin, 126*(2), 220-246. http://dx.doi.org/10.1037//0033-2909.126.2.220

Nigg, J. T., Glass, J. M., Wong, M. M., Poon, E., Jester, J. M., Fitzgerald, H. E., ... & Zucker, R. A. (2004). Neuropsychological executive functioning in children at elevated risk for alcoholism: findings in early adolescence. *Journal of Abnormal Psychology*, *113*(2), 302-314. http://dx.doi.org/10.1037/0021-843X.113.2.302

Niles, A. N., Byrne Haltom, K. E., Lieberman, M. D., Hur, C., & Stanton, A. L. (2016). Writing content predicts benefit from written expressive disclosure: Evidence for repeated exposure and self-affirmation. *Cognition and Emotion*, *30*(2), 258-274. http://dx.doi.org/10.1080/02699931.2014.995598

Nilsson, J. P., Söderström, M., Karlsson, A. U., Lekander, M., Åkerstedt, T., Lindroth, N. E., & Axelsson, J. (2005). Less effective executive functioning after one night's sleep deprivation. *Journal of Sleep Research*, *14*(1), 1-6. http://psycnet.apa.org/doi/10.1111/j.1365-2869.2005.00442.x

Norman, P., Boer, H., & Seydel, E. R. (2005). Protection motivation theory. In M. Conner & P. Norman (Eds), *Predicting health behavior: Research and practice with social cognition models* (2nd Edn, pp. 81–126). Buckingham, UK: Open University Press.

Nyhan, B., & Reifler, J. (2015). The roles of information deficits and identity threat in the prevalence of misperceptions. *Manuscript submitted for publication*.

Orbell, S., & Sheeran, P. (1998). Regulation of behaviour in pursuit of health goals. *Psychology and Health*, *13*(4), 753-758. http://dx.doi.org/10.1080/08870449808407429

Orth, U., Trzesniewski, K. H., & Robins, R. W. (2010). Self-esteem development from young adulthood to old age: a cohort-sequential longitudinal study. *Journal of Personality and Social Psychology*, *98*(4), 645-658. http://dx.doi.org/10.1037/a0018769

Park, L. E. (2007). Appearance-based rejection sensitivity: Implications for mental and physical health, affect, and motivation. *Personality and Social Psychology Bulletin*, 33(4), 490-504. https://doi.org/10.1177/0146167206296301

Pauketat, J. V., Moons, W. G., Chen, J. M., Mackie, D. M., & Sherman, D. K. (2016). Self-affirmation and affective forecasting: Affirmation reduces the anticipated impact of negative events. *Motivation and Emotion*, *40*(5), 750-759. http://dx.doi.org/10.1007/s11031-016-9562-x

Pekrun, R., & Linnenbrink-Garcia, L. (2014). *International handbook of emotions in education*. New York, NY: Routledge.

Pennebaker, J. W., Booth, R. J., & Francis, M. E. (2007). LIWC2007: Linguistic inquiry and word count. [Computer software]. Mahwah, NJ: Erlbaum.

Pennebaker, J. W., & Chung, C. K. (2007). Expressive writing, emotional upheavals, and health. In H. S. Friedman & R. C. Silver (Eds.), *Foundations of health psychology* (pp. 263–284). New York, NY: Oxford University Press.

Pennebaker, J. W., Mayne, T. J., & Francis, M. E. (1997). Linguistic predictors of adaptive bereavement. *Journal of Personality and Social Psychology*, *72*(4), 863 -871 http://dx.doi.org/10.1037//0022-3514.72.4.863

Peterson, J. C., Charlson, M. E., Hoffman, Z., Wells, M. T., Wong, S. C., Hollenberg, J. P., ... & Allegrante, J. P. (2012). A randomized controlled trial of positive-affect induction

to promote physical activity after percutaneous coronary intervention. *Archives of Internal Medicine*, *172*(4), 329-336. http://dx.doi.org/10.1001/archinternmed.2011.1311

Phillips-Caesar, E. G., Winston, G., Peterson, J. C., Wansink, B., Devine, C. M., Kanna, B., ... & Charlson, M. E. (2015). Small Changes and Lasting Effects (SCALE) Trial: the formation of a weight loss behavioral intervention using EVOLVE. *Contemporary Clinical Trials, 41*, 118-128. http://dx.doi.org/10.1016/j.cct.2015.01.003

Pillow, D. R., Malone, G. P., & Hale, W. J. (2015). The need to belong and its association with fully satisfying relationships: A tale of two measures. *Personality and individual differences, 74*, 259-264. http://dx.doi.org/10.1016/j.paid.2014.10.031.

Polderman, T. J., Posthuma, D., De Sonneville, L. M., Stins, J. F., Verhulst, F. C., & Boomsma, D. I. (2007). Genetic analyses of the stability of executive functioning during childhood. *Biological Psychology*, *76*(1), 11-20. http://dx.doi.org/10.1016/j.biopsycho.2007.05.002

Protzko, J., & Aronson, J. (2016). Context Moderates Affirmation Effects on the Ethnic Achievement Gap. *Social Psychological and Personality Science*, *7*(6), 500-507. http://dx.doi.org/10.1177/1948550616646426

Pyone, J. S., & Isen, A. M. (2011). Positive affect, intertemporal choice, and levels of thinking: Increasing consumers' willingness to wait. *Journal of Marketing Research*, *48*(3), 532-543. http://dx.doi.org/10.1509/jmkr.48.3.532

Raghunathan, R., & Trope, Y. (2002). Walking the tightrope between feeling good and being accurate: mood as a resource in processing persuasive messages. *Journal of Personality and Social Psychology*, *83*(3), 510-525. http://dx.doi.org/10.1037/0022-3514.83.3.510

Reed, M. B., & Aspinwall, L. G. (1998). Self-affirmation reduces biased processing of health-risk information. *Motivation and Emotion*, *22*(2), 99-132. http://dx.doi.org/10.1023/A:1021463221281

Roberts Jr, R. J., & Pennington, B. F. (1996). An interactive framework for examining prefrontal cognitive processes. *Developmental Neuropsychology*, *12*(1), 105-126. http://dx.doi.org/10.1080/87565649609540642

Robins, R. W., Trzesniewski, K. H., Tracy, J. L., Gosling, S. D., & Potter, J. (2002). Global self-esteem across the life span. *Psychology and aging*, *17*(3), 423-434. http://dx.doi.org/10.1037//0882-7974.17.3.423

Robles, T. F., Brooks, K. P., & Pressman, S. D. (2009). Trait positive affect buffers the effects of acute stress on skin barrier recovery. *Health psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, *28*(3), 373-378. http://dx.doi.org/10.1037/a0014662

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Rowe, G., Hirsh, J. B., & Anderson, A. K. (2007). Positive affect increases the breadth of attentional selection. *Proceedings of the National Academy of Sciences*, *104*(1), 383-388. http://dx.doi.org/10.1073/pnas.0605198104

Rudman, L. A., Dohn, M. C., & Fairchild, K. (2007). Implicit self-esteem compensation: automatic threat defense. *Journal of Personality and Social Psychology*, *93*(5), 798.-813. http://dx.doi.org/10.1037/0022-3514.93.5.798

Rueda, M. R., Posner, M. I., & Rothbart, M. K. (2005). The development of executive attention: Contributions to the emergence of self-regulation. *Developmental Neuropsychology*, *28*(2), 573-594. http://dx.doi.org/10.1207/s15326942dn2802_2

Salanova, M., Llorens, S., & Schaufeli, W. B. (2011). “Yes, I can, I feel good, and I just do it!” On gain cycles and spirals of efficacy beliefs, affect, and engagement. *Applied Psychology*, *60*(2), 255-285. http://dx.doi.org/10.1111/j.1464-0597.2010.00435.x

Salles, A., Mueller, C. M., & Cohen, G. L. (2016). A Values Affirmation Intervention to Improve Female Residents' Surgical Performance. *Journal of Graduate Medical Education*, *8*(3), 378-383. http://dx.doi.org/10.4300/JGME-D-15-00214.1

Sanada, M., Ikeda, K., Kimura, K., & Hasegawa, T. (2013). Motivation enhances visual working memory capacity through the modulation of central cognitive processes. *Psychophysiology*, *50*(9), 864-871. http://dx.doi.org/10.1111/psyp.12077

Sandelands, L. E., Brockner, J., & Glynn, M. A. (1988). If at first you don't succeed, try, try again: Effects of persistence-performance contingencies, ego involvement, and self-esteem on task persistence. *Journal of Applied Psychology*, *73*(2), 208-216. http://dx.doi.org/10.1037/0021-9010.73.2.208

Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A re-evaluation of the Life Orientation Test. *Journal of Personality and Social Psychology*, *67*(6), 1063-1078. http://dx.doi.org/10.1037/0022-3514.67.6.1063

Schmeichel, B. J., & Vohs, K. (2009). Self-affirmation and self-control: affirming core values counteracts ego depletion. *Journal of Personality and Social Psychology*, *96*(4), 770-782. http://dx.doi.org/10.1037/a0014635

Schmitt, D. P., & Allik, J. (2005). Simultaneous administration of the Rosenberg Self-Esteem Scale in 53 nations: exploring the universal and culture-specific features of global self-esteem. *Journal of Personality and Social Psychology*, *89*(4), 623-642. http://dx.doi.org/10.1037/0022-3514.89.4.623

Schmitz, T. W., De Rosa, E., & Anderson, A. K. (2009). Opposing influences of affective state valence on visual cortical encoding. *Journal of Neuroscience*, *29*(22), 7199-7207. https://doi.org/10.1523/JNEUROSCI.5387-08.2009

Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology*, *45*(3), 513-523. http://psycnet.apa.org/doi/10.1037/0022-3514.45.3.513

Schwarz, N., & Bohner, G. (1996). Feelings and their motivational implications: Moods and the action sequence. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognitions and motivation to behavior* (pp. 119–145). New York, NY: Guilford Press

Schwarzer, R., & Jerusalem, M. R. (1995). Generalized self-efficacy scale. In J. Weinman, S. Wright, & M. Johnson (Eds.), *Measures in health psychology: A user's portfolio. Casual and control beliefs* (pp. 35–37). Windsor, UK: NFER-NELSON

Schumann, K. (2014). An affirmed self and a better apology: The effect of self-affirmation on transgressors' responses to victims. *Journal of Experimental Social Psychology*, *54*, 89-96. http://dx.doi.org/10.1016/j.jesp.2014.04.013

Scott, J. L., Brown, A. C., Phair, J. K., Westland, J. N., & Schüz, B. (2013). Self-affirmation, intentions and alcohol consumption in students: A randomized exploratory trial. *Alcohol and Alcoholism*, *48*(4), 458-463. https://doi.org/10.1093/alcalc/agt027

Selcuk, E., Zayas, V., Günaydin, G., Hazan, C., & Kross, E. (2012). Mental representations of attachment figures facilitate recovery following upsetting autobiographical memory recall. *Journal of Personality and Social Psychology*, *103*(2), 362-78. http://dx.doi.org/10.1037/a0028125

Senko, C., & Harackiewicz, J. M. (2002). Performance goals: The moderating roles of context and achievement orientation. *Journal of Experimental Social Psychology*, *38*(6), 603-610. http://dx.doi.org/10.1016/S0022-1031(02)00503-6

Shapiro, J. R., Williams, A. M., & Hambarchyan, M. (2013). Are all interventions created equal? A multi-threat approach to tailoring stereotype threat interventions. *Journal of Personality and Social Psychology*, *104*(2), 277-288. http://dx.doi.org/10.1037/a0030461

Shaver, P., Schwartz, J., Kirson, D., & O'connor, C. (1987). Emotion knowledge: further exploration of a prototype approach. *Journal of Personality and Social Psychology*, *52*(6), 1061-1086. http://dx.doi.org/10.1037/0022-3514.52.6.1061

Shea, L., & Masicampo, E. J. (2014). Self-affirmation counteracts the effects of burdens on judgments of distance. *Journal of Experimental Social Psychology*, *50*, 105-108. http://dx.doi.org/10.1016/j.jesp.2013.09.006

Sheeran, P. (n.d.) Operative Stability; Certainty; Meta Stability. *Unpublished manuscript* "Properties of Intention")

Cooke, R., & Sheeran, P. (2013). Properties of intention: Component structure and consequences for behavior, information processing, and resistance. *Journal of Applied Social Psychology*, *43*(4), 749-760. http://dx.doi.org/10.1111/jasp.12003

Sherman, D. K. (2013). Self-affirmation: Understanding the effects. *Social and Personality Psychology Compass*, *7*(11), 834-845. http://dx.doi.org/10.1111/spc3.12072

Sherman, D. K., Bunyan, D. P., Creswell, J. D., & Jaremka, L. M. (2009). Psychological vulnerability and stress: the effects of self-affirmation on sympathetic nervous system responses to naturalistic stressors. *Health Psychology*, *28*(5), 554-562. http://dx.doi.org/10.1037/a0014663

Sherman, D. K., & Cohen, G. L. (2006). The psychology of self-defense: Self-affirmation theory. In M. P. Zanna (Ed.) *Advances in experimental social psychology* (Vol. 38, pp. 183–242). San Diego, CA: Academic Press.

Sherman D. K., Cohen, G.L., Nelson, L.D., Nussbaum, A.D., Bunyan, D.P., & Garcia, J. (2009). Affirmed yet unaware: exploring the role of awareness in the process of self-affirmation. *Journal of Personality and Social Psychology, 97*(5), 745–764. http://dx.doi.org/10.1037/a0015451

Sherman, D. K., & Hartson, K. A. (2011). Reconciling self-protection with self-improvement: Self-affirmation theory. In M. Alicke & C. Sedikides (Eds.), *The Handbook of Self-Enhancement and Self-Protection.* (pp. 128–151). New York, NY: Guilford Press.

Sherman, D. K., Hartson, K. A., Binning, K. R., Purdie-Vaughns, V., Garcia, J., Taborsky-Barba, S., ... & Cohen, G. L. (2013). Deflecting the trajectory and changing the narrative: how self-affirmation affects academic performance and motivation under identity threat. *Journal of Personality and Social Psychology*, *104*(4), 591-618. http://dx.doi.org/10.1037/a0031495

Sherman, D. K., & Kim, H. S. (2005). Is there an" I" in" team"? The role of the self in group-serving judgments. *Journal of personality and social psychology*, *88*(1), 108-120. http://dx.doi.org/10.1037/0022-3514.88.1.108

Sherman, D. A., Nelson, L. D., & Steele, C. M. (2000). Do messages about health risks threaten the self? Increasing the acceptance of threatening health messages via self-affirmation. *Personality and Social Psychology Bulletin*, *26*(9), 1046-1058. http://dx.doi.org/10.1177/01461672002611003

Shnabel, N., Purdie-Vaughns, V., Cook, J. E., Garcia, J., & Cohen, G. L. (2013). Demystifying values-affirmation interventions: Writing about social belonging is a

key to buffering against identity threat. *Personality and Social Psychology Bulletin, 39*(5), 663-676. https://doi.org/10.1177/0146167213480816

Shrira, I., & Martin, L. L. (2005). Stereotyping, self-affirmation, and the cerebral hemispheres. *Personality and Social Psychology Bulletin, 31*(6), 846-856. https://doi.org/10.1177/0146167204272232

Slatcher, R. B., & Pennebaker, J. W. (2006). How do I love thee? Let me count the words the social effects of expressive writing. *Psychological Science, 17*(8), 660-664. https://doi.org/10.1111/j.1467-9280.2006.01762.x

Sniehotta, F. F., Scholz, U., & Schwarzer, R. (2005). Bridging the intention–behaviour gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychology & Health, 20*(2), 143-160. http://dx.doi.org/10.1080/08870440512331317670

Spencer, S. J., Fein, S., & Lomore, C. D. (2001). Maintaining one's self-image vis-à-vis others: The role of self-affirmation in the social evaluation of the self. *Motivation and Emotion, 25*(1), 41-65. http://dx.doi.org/10.1023/A:1010659805978

Spencer, S. J., Josephs, R. A., & Steele, C. M. (1993). Low self-esteem: The uphill struggle for self-integrity. In R. Baumeister (Ed.), *Self-esteem: The puzzle of low self-regard* (pp. 21-36). New York, NY: Plenum Press.

St Clair-Thompson, H. L., & Gathercole, S. E. (2006). Executive functions and achievements in school: Shifting, updating, inhibition, and working memory. *The Quarterly Journal of Experimental Psychology, 59*(4), 745-759. http://dx.doi.org/10.1080/17470210500162854

Ståhle, L., Ståhle, E. L., Granström, E., Isaksson, S., Annas, P., & Sepp, H. (2011). Effects of sleep or food deprivation during civilian survival training on cognition, blood glucose

and 3-OH-butyrate. *Wilderness & Environmental Medicine*, *22*(3), 202-210. http://dx.doi.org/10.1016/j.wem.2011.02.018.

Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 21, pp. 261–302). New York: Academic Press.

Steele, C. M., & Liu, T. J. (1983). Dissonance processes as self-affirmation. *Journal of Personality and Social Psychology*, *45*(1), 5-19. http://dx.doi.org/10.1037/0022-3514.45.1.5

Steele, C. M., Spencer, S. J., & Lynch, M. (1993). Self-image resilience and dissonance: the role of affirmational resources. *Journal of Personality and Social Psychology*, *64*(6), 885-896. http://psycnet.apa.org/doi/10.1037/0022-3514.64.6.885

Steptoe, A., Perkins-Porras, L., McKay, C., Rink, E., Hilton, S., & Cappuccio, F. P. (2003). Psychological factors associated with fruit and vegetable intake and with biomarkers in adults from a low-income neighborhood. *Health Psychology*, *22*(2), 148-155. http://dx.doi.org/10.1037/0278-6133.22.2.148

Stone, J., Whitehead, J., Schmader, T., & Focella, E. (2011). Thanks for asking: Self-affirming questions reduce backlash when stigmatized targets confront prejudice. *Journal of Experimental Social Psychology*, *47*(3), 589-598. http://dx.doi.org/10.1016/j.jesp.2010.12.016

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, *18*(6), 643-662. http://dx.doi.org/10.1037/0096-3445.121.1.15

Studer, R., & Winkelmann, R. (2014). Reported happiness, fast and slow. *Social Indicators Research*, *117*(3), 1055-1067. http://dx.doi.org/10.1007/s11205-013-0376-x

Suchy, Y. (2009). Executive functioning: Overview, assessment, and research issues for non-neuropsychologists. *Annals of Behavioral Medicine*, *37*(2), 106-116. http://dx.doi.org/10.1007/s12160-009-9097-4

Sweeney, A. M., & Moyer, A. (2015). Self-affirmation and responses to health messages: A meta-analysis on intentions and behavior. *Health Psychology*, *34*(2), 149-159. http://dx.doi.org/10.1037/hea0000110

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades and interpersonal success. *Journal of Personality*, *72* (2), 271-324. http://dx.doi.org/10.1111/j.0022-3506.2004.00263

Taylor, S. F., Welsh, R. C., Wager, T. D., Phan, K. L., Fitzgerald, K. D., & Gehring, W. J. (2004). A functional neuroimaging study of motivation and executive function. *Neuroimage*, *21*(3), 1045-1054. http://dx.doi.org/10.1016/j.neuroimage.2003.10.032

Tellegen, A., Watson, D., & Clark, L. A. (1999). On the dimensional and hierarchical structure of affect. *Psychological Science*, *10*(4), 297-303. https://doi.org/10.1111/1467-9280.00157

Tesser, A. (2000). On the confluence of self-esteem maintenance mechanisms. *Personality and Social Psychology Review*, *4*(4), 290-299. https://doi.org/10.1207/S15327957PSPR0404_1

Tesser, A., & Cornell, D. P. (1991). On the confluence of self-processes. *Journal of Experimental Social Psychology*, *27*(6), 501-526. http://dx.doi.org/10.1016/0022-1031(91)90023-Y

Tice, D. M. (1991). Esteem protection or enhancement? Self-handicapping motives and attributions differ by trait self-esteem. *Journal of Personality and Social Psychology*, *60*(5), 711-725. http://dx.doi.org/10.1037/0022-3514.60.5.711

Tice, D. M., Baumeister, R. F., Shmueli, D., & Muraven, M. (2007). Restoring the self: Positive affect helps improve self-regulation following ego depletion. *Journal of experimental social psychology*, *43*(3), 379-384.

Toma, C. (2010). Affirming the self online: Motives, benefits and costs of Facebook use. *Doctoral dissertation.*

Toma, C. L. (2013). Feeling better but doing worse: Effects of Facebook self-presentation on implicit self-esteem and cognitive task performance. *Media Psychology*, *16*(2), 199-220. http://dx.doi.org/10.1080/15213269.2012.762189

Townsend, J. T., & Ashby, F. G. (1983). *Stochastic modeling of elementary psychological processes*. Cambridge, UK: Cambridge University Press.

Townsend, C., & Sood, S. (2012). Self-affirmation through the choice of highly aesthetic products. *Journal of Consumer Research*, *39*(2), 415-428. http://dx.doi.org/10.1086/663775

Trzesniewski, K. H., Donnellan, M. B., & Robins, R. W. (2003). Stability of self-esteem across the life span. *Journal of Personality and Social Psychology*, *84*(1), 205-220. http://dx.doi.org/10.1037/0022-3514.84.1.205

Trope, Y., & Liberman, N. (2003). Temporal construal. *Psychological Review*, *110*(3), 403-421. http://dx.doi.org/10.1037/0033-295X.110.3.403

Trope, Y., & Neter, E. (1994). Reconciling competing motives in self-evaluation: the role of self-control in feedback seeking. *Journal of Personality and Social Psychology*, *66*(4), 646-657. http://dx.doi.org/10.1037/0022-3514.66.4.646

Tugade, M. M., & Fredrickson, B. L. (2004). Resilient individuals use positive emotions to bounce back from negative emotional experiences. *Journal of Personality and Social Psychology*, *86*(2), 320-333. http://dx.doi.org/10.1037/0022-3514.86.2.320

Tugade, M. M., & Fredrickson, B. L. (2007). Regulation of positive emotions: Emotion regulation strategies that promote resilience. *Journal of Happiness Studies*, *8*(3), 311-333. http://dx.doi.org/10.1007/s10902-006-9015-4

Turner, R. G., Carver, C. S., Scheier, M. F., & Ickes, W. (1978). Correlates of self-consciousness. *Journal of Personality Assessment*, *42*(3), 285-289. http://dx.doi.org/10.1207/s15327752jpa4203_10

Unsworth, N., Heitz, R. P., Schrock, J. C., & Engle, R. W. (2005). An automated version of the operation span task. *Behavior Research Methods*, *37*(3), 498-505. http://dx.doi.org/10.3758/BF03192720

Usala, P. D., & Hertzog, C. (1989). Measurement of affective states in adults: Evaluation of an adjective rating scale instrument. *Research on Aging*, *11*(4), 403-426. http://dx.doi.org/10.1177/0164027589114001

Vallacher, R. R., & Wegner, D. M. (1989). Levels of personal agency: Individual variation in action identification. *Journal of Personality and Social Psychology*, *57*(4), 660- 671. http://dx.doi.org/10.1037/0022-3514.57.4.660

van Dijk, W. W., van Koningsbruggen, G. M., Ouwerkerk, J. W., & Wesseling, Y. M. (2011). Self-esteem, self-affirmation, and schadenfreude. *Emotion*, *11*(6), 1445-1449. http://psycnet.apa.org/doi/10.1037/a0026331

van Koningsbruggen, G. M., & Das, E. (2009). Don't derogate this message! Self-affirmation promotes online type 2 diabetes risk test taking. *Psychology and Health*, *24*(6), 635-649. http://dx.doi.org/10.1080/08870440802340156

van Koningsbruggen, G. M., Das, E., & Roskos-Ewoldsen, D. R. (2009). How self-affirmation reduces defensive processing of threatening health information: evidence at the implicit level. *Health Psychology*, *28*(5), 563-568. http://dx.doi.org/10.1037/a0015610

van Koningsbruggen, G. M., Harris, P. R., Smits, A. J., Schüz, B., Scholz, U., & Cooke, R. (2016). Self-affirmation before exposure to health communications promotes intentions and health behavior change by increasing anticipated regret. *Communication Research*, *43*(8), 1027-1044. https://doi.org/10.1177/0093650214555180

Vance, K. M. (1998). *How Self-Affirmations Influence the Motivation and Behaviors Associated With Prejedice Reduction* (No. AFIT-FY99-68). AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH.

Vohs, K. D., Park, J. K., & Schmeichel, B. J. (2013). Self-affirmation can enable goal disengagement. *Journal of Personality and Social Psychology, 104*(1), 14-27. http://dx.doi.org/10.1037/a0030478

Wakslak, C., & Trope, Y. (2009). The effect of construal level on subjective probability estimates. *Psychological Science, 20*(1), 52-58. http://dx.doi.org/10.1111/j.1467-9280.2008.02250.x

Walter, N., Demetriades, S. Z., & Murphy, S. T. (2016). Involved, United, and Efficacious: Could Self-Affirmation Be the Solution to California's Drought?. *Health Communication*, 1-10. http://dx.doi.org/10.1080/10410236.2016.1217451

Walton, G. M., & Cohen, G. L. (2011). A brief social-belonging intervention improves academic and health outcomes of minority students. *Science, 331*(6023), 1447-1451. http://dx.doi.org/10.1126/science.1198364

Ward, A., Atkins, D. C., Lepper, M. R., & Ross, L. (2011). Affirming the self to promote agreement with another: Lowering a psychological barrier to conflict resolution. *Personality and Social Psychology Bulletin, 37*, 1216–1228. https://doi.org/10.1177/0146167211409439

Wardle, J., Parmenter, K., & Waller, J. (2000). Nutrition knowledge and food intake. *Appetite*, *34*(3), 269-275. http://dx.doi.org/10.1006/appe.1999.0311

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063-1070.

Waugh, C. E., & Fredrickson, B. L. (2006). Nice to know you: Positive emotions, self–other overlap, and complex understanding in the formation of a new relationship. *The Journal of Positive Psychology*, *1*(2), 93-106. http://dx.doi.org/10.1080/17439760500510569

Wegener, D. T. (1991). Mood and activity choice: Comparisons of mood-management across affective states (Doctoral dissertation, The Ohio State University).

Wegener, D. T., & Petty, R. E. (1994). Mood management across affective states: the hedonic contingency hypothesis. *Journal of Personality and Social Psychology*, *66*(6), 1034-1048. http://dx.doi.org/10.1037/0022-3514.66.6.1034

Wegener, D. T., Petty, R. E., & Smith, S. M. (1995). Positive mood can increase or decrease message scrutiny: the hedonic contingency view of mood and message processing. *Journal of Personality and Social Psychology*, *69*(1), 5-15. http://dx.doi.org/10.1037/0022-3514.69.1.5

Westermann, R., Stahl, G. U. N. T. E. R., & Hesse, F. (1996). Relative effectiveness and validity of mood induction procedures: analysis. *European Journal of Social Psychology*, *26*, 557-580. 10.1002/(SICI)1099-0992(199607)26:4<557::AID-EJSP769>3.0.CO;2-4

Wiedemann, A. U., Lippke, S., Reuter, T., Schüz, B., Ziegelmann, J. P., & Schwarzer, R. (2009). Prediction of stage transitions in fruit and vegetable intake. *Health Education Research*, *24*(4), 596-607. https://doi.org/10.1093/her/cyn061

Wileman, V., Farrington, K., Chilcot, J., Norton, S., Wellsted, D. M., Almond, M. K., ... & Armitage, C. J. (2014). Evidence that self-affirmation improves phosphate control in hemodialysis patients: A pilot cluster randomized controlled trial. *Annals of Behavioral Medicine*, *48*(2), 275-281. http://dx.doi.org/10.1007/s12160-014-9597-8

Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Communications Monographs*, *59*(4), 329-349. http://dx.doi.org/10.1080/03637759209376276

Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health Education & Behavior*, *27*(5), 591-615. https://doi.org/10.1177/109019810002700506

Wood, J. V., Heimpel, S. A., & Michela, J. L. (2003). Savoring versus dampening: self-esteem differences in regulating positive affect. *Journal of Personality and Social Psychology*, *85*(3), 566-580. http://psycnet.apa.org/doi/10.1037/0022-3514.85.3.566

Woodman, T., & Hardy, L. (2003). The relative impact of cognitive anxiety and self-confidence upon sport performance: A meta-analysis. *Journal of Sports Sciences*, *21*(6), 443-457. http://dx.doi.org/10.1080/0264041031000101809

Woods, S. P., & Tröster, A. I. (2003). Prodromal frontal/executive dysfunction predicts incident dementia in Parkinson's disease. *Journal of the International Neuropsychological Society*, *9*(01), 17-24. https://doi.org/10.1017/S1355617703910022

Woolf, K., McManus, I. C., Gill, D., & Dacre, J. (2009). The effect of a brief social intervention on the examination results of UK medical students: a cluster randomised controlled trial. *BMC Medical Education*, *9*(1), 35. https://doi.org/10.1186/1472-6920-9-35

Wyer, R. S., Clore, G. L., & Isbell, L. M. (1999). Affect and information processing. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 31, pp. 1–77). New York, NY: Academic Press.

Ybarra, O., Burnstein, E., Winkielman, P., Keller, M. C., Manis, M., Chan, E., & Rodriguez, J. (2008). Mental exercising through simple socializing: Social interaction promotes general cognitive functioning. *Personality and Social Psychology Bulletin, 34*(2), 248-259. https://doi.org/10.1177/0146167207310454

Ybarra, O., Winkielman, P., Yeh, I., Burnstein, E., & Kavanagh, L. (2011). Friends (and sometimes enemies) with cognitive benefits: What types of social interactions boost executive functioning?. *Social Psychological and Personality Science, 2*(3), 253-261. https://doi.org/10.1177/1948550610386808

Zárate, M. A., & Garza, A. A. (2002). In-group distinctiveness and self-affirmation as dual components of prejudice reduction. *Self and Identity, 1*(3), 235-249. http://dx.doi.org/10.1080/152988602760124865

Zeigler-Hill, V. (2013). *Self-esteem*. London, UK: Psychology Press.

Zhao, X., & Nan, X. (2010). Influence of Self-Affirmation on Responses to Gain-Versus Loss-Framed Antismoking Messages. *Human Communication Research, 36*(4), 493-511. https://doi.org/10.1111/j.1468-2958.2010.01385.x

Zhao, X., Peterson, E. B., Kim, W., & Rolfe-Redding, J. (2014). Effects of self-affirmation on daily versus occasional smokers' responses to graphic warning labels. *Communication Research, 41*(8), 1137-1158. https://doi.org/10.1177/0093650212465433

Zhou, X., Nonnemaker, J., Sherrill, B., Gilsenan, A. W., Coste, F., & West, R. (2009). Attempts to quit smoking and relapse: factors associated with success or failure from

the ATTEMPT cohort study. *Addictive Behaviors*, *34*(4), 365-373. http://dx.doi.org/10.1016/j.addbeh.2008.11.013

Appendix 1: Self-affirmation manipulation

STUDENT VALUES QUESTIONNAIRE

In the present study we are interested in investigating students' values. By values we mean the moral principles and standards by which people try to live their lives. For example, honesty might be a core value for some students. That is, they may try to be honest in all they do – whether in dealing with other people or when studying or working outside university. Following are some personal values that other students have described as important to them.

Conscientious
Friendliness
Spirituality / Religiousness
Compassion
Intelligence
Generosity
Trustworthiness
Kindness
Creativity
Spontaneity
Hedonism (the pursuit of pleasure/happiness)

You are going to be asked to choose a value and write a short statement about it

Please turn over

Please select the value that is **most** important to you, and write it in the space provided. **This value does not have to appear on the list on the previous page.** If more than one value is equally important to you then please select just one of them to write about.

Value:……..

On the sheet provided please write a short statement (around 2-3 paragraphs) about why this principle or standard is important to **you.** Take a couple of minutes to think about this value and how this value has influenced your past behaviours or attitudes. Please write about how you use this value in your everyday life – at University, at home, amongst friends or in dealing with strangers. If you can, try to recall and write about specific occasions on which this value determined what you did.

Please write as much as you can about the value you have selected (a minimum of two or three paragraphs is required).

Please continue writing until the experimenter returns.

STUDENT VALUES QUESTIONNAIRE

In the present study we are interested in investigating students' values. By values we mean the moral principles and standards by which people try to live their lives. For example, honesty might be a core value for some students. That is, they may try to be honest in all they do – whether in dealing with other people or when studying or working outside university. Following are some personal values that other students have described as important to them.

Conscientious
Friendliness
Spirituality / Religiousness
Compassion
Intelligence
Generosity
Trustworthiness
Kindness
Creativity
Spontaneity
Hedonism (the pursuit of pleasure/happiness)

You are going to be asked to choose a value and write a short statement about it

Please turn over

Please select the value that is **least** important to you, and write it in the space provided. **This value does not have to appear on the list on the previous page.** If more than one value is equally unimportant to you then please select just one of them to write about.

Value:……..

On the sheet provided please write a short statement (around 2-3 paragraphs) about why this principle or standard could be important to **another student**. Take a couple of minutes to think about how this value may influence their behaviours or attitudes. Please write about how they may use this value in their everyday life – at University, at home, amongst friends or in dealing with strangers. Only think about why this value might be important to another person, and **not** why it is unimportant to you.

Please write as much as you can about the value you have selected (a minimum of two or three paragraphs is required).

Please continue writing until the experimenter returns.

Appendix 2: Materials referred to in Chapter 2
Baseline online questionnaire

Page 1

Thank you for agreeing to take part in this study.

This questionnaire is the first part of a two-part study. Once you have completed it, I will be in contact to arrange a time and date for you to complete the second part, which consists of a few simple tasks.

Once you have completed both parts, you will be awarded course credits.

Please read the instructions carefully and answer the questions in the order they appear on the page.

You will not be able to return to a page once you have clicked the continue button.

If you wish to take part, please complete the consent form below.

Please note, this study has been reviewed by the School Cluster based Ethical Review Committee (C-REC) for Sciences and Technology (crecscitec@admin.sussex.ac.uk) and has been approved.

Electronic consent form

By clicking 'Continue' at the bottom of this page, you indicate that you understand:

- That you are under no obligation to participate and you can withdraw from the study at any time without having to give a reason
- That your data will be kept confidential in accordance with the Data Protection Act 1998. Once the final phase of the study has been completed, all names and email addresses will be removed from any questionnaires and all answers will be stored anonymously from that point onwards.
- That there are no undue risks (i.e. risks you would not normally take in everyday life) involved in this study.

( ) Continue

Page 2

Background information

1. Please enter today's date.

_____

2. Please enter your email address so we can contact you to take part in the second part of the study.

_____

3. Please write your name. Please note all names and email addresses will be removed from all files as soon as the final phase of the study has been completed, and your answers will be stored anonymously from that point.

_____

4. Are you male or female?
( ) Male
( ) Female

5. Please enter your age.

_____

6. What is your current occupation?
( ) Student
( ) Employed
( ) Unemployed
( ) Other; please specify: _____

7. If you answered student in Question 6, what subject are you studying?

_____

8. If you answered student in Question 6, what year are you in?

_____

9. Which of the following best describes your ethnicity? Please tick one of the following.
( ) White
( ) Mixed
( ) Asian or Asian British
( ) Black or Black British
( ) Chinese
( ) Other ethnic group
( ) Prefer not to say

10. Please enter your nationality.

_____

Page 3

On the following pages, we would like to ask you some questions about your thoughts and feelings.
Please be as honest and accurate as you can throughout. There are no "correct" or "incorrect" answers.
Try not to let your response to one statement influence your responses to other statements.

Using the scale provided, please indicate how much each of the following statements reflects how you typically are.

Please answer the questions by clicking the response that is most relevant to you.

	Not at all ... Very much
I am good at resisting temptation.	1-------2-------3-------4-------5
I have a hard time breaking bad habits.	1-------2-------3-------4-------5
I am lazy.	1-------2-------3-------4-------5
I say inappropriate things.	1-------2-------3-------4-------5
I never allow myself to lose control.	1-------2-------3-------4-------5
I do certain things that are bad for me, if they are fun.	1-------2-------3-------4-------5
People can count on me to keep on schedule.	1-------2-------3-------4-------5
Getting up in the morning is hard for me.	1-------2-------3-------4-------5
I have trouble saying no.	1-------2-------3-------4-------5
I change my mind fairly often.	1-------2-------3-------4-------5
I blurt out whatever is on my mind.	1-------2-------3-------4-------5
People would describe me as impulsive.	1-------2-------3-------4-------5
I refuse things that are bad for me.	1-------2-------3-------4-------5
I spend too much money.	1-------2-------3-------4-------5
I keep everything neat.	1-------2-------3-------4-------5
I am self-indulgent at times.	1-------2-------3-------4-------5
I wish I had more self-discipline.	1-------2-------3-------4-------5
I am reliable.	1-------2-------3-------4-------5
I get carried away by my feelings.	1-------2-------3-------4-------5
I do many things on the spur of the moment.	1-------2-------3-------4-------5
I don't keep secrets very well.	1-------2-------3-------4-------5
People would say that I have iron self- discipline.	1-------2-------3-------4-------5
I have worked or studied all night at the last minute.	1-------2-------3-------4-------5
I'm not easily discouraged.	1-------2-------3-------4-------5
I'd be better off if I stopped to think before acting.	1-------2-------3-------4-------5
I engage in healthy practices.	1-------2-------3-------4-------5
I eat healthy foods.	1-------2-------3-------4-------5
Pleasure and fun sometimes keep me from getting work done.	1-------2-------3-------4-------5
I have trouble concentrating.	1-------2-------3-------4-------5
I am able to work effectively toward long-term goals.	1-------2-------3-------4-------5
Sometimes I can't stop myself from doing something, even if I know it is wrong.	1-------2-------3-------4-------5
I often act without thinking through all the alternatives.	1-------2-------3-------4-------5
I lose my temper too easily.	1-------2-------3-------4-------5
I often interrupt people.	1-------2-------3-------4-------5
I sometimes drink or use drugs to excess.	1-------2-------3-------4-------5
I am always on time.	1-------2-------3-------4-------5

Page 4

Please record the appropriate answer for each item, depending on whether you Strongly agree, agree, disagree, or strongly disagree with it.

	Strongly disagree	Disagree	Agree	Strongly agree
I feel that I am a person of worth, at least on an equal plane with others.	1	2	3	4
I feel that I have a number of good qualities..	1	2	3	4
All in all, I am inclined to feel that I am a failure.	1	2	3	4
I am able to do things as well as most other people.	1	2	3	4
I feel I do not have much to be proud of.	1	2	3	4
I take a positive attitude toward myself.	1	2	3	4
On the whole, I am satisfied with myself.	1	2	3	4
I wish I could have more respect for myself.	1	2	3	4
I certainly feel useless at times.	1	2	3	4
At times I think I am no good at all.	1	2	3	4

Page 5

Sometimes when we face difficulties, challenges or problems in our daily lives we can find ourselves thinking about ourselves. We are interested in how often you find yourself thinking about yourself when things start to bother you.

When I feel threatened or anxious by people or events I find myself...

	Disagree completely						Agree completely
... thinking about my strengths.	1	2	3	4	5	6	7
... recalling times I did the right thing.	1	2	3	4	5	6	7
… thinking about my values.	1	2	3	4	5	6	7
... thinking about my principles.	1	2	3	4	5	6	7
... thinking about the people who are important to me.	1	2	3	4	5	6	7
... thinking about what I stand for.	1	2	3	4	5	6	7
… thinking about my family.	1	2	3	4	5	6	7
… thinking about my friends.	1	2	3	4	5	6	7
… thinking about the things I am good at.	1	2	3	4	5	6	7
… thinking about the things I like about myself.	1	2	3	4	5	6	7
… thinking about the things I am bad at.	1	2	3	4	5	6	7
… thinking about the things that I value about myself.	1	2	3	4	5	6	7
… thinking about the people who believe in me.	1	2	3	4	5	6	7
… thinking about my failings.	1	2	3	4	5	6	7
… thinking about the people I love.	1	2	3	4	5	6	7
… thinking about the things that I'd like to change about myself.	1	2	3	4	5	6	7
… thinking about the people I trust.	1	2	3	4	5	6	7
… thinking about the things I believe in.	1	2	3	4	5	6	7
… remembering things I have succeeded at.	1	2	3	4	5	6	7

Page 6

How accurately does each of these traits describe you as you typically are, compared to other people of the same age and sex?

	Not at all accurate				Extremely accurate
Lively	1-------2	-------3	-------4	-------5	
Full of energy	1-------2	-------3	-------4	-------5	
Tense	1-------2	-------3	-------4	-------5	
Happy	1-------2	-------3	-------4	-------5	
Pleased	1-------2	-------3	-------4	-------5	
Cheerful	1-------2	-------3	-------4	-------5	
At-ease	1-------2	-------3	-------4	-------5	
Calm	1-------2	-------3	-------4	-------5	
Relaxed	1-------2	-------3	-------4	-------5	
Sad	1-------2	-------3	-------4	-------5	
Depressed	1-------2	-------3	-------4	-------5	
Unhappy	1-------2	-------3	-------4	-------5	
On-edge	1-------2	-------3	-------4	-------5	
Nervous	1-------2	-------3	-------4	-------5	
Energetic	1-------2	-------3	-------4	-------5	
Hostile	1-------2	-------3	-------4	-------5	
Resentful	1-------2	-------3	-------4	-------5	
Angry	1-------2	-------3	-------4	-------5	

Page 7

Please indicate your agreement with the statements below by clicking the appropriate response next to the statement using the following scale.

	Strongly Disagree		Disagree		Agree		Strongly Agree
I have the ability and skills to deal with whatever comes my way.	1-------2	-------3	-------4	-------5	-------6	-------7	
I feel that I'm basically a moral person.	1-------2	-------3	-------4	-------5	-------6	-------7	
On the whole, I am a capable person.	1-------2	-------3	-------4	-------5	-------6	-------7	
I am a good person.	1-------2	-------3	-------4	-------5	-------6	-------7	
When I think about the future, I'm confident that I can meet the challenges that I will face.	1-------2	-------3	-------4	-------5	-------6	-------7	
I try to do the right thing.	1-------2	-------3	-------4	-------5	-------6	-------7	
Even though there is always room for self-improvement, I feel a sense of completeness about who I fundamentally am.	1-------2	-------3	-------4	-------5	-------6	-------7	
I am comfortable with who I am.	1-------2	-------3	-------4	-------5	-------6	-------7	

Page 8

Please answer the questions by clicking the response that is most relevant to you.

	Not at all true	Hardly true	Moderately true	Exactly true
I can always manage to solve difficult problems if I try hard enough.	1	2	3	4
If someone opposes me, I can find the means and ways to get what I want.	1	2	3	4
It is easy for me to stick to my aims and accomplish my goals.	1	2	3	4
I am confident that I could deal efficiently with unexpected events.	1	2	3	4
Thanks to my resourcefulness, I know how to handle unforeseen situations.	1	2	3	4
I can solve most problems if I invest the necessary effort.	1	2	3	4
I can remain calm when facing difficulties because I can rely on my coping abilities.	1	2	3	4
When I am confronted with a problem, I can usually find several solutions.	1	2	3	4
If I am in trouble, I can usually think of a solution.	1	2	3	4
I can usually handle whatever comes my way.	1	2	3	4

Page 9

Please read each statement carefully before answering. Indicate how often you behave in the stated manner by clicking the appropriate response.

	Almost never				Almost always
I try to be understanding and patient towards those aspects of my personality I don't like.	1	2	3	4	5
I'm kind to myself when I'm experiencing suffering.	1	2	3	4	5
When I'm going through a very hard time, I give myself the caring and tenderness I need.	1	2	3	4	5
I'm tolerant of my own flaws and inadequacies.	1	2	3	4	5
I try to be loving towards myself when I'm feeling emotional pain.	1	2	3	4	5
When I see aspects of myself that I don't like, I get down on myself.	1	2	3	4	5
When times are really difficult, I tend to be tough on myself.	1	2	3	4	5
I can be a bit cold-hearted towards myself when I'm experiencing suffering.	1	2	3	4	5
I'm disapproving and judgemental about my own flaws and inadequacies.	1	2	3	4	5
I'm intolerant and impatient towards those aspects of my personality I don't like.	1	2	3	4	5
When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.	1	2	3	4	5
I try to see my failings as part of the human condition.	1	2	3	4	5
When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.	1	2	3	4	5

When things are going badly for me, I see the difficulties as part of life that everyone gets through.	1-------2-------3-------4-------5
When I fail at something that's important to me I tend to feel alone in my failure.	1-------2-------3-------4-------5
When I think about my inadequacies it tends to make me feel more separate and cut off from the rest of the world.	1-------2-------3-------4-------5
When I'm feeling down I tend to feel like most other people are probably happier than I am.	1-------2-------3-------4-------5
When I'm really struggling I tend to feel like other people must be having an easier time of it.	1-------2-------3-------4-------5
When something upsets me I try to keep my emotions in balance.	1-------2-------3-------4-------5
When I'm feeling down I try to approach my feelings with curiosity and openness.	1-------2-------3-------4-------5
When something painful happens I try to take a balanced view of the situation.	1-------2-------3-------4-------5
When I fail at something important to me I try to keep things in perspective.	1-------2-------3-------4-------5
When something upsets me I get carried away with my feelings.	1-------2-------3-------4-------5
When I'm feeling down I tend to obsess and fixate on everything that's wrong.	1-------2-------3-------4-------5
When something painful happens I tend to blow the incident out of proportion.	1-------2-------3-------4-------5
When I fail at something important to me I become consumed by feelings of inadequacy	1-------2-------3-------4-------5

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Please indicate the extent to which you agree with the following statements by clicking the appropriate response.
Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no "correct" or “incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer.

	Strongly disagree Disagree Neutral Agree Strongly agree
In uncertain times, I usually expect the best.	1-------2-------3-------4-------5
It's easy for me to relax.	1-------2-------3-------4-------5
If something can go wrong for me, it will.	1-------2-------3-------4-------5
I'm always optimistic about my future.	1-------2-------3-------4-------5
I enjoy my friends a lot.	1-------2-------3-------4-------5
It's important for me to keep busy.	1-------2-------3-------4-------5
I hardly ever expect things to go my way.	1-------2-------3-------4-------5
I don't get upset too easily.	1-------2-------3-------4-------5
I rarely count on good things happening to me.	1-------2-------3-------4-------5

Overall, I expect more good things to happen to me than bad.	1-------2-------3-------4-------5

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Please indicate the extent to which the following statements describe you by clicking the appropriate response.

	Does not describe me well	Does describe me well
I often have tender, concerned feelings for people less fortunate than me.	1-------2-------3-------4	
Sometimes I don't feel very sorry for other people when they are having problems.	1-------2-------3-------4	
When I see someone being taken advantage of, I feel kind of protective towards them.	1-------2-------3-------4	
Other people's misfortunes do not usually disturb me a great deal.	1-------2-------3-------4	
When I see someone being treated unfairly, I sometimes don't feel very much pity for them.	1-------2-------3-------4	
I am often quite touched by things that I see happen.	1-------2-------3-------4	
I would describe myself as a pretty soft-hearted person.	1-------2-------3-------4	

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Please indicate the extent to which you agree with the following statements by clicking the appropriate response.

	Strongly disagree Disagree Neutral Agree Strongly agree
After I encounter information about a topic, I am likely to stop and think about it.	1-------2-------3-------4-------5
If I need to act on a topic, the more viewpoints I get the better.	1-------2-------3-------4-------5
After thinking about a topic, I have a broader understanding.	1-------2-------3-------4-------5
When I encounter information about a topic, I read or listen to most of it, even though I may not agree with its perspective.	1-------2-------3-------4-------5
It is important for me to interpret information about a topic in a way that applies directly to my life.	1-------2-------3-------4-------5
When I encounter information about a topic, I focus on only a few key points.	1-------2-------3-------4-------5
There is far more information on a topic than I personally need.	1-------2-------3-------4-------5
When I see or hear information about a topic, I rarely spend much time thinking about it.	1-------2-------3-------4-------5
If I need to act on information about a topic, the advice of one expert is enough for me.	1-------2-------3-------4-------5

Page 13

Thank you!

Thank you very much for taking the time to complete this questionnaire.

Please now follow the link below to choose a time slot where it's convenient for you to come to the lab and complete the second part of the study, which requires you to do some simple tasks and fill out a few more questionnaires.

https://philine.youcanbook.me/index.jsp

If you don't choose a time slot now, I will be in contact later using the email address you provided at the start of the questionnaire to arrange a convenient time for you.

If you have any questions about the study at this stage, please don't hesitate to email me (Philine Stein) straightaway: philine@sussex.ac.uk

For advice on any of the topics touched upon in this questionnaire, you can contact student support: http://www.sussex.ac.uk/studentsupport/

For more information on general mood, as well as on stress, anxiety and depression, visit the NHS Choices Moodzone:

http://www.nhs.uk/Conditions/stress-anxiety-depression/Pages/low-mood-stress-anxiety.aspx

Funnel debrief

1 What do you think the purpose of the experiment was?

2 Did you think any of the tasks were related in any way? 0 No 1 Yes
If yes, can you tell us something about how?

3 Do you feel that your responses on any of the later tasks were influenced by your response to on an earlier task? 0 No 1 Yes
If yes, can you tell us something about how?

4 Have you completed any of these tasks before today? 0 No 1Yes

If yes, can you briefly describe which one and when

Electronic debrief and thank you

Thank you very much for your time!
The aim of my research is to explore whether writing about valued aspects of the self makes people more positive and more confident in their abilities and therefore increases their executive functions – such as impulse control, attention regulation and ultimately memory. To test this, I am asking some of you to write about a value that is important to you and how you use this value in your everyday life, and some of you to write about an unimportant value. All of you answer the same questionnaires about your feelings and attitudes and complete the same two tasks designed to measure working memory and selective attention. If you would like to withdraw your answers now that you know the purpose of the study, or if you have any questions, please don't hesitate to contact me – philine@sussex.ac.uk
Many thanks for your participation.

For advice on any of the topics touched upon in this questionnaire, you can contact student support: http://www.sussex.ac.uk/studentsupport/
For more information on general mood, as well as on stress, anxiety and depression, visit the NHS Choices Moodzone:
http://www.nhs.uk/Conditions/stress-anxiety-depression/Pages/low-mood-stress-anxiety.aspx

Appendix 3: Materials referred to in Chapter 3
Baseline online questionnaire

Page 1

Thank you for agreeing to take part in this study.

This questionnaire is the first part of a two-part study. Once you have completed it, you can pick a time and date for you to complete the second part, which consists of a few simple tasks.

Once you have completed both parts, I can offer you 5 course credits or £5. Your participation is highly valued and appreciated.

Please read the instructions carefully and answer the questions in the order they appear on the page.

You will not be able to return to a page once you have clicked the continue button.

If you wish to take part, please complete the consent form below.

Please note, this study has been reviewed by the Sciences and Technology Cross-Schools Research Ethics Committee (crecscitec@sussex.ac.uk) and has been approved.

Electronic consent form

By clicking 'Continue' at the bottom of this page, you indicate that you understand:

- That you are under no obligation to participate and you can withdraw from the study at any time without having to give a reason
- That you are under no obligation to take part in this study. Participation is purely voluntary and you are free to withdraw at any time, without giving a reason, until it is no longer practical for you to do so. This will be once data collection is complete, at which point you will receive a debrief via email and a reminder of your option to withdraw your data.
- That your data will be kept confidential in accordance with the Data Protection Act 1998. Once the final phase of the study has been completed, all names and email addresses will be removed from any questionnaires and all answers will be stored anonymously from that point onwards.
- That there are no undue risks (i.e. risks you would not normally take in everyday life) involved in this study.

( ) Continue

Page 2

Background information

1. Please enter today's date.

_____

2. Please enter your email address so we can contact you to take part in the second part of the study.

_____

3. Please write your name. Please note all names and email addresses will be removed from all files as soon as the final phase of the study has been completed, and your answers will be stored anonymously from that point.

_____

4. Are you male or female?
( ) Male
( ) Female

5. Please enter your age.

_____

6. What is your current occupation?
( ) Student
( ) Employed
( ) Unemployed
( ) Other; please specify: _____

7. If you answered student in Question 6, what subject are you studying?

_____

8. If you answered student in Question 6, what year are you in?

_____

9. Which of the following best describes your ethnicity? Please tick one of the following.
( ) White
( ) Mixed
( ) Asian or Asian British
( ) Black or Black British
( ) Chinese
( ) Other ethnic group
( ) Prefer not to say

10. Please enter your nationality.

_____

Page 3

On the following pages, we would like to ask you some questions about your thoughts and feelings.
Please be as honest and accurate as you can throughout. There are no "correct" or "incorrect" answers.
Try not to let your response to one statement influence your responses to other statements.

Using the scale provided, please indicate how much each of the following statements reflects how you typically are.

Please answer the questions by clicking the response that is most relevant to you.

	Not at all ... Very much
I am good at resisting temptation.	1-------2-------3-------4-------5
I have a hard time breaking bad habits.	1-------2-------3-------4-------5
I am lazy.	1-------2-------3-------4-------5
I say inappropriate things.	1-------2-------3-------4-------5
I never allow myself to lose control.	1-------2-------3-------4-------5
I do certain things that are bad for me, if they are fun.	1-------2-------3-------4-------5
People can count on me to keep on schedule.	1-------2-------3-------4-------5
Getting up in the morning is hard for me.	1-------2-------3-------4-------5
I have trouble saying no.	1-------2-------3-------4-------5
I change my mind fairly often.	1-------2-------3-------4-------5
I blurt out whatever is on my mind.	1-------2-------3-------4-------5
People would describe me as impulsive.	1-------2-------3-------4-------5
I refuse things that are bad for me.	1-------2-------3-------4-------5
I spend too much money.	1-------2-------3-------4-------5
I keep everything neat.	1-------2-------3-------4-------5
I am self-indulgent at times.	1-------2-------3-------4-------5
I wish I had more self-discipline.	1-------2-------3-------4-------5
I am reliable.	1-------2-------3-------4-------5
I get carried away by my feelings.	1-------2-------3-------4-------5
I do many things on the spur of the moment.	1-------2-------3-------4-------5
I don’t keep secrets very well.	1-------2-------3-------4-------5
People would say that I have iron self- discipline.	1-------2-------3-------4-------5
I have worked or studied all night at the last minute.	1-------2-------3-------4-------5
I’m not easily discouraged.	1-------2-------3-------4-------5
I’d be better off if I stopped to think before acting.	1-------2-------3-------4-------5
I engage in healthy practices.	1-------2-------3-------4-------5
I eat healthy foods.	1-------2-------3-------4-------5
Pleasure and fun sometimes keep me from getting work done.	1-------2-------3-------4-------5
I have trouble concentrating.	1-------2-------3-------4-------5
I am able to work effectively toward long-term goals.	1-------2-------3-------4-------5
Sometimes I can’t stop myself from doing something, even if I know it is wrong.	1-------2-------3-------4-------5
I often act without thinking through all the alternatives.	1-------2-------3-------4-------5
I lose my temper too easily.	1-------2-------3-------4-------5
I often interrupt people.	1-------2-------3-------4-------5
I sometimes drink or use drugs to excess.	1-------2-------3-------4-------5
I am always on time.	1-------2-------3-------4-------5

Page 4

Please record the appropriate answer for each item, depending on whether you Strongly agree, agree, disagree, or strongly disagree with it.

	Strongly disagree Disagree Agree Strongly agree
I feel that I am a person of worth, at least on an equal plane with others.	1-------2------3-------4
I feel that I have a number of good qualities..	1-------2------3-------4
All in all, I am inclined to feel that I am a failure.	1-------2------3-------4
I am able to do things as well as most other people.	1-------2------3-------4
I feel I do not have much to be proud of.	1-------2------3-------4
I take a positive attitude toward myself.	1-------2------3-------4
On the whole, I am satisfied with myself.	1-------2------3-------4
I wish I could have more respect for myself.	1-------2------3-------4
I certainly feel useless at times.	1-------2------3-------4
At times I think I am no good at all.	1-------2------3-------4

Page 5

Sometimes when we face difficulties, challenges or problems in our daily lives we can find ourselves thinking about ourselves. We are interested in how often you find yourself thinking about yourself when things start to bother you.

When I feel threatened or anxious by people or events I find myself...

	Disagree completely Agree completely
... thinking about my strengths.	1-------2-------3-------4-------5-------6-------7
... recalling times I did the right thing.	1-------2-------3-------4-------5-------6-------7
… thinking about my values.	1-------2-------3-------4-------5-------6-------7
... thinking about my principles.	1-------2-------3-------4-------5-------6-------7
... thinking about the people who are important to me.	1-------2-------3-------4-------5-------6-------7
... thinking about what I stand for.	1-------2-------3-------4-------5-------6-------7
… thinking about my family.	1-------2-------3-------4-------5-------6-------7
… thinking about my friends.	1-------2-------3-------4-------5-------6-------7
… thinking about the things I am good at.	1-------2-------3-------4-------5-------6-------7
… thinking about the things I like about myself.	1-------2-------3-------4-------5-------6-------7
… thinking about the things I am bad at.	1-------2-------3-------4-------5-------6-------7
… thinking about the things that I value about myself.	1-------2-------3-------4-------5-------6-------7
… thinking about the people who believe in me.	1-------2-------3-------4-------5-------6-------7
… thinking about my failings.	1-------2-------3-------4-------5-------6-------7

… thinking about the people I love.	1-------2-------3-------4-------5-------6-------7
… thinking about the things that I'd like to change about myself.	1-------2-------3-------4-------5-------6-------7
… thinking about the people I trust.	1-------2-------3-------4-------5-------6-------7
… thinking about the things I believe in.	1-------2-------3-------4-------5-------6-------7
… remembering things I have succeeded at.	1-------2-------3-------4-------5-------6-------7

Page 6

When we think of ourselves, our thoughts are sometimes negative and sometimes positive.

We are interested in the POSITIVE thoughts you have about yourself.

Please indicate how much you agree or disagree with each of the following statements.

Thinking POSITIVELY about myself is something…	Disagree completely … Agree completely
… I do automatically.	1-------2-------3-------4-------5-------6-------7
… that feels sort of natural to me.	1-------2-------3-------4-------5-------6-------7
… I do without further thinking.	1-------2-------3-------4-------5-------6-------7
… I would find hard not to do.	1-------2-------3-------4-------5-------6-------7
… that's typically "me".	1-------2-------3-------4-------5-------6-------7

Page 7

How accurately does each of these traits describe you as you typically are, compared to other people of the same age and sex?

	Not at all accurate … Extremely accurate
Lively	1-------2-------3-------4-------5
Full of energy	1-------2-------3-------4-------5
Tense	1-------2-------3-------4-------5
Happy	1-------2-------3-------4-------5
Pleased	1-------2-------3-------4-------5
Cheerful	1-------2-------3-------4-------5
At-ease	1-------2-------3-------4-------5
Calm	1-------2-------3-------4-------5
Relaxed	1-------2-------3-------4-------5
Sad	1-------2-------3-------4-------5
Depressed	1-------2-------3-------4-------5
Unhappy	1-------2-------3-------4-------5
On-edge	1-------2-------3-------4-------5
Nervous	1-------2-------3-------4-------5
Energetic	1-------2-------3-------4-------5

Hostile	1-------2-------3-------4-------5
Resentful	1-------2-------3-------4-------5
Angry	1-------2-------3-------4-------5

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Please indicate your agreement with the statements below by clicking the appropriate response next to the statement using the following scale.

	Strongly Disagree	Disagree	Agree	Strongly Agree
I have the ability and skills to deal with whatever comes my way.	1-------2-------3-------4-------5-------6-------7			
I feel that I'm basically a moral person.	1-------2-------3-------4-------5-------6-------7			
On the whole, I am a capable person.	1-------2-------3-------4-------5-------6-------7			
I am a good person.	1-------2-------3-------4-------5-------6-------7			
When I think about the future, I'm confident that I can meet the challenges that I will face.	1-------2-------3-------4-------5-------6-------7			
I try to do the right thing.	1-------2-------3-------4-------5-------6-------7			
Even though there is always room for self-improvement, I feel a sense of completeness about who I fundamentally am.	1-------2-------3-------4-------5-------6-------7			
I am comfortable with who I am.	1-------2-------3-------4-------5-------6-------7			

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Please answer the questions by clicking the response that is most relevant to you.

	Not at all true	Hardly true	Moderately true	Exactly true
I can always manage to solve difficult problems if I try hard enough.	1-------2-------3-------4			
If someone opposes me, I can find the means and ways to get what I want.	1-------2-------3-------4			
It is easy for me to stick to my aims and accomplish my goals.	1-------2-------3-------4			
I am confident that I could deal efficiently with unexpected events.	1-------2-------3-------4			
Thanks to my resourcefulness, I know how to handle unforeseen situations.	1-------2-------3-------4			
I can solve most problems if I invest the necessary effort.	1-------2-------3-------4			
I can remain calm when facing difficulties because I can rely on my coping abilities.	1-------2-------3-------4			
When I am confronted with a problem, I can usually find several solutions.	1-------2-------3-------4			
If I am in trouble, I can usually think of a solution.	1-------2-------3-------4			
I can usually handle whatever comes my way.	1-------2-------3-------4			

Page 10

Please read each statement carefully before answering. Indicate how often you behave in the stated manner by clicking the appropriate response.

	Almost never				Almost always
I try to be understanding and patient towards those aspects of my personality I don't like.	1	2	3	4	5
I'm kind to myself when I'm experiencing suffering.	1	2	3	4	5
When I'm going through a very hard time, I give myself the caring and tenderness I need.	1	2	3	4	5
I'm tolerant of my own flaws and inadequacies.	1	2	3	4	5
I try to be loving towards myself when I'm feeling emotional pain.	1	2	3	4	5
When I see aspects of myself that I don't like, I get down on myself.	1	2	3	4	5
When times are really difficult, I tend to be tough on myself.	1	2	3	4	5
I can be a bit cold-hearted towards myself when I'm experiencing suffering.	1	2	3	4	5
I'm disapproving and judgemental about my own flaws and inadequacies.	1	2	3	4	5
I'm intolerant and impatient towards those aspects of my personality I don't like.	1	2	3	4	5
When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.	1	2	3	4	5
I try to see my failings as part of the human condition.	1	2	3	4	5
When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.	1	2	3	4	5
When things are going badly for me, I see the difficulties as part of life that everyone gets through.	1	2	3	4	5
When I fail at something that's important to me I tend to feel alone in my failure.	1	2	3	4	5
When I think about my inadequacies it tends to make me feel more separate and cut off from the rest of the world.	1	2	3	4	5
When I'm feeling down I tend to feel like most other people are probably happier than I am.	1	2	3	4	5
When I'm really struggling I tend to feel like other people must be having an easier time of it.	1	2	3	4	5
When something upsets me I try to keep my emotions in balance.	1	2	3	4	5
When I'm feeling down I try to approach my feelings with curiosity and openness.	1	2	3	4	5
When something painful happens I try to take a balanced view of the situation.	1	2	3	4	5
When I fail at something important to me I try to keep things in perspective.	1	2	3	4	5
When something upsets me I get carried away with my feelings.	1	2	3	4	5
When I'm feeling down I tend to obsess and fixate on everything that's wrong.	1	2	3	4	5

When something painful happens I tend to blow the incident out of proportion.	1-------2-------3-------4-------5
When I fail at something important to me I become consumed by feelings of inadequacy	1-------2-------3-------4-------5

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Please indicate the extent to which you agree with the following statements by clicking the appropriate response.
Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no "correct" or “incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer.

	Strongly disagree Disagree Neutral Agree Strongly agree
In uncertain times, I usually expect the best.	1-------2-------3-------4-------5
It's easy for me to relax.	1-------2-------3-------4-------5
If something can go wrong for me, it will.	1-------2-------3-------4-------5
I'm always optimistic about my future.	1-------2-------3-------4-------5
I enjoy my friends a lot.	1-------2-------3-------4-------5
It's important for me to keep busy.	1-------2-------3-------4-------5
I hardly ever expect things to go my way.	1-------2-------3-------4-------5
I don't get upset too easily.	1-------2-------3-------4-------5
I rarely count on good things happening to me.	1-------2-------3-------4-------5
Overall, I expect more good things to happen to me than bad.	1-------2-------3-------4-------5

Page 12

Please indicate the extent to which the following statements describe you by clicking the appropriate response.

	Does not describe me well Does describe me well
I often have tender, concerned feelings for people less fortunate than me.	1-------2-------3-------4
Sometimes I don't feel very sorry for other people when they are having problems.	1-------2-------3-------4
When I see someone being taken advantage of, I feel kind of protective towards them.	1-------2-------3-------4
Other people's misfortunes do not usually disturb me a great deal.	1-------2-------3-------4
When I see someone being treated unfairly, I sometimes don't feel very much pity for them.	1-------2-------3-------4
I am often quite touched by things that I see happen.	1-------2-------3-------4
I would describe myself as a pretty soft-hearted person.	1-------2-------3-------4

Page 13

Please indicate the extent to which you agree with the following statements by clicking the appropriate response.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
After I encounter information about a topic, I am likely to stop and think about it.	1	2	3	4	5
If I need to act on a topic, the more viewpoints I get the better.	1	2	3	4	5
After thinking about a topic, I have a broader understanding.	1	2	3	4	5
When I encounter information about a topic, I read or listen to most of it, even though I may not agree with its perspective.	1	2	3	4	5
It is important for me to interpret information about a topic in a way that applies directly to my life.	1	2	3	4	5
When I encounter information about a topic, I focus on only a few key points.	1	2	3	4	5
There is far more information on a topic than I personally need.	1	2	3	4	5
When I see or hear information about a topic, I rarely spend much time thinking about it.	1	2	3	4	5
If I need to act on information about a topic, the advice of one expert is enough for me.	1	2	3	4	5

Page 14

Next are some questions about the support that is available to you.
About how many close friends and close relatives do you have (people you feel at ease with and can talk to about what is on your mind)?
Write in number of close friends and close relatives: ☐☐

People sometimes look to others for companionship, assistance, or other types of support.
How often is each of the following kinds of support available to YOU if you need it?

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
Someone to help you if you were confined to bed	1	2	3	4	5
Someone you can count on to listen to you when you need to talk .	1	2	3	4	5
Someone to give you good advice about a crisis	1	2	3	4	5
Someone to take you to the doctor if you need it	1	2	3	4	5
Someone who shows you love and affection	1	2	3	4	5
Someone to have a good time with	1	2	3	4	5
Someone to give you information to help you understand a situation	1	2	3	4	5
Someone to confide in or talk to about yourself or your problems	1	2	3	4	5

Someone who hugs you	1-------2-------3-------4-------5
Someone to get together with for relaxation	1-------2-------3-------4-------5
Someone to prepare your meals if you were unable to do it yourself	1-------2-------3-------4-------5
Someone whose advice you really want	1-------2-------3-------4-------5
Someone to do things with to help you get your mind off things	1-------2-------3-------4-------5
Someone to help with daily chores if you were sick	1-------2-------3-------4-------5
Someone to share your most private worries and fears with	1-------2-------3-------4-------5
Someone to turn to for suggestions about how to deal with a personal problem	1-------2-------3-------4-------5
Someone to do something enjoyable with	1-------2-------3-------4-------5
Someone who understands your problems	1-------2-------3-------4-------5
Someone to love and make you feel wanted	1-------2-------3-------4-------5

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Please indicate the extent to which you agree with the following statements by clicking the appropriate response.

	Disagree strongly	Agree Strongly
Being good at university is part of my self-image.	1-----2-----3-----4-----5-----6-----7-----8-----9-----10	
Being good at university is part of "who I am."	1-----2-----3-----4-----5-----6-----7-----8-----9-----10	
Being good at university is a part of my personality.	1-----2-----3-----4-----5-----6-----7-----8-----9-----10	
Being good at university is a large part of my daily life.	1-----2-----3-----4-----5-----6-----7-----8-----9-----10	
Others view being good at university as part of my personality.	1-----2-----3-----4-----5-----6-----7-----8-----9-----10	
Overall, I try to be a good student	1-----2-----3-----4-----5-----6-----7-----8-----9-----10	
Overall, I think that I am a good student	1-----2-----3-----4-----5-----6-----7-----8-----9-----10	

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We are interested in how you deal with information about harm that could come to you.
For example, when you hear about:

- a health problem that you may be at risk for;
- a new public danger;
- the risk of being a victim of crime; or
- the threat of terrorist attacks.

For each of the following, rate how much that approach or attitude describes you.	Not at all like me — Very much like me
When I hear that my health is at risk, I try to actively work to decrease my risk in order to alleviate my concerns.	1-----2-----3-----4-----5-----6-----7
Working to decrease health risks helps me to feel less vulnerable to those risks.	1-----2-----3-----4-----5-----6-----7
When presented with a dangerous risk, it eases my concern if I work to decrease the risk.	1-----2-----3-----4-----5-----6-----7
When I sense that my safety is in danger, I find a course of action that would lead me to feel safe again.	1-----2-----3-----4-----5-----6-----7
One of the rules in my life that I follow is that in order to be free of worry, one must be proactive and tackle life's problems head on.	1-----2-----3-----4-----5-----6-----7
I am the type of person who worries extensively over a threatening situation.	1-----2-----3-----4-----5-----6-----7
It is my nature to feel as if I'm more vulnerable to certain dangers, try to overcome them, and still feel unsafe after taking some precautions.	1-----2-----3-----4-----5-----6-----7
I sometimes feel overwhelmed trying to protect myself from all the possible dangers in life.	1-----2-----3-----4-----5-----6-----7
No matter what I do to feel more secure, I frequently worry about my safety.	1-----2-----3-----4-----5-----6-----7
I feel that despite everything that I've done to avoid danger, it is not enough.	1-----2-----3-----4-----5-----6-----7
I rarely think about bad things happening to me.	1-----2-----3-----4-----5-----6-----7
If something bad happens to me, I will address it then, but it is not worthwhile to worry about what could happen.	1-----2-----3-----4-----5-----6-----7
There is no point in worrying about possible threats when they might not even happen to me.	1-----2-----3-----4-----5-----6-----7
I focus on the good things that happen to me, not the negative.	1-----2-----3-----4-----5-----6-----7
In general, I do not worry about threats to my personal safety.	1-----2-----3-----4-----5-----6-----7
I would rather not hear about health or safety risks that may affect me.	1-----2-----3-----4-----5-----6-----7
When I hear of news reports of health threats, I tend to ignore them because they are too stressful.	1-----2-----3-----4-----5-----6-----7
I tend to avoid information that I may be at risk for health problems.	1-----2-----3-----4-----5-----6-----7
Even if true, I would not want to hear bad news concerning my well-being.	1-----2-----3-----4-----5-----6-----7
Hearing information about threats makes me more stressed, so I avoid it.	1-----2-----3-----4-----5-----6-----7

Page 17

Thank you!

Thank you very much for taking the time to complete this questionnaire.

Please now follow the link below to choose a time slot where it’s convenient for you to come to the lab and complete the second part of the study, which requires you to do some computerised tasks and fill out a few more questionnaires.

Https://philine.youcanbook.me/index.jsp

If you don't choose a time slot now, I will be in contact later using the email address you provided at the start of the questionnaire to arrange a convenient time for you.

If you have any questions about the study at this stage, please don't hesitate to email me (Philine Harris) straightaway: philine@sussex.ac.uk

For advice on any of the topics touched upon in this questionnaire, you can contact student support… http://www.sussex.ac.uk/studentsupport/

…as well as the Student Life Centre http://www.sussex.ac.uk/studentlifecentre/

For more information on general mood, as well as on stress, anxiety and depression, visit the NHS Choices Moodzone:

http://www.nhs.uk/Conditions/stress-anxiety-depression/Pages/low-mood-stress-anxiety.aspx

Questionnaires after self-affirmation

Below are some questions about your feelings right now. Please circle the number representing the appropriate response.

RIGHT NOW ….	Strongly Disagree	Disagree	Disagree a little	Agree a little	Agree	Strongly Agree
… I generally feel that people accept me.	1	2	3	4	5	6
… I have a strong sense of 'belonging'	1	2	3	4	5	6
… I feel that I am valued by the people who matter to me	1	2	3	4	5	6
… I don't feel that there is any place where I really fit in this world.	1	2	3	4	5	6
… I feel left out of things.	1	2	3	4	5	6
… I am not valued by or important to my friends.	1	2	3	4	5	6
… I feel like I have a lot of social support.	1	2	3	4	5	6

RIGHT NOW I feel like I have got ...

not very much social support	1	2	3	4	5	6	7	a lot of social support

New page

For each of the following pairs, please circle the word that best fits your frame of mind RIGHT NOW.

Near	Far
Tomorrow	A year
Friend	Enemy
They	We
Sure	Unsure
Certainly	Possibly
Real	Abstract
Practical	Desirable
Close	Distant
Self	Others
Likely	Unlikely
Specific	General
Here	There
Now	Future

Funnel debrief

1 What do you think the purpose of the experiment was?

2 Did you think any of the tasks were related in any way? 0 No 1 Yes
If yes, can you tell us something about how?

3 Do you feel that your responses on any of the later tasks were influenced by your response to on an earlier task? 0 No 1 Yes
If yes, can you tell us something about how?

4 Have you completed any of these tasks before today? 0 No 1Yes

If yes, can you briefly describe which one and when

Electronic debrief

Thank you very much for your time!

The aim of my research is to explore whether writing about valued aspects of the self makes people more positive and more confident in their abilities and therefore increases their executive functions – such as attention control and working memory.

To test this, I am asking some of you to write about a value that is important to you and how you use this value in your everyday life, and some of you to write about an unimportant value. All of you answered the same questionnaires about your feelings and attitudes and completed the same task that required you to attend to two things at once and that measured working memory.

If you would like to withdraw your answers now that you know the purpose of the study, or if you have any questions, please don't hesitate to contact me – philine@sussex.ac.uk

Many thanks for your participation.

For advice on any of the topics touched upon in this questionnaire, you can contact student support… http://www.sussex.ac.uk/studentsupport/

…as well as the Student Life Centre http://www.sussex.ac.uk/studentlifecentre/

For more information on general mood, as well as on stress, anxiety and depression, visit the NHS Choices Moodzone:

http://www.nhs.uk/Conditions/stress-anxiety-depression/Pages/low-mood-stress-anxiety.aspx

Appendix 4: Materials referred to in Chapter 5
Baseline online questionnaire

Page 1

Thank you for agreeing to take part in this study.

This questionnaire is the first part of a two-part study. Once you have completed it, you can pick a time and date for you to complete the second part, which consists of a few computer tasks.

Once you have completed both parts, I can offer you 5 course credits or £5. Your participation is highly valued and appreciated.

Please read the instructions carefully and answer the questions in the order they appear on the page.

You will not be able to return to a page once you have clicked the continue button.

If you wish to take part, please complete the consent form below.

Please note, this study has been reviewed by the Sciences and Technology Cross-Schools Research Ethics Committee (crecscitec@sussex.ac.uk) and has been approved.

Electronic consent form

By clicking 'Continue' at the bottom of this page, you indicate that you understand:

- That you are under no obligation to take part in this study. Participation is purely voluntary and you are free to withdraw at any time, without giving a reason, until it is no longer practical for you to do so. This will be once data collection is complete, at which point you will receive a debrief via email and a reminder of your option to withdraw your data.
- That your data will be kept confidential in accordance with the Data Protection Act 1998. Once the final phase of the study has been completed, all names and email addresses will be removed from any questionnaires and all answers will be stored anonymously from that point onwards.
- That there are no undue risks (i.e. risks you would not normally take in everyday life) involved in this study.

( ) Continue

Page 2

Background information

1. Please enter today's date.

_____

2. Please enter your email address so we can contact you to take part in the second part of the study.

_____

3. Please write your name. Please note all names and email addresses will be removed from all files as soon as the final phase of the study has been completed, and your answers will be stored anonymously from that point.

_____

4. Are you male or female?
( ) Male
( ) Female

5. Please enter your age.

_____

6. What is your current occupation?
( ) Student
( ) Employed
( ) Unemployed
( ) Other; please specify: _____

7. If you answered student in Question 6, what subject are you studying?

_____

8. If you answered student in Question 6, what year are you in?

_____

9. Which of the following best describes your ethnicity? Please tick one of the following.
( ) White
( ) Mixed
( ) Asian or Asian British
( ) Black or Black British
( ) Chinese
( ) Other ethnic group
( ) Prefer not to say

10. Please enter your nationality.

_____

Page 3

On the following pages, we would like to ask you some questions about your thoughts and feelings.
Please be as honest and accurate as you can throughout. There are no "correct" or "incorrect" answers.
Try not to let your response to one statement influence your responses to other statements.

Using the scale provided, please indicate how much each of the following statements reflects how you typically are.

Please answer the questions by clicking the response that is most relevant to you.

	Not at all ... Very much
I am good at resisting temptation.	1-------2-------3-------4-------5
I have a hard time breaking bad habits.	1-------2-------3-------4-------5
I am lazy.	1-------2-------3-------4-------5
I say inappropriate things.	1-------2-------3-------4-------5
I never allow myself to lose control.	1-------2-------3-------4-------5
I do certain things that are bad for me, if they are fun.	1-------2-------3-------4-------5
People can count on me to keep on schedule.	1-------2-------3-------4-------5
Getting up in the morning is hard for me.	1-------2-------3-------4-------5
I have trouble saying no.	1-------2-------3-------4-------5
I change my mind fairly often.	1-------2-------3-------4-------5
I blurt out whatever is on my mind.	1-------2-------3-------4-------5
People would describe me as impulsive.	1-------2-------3-------4-------5
I refuse things that are bad for me.	1-------2-------3-------4-------5
I spend too much money.	1-------2-------3-------4-------5
I keep everything neat.	1-------2-------3-------4-------5
I am self-indulgent at times.	1-------2-------3-------4-------5
I wish I had more self-discipline.	1-------2-------3-------4-------5
I am reliable.	1-------2-------3-------4-------5
I get carried away by my feelings.	1-------2-------3-------4-------5
I do many things on the spur of the moment.	1-------2-------3-------4-------5
I don’t keep secrets very well.	1-------2-------3-------4-------5
People would say that I have iron self- discipline.	1-------2-------3-------4-------5
I have worked or studied all night at the last minute.	1-------2-------3-------4-------5
I’m not easily discouraged.	1-------2-------3-------4-------5
I’d be better off if I stopped to think before acting.	1-------2-------3-------4-------5
I engage in healthy practices.	1-------2-------3-------4-------5
I eat healthy foods.	1-------2-------3-------4-------5
Pleasure and fun sometimes keep me from getting work done.	1-------2-------3-------4-------5
I have trouble concentrating.	1-------2-------3-------4-------5
I am able to work effectively toward long-term goals.	1-------2-------3-------4-------5
Sometimes I can’t stop myself from doing something, even if I know it is wrong.	1-------2-------3-------4-------5
I often act without thinking through all the alternatives.	1-------2-------3-------4-------5
I lose my temper too easily.	1-------2-------3-------4-------5
I often interrupt people.	1-------2-------3-------4-------5
I sometimes drink or use drugs to excess.	1-------2-------3-------4-------5
I am always on time.	1-------2-------3-------4-------5

Page 4

Please record the appropriate answer for each item, depending on whether you Strongly agree, agree, disagree, or strongly disagree with it.

	Strongly disagree Disagree Agree Strongly agree
I feel that I am a person of worth, at least on an equal plane with others.	1-------2------3-------4
I feel that I have a number of good qualities.	1-------2------3-------4
All in all, I am inclined to feel that I am a failure.	1-------2------3-------4
I am able to do things as well as most other people.	1-------2------3-------4
I feel I do not have much to be proud of.	1-------2------3-------4
I take a positive attitude toward myself.	1-------2------3-------4
On the whole, I am satisfied with myself.	1-------2------3-------4
I wish I could have more respect for myself.	1-------2------3-------4
I certainly feel useless at times.	1-------2------3-------4
At times I think I am no good at all.	1-------2------3-------4

Page 5

Sometimes when we face difficulties, challenges or problems in our daily lives we can find ourselves thinking about ourselves. We are interested in how often you find yourself thinking about yourself when things start to bother you.

When I feel threatened or anxious by people or events I find myself...

	Disagree completely Agree completely
... thinking about my strengths.	1-------2-------3-------4-------5-------6-------7
... recalling times I did the right thing.	1-------2-------3-------4-------5-------6-------7
… thinking about my values.	1-------2-------3-------4-------5-------6-------7
... thinking about my principles.	1-------2-------3-------4-------5-------6-------7
... thinking about the people who are important to me.	1-------2-------3-------4-------5-------6-------7
... thinking about what I stand for.	1-------2-------3-------4-------5-------6-------7
… thinking about my family.	1-------2-------3-------4-------5-------6-------7
… thinking about my friends.	1-------2-------3-------4-------5-------6-------7
… thinking about the things I am good at.	1-------2-------3-------4-------5-------6-------7
… thinking about the things I like about myself.	1-------2-------3-------4-------5-------6-------7
… thinking about the things I am bad at.	1-------2-------3-------4-------5-------6-------7
… thinking about the things that I value about myself.	1-------2-------3-------4-------5-------6-------7
… thinking about the people who believe in me.	1-------2-------3-------4-------5-------6-------7
… thinking about my failings.	1-------2-------3-------4-------5-------6-------7
… thinking about the people I love.	1-------2-------3-------4-------5-------6-------7

… thinking about the things that I'd like to change about myself.	1-------2-------3-------4-------5-------6-------7
… thinking about the people I trust.	1-------2-------3-------4-------5-------6-------7
… thinking about the things I believe in.	1-------2-------3-------4-------5-------6-------7
… remembering things I have succeeded at.	1-------2-------3-------4-------5-------6-------7

Page 6

When we think of ourselves, our thoughts are sometimes negative and sometimes positive.

We are interested in the POSITIVE thoughts you have about yourself.

Please indicate how much you agree or disagree with each of the following statements.

Thinking POSITIVELY about myself is something…	Disagree completely	Agree completely
… I do automatically.	1-------2-------3-------4-------5-------6-------7	
… that feels sort of natural to me.	1-------2-------3-------4-------5-------6-------7	
… I do without further thinking.	1-------2-------3-------4-------5-------6-------7	
… I would find hard not to do.	1-------2-------3-------4-------5-------6-------7	
… that's typically "me".	1-------2-------3-------4-------5-------6-------7	

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How accurately does each of these traits describe you as you typically are, compared to other people of the same age and sex?

	Not at all accurate	Extremely accurate
Lively	1-------2-------3-------4-------5	
Full of energy	1-------2-------3-------4-------5	
Tense	1-------2-------3-------4-------5	
Happy	1-------2-------3-------4-------5	
Pleased	1-------2-------3-------4-------5	
Cheerful	1-------2-------3-------4-------5	
At-ease	1-------2-------3-------4-------5	
Calm	1-------2-------3-------4-------5	
Relaxed	1-------2-------3-------4-------5	
Sad	1-------2-------3-------4-------5	
Depressed	1-------2-------3-------4-------5	
Unhappy	1-------2-------3-------4-------5	
On-edge	1-------2-------3-------4-------5	
Nervous	1-------2-------3-------4-------5	
Energetic	1-------2-------3-------4-------5	
Hostile	1-------2-------3-------4-------5	

Resentful	1-------2-------3-------4-------5
Angry	1-------2-------3-------4-------5

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Please indicate your agreement with the statements below by clicking the appropriate response next to the statement using the following scale.

	Strongly Disagree Disagree Agree Strongly Agree
I have the ability and skills to deal with whatever comes my way.	1-----2-----3-----4-----5-----6-----7
I feel that I'm basically a moral person.	1-----2-----3-----4-----5-----6-----7
On the whole, I am a capable person.	1-----2-----3-----4-----5-----6-----7
I am a good person.	1-----2-----3-----4-----5-----6-----7
When I think about the future, I'm confident that I can meet the challenges that I will face.	1-----2-----3-----4-----5-----6-----7
I try to do the right thing.	1-----2-----3-----4-----5-----6-----7
Even though there is always room for self-improvement, I feel a sense of completeness about who I fundamentally am.	1-----2-----3-----4-----5-----6-----7
I am comfortable with who I am.	1-----2-----3-----4-----5-----6-----7

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Please answer the questions by clicking the response that is most relevant to you.

	Not at all true Hardly true Moderately true Exactly true
I can always manage to solve difficult problems if I try hard enough.	1-------2-------3-------4
If someone opposes me, I can find the means and ways to get what I want.	1-------2-------3-------4
It is easy for me to stick to my aims and accomplish my goals.	1-------2-------3-------4
I am confident that I could deal efficiently with unexpected events.	1-------2-------3-------4
Thanks to my resourcefulness, I know how to handle unforeseen situations.	1-------2-------3-------4
I can solve most problems if I invest the necessary effort.	1-------2-------3-------4
I can remain calm when facing difficulties because I can rely on my coping abilities.	1-------2-------3-------4
When I am confronted with a problem, I can usually find several solutions.	1-------2-------3-------4
If I am in trouble, I can usually think of a solution.	1-------2-------3-------4
I can usually handle whatever comes my way.	1-------2-------3-------4

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Please read each statement carefully before answering. Indicate how often you behave in the stated manner by clicking the appropriate response.

	Almost never				Almost always
I try to be understanding and patient towards those aspects of my personality I don't like.	1	2	3	4	5
I'm kind to myself when I'm experiencing suffering.	1	2	3	4	5
When I'm going through a very hard time, I give myself the caring and tenderness I need.	1	2	3	4	5
I'm tolerant of my own flaws and inadequacies.	1	2	3	4	5
I try to be loving towards myself when I'm feeling emotional pain.	1	2	3	4	5
When I see aspects of myself that I don't like, I get down on myself.	1	2	3	4	5
When times are really difficult, I tend to be tough on myself.	1	2	3	4	5
I can be a bit cold-hearted towards myself when I'm experiencing suffering.	1	2	3	4	5
I'm disapproving and judgemental about my own flaws and inadequacies.	1	2	3	4	5
I'm intolerant and impatient towards those aspects of my personality I don't like.	1	2	3	4	5
When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.	1	2	3	4	5
I try to see my failings as part of the human condition.	1	2	3	4	5
When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.	1	2	3	4	5
When things are going badly for me, I see the difficulties as part of life that everyone gets through.	1	2	3	4	5
When I fail at something that's important to me I tend to feel alone in my failure.	1	2	3	4	5
When I think about my inadequacies it tends to make me feel more separate and cut off from the rest of the world.	1	2	3	4	5
When I'm feeling down I tend to feel like most other people are probably happier than I am.	1	2	3	4	5
When I'm really struggling I tend to feel like other people must be having an easier time of it.	1	2	3	4	5
When something upsets me I try to keep my emotions in balance.	1	2	3	4	5
When I'm feeling down I try to approach my feelings with curiosity and openness.	1	2	3	4	5
When something painful happens I try to take a balanced view of the situation.	1	2	3	4	5
When I fail at something important to me I try to keep things in perspective.	1	2	3	4	5
When something upsets me I get carried away with my feelings.	1	2	3	4	5
When I'm feeling down I tend to obsess and fixate on everything that's wrong.	1	2	3	4	5

When something painful happens I tend to blow the incident out of proportion.	1-------2-------3-------4-------5
When I fail at something important to me I become consumed by feelings of inadequacy	1-------2-------3-------4-------5

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Please indicate the extent to which you agree with the following statements by clicking the appropriate response.
Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no "correct" or “incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer.

	Strongly disagree Disagree Neutral Agree Strongly agree
In uncertain times, I usually expect the best.	1-------2-------3-------4-------5
It's easy for me to relax.	1-------2-------3-------4-------5
If something can go wrong for me, it will.	1-------2-------3-------4-------5
I'm always optimistic about my future.	1-------2-------3-------4-------5
I enjoy my friends a lot.	1-------2-------3-------4-------5
It's important for me to keep busy.	1-------2-------3-------4-------5
I hardly ever expect things to go my way.	1-------2-------3-------4-------5
I don't get upset too easily.	1-------2-------3-------4-------5
I rarely count on good things happening to me.	1-------2-------3-------4-------5
Overall, I expect more good things to happen to me than bad.	1-------2-------3-------4-------5

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Please indicate the extent to which the following statements describe you by clicking the appropriate response.

	Does not describe me well Does describe me well
I often have tender, concerned feelings for people less fortunate than me.	1-------2-------3-------4
Sometimes I don't feel very sorry for other people when they are having problems.	1-------2-------3-------4
When I see someone being taken advantage of, I feel kind of protective towards them.	1-------2-------3-------4
Other people's misfortunes do not usually disturb me a great deal.	1-------2-------3-------4
When I see someone being treated unfairly, I sometimes don't feel very much pity for them.	1-------2-------3-------4
I am often quite touched by things that I see happen.	1-------2-------3-------4
I would describe myself as a pretty soft-hearted person.	1-------2-------3-------4

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Please indicate the extent to which you agree with the following statements by clicking the appropriate response.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
After I encounter information about a topic, I am likely to stop and think about it.	1	2	3	4	5
If I need to act on a topic, the more viewpoints I get the better.	1	2	3	4	5
After thinking about a topic, I have a broader understanding.	1	2	3	4	5
When I encounter information about a topic, I read or listen to most of it, even though I may not agree with its perspective.	1	2	3	4	5
It is important for me to interpret information about a topic in a way that applies directly to my life.	1	2	3	4	5
When I encounter information about a topic, I focus on only a few key points.	1	2	3	4	5
There is far more information on a topic than I personally need.	1	2	3	4	5
When I see or hear information about a topic, I rarely spend much time thinking about it.	1	2	3	4	5
If I need to act on information about a topic, the advice of one expert is enough for me.	1	2	3	4	5

Page 14

Next are some questions about the support that is available to you.
About how many close friends and close relatives do you have (people you feel at ease with and can talk to about what is on your mind)?
Write in number of close friends and close relatives: ☐☐

People sometimes look to others for companionship, assistance, or other types of support.
How often is each of the following kinds of support available to YOU if you need it?

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
Someone to help you if you were confined to bed	1	2	3	4	5
Someone you can count on to listen to you when you need to talk .	1	2	3	4	5
Someone to give you good advice about a crisis	1	2	3	4	5
Someone to take you to the doctor if you need it	1	2	3	4	5
Someone who shows you love and affection	1	2	3	4	5
Someone to have a good time with	1	2	3	4	5
Someone to give you information to help you understand a situation	1	2	3	4	5

Someone to confide in or talk to about yourself or your problems	1-------2-------3-------4-------5
Someone who hugs you	1-------2-------3-------4-------5
Someone to get together with for relaxation	1-------2-------3-------4-------5
Someone to prepare your meals if you were unable to do it yourself	1-------2-------3-------4-------5
Someone whose advice you really want	1-------2-------3-------4-------5
Someone to do things with to help you get your mind off things	1-------2-------3-------4-------5
Someone to help with daily chores if you were sick	1-------2-------3-------4-------5
Someone to share your most private worries and fears with	1-------2-------3-------4-------5
Someone to turn to for suggestions about how to deal with a personal problem	1-------2-------3-------4-------5
Someone to do something enjoyable with	1-------2-------3-------4-------5
Someone who understands your problems	1-------2-------3-------4-------5
Someone to love and make you feel wanted	1-------2-------3-------4-------5

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We are interested in how you deal with information about harm that could come to you.
For example, when you hear about:

- a health problem that you may be at risk for;
- a new public danger;
- the risk of being a victim of crime; or
- the threat of terrorist attacks.

For each of the following, rate how much that approach or attitude describes you.	Not at all like me ... Very much like me
When I hear that my health is at risk, I try to actively work to decrease my risk in order to alleviate my concerns.	1------2------3------4------5------6------7
Working to decrease health risks helps me to feel less vulnerable to those risks.	1------2------3------4------5------6------7
When presented with a dangerous risk, it eases my concern if I work to decrease the risk.	1------2------3------4------5------6------7
When I sense that my safety is in danger, I find a course of action that would lead me to feel safe again.	1------2------3------4------5------6------7
One of the rules in my life that I follow is that in order to be free of worry, one must be proactive and tackle life's problems head on.	1------2------3------4------5------6------7
I am the type of person who worries extensively over a threatening situation.	1------2------3------4------5------6------7
It is my nature to feel as if I'm more vulnerable to certain dangers, try to overcome them, and still feel unsafe after taking some precautions.	1------2------3------4------5------6------7
I sometimes feel overwhelmed trying to protect myself from all the possible dangers in life.	1------2------3------4------5------6------7
No matter what I do to feel more secure, I frequently worry about my safety.	1------2------3------4------5------6------7
I feel that despite everything that I've done to avoid danger, it is not enough.	1------2------3------4------5------6------7
I rarely think about bad things happening to me.	1------2------3------4------5------6------7

If something bad happens to me, I will address it then, but it is not worthwhile to worry about what could happen.	1------2------3------4------5------6------7
There is no point in worrying about possible threats when they might not even happen to me.	1------2------3------4------5------6------7
I focus on the good things that happen to me, not the negative.	1------2------3------4------5------6------7
In general, I do not worry about threats to my personal safety.	1------2------3------4------5------6------7
I would rather not hear about health or safety risks that may affect me.	1------2------3------4------5------6------7
When I hear of news reports of health threats, I tend to ignore them because they are too stressful.	1------2------3------4------5------6------7
I tend to avoid information that I may be at risk for health problems.	1------2------3------4------5------6------7
Even if true, I would not want to hear bad news concerning my well-being.	1------2------3------4------5------6------7
Hearing information about threats makes me more stressed, so I avoid it.	1------2------3------4------5------6------7

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Please answer the questions below using the scales provided.

	Never/Not at all ... Always / Very much
How often do you feel inferior to most of the people you know?	1-------2-------3-------4-------5-------6-------7
Do you ever think that you are a worthless individual?	1-------2-------3-------4-------5-------6-------7
How confident do you feel that the people you know look up to you and respect you?	1-------2-------3-------4-------5-------6-------7
Do you ever feel so discouraged with yourself that you wonder whether you are a worthwhile person?	1-------2-------3-------4-------5-------6-------7
How often do you dislike yourself?	1-------2-------3-------4-------5-------6-------7
In general, how confident do you feel about your abilities?	1-------2-------3-------4-------5-------6-------7
How often do you have the feeling that there is nothing you can do well?	1-------2-------3-------4-------5-------6-------7
How much do you worry about how well you get along with other people?	1-------2-------3-------4-------5-------6-------7
How often do you worry about receiving criticism?	1-------2-------3-------4-------5-------6-------7
Do you ever feel afraid or anxious when you are going into a room by yourself where other people have already gathered and are talking?	1-------2-------3-------4-------5-------6-------7
How often do you feel self-conscious?	1-------2-------3-------4-------5-------6-------7
How much do you worry about whether other people will regard you as a success or failure?	1-------2-------3-------4-------5-------6-------7

When in a group of people, do you ever have trouble of the right things to talk about?	1-------2-------3-------4-------5-------6-------7
When you make an embarrassing mistake or have done something that makes you look foolish, how long it take you to get over it?	1-------2-------3-------4-------5-------6-------7
Do you often feel uncomfortable meeting new people?	1-------2-------3-------4-------5-------6-------7
How often do you worry about whether other people like to be with you?	1-------2-------3-------4-------5-------6-------7
How often are you troubled with shyness?	1-------2-------3-------4-------5-------6-------7
When you think that some of the people you meet might have an unfavourable opinion of you, how concerned or worried do you feel about it?	1-------2-------3-------4-------5-------6-------7
How often do you feel worried or bothered about what other people think about you?	1-------2-------3-------4-------5-------6-------7
When you have to do an important task for school or work, how concerned or worried do you feel about it?	1-------2-------3-------4-------5-------6-------7
When you have to convince someone who may disagree with your ideas, how concerned or worried do you feel about it?	1-------2-------3-------4-------5-------6-------7
How often do you have trouble expressing your ideas?	1-------2-------3-------4-------5-------6-------7
How often do you have trouble understanding things you read?	1-------2-------3-------4-------5-------6-------7
How often do you imagine that you are less intelligent than other people?	1-------2-------3-------4-------5-------6-------7
In doing an important task at work or school, how often do you feel you did an excellent job on it?	1-------2-------3-------4-------5-------6-------7
Compared with others, how often do you feel you must work harder to learn the same things?	1-------2-------3-------4-------5-------6-------7
Do you ever feel ashamed of your physique or figure?	1-------2-------3-------4-------5-------6-------7
How often do you feel that most of your friends or peers are more physically attractive than yourself?	1-------2-------3-------4-------5-------6-------7
How often do you wish or fantasize that you were better looking?	1-------2-------3-------4-------5-------6-------7
Do you ever feel concerned or worried about your ability to attract others?	1-------2-------3-------4-------5-------6-------7
How confident are you that others see you as being physically appealing?	1-------2-------3-------4-------5-------6-------7
Do you ever think of yourself as physically uncoordinated?	1-------2-------3-------4-------5-------6-------7
Do you ever feel inferior to most other people in athletic ability?	1-------2-------3-------4-------5-------6-------7
When involved in sports requiring physical coordination, are you ever concerned that you will not do well?	1-------2-------3-------4-------5-------6-------7
Do you ever think that you lack the ability to be good dancer or do well at recreational activities coordination?	1-------2-------3-------4-------5-------6-------7
When you are trying to do well at a sport and you know other people are watching, how rattled or flustered do you get?	1-------2-------3-------4-------5-------6-------7

	Not very true of me				Very true of me
I have high self-esteem.	1-------2-------3-------4-------5				

Page 17

Here are a number of personality traits that may or may not apply to you. Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

I see myself as…	Disagree strongly						Agree strongly
Extraverted, enthusiastic	1-------2-------3-------4-------5-------6-------7						
Critical, quarrelsome	1-------2-------3-------4-------5-------6-------7						
Dependable, self-disciplined	1-------2-------3-------4-------5-------6-------7						
Anxious, easily upset	1-------2-------3-------4-------5-------6-------7						
Open to new experiences, complex	1-------2-------3-------4-------5-------6-------7						
Reserved, quiet	1-------2-------3-------4-------5-------6-------7						
Sympathetic, warm	1-------2-------3-------4-------5-------6-------7						
Disorganized, careless	1-------2-------3-------4-------5-------6-------7						
Calm, emotionally stable	1-------2-------3-------4-------5-------6-------7						
Conventional, uncreative	1-------2-------3-------4-------5-------6-------7						

Positive affect after manipulation

Computer task

You will now be presented with a series of 20 emotions items that appear one after the other on the screen, and you will be asked whether you are feeling each emotion right now. Please press ‘Y’ (for yes) if you are feeling this emotion right now, and ‘N’ (for no) if you are not feeling this emotion right now. Please respond as quickly as possible.

The following items will be presented to participants in random order:

Amusement
Awe

Gratitude
Hope
Inspiration
Interest
Joy
Love
Pride
Serenity
Stress
Sadness
Fear
Guilt
Hate
Disgust
Embarrassment
Anger
Contempt
Shame

Positive affect after tasks

Below are some questions about your feelings right now. Please circle the number representing the appropriate response.

How much are you experiencing each of these emotions RIGHT NOW? Are you…	Not at all	A little bit	Moderately	Quite a bit	Extremely
…amused, fun-loving, or silly?	1	2	3	4	5
…awe, wonder, or amazement?	1	2	3	4	5
…grateful, appreciative, or thankful?	1	2	3	4	5
…hopeful, optimistic, or encouraged?	1	2	3	4	5
…inspired, uplifted, or elevated?	1	2	3	4	5
…interested, alert, or curious?	1	2	3	4	5
…joyful, glad, or happy?	1	2	3	4	5
…love, closeness, or trust?	1	2	3	4	5
…proud, confident, or self-assured?	1	2	3	4	5
…serene, content, or peaceful?	1	2	3	4	5
…stressed, nervous, or overwhelmed?	1	2	3	4	5
…sad, downhearted, or unhappy?	1	2	3	4	5
...scared, fearful, or afraid?	1	2	3	4	5
...guilty, repentant, or blameworthy?	1	2	3	4	5
...hate, distrust, or suspicion?	1	2	3	4	5
...disgust, distaste, or revulsion?	1	2	3	4	5
...embarrassed, self-conscious, or blushing?	1	2	3	4	5
...angry, irritated, or annoyed?	1	2	3	4	5
...contemptuous, scornful, or disdainful?	1	2	3	4	5
...ashamed, humiliated, or disgraced?	1	2	3	4	5

Appendix 5: Materials referred to in Chapter 6

Time 1 Baseline online questionnaire

Page 1

Thank you for agreeing to take part in this study.

This questionnaire is the first part of a three-part study. Once you have completed it, you can pick a time and date for you to complete the second part, which consists of some simple reading, writing and reaction time tasks and a short questionnaire – all of which will take no longer than 30 minutes. One week after you have completed the second part, you will be emailed with one final online questionnaire, which will take no longer than 10 minutes to complete.

Once you have completed all three parts, I can offer you 5 course credits or £5. Your participation is highly valued and appreciated.

Please read the instructions carefully and answer the questions in the order they appear on the page.

You will not be able to return to a page once you have clicked the continue button.

If you wish to take part, please complete the consent form below.

This study has been approved by the Sciences & Technology Cross-Schools Research Ethics Committee (crecscitec@sussex.ac.uk). The project reference number is ER/PS230/6.

The University of Sussex has insurance in place to cover its legal liabilities in respect of this study.

If you would like more information on this study before you decide whether to take part or not, please feel free to email me with any questions you may have: philine@sussex.ac.uk

Electronic consent form

By clicking 'Next' at the bottom of this page, you indicate that you:

- Understand that you are under no obligation to take part in this study. Participation is purely voluntary and you are free to withdraw at any time, without giving a reason, until it is no longer practical for you to do so. This will be once data collection is complete, at which point you will receive a debrief via email and a reminder of your option to withdraw your data.
- Understand that your data will be kept confidential in accordance with the Data Protection Act 1998. Once the final phase of the study has been completed, all names and email addresses will be removed from any questionnaires and all answers will be stored anonymously from that point onwards.

- Understand that there are no undue risks (i.e. risks you would not normally take in everyday life) involved in this study.
- You are over 16

( ) Next

Page 2

Background information

1. Please enter today's date.

_____

2. Please enter your email address so we can contact you to take part in the second part of the study.

_____

3. Please write your name. Please note all names and email addresses will be removed from all files as soon as the final phase of the study has been completed, and your answers will be stored anonymously from that point.

_____

4. Are you male or female?
( ) Male
( ) Female

5. Please enter your age.

_____

6. What is your current occupation?
( ) Student
( ) Employed
( ) Unemployed
( ) Other; please specify: _____

7. If you answered student in Question 6, what subject are you studying?

_____

8. If you answered student in Question 6, what year are you in?

_____

9. Which of the following best describes your ethnicity? Please tick one of the following.
( ) White
( ) Mixed
( ) Asian or Asian British
( ) Black or Black British
( ) Chinese
( ) Other ethnic group
( ) Prefer not to say

10. Please enter your nationality.

_____

Page 3

On the following pages, we would like to ask you some questions about your thoughts and feelings.
Please be as honest and accurate as you can throughout. There are no "correct" or “incorrect" answers.
Try not to let your response to one statement influence your responses to other statements.
Using the scale provided, please indicate how much each of the following statements reflects how you typically are.

Please answer the questions by clicking the response that is most relevant to you.

	Not at all ... Very much
I am good at resisting temptation.	1-------2-------3-------4-------5
I have a hard time breaking bad habits.	1-------2-------3-------4-------5
I am lazy.	1-------2-------3-------4-------5
I say inappropriate things.	1-------2-------3-------4-------5
I never allow myself to lose control.	1-------2-------3-------4-------5
I do certain things that are bad for me, if they are fun.	1-------2-------3-------4-------5
People can count on me to keep on schedule.	1-------2-------3-------4-------5
Getting up in the morning is hard for me.	1-------2-------3-------4-------5
I have trouble saying no.	1-------2-------3-------4-------5
I change my mind fairly often.	1-------2-------3-------4-------5
I blurt out whatever is on my mind.	1-------2-------3-------4-------5
People would describe me as impulsive.	1-------2-------3-------4-------5
I refuse things that are bad for me.	1-------2-------3-------4-------5
I spend too much money.	1-------2-------3-------4-------5
I keep everything neat.	1-------2-------3-------4-------5
I am self-indulgent at times.	1-------2-------3-------4-------5
I wish I had more self-discipline.	1-------2-------3-------4-------5
I am reliable.	1-------2-------3-------4-------5
I get carried away by my feelings.	1-------2-------3-------4-------5
I do many things on the spur of the moment.	1-------2-------3-------4-------5
I don’t keep secrets very well.	1-------2-------3-------4-------5
People would say that I have iron self- discipline.	1-------2-------3-------4-------5
I have worked or studied all night at the last minute.	1-------2-------3-------4-------5
I’m not easily discouraged.	1-------2-------3-------4-------5
I’d be better off if I stopped to think before acting.	1-------2-------3-------4-------5
I engage in healthy practices.	1-------2-------3-------4-------5
I eat healthy foods.	1-------2-------3-------4-------5
Pleasure and fun sometimes keep me from getting work done.	1-------2-------3-------4-------5
I have trouble concentrating.	1-------2-------3-------4-------5
I am able to work effectively toward long-term goals.	1-------2-------3-------4-------5
Sometimes I can’t stop myself from doing something, even if I know it is wrong.	1-------2-------3-------4-------5
I often act without thinking through all the alternatives.	1-------2-------3-------4-------5
I lose my temper too easily.	1-------2-------3-------4-------5

I often interrupt people.	1-------2-------3-------4-------5
I sometimes drink or use drugs to excess.	1-------2-------3-------4-------5
I am always on time.	1-------2-------3-------4-------5

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Please record the appropriate answer for each item, depending on whether you Strongly agree, agree, disagree, or strongly disagree with it.

	Strongly disagree Disagree Agree Strongly agree
I feel that I am a person of worth, at least on an equal plane with others.	1-------2------3-------4
I feel that I have a number of good qualities.	1-------2------3-------4
All in all, I am inclined to feel that I am a failure.	1-------2------3-------4
I am able to do things as well as most other people.	1-------2------3-------4
I feel I do not have much to be proud of.	1-------2------3-------4
I take a positive attitude toward myself.	1-------2------3-------4
On the whole, I am satisfied with myself.	1-------2------3-------4
I wish I could have more respect for myself.	1-------2------3-------4
I certainly feel useless at times.	1-------2------3-------4
At times I think I am no good at all.	1-------2------3-------4

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Please answer the questions below using the scales provided.

	Never/Not at all Always / Very much
How often do you feel inferior to most of the people you know?	1------2-------3------4------5------6------7
Do you ever think that you are a worthless individual?	1------2-------3------4------5------6------7
How confident do you feel that the people you know look up to you and respect you?	1------2-------3------4------5------6------7
Do you ever feel so discouraged with yourself that you wonder whether you are a worthwhile person?	1------2-------3------4------5------6------7
How often do you dislike yourself?	1------2-------3------4------5------6------7
In general, how confident do you feel about your abilities?	1------2-------3------4------5------6------7
How often do you have the feeling that there is nothing you can do well?	1------2-------3------4------5------6------7
How much do you worry about how well you get along with other people?	1------2-------3------4------5------6------7
How often do you worry about receiving criticism?	1------2-------3------4------5------6------7

Do you ever feel afraid or anxious when you are going into a room by yourself where other people have already gathered and are talking?	1------2-------3------4------5------6------7
How often do you feel self-conscious?	1------2-------3------4------5------6------7
How much do you worry about whether other people will regard you as a success or failure?	1------2-------3------4------5------6------7
When in a group of people, do you ever have trouble of the right things to talk about?	1------2-------3------4------5------6------7
When you make an embarrassing mistake or have done something that makes you look foolish, how long it take you to get over it?	1------2-------3------4------5------6------7
Do you often feel uncomfortable meeting new people?	1------2-------3------4------5------6------7
How often do you worry about whether other people like to be with you?	1------2-------3------4------5------6------7
How often are you troubled with shyness?	1------2-------3------4------5------6------7
When you think that some of the people you meet might have an unfavourable opinion of you, how concerned or worried do you feel about it?	1------2-------3------4------5------6------7
How often do you feel worried or bothered about what other people think about you?	1------2-------3------4------5------6------7
When you have to do an important task for school or work, how concerned or worried do you feel about it?	1------2-------3------4------5------6------7
When you have to convince someone who may disagree with your ideas, how concerned or worried do you feel about it?	1------2-------3------4------5------6------7
How often do you have trouble expressing your ideas?	1------2-------3------4------5------6------7
How often do you have trouble understanding things you read?	1------2-------3------4------5------6------7
How often do you imagine that you are less intelligent than other people?	1------2-------3------4------5------6------7
In doing an important task at work or school, how often do you feel you did an excellent job on it?	1------2-------3------4------5------6------7
Compared with others, how often do you feel you must work harder to learn the same things?	1------2-------3------4------5------6------7
Do you ever feel ashamed of your physique or figure?	1------2-------3------4------5------6------7
How often do you feel that most of your friends or peers are more physically attractive than yourself?	1------2-------3------4------5------6------7
How often do you wish or fantasize that you were better looking?	1------2-------3------4------5------6------7
Do you ever feel concerned or worried about your ability to attract others?	1------2-------3------4------5------6------7
How confident are you that others see you as being physically appealing?	1------2-------3------4------5------6------7
Do you ever think of yourself as physically uncoordinated?	1------2-------3------4------5------6------7
Do you ever feel inferior to most other people in athletic ability?	1------2-------3------4------5------6------7
When involved in sports requiring physical coordination, are you ever concerned that you will not do well?	1------2-------3------4------5------6------7
Do you ever think that you lack the ability to be good dancer or do well at recreational activities coordination?	1------2-------3------4------5------6------7
When you are trying to do well at a sport and you know other people are watching, how rattled or flustered do you get?	1------2-------3------4------5------6------7

	Not very true of me	Very true of me
I have high self-esteem.	1-------2-------3-------4-------5	

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We are also looking at people's aesthetic judgements of simple stimuli, such as letters of the alphabet. Previous research has shown that studying these kinds of judgements can lead to a better understanding of certain aspects of human emotions.

Please now evaluate the following letters. Please rely on your first, intuitive reaction towards each one.

	Not at all beautiful								Extremely beautiful
A	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
B	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
C	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
D	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
E	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
F	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
G	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
H	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
I	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
J	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
K	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
L	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
M	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
N	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
O	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
P	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
Q	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
R	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
S	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
T	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
U	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
V	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
W	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
X	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9
Y	1 ------	2 ------	3 ------	4 ------	5 ------	6 ------	7 ------	8 ------	9

Z	1 ------ 2 ------ 3 ------ 4 ------ 5 ------ 6 ------ 7 ------ 8 ------ 9

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Sometimes when we face difficulties, challenges or problems in our daily lives we can find ourselves thinking about ourselves. We are interested in how often you find yourself thinking about yourself when things start to bother you.

When I feel threatened or anxious by people or events I find myself...

	Disagree completely	Agree completely
... thinking about my strengths.	1-------2-------3-------4-------5-------6-------7	
... recalling times I did the right thing.	1-------2-------3-------4-------5-------6-------7	
… thinking about my values.	1-------2-------3-------4-------5-------6-------7	
... thinking about my principles.	1-------2-------3-------4-------5-------6-------7	
... thinking about the people who are important to me.	1-------2-------3-------4-------5-------6-------7	
... thinking about what I stand for.	1-------2-------3-------4-------5-------6-------7	
… thinking about my family.	1-------2-------3-------4-------5-------6-------7	
… thinking about my friends.	1-------2-------3-------4-------5-------6-------7	
… thinking about the things I am good at.	1-------2-------3-------4-------5-------6-------7	
… thinking about the things I like about myself.	1-------2-------3-------4-------5-------6-------7	
… thinking about the things I am bad at.	1-------2-------3-------4-------5-------6-------7	
… thinking about the things that I value about myself.	1-------2-------3-------4-------5-------6-------7	
… thinking about the people who believe in me.	1-------2-------3-------4-------5-------6-------7	
… thinking about my failings.	1-------2-------3-------4-------5-------6-------7	
… thinking about the people I love.	1-------2-------3-------4-------5-------6-------7	
… thinking about the things that I'd like to change about myself.	1-------2-------3-------4-------5-------6-------7	
… thinking about the people I trust.	1-------2-------3-------4-------5-------6-------7	
… thinking about the things I believe in.	1-------2-------3-------4-------5-------6-------7	
… remembering things I have succeeded at.	1-------2-------3-------4-------5-------6-------7	

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When we think of ourselves, our thoughts are sometimes negative and sometimes positive.
We are interested in the POSITIVE thoughts you have about yourself.
Please indicate how much you agree or disagree with each of the following statements.

Thinking POSITIVELY about myself is something…	Disagree completely	Agree completely
… I do automatically.	1-------2-------3-------4-------5-------6-------7	
… that feels sort of natural to me.	1-------2-------3-------4-------5-------6-------7	
… I do without further thinking.	1-------2-------3-------4-------5-------6-------7	

… I would find hard not to do.	1-------2-------3-------4-------5-------6-------7
… that's typically "me".	1-------2-------3-------4-------5-------6-------7

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How accurately does each of these traits describe you as you typically are, compared to other people of the same age and sex?

	Not at all accurate				Extremely accurate
Lively	1-------2-------3-------4-------5				
Full of energy	1-------2-------3-------4-------5				
Tense	1-------2-------3-------4-------5				
Happy	1-------2-------3-------4-------5				
Pleased	1-------2-------3-------4-------5				
Cheerful	1-------2-------3-------4-------5				
At-ease	1-------2-------3-------4-------5				
Calm	1-------2-------3-------4-------5				
Relaxed	1-------2-------3-------4-------5				
Sad	1-------2-------3-------4-------5				
Depressed	1-------2-------3-------4-------5				
Unhappy	1-------2-------3-------4-------5				
On-edge	1-------2-------3-------4-------5				
Nervous	1-------2-------3-------4-------5				
Energetic	1-------2-------3-------4-------5				
Hostile	1-------2-------3-------4-------5				
Resentful	1-------2-------3-------4-------5				
Angry	1-------2-------3-------4-------5				

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Please indicate your agreement with the statements below by clicking the appropriate response next to the statement using the following scale.

	Strongly Disagree		Disagree		Agree		Strongly Agree
I have the ability and skills to deal with whatever comes my way.	1-------2-------3-------4-------5-------6-------7						
I feel that I'm basically a moral person.	1-------2-------3-------4-------5-------6-------7						
On the whole, I am a capable person.	1-------2-------3-------4-------5-------6-------7						
I am a good person.	1-------2-------3-------4-------5-------6-------7						
When I think about the future, I'm confident that I can meet the challenges that I will face.	1-------2-------3-------4-------5-------6-------7						
I try to do the right thing.	1-------2-------3-------4-------5-------6-------7						
Even though there is always room for self-improvement, I feel a sense of completeness about who I fundamentally am.	1-------2-------3-------4-------5-------6-------7						

I am comfortable with who I am.	1-------2-------3-------4-------5-------6-------7

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Please answer the questions by clicking the response that is most relevant to you.

	Not at all true	Hardly true	Moderately true	Exactly true
I can always manage to solve difficult problems if I try hard enough.	1	2	3	4
If someone opposes me, I can find the means and ways to get what I want.	1	2	3	4
It is easy for me to stick to my aims and accomplish my goals.	1	2	3	4
I am confident that I could deal efficiently with unexpected events.	1	2	3	4
Thanks to my resourcefulness, I know how to handle unforeseen situations.	1	2	3	4
I can solve most problems if I invest the necessary effort.	1	2	3	4
I can remain calm when facing difficulties because I can rely on my coping abilities.	1	2	3	4
When I am confronted with a problem, I can usually find several solutions.	1	2	3	4
If I am in trouble, I can usually think of a solution.	1	2	3	4
I can usually handle whatever comes my way.	1	2	3	4

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Please read each statement carefully before answering. Indicate how often you behave in the stated manner by clicking the appropriate response.

	Almost never				Almost always
I try to be understanding and patient towards those aspects of my personality I don't like.	1	2	3	4	5
I'm kind to myself when I'm experiencing suffering.	1	2	3	4	5
When I'm going through a very hard time, I give myself the caring and tenderness I need.	1	2	3	4	5
I'm tolerant of my own flaws and inadequacies.	1	2	3	4	5
I try to be loving towards myself when I'm feeling emotional pain.	1	2	3	4	5
When I see aspects of myself that I don't like, I get down on myself.	1	2	3	4	5
When times are really difficult, I tend to be tough on myself.	1	2	3	4	5
I can be a bit cold-hearted towards myself when I'm experiencing suffering.	1	2	3	4	5
I'm disapproving and judgemental about my own flaws and inadequacies.	1	2	3	4	5
I'm intolerant and impatient towards those aspects of my personality I don't like.	1	2	3	4	5

When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.	1-------2-------3-------4-------5
I try to see my failings as part of the human condition.	1-------2-------3-------4-------5
When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.	1-------2-------3-------4-------5
When things are going badly for me, I see the difficulties as part of life that everyone gets through.	1-------2-------3-------4-------5
When I fail at something that's important to me I tend to feel alone in my failure.	1-------2-------3-------4-------5
When I think about my inadequacies it tends to make me feel more separate and cut off from the rest of the world.	1-------2-------3-------4-------5
When I'm feeling down I tend to feel like most other people are probably happier than I am.	1-------2-------3-------4-------5
When I'm really struggling I tend to feel like other people must be having an easier time of it.	1-------2-------3-------4-------5
When something upsets me I try to keep my emotions in balance.	1-------2-------3-------4-------5
When I'm feeling down I try to approach my feelings with curiosity and openness.	1-------2-------3-------4-------5
When something painful happens I try to take a balanced view of the situation.	1-------2-------3-------4-------5
When I fail at something important to me I try to keep things in perspective.	1-------2-------3-------4-------5
When something upsets me I get carried away with my feelings.	1-------2-------3-------4-------5
When I'm feeling down I tend to obsess and fixate on everything that's wrong.	1-------2-------3-------4-------5
When something painful happens I tend to blow the incident out of proportion.	1-------2-------3-------4-------5
When I fail at something important to me I become consumed by feelings of inadequacy	1-------2-------3-------4-------5

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Please indicate the extent to which you agree with the following statements by clicking the appropriate response.

Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no "correct" or “incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer.

	Strongly disagree Disagree Neutral Agree Strongly agree
In uncertain times, I usually expect the best.	1-------2-------3-------4-------5
It's easy for me to relax.	1-------2-------3-------4-------5
If something can go wrong for me, it will.	1-------2-------3-------4-------5
I'm always optimistic about my future.	1-------2-------3-------4-------5
I enjoy my friends a lot.	1-------2-------3-------4-------5

It's important for me to keep busy.	1-------2-------3-------4-------5
I hardly ever expect things to go my way.	1-------2-------3-------4-------5
I don't get upset too easily.	1-------2-------3-------4-------5
I rarely count on good things happening to me.	1-------2-------3-------4-------5
Overall, I expect more good things to happen to me than bad.	1-------2-------3-------4-------5

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Please indicate the extent to which the following statements describe you by clicking the appropriate response.

	Does not describe me well			Does describe me well
I often have tender, concerned feelings for people less fortunate than me.	1-------2-------3-------4			
Sometimes I don't feel very sorry for other people when they are having problems.	1-------2-------3-------4			
When I see someone being taken advantage of, I feel kind of protective towards them.	1-------2-------3-------4			
Other people's misfortunes do not usually disturb me a great deal.	1-------2-------3-------4			
When I see someone being treated unfairly, I sometimes don't feel very much pity for them.	1-------2-------3-------4			
I am often quite touched by things that I see happen.	1-------2-------3-------4			
I would describe myself as a pretty soft-hearted person.	1-------2-------3-------4			

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Please indicate the extent to which you agree with the following statements by clicking the appropriate response.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
After I encounter information about a topic, I am likely to stop and think about it.	1-------2-------3-------4-------5				
If I need to act on a topic, the more viewpoints I get the better.	1-------2-------3-------4-------5				
After thinking about a topic, I have a broader understanding.	1-------2-------3-------4-------5				
When I encounter information about a topic, I read or listen to most of it, even though I may not agree with its perspective.	1-------2-------3-------4-------5				
It is important for me to interpret information about a topic in a way that applies directly to my life.	1-------2-------3-------4-------5				
When I encounter information about a topic, I focus on only a few key points.	1-------2-------3-------4-------5				
There is far more information on a topic than I personally need.	1-------2-------3-------4-------5				
When I see or hear information about a topic, I rarely spend much time thinking about it.	1-------2-------3-------4-------5				
If I need to act on information about a topic, the advice of one expert is enough for me.	1-------2-------3-------4-------5				

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Next are some questions about the support that is available to you.
About how many close friends and close relatives do you have (people you feel at ease with and can talk to about what is on your mind)?
Write in number of close friends and close relatives: ☐☐

People sometimes look to others for companionship, assistance, or other types of support.
How often is each of the following kinds of support available to YOU if you need it?

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
Someone to help you if you were confined to bed	1	2	3	4	5
Someone you can count on to listen to you when you need to talk .	1	2	3	4	5
Someone to give you good advice about a crisis	1	2	3	4	5
Someone to take you to the doctor if you need it	1	2	3	4	5
Someone who shows you love and affection	1	2	3	4	5
Someone to have a good time with	1	2	3	4	5
Someone to give you information to help you understand a situation	1	2	3	4	5
Someone to confide in or talk to about yourself or your problems	1	2	3	4	5
Someone who hugs you	1	2	3	4	5
Someone to get together with for relaxation	1	2	3	4	5
Someone to prepare your meals if you were unable to do it yourself	1	2	3	4	5
Someone whose advice you really want	1	2	3	4	5
Someone to do things with to help you get your mind off things	1	2	3	4	5
Someone to help with daily chores if you were sick	1	2	3	4	5
Someone to share your most private worries and fears with	1	2	3	4	5
Someone to turn to for suggestions about how to deal with a personal problem	1	2	3	4	5
Someone to do something enjoyable with	1	2	3	4	5
Someone who understands your problems	1	2	3	4	5
Someone to love and make you feel wanted	1	2	3	4	5

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We are interested in how you deal with information about harm that could come to you. For example, when you hear about:

- a health problem that you may be at risk for;
- a new public danger;
- the risk of being a victim of crime; or
- the threat of terrorist attacks.

For each of the following, rate how much that approach or attitude describes you.	Not at all like me 1-----2-----3-----4-----5-----6-----7 Very much like me
When I hear that my health is at risk, I try to actively work to decrease my risk in order to alleviate my concerns.	1-----2-----3-----4-----5-----6-----7
Working to decrease health risks helps me to feel less vulnerable to those risks.	1-----2-----3-----4-----5-----6-----7
When presented with a dangerous risk, it eases my concern if I work to decrease the risk.	1-----2-----3-----4-----5-----6-----7
When I sense that my safety is in danger, I find a course of action that would lead me to feel safe again.	1-----2-----3-----4-----5-----6-----7
One of the rules in my life that I follow is that in order to be free of worry, one must be proactive and tackle life's problems head on.	1-----2-----3-----4-----5-----6-----7
I am the type of person who worries extensively over a threatening situation.	1-----2-----3-----4-----5-----6-----7
It is my nature to feel as if I'm more vulnerable to certain dangers, try to overcome them, and still feel unsafe after taking some precautions.	1-----2-----3-----4-----5-----6-----7
I sometimes feel overwhelmed trying to protect myself from all the possible dangers in life.	1-----2-----3-----4-----5-----6-----7
No matter what I do to feel more secure, I frequently worry about my safety.	1-----2-----3-----4-----5-----6-----7
I feel that despite everything that I've done to avoid danger, it is not enough.	1-----2-----3-----4-----5-----6-----7
I rarely think about bad things happening to me.	1-----2-----3-----4-----5-----6-----7
If something bad happens to me, I will address it then, but it is not worthwhile to worry about what could happen.	1-----2-----3-----4-----5-----6-----7
There is no point in worrying about possible threats when they might not even happen to me.	1-----2-----3-----4-----5-----6-----7
I focus on the good things that happen to me, not the negative.	1-----2-----3-----4-----5-----6-----7
In general, I do not worry about threats to my personal safety.	1-----2-----3-----4-----5-----6-----7
I would rather not hear about health or safety risks that may affect me.	1-----2-----3-----4-----5-----6-----7
When I hear of news reports of health threats, I tend to ignore them because they are too stressful.	1-----2-----3-----4-----5-----6-----7
I tend to avoid information that I may be at risk for health problems.	1-----2-----3-----4-----5-----6-----7
Even if true, I would not want to hear bad news concerning my well-being.	1-----2-----3-----4-----5-----6-----7
Hearing information about threats makes me more stressed, so I avoid it.	1-----2-----3-----4-----5-----6-----7

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Portion Size Guide

Next, we would like to ask you some questions about your consumption of fruit and vegetables.

Please note that:
1 portion of fresh fruit = 80g
1 portion of dried fruit = 30g
1 portion of fresh vegetables = 80g

Juice can only count as 1 portion a day, however much you drink.

Potatoes are starchy food so they don't count towards your vegetable consumption.

You can familiarise yourself with some examples of portion sizes for different fruit and vegetables by clicking HERE. (link to http://www.nhs.uk/Livewell/5ADAY/Pages/Portionsizes.aspx)

When answering questions about your fruit and vegetable consumption, we will give you this link again, so you can consult it if you need.

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Now, we would like to ask you some questions about your consumption of fruit and vegetables on a TYPICAL DAY.

If you need to, you can get information on portion sizes by clicking HERE. (link to http://www.nhs.uk/Livewell/5ADAY/Pages/Portionsizes.aspx)

Currently, do you eat at least 5 portions of fruit and vegetables on a TYPICAL DAY? (Required)

- ○ No, and I do not intend to do so.
- ○ No, but I am thinking about it.
- ○ No, but I strongly intend to do so.
- ○ Yes, but it is difficult for me.
- ○ Yes, and it is easy for me.

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How many portions of fruit - of any kind - do you eat on a TYPICAL DAY? (Put zero if none.)

If you need to, you can get information on portion sizes by clicking HERE.

Juice can only count as 1 portion a day, however much you drink.

Portions of fruit per day: ☐☐

How many portions of vegetables do you eat on a TYPICAL DAY? (Put zero if none.)

If you need to, you can get information on portion sizes by clicking HERE. (link to http://www.nhs.uk/Livewell/5ADAY/Pages/Portionsizes.aspx)

Potatoes are a starchy food so they don't count towards your vegetable consumption.

Portions of vegetables per day: ☐☐

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Now, please answer some questions about your WEEKLY consumption of food.

WEEKLY FOOD CHECKLIST

In a TYPICAL WEEK, about how many portions do you eat of the following foods? (Please select one radio button on each line)

If you need to, you can get information on portion sizes for fruit and vegetables by clicking HERE. (link to http://www.nhs.uk/Livewell/5ADAY/Pages/Portionsizes.aspx)

	None	Less than 1 a week	1 to 2 a week	3 to 5 a week	6 to 7 a week	8 to 11 a week	12 or more a week
Pasta or rice	○	○	○	○	○	○	○
Potatoes	○	○	○	○	○	○	○
Peas	○	○	○	○	○	○	○
Beans (baked, tinned, or dried) or lentils	○	○	○	○	○	○	○
Other vegetables (any type)	○	○	○	○	○	○	○
Fruit (fresh, frozen, canned)	○	○	○	○	○	○	○

In a TYPICAL WEEK, do you eat any other fruit or vegetables not on this list?

If so, please write in below, including the number of portions (e.g. dried fruit - 3):

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DAILY FOOD CHECKLIST

VEGETABLES, FRESH, FROZEN, CANNED, DRIED

In the last 24 HOURS, about how many portions did you eat of the following vegetables? (Please select one radio button on each line)

If you need to, you can get information on portion sizes by clicking HERE. (link to http://www.nhs.uk/Livewell/5ADAY/Pages/Portionsizes.aspx)

	None	¼	½	1	2	3+
Avocado	○	○	○	○	○	○
Beans, green, broad, runner	○	○	○	○	○	○
Beans, lentils, peas (dried)	○	○	○	○	○	○
Beansprouts	○	○	○	○	○	○
Beetroot	○	○	○	○	○	○
Broccoli/calabrese	○	○	○	○	○	○
Brussel sprouts	○	○	○	○	○	○
Cabbage or spring greens	○	○	○	○	○	○
Carrot	○	○	○	○	○	○
Cauliflower	○	○	○	○	○	○
Celery	○	○	○	○	○	○
Coleslaw	○	○	○	○	○	○
Cucumber	○	○	○	○	○	○
Garlic [clove]	○	○	○	○	○	○
Leek	○	○	○	○	○	○
Lettuce	○	○	○	○	○	○
Marrow or courgette	○	○	○	○	○	○
Mushrooms	○	○	○	○	○	○
Mustard & Cress, watercress	○	○	○	○	○	○
Onion, cooking	○	○	○	○	○	○
Onion, spring	○	○	○	○	○	○
Parsnip	○	○	○	○	○	○
Peas, fresh or frozen	○	○	○	○	○	○
Peas, tinned	○	○	○	○	○	○
Pepper (red/green)	○	○	○	○	○	○
Radishes	○	○	○	○	○	○
Spinach	○	○	○	○	○	○
Squash	○	○	○	○	○	○
Swede, turnip	○	○	○	○	○	○
Sweetcorn	○	○	○	○	○	○
Tomatoes, fresh	○	○	○	○	○	○
Tomatoes, tinned	○	○	○	○	○	○
Other fresh herbs	○	○	○	○	○	○
Mixed salad	○	○	○	○	○	○
Mixed vegetables	○	○	○	○	○	○
Vegetabl based soup	○	○	○	○	○	○
Pulse (lentil) based soup	○	○	○	○	○	○

Other vegetables you have eaten in the last 24 HOURS that are not on the list (e.g. celeriac, asparagus, fennel, aubergine, pumpkin).

Please include the number of portions (e.g. celeriac - 1/4).

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FRUIT

In the last 24 HOURS, about how many portions did you eat of the following fruits? (Please select one radio button on each line)

If you need to, you can get information on portion sizes by clicking HERE. (link to http://www.nhs.uk/Livewell/5ADAY/Pages/Portionsizes.aspx)

	None	¼	½	1	2	3+
Apple	○	○	○	○	○	○
Apricot	○	○	○	○	○	○
Banana	○	○	○	○	○	○
Berries, e.g. raspberries, strawberries, blueberries, blackcurrants	○	○	○	○	○	○
Cherries	○	○	○	○	○	○
Dried fruit, e.g. raisins, prunes [30g handful]	○	○	○	○	○	○
Fruit salad, fresh	○	○	○	○	○	○
Fruit salad, canned	○	○	○	○	○	○
Grapes	○	○	○	○	○	○
Grapefruit	○	○	○	○	○	○
Mango	○	○	○	○	○	○
Melon	○	○	○	○	○	○
Orange, satsuma	○	○	○	○	○	○
Peach, nectarine	○	○	○	○	○	○
Pear	○	○	○	○	○	○
Pineapple	○	○	○	○	○	○
Plum	○	○	○	○	○	○
Real fruit juice (100%), e.g. orange, apple [medium glass]	○	○	○	○	○	○
Rhubarb	○	○	○	○	○	○

Stewed fruit with sugar	○	○	○	○	○	○
Watermelon	○	○	○	○	○	○

Other fruit you have eaten in the last 24 HOURS that are not on the list (e.g. pomegranate, kiwi, papaya, Sharon fruit).

Please include the number of portions (e.g. pomegranate - 1/2).

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For me eating at least 5 portions of fruit and vegetables every day is…

Unenjoyable	3-------2-------1-------0-------1-------2-------3	*Enjoyable*
Boring	3-------2-------1-------0-------1-------2-------3	*Fun*
Painful	3-------2-------1-------0-------1-------2-------3	*Pleasurable*
Bad	3-------2-------1-------0-------1-------2-------3	*Good*
Foolish	3-------2-------1-------0-------1-------2-------3	*Wise*
Harmful	3-------2-------1-------0-------1-------2-------3	*Beneficial*
Useless	3-------2-------1-------0-------1-------2-------3	*Useful*
Unimportant	3-------2-------1-------0-------1-------2-------3	*Important*

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Thank you!

Thank you very much for taking the time to complete this questionnaire.

Please now follow the link below to choose a time slot where it's convenient for you to come to the lab and complete the second part of the study, which requires you to do some simple reading, writing and reaction time tasks, and a short questionnaire.

philine.youcanbook.me

If you don't choose a time slot now, I will be in contact later using the email address you provided at the start of the questionnaire to arrange a convenient time for you.
If you have any questions about the study at this stage, please don't hesitate to email me (Philine Harris) straightaway: philine@sussex.ac.uk

One week after you have completed the second part of the study, I will email you the final part, which is a 10-minute online questionnaire. Once you've completed this final part, you will receive your 5 course credits, or £5.

For advice on any of the topics touched upon in this questionnaire, you can contact student support… http://www.sussex.ac.uk/studentsupport/

…as well as the Student Life Centre http://www.sussex.ac.uk/studentlifecentre/

For more information on general mood, as well as on stress, anxiety and depression, visit the NHS Choices Moodzone:
http://www.nhs.uk/Conditions/stress-anxiety-depression/Pages/low-mood-stress-anxiety.aspx

For more advice on eating five portions of fruit and vegetable and information on a healthy diet, click here:
http://www.nhs.uk/LiveWell/5ADAY/Pages/5ADAYhome.aspx

Time 2 Positive mood induction

STUDENTS' IMAGINATION ABILITIES
In the present study we are interested in investigating students' imagination abilities.
By imagination abilities, we mean how easy you find it to follow a story and vividly imagine what is happening in that story. For example, you might try to imagine everything described in the story with as much detail as possible, and you might try to put yourself in the setting and vividly imagine being one of the people involved.

Take your time reading the story. Keep reading until the experimenter returns.

If you are finished before the experimenter returns, re-read the story and spend the time engaging with the story.

Clive and Mary Bartlett, of Stroud, Gloucestershire, met a couple named John and Jean Taylor, of Dorking, Surrey, some years ago. Although they live a fairly long way from each other, they like to get together a couple of times a year, just to say hello.

This summer they decided it might be nice if they had dinner together. The Bartletts didn't want to ask the Taylors to drive all the way to the Stroud area, and the Taylors didn't want to ask the Bartletts to drive all the way to Dorking. So they compromised. They selected a town midway between – the town of Burford, in the Cotswolds – and they agreed to meet there for a Sunday roast.

They asked around, and someone recommended a Burford pub called the Royal Oak Inn. The food was supposed to be good. The Bartletts and the Taylors – all of them are in their 60s – decided to make a reservation for 2 p.m. that Sunday. One of them called to make the reservation. Then they made arrangements to meet in the pub at 1 p.m. for a pint, talk for a few hours, then eat.

On the appointed day, Clive and Mary Bartlett drove from Stroud to Burford. They found the pub, on the corner of Witney Street and Pytt's Lane. The pub was a beautiful old house. The Taylors were waiting for them in the customer car park.

The Bartletts were so happy to see their friends that it didn't even strike them as odd that the Taylors' car was the only one in the customer car park.

"You're not going to believe what happened," John Taylor said as the Bartletts got out of their own car.

The Taylors had gone into the pub, only to be told that it was closed for the day. Usually the Roal Oak is open Sundays and closed Mondays – but this particular week, it was closed on Sunday because the owners were having a private family party. The party was due to start in a few hours, and the guests would be arriving.

"The owners told us to come in when you arrived, and they would recommend someplace else around here," John Taylor said.

So the Bartletts and the Taylors went into the pub. The owners – twin brothers, George and Rob Thompson, both 58 – led them to the bar and insisted that they have a complimentary drink. The brothers were apologetic; they explained that the woman who took the reservation must have forgotten that the pub was due to be closed that Sunday.

The Bartletts and the Taylors drank their pints and talked. And then the brothers appeared again.

"We feel so bad," George Thompson said, "we want you to stay for the party. We want you to be our guests. We insist."

The Bartletts and the Taylors didn`t know what to make of this. But they didn't have time to decide. Soon the guests started to arrive. There were 75 people in all; they had come to the pub to honour the university graduation of Cathy Thompson, the brothers' niece.

George Thompson pulled the Bartletts and the Taylors aside.

“I know you probably don’t feel comfortable with a bunch of strangers,” he said. “Nobody does. So just mingle if you wish – but I’m going to set you up your own table out on the patio, where you can catch up with each other like you planned in the first place.”

The Thompson brothers moved a table out onto the back patio. There were plants out there, and a big back garden and a fish pond. The Thompson brothers said that the buffet was inside; the Bartletts and the Taylors were to eat as much as they wanted. There would be no charge.

And so the party started. The Bartletts and the Taylors were overwhelmed; they knew no one here, and all of a sudden they were joining people at the lavish buffet table. There was roast beef, and ham with pineapple, some vegetarian dishes, and salads, and desserts. They helped themselves and went to their private table on the terrace.

When the Bartletts and the Taylors had finished with their meal and their conversation, they walked back into the house. The party was still in progress.

Mrs. Bartlett didn’t know what to say; she couldn’t believe that they had been taken in just as if they had been invited. So she stood in the middle of the room full of strangers and said: “Thank you all. I just hope you had as nice a time today as we did.”

The people in the room started to say goodbye to them, and the Thompson brothers got up to show them to the front door.

“Get home safe,” George Thompson said.

So the Bartletts drove toward Stroud, and the Taylors drove toward Dorking. Mrs. Bartlett thought to herself: All you hear about is unfriendliness and nastiness; people are supposed to distrust each other and keep to themselves in a cocoon of self-protection. Once in a while, in a small pub off the bustle and hustle, you see another side.

Time 2 Positive affect after manipulations

After participants have completed one of the three conditions, everyone turns to the computer.

Computer task: Emotions

New page

You will now be presented with a series of 20 emotions items that appear one after the other on the screen, and you will be asked whether you are feeling each emotion right now. Please press 'Y' (for yes) if you are feeling this emotion right now, and 'N' (for no) if you are not feeling this emotion right now. Please respond as quickly as possible.

The following items will be presented to participants in random order:

Amusement
Awe
Gratitude
Hope
Inspiration
Interest
Joy
Love
Pride
Serenity
Stress
Sadness
Fear
Guilt
Hate
Disgust
Embarrassment
Anger
Contempt
Shame

Computerised mood measures: Participants are asked to respond to each item (which appear along with the appropriate scale one after the other on the screen) by pressing the corresponding key on the keyboard.

New page

Next, we would like to ask a few more questions about your mood right now.

At this moment, my mood is …

Very bad 1 ------- 2 ------- 3 ------- 4 -------- 5 Very good

Please press the corresponding key on the keyboard.

New page

For the next few items, please use the scale below to indicate the extent to which each item applies to your feelings right now.

To what extent does the item below apply to your feelings RIGHT NOW?

	Definitely does not apply to my feelings at this moment			Definitely does apply to my feelings at this moment
Happy	1 ----------	2 ----------	3 ----------	4
Elated	1 ----------	2 ----------	3 ----------	4
Sad	1 ----------	2 ----------	3 ----------	4
Depressed	1 ----------	2 ----------	3 ----------	4
Pleased	1 ----------	2 ----------	3 ----------	4
Refreshed	1 ----------	2 ----------	3 ----------	4
Anxious	1 ----------	2 ----------	3 ----------	4
Tense	1 ----------	2 ----------	3 ----------	4

Please press the corresponding key on the keyboard.

Time 2 Health-risk message

Health message on fruit and vegetable consumption – presented on the computer. Participants read each section of the message and can move onto the next one by pressing spacebar.

New page

In this next section of the study we would like you to read information on fruit and vegetable consumption that we are evaluating for possible use in future health campaigns (e.g., in leaflets or online). This information will later on be laid out professionally, but at the moment we would like to refine the text itself.
Some people are being asked to comment on how easy they find the information to understand, but we would like you to think about how the health information may be relevant to you and how it makes you feel.
Please note that all this information fruit and vegetable consumption is genuine.
Please read the information carefully; later on we will ask you some questions related to it.
Press SPACEBAR to continue.

New page

EATING ENOUGH FRUIT AND VEGETABLES: FACTS AND ADVICE

EATING AT LEAST 5 A DAY.

The UK Government recommends you eat at least 5 portions of fruit or vegetables a day to help reduce the risk of heart disease, some cancers and many other chronic conditions.

PREVENTING CHRONIC DISEASES: HEART DISEASE

Eating at least 5 portions of fruit and vegetables a day has been shown to reduce the risk of coronary heart disease and stroke. Each additional portion of fruit and vegetables a person eats a day appears to lower the risk of coronary heart disease and stroke. Intakes of more than 5 portions of fruit and vegetables a day have been associated with a 17% reduction in coronary heart disease risk, and intakes of 3-5 portions a day have been associated with a 7% reduction in coronary heart disease risk.

Evidence suggests that one of the benefits of increasing fruit and vegetable intake is that it helps reduce blood pressure. High blood pressure is a major preventable cause of stroke and heart attacks.

Press SPACEBAR to continue.

New page

PREVENTING CHRONIC DISEASES: CANCER

Evidence suggests that eating at least 5 portions of fruit or vegetables a day protects against certain types of cancer. Although fruit and vegetable consumption may not protect against hormone-based cancers such as breast or prostate cancer, research has shown that eating more

fruit and vegetables decreases the risk of colorectal (bowel) cancer, gastric (stomach) cancer, pancreatic cancer, lung cancer, bladder cancer and some subtypes of head-neck cancers.

Eating at least 5 fruit and vegetables a day may also help reduce the chances of becoming overweight or obese, which also contribute to cancer.

Press SPACEBAR to continue.

New page

PREVENTING CHRONIC DISEASES: OTHER CHRONIC CONDITIONS

There are other health benefits to eating at least 5 portions of fruit or vegetables a day too, including delaying the development of cataracts, reducing the symptoms of asthma, improving bowel function, and helping to manage diabetes.

All in all, experts still recommend eating at least 5 fruit and vegetables a day for the range of health benefits this brings.

Press SPACEBAR to continue.

New page

HOW IT WORKS

The reason why fruit and vegetables are so beneficial is because of the array of compounds they contain. As well as vitamins and minerals (such as folic acid, vitamin C and potassium), fruit and vegetables also contain many non-nutrient complex plant compounds (called phytochemicals).

These appear to improve the function of the immune system and some are also antioxidants that destroy free radicals in the body. Free radicals are believed to have a role in causing cancer as well as in creating other harmful effects to our bodies.

Press SPACEBAR to continue.

New page

I TAKE A VITAMIN TABLET EVERY DAY. ISN'T THAT ENOUGH?

It appears that the benefits of fruit and vegetables stem not only from their individual compounds, but also from the interaction between them. Dietary supplements containing isolated vitamins and minerals do not appear to have the same beneficial effects as fruit and vegetables themselves.

Indeed in some studies, supplements have caused more harm than good, as the optimum dose to protect against disease is not always fully understood.

To get the maximum benefits, you need to eat different types of fruit and vegetables. Fruit and vegetables all contain different combinations of fibre, vitamins, minerals and other nutrients. So, aim to include a variety of fruit and vegetables in your 5 A DAY to get the most benefit.

Press SPACEBAR to continue.

New page

RECOMMENDATIONS

To receive the health benefits of fruit and vegetable consumption, aim for **AT LEAST 5** portions of a variety of fruit and vegetables (excluding potatoes) **EVERY** day. Fresh, frozen, chilled, canned, 100% juice, and dried fruit and vegetables all count.

KEEP TRYING

Remember, it's like **BRUSHING YOUR TEETH**; this is something you need to do **EVERY** day, not most days or occasionally, but **EVERY DAY**.

However, if you miss a day don't worry; you can always try again tomorrow. The important thing is to **KEEP TRYING**; the more often you try, the more often you will have days in which you meet your target of fruit and vegetables.

Next, you will find some tips on how to add fruit and vegetables to your diet.

Press SPACEBAR to continue.

New page

HOW TO INCREASE YOUR FRUIT AND VEGETABLE CONSUMPTION

To help you meet the 5 A DAY recommendation you could:

- Drink fruit juice or eat fruit with your breakfast
- Make a smoothie with fruit juice and your preferred fruits (you could put over-ripe fruit in a smoothie rather than throwing it out)
- Add chopped fruit to your breakfast cereal or dessert
- Eat fruit as a starter or a dessert
- Keep a stock of fruit sticks for snacks
- When on the move, carry with you easy to eat fruit such as bananas, apples or satsumas

Press SPACEBAR to continue.

New page

HOW TO INCREASE YOUR VEGETABLE CONSUMPTION

To help you meet the 5 A DAY recommendation you could:

- Eat homemade vegetable soup
- Serve 2 large portions of vegetables with your dinner or have a salad as a starter
- When eating out try the vegetarian option or order a salad with your main meal
- Add extra vegetables to a take away (e.g., add peppers and mushrooms to a pizza or a curry)
- Add extra salad vegetables to a sandwich (e.g., lettuce, tomatoes, cucumber or grated carrot)
- Keep a stock of vegetable sticks for snacks, such as carrots or celery

Press SPACEBAR to continue.

New page

PORTION SIZE

One portion of 80g can be estimated as:

- 3 tablespoons of vegetables
- 2 or more tablespoons of pulses (e.g., beans, lentils)
- 1 cereal bowl of salad
- 1 medium sized fruit (e.g., apple, banana, pear, orange)
- 2 smaller fruits (e.g., plum, satsuma)
- 1 cup of very small fruits (e.g., berries, grapes)
- 2-3 tablespoons of fresh fruit salad, stewed or canned fruit
- 1 tablespoon of dried fruit
- 1 or more glasses of fruit juice (count juice as 1 portion however much you drink)

REMEMBER YOU SHOULD TRY TO EAT AT LEAST 5 A DAY EACH AND EVERY DAY

Press SPACEBAR to continue.

New page

Thank you.

If you would like to receive the information you have just read (including the tips and advice) as an email, please press Y (yes) now, then continue by opening the envelope, in which you will find the next questionnaire.

Otherwise, you can just continue by opening the envelope, in which you will find the next questionnaire.

Time 2 Reactions to health-risk message

There will be an envelope on the table in which participants will find Questionnaire 1 and a flyer (see below).

Questionnaire 1
Page 1

In this section of the study we would like to ask you about eating 5 A DAY during the **NEXT 7 DAYS**.

I intend eating at least 5 portions of fruit and vegetables every day in the next 7 days.

Strongly disagree 1-------2-------3-------4-------5-------6-------7 *Strongly agree*

Definitely no 1-------2-------3-------4-------5-------6-------7 *Definitely yes*

How likely is it that you will eat at least 5 portions of fruit and vegetables every day in the next 7 days?

Very unlikely 1-------2-------3-------4-------5-------6-------7 *Very likely*

For me eating at least 5 portions of fruit and vegetables every day in the next 7 days would be

Unenjoyable 3-------2-------1-------0-------1-------2-------3 *Enjoyable*
Boring 3-------2-------1-------0-------1-------2-------3 *Fun*
Painful 3-------2-------1-------0-------1-------2-------3 *Pleasurable*
Bad 3-------2-------1-------0-------1-------2-------3 *Good*
Foolish 3-------2-------1-------0-------1-------2-------3 *Wise*
Harmful 3-------2-------1-------0-------1-------2-------3 *Beneficial*
Useless 3-------2-------1-------0-------1-------2-------3 *Useful*
Unimportant 3-------2-------1-------0-------1-------2-------3 *Important*

Most people who are important to me think that I should eat at least 5 portions of fruit and vegetables every day in the next 7 days.

Strongly disagree 1-------2-------3-------4-------5-------6-------7 *Strongly agree*
Very unlikely 1-------2-------3-------4-------5-------6-------7 *Very likely*

People who are important to me would disapprove/approve of me eating at least 5 portions of fruit and vegetables every day in the next 7 days.

Disapprove 1-------2-------3-------4-------5-------6-------7 *Approve*

Most people I know will eat at least 5 portions of fruit and vegetables every day in the next 7 days.

Strongly disagree 1-------2-------3-------4-------5-------6------7 *Strongly agree*
Very unlikely 1-------2-------3-------4-------5-------6-------7 *Very likely*

Page 2

Of the people you know, how many will eat at least 5 portions of fruit and vegetables every day in the next 7 days?

None 1-------2-------3-------4-------5-------6-------7 *All*

How much control do you have over whether or not you will eat at least 5 portions of fruit and vegetables every day in the next 7 days?

No control 1-------2-------3-------4-------5-------6-------7 *Complete control*

I feel in complete control of whether or not I will eat at least 5 portions of fruit and vegetables every day in the next 7 days.

Strongly disagree 1-------2-------3-------4-------5-------6-------7 *Strongly agree*

It is up to me whether or not I will eat at least 5 portions of fruit and vegetables every day in the next 7 days.

Strongly disagree 1-------2-------3-------4-------5-------6-------7 *Strongly agree*

I know for sure that if I wanted to I could eat at least 5 portions of fruit and vegetables every day in the next 7 days.

Strongly disagree 1-------2-------3-------4-------5-------6-------7 *Strongly agree*

If I wanted to, I could easily eat at least 5 portions of fruit and vegetables every day in the next 7 days.

Strongly disagree 1-------2-------3-------4-------5-------6-------7 *Strongly agree*

If I wanted to, I would find eating at least 5 portions of fruit and vegetables every day in the next 7 days easy.

Strongly disagree 1-------2-------3-------4-------5-------6-------7 *Strongly agree*

Page 3

During the next 7 days, I will...

	Strongly disagree	*Strongly agree*
... often have an intention to eat at least 5 portions of fruit and vegetables every day on my mind.	1-------2-------3-------4-------5-------6-------7	
... constantly be aware of a desire to eat at least 5 portions of fruit and vegetables every day.	1-------2-------3-------4-------5-------6-------7	
... consistently monitor whether I eat at least 5 portions of fruit and vegetables every day.	1-------2-------3-------4-------5-------6-------7	
... take care to eat fruit and vegetables throughout the day to achieve at least the recommended 5 portions of fruit and vegetables every day.	1-------2-------3-------4-------5-------6-------7	
... really try hard to regularly eat at least 5 portions of fruit and vegetables every day.	1-------2-------3-------4-------5-------6-------7	
... do my best to meet my standards for eating at least 5 portions of fruit and vegetables every day.	1-------2-------3-------4-------5-------6-------7	

Page 4

While reading the article…	Not at all	Extremely
…I thought about the consequences of not eating at least 5 portions of fruit and vegetables every day.	1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7	
…I thought deeply about the information.	1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7	
… I tried not to think about how the article applied to me.	1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7	
… I felt positive about eating at least 5 portions of fruit and vegetables every day.	1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7	
… I felt happy at the thought of eating at least 5 portions of fruit and vegetables every day.	1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7	
… I felt fearful.	1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7	
… I felt anxious.	1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7	

	Strongly Disagree … Strongly Agree
I am worried that I do not currently eat enough fruit and vegetables.	1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7
I worry about my current level of consumption of fruit and vegetables.	1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7
I worry about the consequences of not eating at least 5 portions of fruit and vegetables every day.	1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7

Time 2 Positive affect after health-risk message

Page 5

Below are some questions about your feelings **right now**. Please circle the number representing the appropriate response.

RIGHT NOW to what extent are you feeling…	Not at all	A little bit	Moderately	Quite a bit	Extremely
…hopeful, optimistic, or encouraged?	1	2	3	4	5
…inspired, uplifted, or elevated?	1	2	3	4	5
…interested, alert, or curious?	1	2	3	4	5
…joyful, glad, or happy?	1	2	3	4	5
…love, closeness, or trust?	1	2	3	4	5
…proud, confident, or self-assured?	1	2	3	4	5
…amused, fun-loving, or entertained?	1	2	3	4	5
…awe, wonder, or amazement?	1	2	3	4	5
…grateful, appreciative, or thankful?	1	2	3	4	5
…serene, content, or peaceful?	1	2	3	4	5
…stressed, nervous, or overwhelmed?	1	2	3	4	5
…sad, downhearted, or unhappy?	1	2	3	4	5
...scared, fearful, or afraid?	1	2	3	4	5
...guilty, repentant, or blameworthy?	1	2	3	4	5
...hate, distrust, or suspicion?	1	2	3	4	5
...disgust, distaste, or revulsion?	1	2	3	4	5
...embarrassed, self-conscious, or blushing?	1	2	3	4	5
...angry, irritated, or annoyed?	1	2	3	4	5
...contemptuous, scornful, or disdainful?	1	2	3	4	5
...ashamed, humiliated, or disgraced?	1	2	3	4	5

Page 6

Please now think about your feelings RIGHT NOW and indicate, by circling the appropriate number below, to what extent the items below apply to your feelings at this moment:

At this moment, my mood is …

Very bad 1 ------- 2 ------- 3 ------- 4 -------- 5 Very good

	Definitely does not apply to my feelings at this moment			Definitely does apply to my feelings at this moment
Pleased	1 ----------	2 ----------	3 ----------	4
Tense	1 ----------	2 ----------	3 ----------	4
Anxious	1 ----------	2 ----------	3 ----------	4
Elated	1 ----------	2 ----------	3 ----------	4
Happy	1 ----------	2 ----------	3 ----------	4
Refreshed	1 ----------	2 ----------	3 ----------	4
Depressed	1 ----------	2 ----------	3 ----------	4
Sad	1 ----------	2 ----------	3 ----------	4

Time 2 Manipulation checks

Page 7 for self-affirmation or no affirmation writing conditions

Please now think back to the task you were asked to complete near the start of this study, when we asked you to choose and write about a personal value. We would like to ask you about your experiences of completing that task.

Doing the task about values made me aware of …

	Strongly Disagree	Disagree	Agree	Strongly Agree
…who I am.	1-------2-------3-------4-------5-------6-------7			
…people's expectations of me.	1-------2-------3-------4-------5-------6-------7			
…my values (the principles and standards by which I try to live my life).	1-------2-------3-------4-------5-------6-------7			

How important was the value you wrote about?

Not very important 1-----2-----3-----4-----5-----6-----7 Extremely important

Page 7 for positive mood reading condition

Please now think back to the task you were asked to complete near the start of this study, when we asked you to read a story and vividly imagine what was happening in that story. We would like to ask you about your experiences of completing that task.

Doing the task about imagination made me aware of …

	Strongly Disagree	Disagree	Agree	Strongly Agree
…who I am.	1-------2-------3-------4-------5-------6-------7			
…people's expectations of me.	1-------2-------3-------4-------5-------6-------7			
…my values (the principles and standards by which I try to live my life).	1-------2-------3-------4-------5-------6-------7			

Time 2 Flyer

Flyer – together with Questionnaire 1, participants will find the following flyer in the envelope, which displays some of the information of the message (the tips and advice on how to increase fruit and vegetable consumption) and which they are invited to take with them.

Flyer front

Flyer back

Time 3 online questionnaire

Page 1

Thank you again for agreeing to take part in this study.

This questionnaire is the FINAL part of a three-part study. Today we would like you to complete the final set of measures that will take approximately 10 minutes of your time.

Once you have completed this final part, I can offer you 5 course credits or £5. Your participation is highly valued and appreciated.

Please read the instructions carefully and answer the questions in the order they appear on the page.

You will not be able to return to a page once you have clicked the 'Next' button.

If you wish to take part, please click 'Next'. You are under no obligation to take part in this research, and you are free to withdraw at any time, without giving a reason, until it is no longer practical for you to do so. This will be once data collection is complete, at which point you will receive a debrief and a reminder of your option to withdraw your data.

This study has been approved by the Sciences & Technology Cross-Schools Research Ethics Committee (crecscitec@sussex.ac.uk). The project reference number is ER/PS230/6.

( ) Next

Page 2

Portion Size Guide

Next, we would like to ask you some questions about your consumption of fruit and vegetables.

Please note that:
1 portion of fresh fruit = 80g
1 portion of dried fruit = 30g
1 portion of fresh vegetables = 80g

Juice can only count as 1 portion a day, however much you drink.

Potatoes are starchy food so they don't count towards your vegetable consumption.

You can familiarise yourself with some examples of portion sizes for different fruit and vegetables by clicking HERE (link to http://www.nhs.uk/Livewell/5ADAY/Pages/Portionsizes.aspx)

When answering questions about your fruit and vegetable consumption, we will give you this link again, so you can consult it if you need.

Page 3

Now, we would like to ask you some questions about your consumption of fruit and vegetables on a TYPICAL DAY in the LAST 7 DAYS.

If you need to, you can get information on portion sizes by clicking HERE.

In the last 7 days, did you eat at least 5 portions of fruit and vegetables on a TYPICAL DAY? (Required)

- ○ No, and I did not intend to do so.
- ○ No, but I was thinking about it.
- ○ No, but I strongly intended to do so.
- ○ Yes, but it was difficult for me.
- ○ Yes, and it was easy for me.

In the last 7 days, how many portions of fruit - of any kind - did you eat on a TYPICAL DAY? (Put zero if none.)

If you need to, you can get information on portion sizes by clicking HERE (link to http://www.nhs.uk/Livewell/5ADAY/Pages/Portionsizes.aspx).

Juice can only count as 1 portion a day, however much you drink.

Portions of fruit per day in the last 7 days: ☐☐

In the last 7 days, how many portions of vegetables did you eat on a TYPICAL DAY? (Put zero if none.)

If you need to, you can get information on portion sizes by clicking HERE (link to http://www.nhs.uk/Livewell/5ADAY/Pages/Portionsizes.aspx).

Potatoes are a starchy food so they don't count towards your vegetable consumption.

Portions of vegetables per day in the last 7 days: ☐☐

Page 4

WEEKLY FOOD CHECKLIST

In the LAST 7 DAYS , about how many portions do you eat of the following foods? (Please select one radio button on each line)

If you need to, you can get information on portion sizes by clicking HERE (link to http://www.nhs.uk/Livewell/5ADAY/Pages/Portionsizes.aspx).

	None	Less than 1 a week	1 to 2 a week	3 to 5 a week	6 to 7 a week	8 to 11 a week	12 or more a week
Pasta or rice	○	○	○	○	○	○	○
Potatoes	○	○	○	○	○	○	○
Peas	○	○	○	○	○	○	○
Beans (baked, tinned, or dried) or lentils	○	○	○	○	○	○	○
Other vegetables (any type)	○	○	○	○	○	○	○
Fruit (fresh, frozen, canned)	○	○	○	○	○	○	○

In the LAST 7 DAYS, did you eat any other fruit or vegetables not on this list?

If so, please write in below, including the number of portions (e.g. dried fruit - 3):

Page 5

We are now going to ask you for your thoughts about eating at least 5 portions of fruit and vegetables every day in the LAST 7 DAYS.

During the last 7 days,... (Required)

	Not at all — Extremely
... I was successful in monitoring my fruit and vegetable consumption.	1 ---- 2 ---- 3 ---- 4 ---- 5 ---- 6 ---- 7
... I was successful in eating at least 5 portions of fruit and vegetables every day.	1 ---- 2 ---- 3 ---- 4 ---- 5 ---- 6 ---- 7
... I found it difficult to eat at least 5 portions of fruit and vegetables every day.	1 ---- 2 ---- 3 ---- 4 ---- 5 ---- 6 ---- 7

Page 6

Finally, we would like to ask you about eating 5 A DAY during the **NEXT 7 DAYS**.

I intend eating at least 5 portions of fruit and vegetables every day in the next 7 days.

Strongly disagree 1-------2-------3-------4-------5-------6-------7 *Strongly agree*

Definitely no 1-------2-------3-------4-------5-------6-------7 *Definitely yes*

How likely is it that you will eat at least 5 portions of fruit and vegetables every day in the next 7 days?

Very unlikely 1-------2-------3-------4-------5-------6-------7 *Very likely*

For me eating at least 5 portions of fruit and vegetables every day in the next 7 days would be

Unenjoyable 3-------2-------1-------0-------1-------2-------3 *Enjoyable*

Boring 3-------2-------1-------0-------1-------2-------3 *Fun*

Painful 3-------2-------1-------0-------1-------2-------3 *Pleasurable*

Bad 3-------2-------1-------0-------1-------2-------3 *Good*

Foolish 3-------2-------1-------0-------1-------2-------3 *Wise*

Harmful 3-------2-------1-------0-------1-------2-------3 *Beneficial*

Useless 3-------2-------1-------0-------1-------2-------3 *Useful*

Unimportant 3-------2-------1-------0-------1-------2-------3 *Important*

Most people who are important to me think that I should eat at least 5 portions of fruit and vegetables every day in the next 7 days.

Strongly disagree 1-------2-------3-------4-------5-------6-------7 *Strongly agree*
Very unlikely 1-------2-------3-------4-------5-------6-------7 *Very likely*

People who are important to me would disapprove/approve of me eating at least 5 portions of fruit and vegetables every day in the next 7 days.
Disapprove 1-------2-------3-------4-------5-------6-------7 *Approve*

Most people I know will eat at least 5 portions of fruit and vegetables every day in the next 7 days.
Strongly disagree 1-------2-------3-------4-------5-------6------7 *Strongly agree*
Very unlikely 1-------2-------3-------4-------5-------6-------7 *Very likely*

Of the people you know, how many will eat at least 5 portions of fruit and vegetables every day in the next 7 days?
None 1-------2-------3-------4-------5-------6-------7 *All*

How much control did you have over whether or not you will eat at least 5 portions of fruit and vegetables every day in the next 7 days?
No control 1-------2-------3-------4-------5-------6-------7 *Complete control*

I feel in complete control of whether or not I will eat at least 5 portions of fruit and vegetables every day in the next 7 days.
Strongly disagree 1-------2-------3-------4-------5-------6-------7 *Strongly agree*

It is up to me whether or not I will eat at least 5 portions of fruit and vegetables every day in the next 7 days.
Strongly disagree 1-------2-------3-------4-------5-------6-------7 *Strongly agree*

I know for sure that if I wanted to I could eat at least 5 portions of fruit and vegetables every day in the next 7 days.
Strongly disagree 1-------2-------3-------4-------5-------6-------7 *Strongly agree*

If I wanted to, I could easily eat at least 5 portions of fruit and vegetables every day in the next 7 days.
Strongly disagree 1-------2-------3-------4-------5-------6-------7 *Strongly agree*

If I wanted to, I would find eating at least 5 portions of fruit and vegetables every day in the next 7 days easy.
Strongly disagree 1-------2-------3-------4-------5-------6-------7 *Strongly agree*

Page 7

During the last 7 days, I have...

	Strongly disagree						*Strongly agree*
... often had an intention to eat at least 5 portions of fruit and vegetables every day on my mind.	1	2	3	4	5	6	7
... constantly been aware of a desire to eat at least 5 portions of fruit and vegetables every day.	1	2	3	4	5	6	7
... consistently monitored whether I eat at least 5 portions of fruit and vegetables every day.	1	2	3	4	5	6	7
... taken care to eat fruit and vegetables throughout the day to achieve at least the recommended 5 portions of fruit and vegetables every day.	1	2	3	4	5	6	7
... really tried hard to regularly eat at least 5 portions of fruit and vegetables every day.	1	2	3	4	5	6	7
... done my best to meet my standards for eating at least 5 portions of fruit and vegetables every day.	1	2	3	4	5	6	7

Page 8

DAILY FOOD CHECKLIST

VEGETABLES, FRESH, FROZEN, CANNED, DRIED

In the last 24 HOURS, about how many portions did you eat of the following vegetables? (Please select one radio button on each line)

If you need to, you can get information on portion sizes by clicking HERE. (link to http://www.nhs.uk/Livewell/5ADAY/Pages/Portionsizes.aspx)

	None	¼	½	1	2	3+
Avocado	○	○	○	○	○	○
Beans, green, broad, runner	○	○	○	○	○	○
Beans, lentils, peas (dried)	○	○	○	○	○	○
Beansprouts	○	○	○	○	○	○
Beetroot	○	○	○	○	○	○
Broccoli/calabrese	○	○	○	○	○	○
Brussel sprouts	○	○	○	○	○	○

Cabbage or spring greens	○	○	○	○	○	○
Carrot	○	○	○	○	○	○
Cauliflower	○	○	○	○	○	○
Celery	○	○	○	○	○	○
Coleslaw	○	○	○	○	○	○
Cucumber	○	○	○	○	○	○
Garlic [clove]	○	○	○	○	○	○
Leek	○	○	○	○	○	○
Lettuce	○	○	○	○	○	○
Marrow or courgette	○	○	○	○	○	○
Mushrooms	○	○	○	○	○	○
Mustard & Cress, watercress	○	○	○	○	○	○
Onion, cooking	○	○	○	○	○	○
Onion, spring	○	○	○	○	○	○
Parsnip	○	○	○	○	○	○
Peas, fresh or frozen	○	○	○	○	○	○
Peas, tinned	○	○	○	○	○	○
Pepper (red/green)	○	○	○	○	○	○
Radishes	○	○	○	○	○	○
Spinach	○	○	○	○	○	○
Squash	○	○	○	○	○	○
Swede, turnip	○	○	○	○	○	○
Sweetcorn	○	○	○	○	○	○
Tomatoes, fresh	○	○	○	○	○	○
Tomatoes, tinned	○	○	○	○	○	○
Other fresh herbs	○	○	○	○	○	○
Mixed salad	○	○	○	○	○	○
Mixed vegetables	○	○	○	○	○	○
Vegetabl based soup	○	○	○	○	○	○
Pulse (lentil) based soup	○	○	○	○	○	○

Other vegetables you have eaten in the last 24 HOURS that are not on the list (e.g. celeriac, asparagus, fennel, aubergine, pumpkin).

Please include the number of portions (e.g. celeriac - 1/4).

Page 9

FRUIT

In the last 24 HOURS, about how many portions did you eat of the following fruits? (Please select one radio button on each line)

If you need to, you can get information on portion sizes by clicking HERE. (link to http://www.nhs.uk/Livewell/5ADAY/Pages/Portionsizes.aspx)

	None	¼	½	1	2	3+
Apple	○	○	○	○	○	○
Apricot	○	○	○	○	○	○
Banana	○	○	○	○	○	○
Berries, e.g. raspberries, strawberries, blueberries, blackcurrants	○	○	○	○	○	○
Cherries	○	○	○	○	○	○
Dried fruit, e.g. raisins, prunes [30g handful]	○	○	○	○	○	○
Fruit salad, fresh	○	○	○	○	○	○
Fruit salad, canned	○	○	○	○	○	○
Grapes	○	○	○	○	○	○
Grapefruit	○	○	○	○	○	○
Mango	○	○	○	○	○	○
Melon	○	○	○	○	○	○
Orange, satsuma	○	○	○	○	○	○
Peach, nectarine	○	○	○	○	○	○
Pear	○	○	○	○	○	○
Pineapple	○	○	○	○	○	○
Plum	○	○	○	○	○	○
Real fruit juice (100%), e.g. orange, apple [medium glass]	○	○	○	○	○	○
Rhubarb	○	○	○	○	○	○
Stewed fruit with sugar	○	○	○	○	○	○
Watermelon	○	○	○	○	○	○

Other fruit you have eaten in the last 24 HOURS that are not on the list (e.g. pomegranate, kiwi, papaya, Sharon fruit).

Please include the number of portions (e.g. pomegranate - 1/2).

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Lastly, before you finish, we would like to ask you some questions about this study.

What do you think the purpose of the experiment was?

Did you think any of the tasks were related in any way? 0 No 1 Yes

If yes, can you tell us something about how?

Do you feel that your responses on any of the later tasks were influenced by your response to on an earlier task? 0 No 1 Yes

If yes, can you tell us something about how?

Have you completed any of these tasks before today? 0 No 1Yes

If yes, can you briefly describe which one and when.

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Thank you!
Thank you very much for taking the time to complete this study.

The main purpose of this study was to look at how different personality aspects relate to how people evaluate information, specifically health-related information on the benefits of fruit and vegetable consumption and whether some people are more likely to increase their fruit and vegetable consumption after they had read the message. Additionally, we wanted to see whether writing or reading about values would influence people's mood or evaluation of the information. Some of you were asked to write about a personally important or unimportant value and some of you were asked to read a story about someone else.

You will shortly receive 5 course credits for your participation. If they don't show up within a couple of days, or it's close to the deadline, then feel free to drop me an email to make sure they are processed promptly.

If you would like to receive payment in return for your participation (instead of course credits), please also email me to arrange this.

Please also don't hesitate to get in touch with any questions about the study, or if you'd like to withdraw your data now that you know the purpose of the study.

Many thanks for your time!

Philine Harris (philine@sussex.ac.uk)

The University of Sussex has insurance in place to cover its legal liabilities in respect of this study.

For advice on any of the topics touched upon in this questionnaire, you can contact student support… http://www.sussex.ac.uk/studentsupport/

…as well as the Student Life Centre http://www.sussex.ac.uk/studentlifecentre/

For more information on general mood, as well as on stress, anxiety and depression, visit the NHS Choices Moodzone:
http://www.nhs.uk/Conditions/stress-anxiety-depression/Pages/low-mood-stress-anxiety.aspx

For more advice on eating five portions of fruit and vegetable and information on a healthy diet, click here:
http://www.nhs.uk/LiveWell/5ADAY/Pages/5ADAYhome.aspx