Can self-affirmation exacerbate adverse reactions to stress under certain conditions?

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Disclosure statement: The authors declare that they have no conflict of interest.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Word count (including abstract, references, tables and figure captions) = 5,975

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Abstract

Objective. Self-affirmation has repeatedly been shown to reduce adverse psychological and physiological responses to stress. However, it is plausible that self-affirmation could *exacerbate* negative reactions to stress under certain conditions. The current research explored whether self-affirmation would increase negative psychological responses to a stressor occurring in a central life domain characterised by low levels of control.

Design: Female participants (Study 1 $N = 132$; Study 2 $N = 141$) completed baseline measures of anxiety and mood. They were then randomly allocated to complete a self-affirmation or control task, before reading a narrative documenting a stressful birth and imagining themselves in the place of the woman giving birth. After completing this task, participants again reported their levels of anxiety and positive mood.

Main outcome measures: Anxiety and positive mood assessed at follow-up.

Results: Study 1 demonstrated that self-affirmed women experienced increased anxiety and less positive mood at follow-up, compared both to baseline and to women in the control condition. Study 2 revealed that the effect of self-affirmation on outcomes was moderated by fear of childbirth.

Conclusion: These results provide preliminary evidence that self-affirmation may worsen negative responses to stressors under certain conditions and for certain individuals.

Keywords: self-affirmation, stress, defensive processing, birth story

Stressful events have the potential to precipitate emotional and physiological responses that may negatively impact health (Carver & Vargas, 2011; Sherman & Cohen, 2006). Thus, stress can promote emotional distress, adversely impact both the immune and the cardiovascular systems, and lead to maladaptive coping behaviours such as substance misuse, all of which potentially have consequences for health outcomes (Carver & Vargas, 2011). Indeed, stress has been implicated in the onset and progression of many mental and physical health conditions, including anxiety, depression, diabetes, and coronary heart disease (Creswell et al., 2005). Given the improbability of divesting our lives of stress, it is not surprising that much time and effort has been expended searching for techniques to reduce its potentially harmful impact.

Self-affirmation has been heralded as one such technique. It is suggested that affirming the self (e.g., by reflecting on personally important values) boosts psychological resources and self-worth, allowing people to decouple the threat from ego-defence concerns and to view stressful events 'in the context of the big picture' (Cohen & Sherman, 2014, p. 339). In this way, self-affirmation is thought to broaden people's perspective beyond a particular threat, with the result that potential stressors should have less of an influence on mental and physical wellbeing (Cohen & Sherman, 2014; Sherman, 2013; Sherman & Hartson, 2011).

In support of this position, self-affirmation has been shown to reduce the psychological and physiological impact of both experimental (Creswell et al., 2005; Creswell, Dutcher, Klein, Harris, & Levine, 2013; Tang & Schmeichel, 2015) and naturalistic stressors (Creswell et al., 2007; Morgan & Harris, 2015; Sherman, Bunyan, Creswell, & Jaremka, 2009). For example, Creswell et al. (2005) showed that self-affirmed participants who had to give a speech in front of a hostile audience did not display elevated cortisol levels, whereas their non-affirmed counterparts did. Furthermore, Tang and Schmeichel (2015) found that self-affirmation was associated with reduced cardiovascular reactivity after receiving insulting

feedback on an essay. In more naturalistic contexts, Sherman et al. (2009) demonstrated that self-affirmed participants had reduced epinephrine responses and experienced less worry in relation to exam stress. Relatedly, Morgan and Harris (2015) revealed that a self-affirmation intervention resulted in lower levels of anxiety among employees at an educational institution undergoing organizational downsizing. It may thus be tempting to regard self-affirmation as a panacea in stressful situations. However, we speculated that self-affirmation might exacerbate negative reactions to stressful events under certain circumstances, for the reasons explained below.

A core prediction derived from self-affirmation theory is that self-affirmation allows individuals to process threatening information more openly, without resorting to defensive responses. This prediction has received extensive empirical investigation and a considerable body of evidence supports it (Cohen & Sherman, 2014; Epton, Harris, van Koningsbruggen, Kane, & Sheeran, 2014; Sweeney & Moyer, 2014). Most studies focus on situations where defensive processing can be harmful, for example by fostering resistance to health information, such that reduced defensiveness is generally regarded as a positive outcome (Cohen & Sherman, 2014). It is acknowledged, however, that self-affirmation may result in detrimental effects when defensive responses are advantageous (Munro & Stansbury, 2009; Sherman & Hartson, 2011), where detrimental effects can be considered to encompass responses that conflict with adaptive functioning and/or well-being. Thus, Munro & Stansbury (2009) demonstrated that self-affirmation resulted in *less* accurate judgments of misleading, threatening information. This finding was consistent with their prediction that self-affirmation would reduce beneficial defensive responses, which would normally result in individuals processing such threatening information more sceptically.

Defensive responses to stressful events may also be adaptive under certain circumstances. Defensiveness comprises an important part of the psychological immune system (Gilbert,

Pinel, Wilson, Blumberg, & Wheatley, 1998), and can help reduce negative emotions that might otherwise interfere with effective self-regulation and coping (van t'Riet & Ruiter, 2013). When individuals are confronted with a stressor occurring in a central life domain, over which they have little actual control (e.g., bereavement, terminal illness, traumatic birth), defensive responses – such as denial and avoidance – may provide a valuable means of attenuating adverse psychological and physiological reactions (Vaillant, 2000).

Research to date which has documented beneficial effects of a self-affirmation manipulation on stress responses has tended to focus on stressors such as giving a speech (Creswell et al., 2005) or taking exams (Sherman et al., 2009), where an increased sense of perspective may well allow individuals to place the stressor in the context of the bigger picture and hence reduce its potential impact on wellbeing. By contrast, self-affirmation's capacity to remind people of the bigger picture seems unlikely to ameliorate a threat to, for example, the life of one's child; indeed the increased perspective afforded by self-affirmation might arguably be expected to highlight the severity of the issue. Furthermore - and critically - the very defensive responses that are reduced by self-affirmation may provide the only line of psychological immunity in such situations, and hence the only means of lessening adverse psychological and physiological reactions. It is plausible, therefore, that a self-affirmation manipulation might increase negative responses to such stressful events. It is important to establish whether this is the case as, otherwise, self-affirmation interventions might ill-advisedly be implemented in such contexts, with potentially harmful consequences

The present research

In short, following on from the reasoning that self-affirmation might be disadvantageous when defensive responses are beneficial (Sherman & Hartson, 2011), we hypothesize that self-affirmation will make people more vulnerable to the adverse consequences of stressors that occur in central life domains characterised by low control. Given the direction of our

predictions, it was not ethical to explore the impact of self-affirmation on individuals actually undergoing such stressful events. Accordingly, we utilized imagined stressful scenarios to test our hypothesis empirically. More specifically, in both studies, female participants were asked to imagine themselves giving birth in a scenario where (a) they experienced various medical complications such that the unborn child's life was potentially in danger and (b) there was low maternal control.

Study 1 investigated the overall impact of self-affirmation on women's psychological responses to imagining themselves in the resultant birth scenario, operationalized in terms of anxiety and mood. Study 2 extended this research by exploring the moderating role of two variables which might capture individual differences in vulnerability to the stressful event: fear of childbirth and confidence about giving birth. We report all measures, manipulations, and exclusions for both studies.

Study 1

Study 1 explored the impact of a self-affirmation manipulation on levels of anxiety and positive mood experienced by women after reading a narrative documenting a stressful birth with low maternal control and being asked to imagine themselves in the place of the woman giving birth. In line with the rationale outlined above, we predicted that self-affirmation would lead to increases in anxiety and reductions in positive mood following exposure to this narrative.

Method

Participants

Participants were 132 women. The majority were White European (90%), educated to undergraduate degree level or above (70%), and nulliparous (74%). Approximately one third (34%) were married or co-habiting with their partner. In terms of employment status, 61% were employed, 29% were students, and 4% were unemployed (the remaining participants

either selected the category “other” or elected not to say). Ages ranged from 17 to 68 years (M = 29.97; SD = 12.12).

Procedure, materials and design

Participants were recruited opportunistically through contacts of one of the researchers using email and the social media website Facebook and invited to take part in an online study about childbirth. The recruitment message included the link to the online questionnaire. The inclusion criteria, specified at the start of the questionnaire, were that participants should be female and aged 18 years or over[1]. A power calculation revealed that we required a minimum sample size of 46 in order to detect a medium effect size (f) of 0.25 with a .90 level of power. The study was initially left on line for two weeks; data collection was stopped at this time point as we had exceeded our target minimum sample size. Data analysis did not commence until data from all participants had been collated.

The study employed an experimental design and utilised an online questionnaire. Participants first completed socio-demographic variables followed by baseline measures of (a) anxiety, assessed using the state form of the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), α = .92, and (b) positive mood, assessed using the hedonic subscale of the UWIST Mood Adjective Checklist (UMACL; Matthews, Jones, & Chamberlain, 1990), α = .87. The state form of the STAI comprises 20 items (e.g., “I am tense”; “I feel nervous”). Participants were asked to indicate how they felt right now on 4-point response scales ranging from *not at all* (1) to *very much so* (4). The hedonic subscale of the UMACL comprises eight mood-related adjectives (e.g., “cheerful”, “sad”). Participants were asked to rate the extent to which each adjective applied to their current mood on 4-point response scales ranging from *definitely not* (1) to *definitely* (4);

[1] One participant who completed the study indicated that her age was actually 17. As we could see no reason for excluding this participant, her data were retained in analyses.

negatively valenced adjectives were reverse coded. For cases with missing data, we imputed the within-participant mean response prior to calculating total anxiety and mood scores[2].

Participants were next randomly assigned to either the self-affirmation condition (n = 72) or the control condition (n = 60) by the host website. Participants in both conditions were presented with a list of 11 example values on the next page of the online questionnaire (e.g., conscientiousness, compassion, and intelligence). In line with previous self-affirmation research (e.g. Harris et al., 2014), participants in the self-affirmation condition were asked to select their most important value (this did not have to appear on the list) and type it in the space provided. They were then asked to give three reasons why their chosen value was important to them, and describe an example of something they had done to demonstrate its personal importance; open text boxes were provided for participants to type their responses. Participants in the control condition were asked to select their least important value and respond to parallel questions about why this value might be important to someone else. Participants in both conditions rated the personal importance of the value they had chosen on a 7-point scale ranging from *extremely unimportant* (1) to *extremely important* (7).

All participants then read a birth story (approximately 400 words) describing a birth with complications, a high level of medical intervention and a low level of maternal control (Ford & Ayers, 2009). Specifically, the narrative included such details as the midwife being unable to find the unborn baby's heartbeat, the unborn baby being in distress, the need for a medically assisted delivery (episiotomy and ventouse), and the baby being taken away to be given oxygen at birth. Participants were asked to imagine themselves in the place of the woman giving birth and to consider the emotions and thoughts they would have.

[2] At baseline, 20 participants failed to complete at least one STAI item and two participants omitted an item from the hedonic mood scale. In all instances, participants with such missing data completed at least 75% of the items in each scale.

Participants subsequently completed single item measures assessing three dimensions of perceived control (e.g., 'How much control would you imagine you had during those events?'). Responses were given on 7-point scales with appropriate anchors (e.g., *none at all* [1] to *complete control* [1]). They were also asked to indicate what had affected their level of control.

Next, participants again responded to the same measures of anxiety and positive mood assessed at baseline, αs = .94 and .90 respectively[3]. They also completed two items assessing the extent to which they had successfully imagined (themselves in) the story (e.g., 'How well did you imagine yourself in the story?'), $r(128) = .77$, $p < .001$, and two items assessing their level of empathy with the woman giving birth (e.g., 'How much were you able to empathize with the person in the story?'), $r(128) = .72$, $p < .001$. Responses were given on 7-point scales with appropriate anchors (*very poorly* [1] to *very well* [1] for the imagination items and *not at all* [1] to *very much* [1] for the empathy items). Mean scores were computed for both imagination and empathy. Analyses pertaining to the influence of self-affirmation on empathy are available via the supplemental material available online. Lastly, participants completed several items, which assessed (a) whether the birth story reminded them of any prior personal experience and (b) their thoughts about the study. These items were included solely to explore participants' experiences of reading the birth story and to allow them the opportunity to voice any thoughts they may have had about the study. They were not intended to form predictor or outcome variables and, hence, responses are not analysed further in the

[3] At follow-up, 25 participants failed to complete at least one STAI item and seven participants omitted at least one item from the hedonic mood scale. In all but two instances, participants with missing data completed at least 75% of the items in each scale. A further five participants did not complete any of the STAI items at this time point and two participants did not complete any of the hedonic mood items. These latter participants' data were excluded from analyses focusing on anxiety and mood respectively.

present paper. Ethical approval for the study was obtained from the institutional Ethics Committee.

Results

Preliminary analyses

Baseline anxiety scores ranged from 20 to 72 (M = 36.89; SD = 9.20); baseline positive mood scores ranged from 13 to 32 (M = 26.49; SD = 4.39). A series of oneway ANOVAs and Chi-Square analyses revealed no significant differences between conditions on ethnicity (White European or other), employment status (employed vs. other), education (educated to undergraduate degree level or above vs other), parity, age, baseline anxiety or baseline positive mood (ps > .26).

Manipulation checks

Participants in the self-affirmation condition rated the value they chose to write about as more important to them than did those in the control condition, $F(1, 126) = 83.31$, $p < .001$, $\eta_p^2 = .40$; Ms 5.86 and 2.81 respectively, confirming that they had selected a more personally important value to write about. Participants rated the amount of control they perceived having during the birth as low (significantly below the scale mid-point) on all 3 dimensions (all ts < -8.11; all ps < .001), confirming that maternal control was generally regarded as low. Participants' scores on the measure of imagination were significantly higher than the scale mid-point, $t(131) = 8.56$, $p < .001$, indicating the participants had engaged with the birth story task as requested. There were no significant differences between conditions on the measures of control or imagination (all Fs < 2.76; ps > .099; η_p^2s < .022)

The effect of self-affirmation on anxiety and mood

To explore whether the self-affirmation manipulation influenced the levels of anxiety or mood experienced after exposure to the birth story, we conducted two repeated measures ANOVAs with condition (control vs. self-affirmation) as the between-participants variable

and time (baseline vs. post-manipulation) as the within-participants variable. Anxiety and mood scores were entered in turn as the dependent variables. These analyses revealed the predicted significant interaction between condition and time for both anxiety and positive mood, $F(1, 125) = 7.36$, $p = .008$, $\eta_p^2 = .06$ and $F(1, 128) = 4.10$, $p = .045$, $\eta_p^2 = .03$ respectively (Table 1; Figures 1 and 2)[4].

[Table 1 near here]

[Figure 1 near here]

[Figure 2 near here]

To follow up these significant interaction effects, we first conducted separate within-participants ANOVAs in order to test whether there were changes in anxiety and mood across time for participants in the (a) self-affirmation and (b) control condition. These showed that self-affirmed women experienced significant increases in anxiety and significant reductions in positive mood following exposure to the birth story, $F(1, 69) = 20.49$, $p < .001$, $\eta_p^2 = .23$ and $F(1, 70) = 17.29$, $p < .001$, $\eta_p^2 = .20$, respectively. There was no impact of the birth story on non-affirmed participants' anxiety levels, $F(1, 56) = 1.82$, $p = .183$, $\eta_p^2 = .03$. There was, however, a significant reduction in their positive mood, albeit not of the same magnitude as that experienced by women in the self-affirmation condition, $F(1, 58) = 5.76$, $p = .020$, $\eta_p^2 = .09$.

We also conducted ANCOVAs to follow up the significant interaction effects, in order to establish whether self-affirmed women differed from their non-affirmed counterparts in anxiety or mood after exposure to the birth story. ANCOVA on post-manipulation anxiety controlling for baseline anxiety revealed a main effect of condition, $F(1, 124) = 7.52$, $p = .007$, $\eta_p^2 = .06$; self-affirmed women experienced significantly higher levels of post-

[4] Controlling for parity did not alter the patterns of findings.

manipulation anxiety, controlling for baseline anxiety, than women in the control condition, marginal means 41.91, 95% CI [40.11, 43.72] and 38.18, 95% CI [36.18, 40.18] respectively. Similarly, ANCOVA on post-manipulation positive mood controlling for baseline positive mood revealed a main effect of condition, F (1, 127) = 4.48, p = .036, η_p^2 = .03; women in the self-affirmation condition reported significantly lower levels of post-manipulation positive mood, controlling for baseline positive mood, than participants in the control condition, marginal means 24.57, 95% CI [23.81, 25.33] and 25.78, 95% CI [24.94, 26.61] respectively.

Discussion

The findings of Study 1 support the hypothesis that self-affirmation may increase negative psychological responses to an imagined stressful event occurring in a central life domain characterised by low levels of control. Specifically, women who were self-affirmed experienced increased anxiety and reduced positive mood after imagining themselves in a birth situation where their unborn child's life was potentially at risk and there was little they could do about it. By contrast, the birth story had no impact on non-affirmed women's anxiety, and a lesser influence on their mood. Moreover, self-affirmed women experienced significantly more anxiety and less positive mood after reading the birth story compared to their non-affirmed counterparts.

Study 2

While Study 1 evidenced main effects of self-affirmation on outcomes, it is important to explore the parameters under which any such backlash effects of self-affirmation might be particularly likely to occur. One potential such parameter pertains to the individual characteristics of participants. Some previous applications of self-affirmation to stress have found effects to be strongest for those participants most vulnerable to the stressor under investigation, presumably because these individuals are most likely to benefit from the

increased sense of perspective afforded by self-affirmation. Thus, Sherman et al. (2009) found that the buffering effect of self-affirmation on epinephrine responses was most apparent for those students who were the most "psychologically vulnerable" (p. 558), insofar as they were concerned about being evaluated negatively at college. Relatedly, research has shown that the effects of self-affirmation on reactions to threatening health-related information are greatest for those most vulnerable to the health threat. For example, self-affirmation-related reductions in defensive processing have been shown to be most evident for (or confined to) heavier drinkers and smokers after exposure to information about the risks of alcohol consumption and smoking respectively (Harris, Mayle, Mabbot, & Napper, 2007; Harris & Napper, 2005). This, presumably, is a consequence of these individuals being more likely to engage in defensive responses under control conditions (van t'Riet & Ruiter, 2013), and hence more greatly affected by self-affirmation's capacity to reduce defensive processing.

In circumstances where self-affirmation could potentially *exacerbate* negative reactions to a stressful event, we similarly hypothesize that any effects might also be most evident for those who are most vulnerable to the stressor in question. In particular, we speculate that these individuals may be especially reliant on defensive responses to mitigate negative reactions to the stressful event, and hence most adversely affected by self-affirmation's capacity to undermine defensive responding.

In the context of birth we reasoned that women who either (1) were particularly fearful of childbirth or (2) had low levels of confidence surrounding their ability to give birth might be particularly vulnerable to the birth story. Indeed, both fear and low levels of confidence can result in a greater likelihood of defensive responding when faced with a threat (Ruiter, Abraham, & Kok, 2001). We therefore hypothesized that these variables might moderate the impact of self-affirmation on outcomes, with those high in fear or low in confidence being

most likely to experience increased anxiety and reduced positive mood after exposure to the birth story.

Method

Participants

Participants were 141 women. The majority were White European (74%) and nulliparous (94%). Less than 10% were married or co-habiting with their partner. In terms of employment status, 72% were students, 21% were employed, and 2% were unemployed (the remaining participants either selected the category "other" or elected not to say). Ages ranged from 18 to 55 years (M = 22.61; SD = 5.00).

Procedure, materials and design

Participants were recruited opportunistically through contacts of one of the researchers[5] using email or the social media website Facebook and invited to take part in an online study about childbirth. The recruitment message included the link to the online questionnaire. The inclusion criteria, specified at the start of the questionnaire, were that participants should be female and aged 18 years or over. A power calculation revealed that we required a minimum sample size of 108 in order to detect a medium effect size (f^2) of 0.15 with a .90 level of power. The study was left on line for eight weeks; data collection was stopped at this time point as we had exceeded our target minimum sample size. Data analysis did not commence until data from all participants had been collated.

The study employed an experimental design and utilised an online questionnaire. Participants first completed socio-demographic variables followed by the same baseline measures of anxiety (α = .93) and positive mood (α = .89) utilized in Study 1[6]. They next

[5] This researcher was not the same person who provided the contacts for Study 1.

[6] At baseline, 18 participants failed to complete at least one STAI item and four participants omitted an item from the hedonic mood scale. In all instances, participants with such missing data completed at least 75% of the

completed three items assessing fear of childbirth (e.g., 'I am fearful of the labour process'), α = .81, and three items assessing confidence about giving birth (e.g., 'I feel that my body is able to successfully birth a child'), α = .61 (Stoll & Hall, 2013[7]). Responses to these items were given on 7-point scales ranging from *disagree strongly* (1) to *agree strongly* (7). Mean scores were computed for both scales. Participants also completed two items assessing their overall attitude towards childbirth not analysed further here.

Participants were next randomly assigned by the host website to complete the same self-affirmation (n = 76) or control (n = 65) task as Study 1, before reading the same birth story used in the previous study. They subsequently responded to the Study 1 items assessing perceived control before again completing the same measures of anxiety and positive mood assessed at baseline, αs = .94 and .90 respectively[8]. Participants also completed the same

items in each scale. A further participant did not complete any of the STAI items at this time point and hence this participant's data were excluded from analyses focusing on anxiety.

[7] Stoll and Hall (2013) combined responses from all six items to form one scale; however face validity indicated that three of the items assessed fear of birth whilst three assessed confidence about giving birth. In support of this, in the present study principal components analysis identified two components with Eigenvalues > 1. Item loadings confirmed the hypothesized two factor structure, with the three items tapping fear loading onto one factor and the three items tapping confidence loading onto a second. All item loadings were greater than .65. The resultant scales were correlated at $r(138) = -.31$, $p < .001$.

[8] At follow-up, 29 participants failed to complete at least one STAI item and 2 participants omitted one item from the hedonic mood scale. In all but three instances, participants with missing data completed at least 75% of the items in each scale. A further two participants did not complete any of the STAI items at this time point and three participants did not complete any of the hedonic mood items. These latter participants' data were excluded from analyses focusing on anxiety and mood respectively.

measures of imagination and empathy as used in Study 1, $r(138) = .61$, $p < .001$ and $r(135) = .60$, $p < .001$ respectively[9]. Analyses pertaining to the influence of self-affirmation on empathy are available via the supplemental material available online. Ethical approval for the study was obtained from the institutional Ethics Committee.

Results

Preliminary analyses

Baseline anxiety scores ranged from 20.00 to 68.42 ($M = 39.10$; $SD = 10.67$); baseline positive mood scores ranged from 8.00 to 32.00 ($M = 25.16$; $SD = 4.86$); baseline fear of childbirth scores ranged from 1.00 to 7.00 ($M = 5.16$; $SD = 1.35$); and baseline confidence about giving birth scores ranged from 1.67 to 7.00 ($M = 5.08$; $SD = 1.04$). A series of oneway ANOVAs and Chi-Square analyses revealed no significant differences between conditions on ethnicity (White European or other), student status (student vs. other), parity, age, or baseline measures of anxiety, positive mood, fear of childbirth or confidence about giving birth ($ps > .13$).

Manipulation checks

[9] In addition to those measures described above, participants completed a number of additional items after the experimental manipulation. These assessed (1) post-manipulation fear of childbirth, confidence about giving birth and overall attitude towards childbirth and (2) whether the birth story reminded them of any prior personal experience. These items were presented after the post-manipulation measures of anxiety and positive mood. Furthermore, participants completed further questionnaires at 1- and 7-day follow up assessing anxiety, positive mood, fear of childbirth, confidence about giving birth, overall attitude towards childbirth and (in the final questionnaire only) their thoughts about the study. These measures are not analyzed further in the present paper, as they are not central to our core prediction that self-affirmation would impact women's psychological reactions to the birth story (i.e., that self-affirmation would lead to increases in anxiety and reductions in positive mood immediately after reading the birth story). Analyses of the data pertaining to the impact of self-affirmation on anxiety and positive mood at 1- and 7-day follow up are reported in the supplemental materials.

Participants in the self-affirmation condition rated the value they chose to write about as more important to them than did those in the control condition, $F(1, 134) = 95.11$, $p < .001$, $\eta_p^2 = .42$; *M*s 5.96 and 2.94 respectively, confirming that they had selected a more personally important value to write about. Participants rated the amount of control they perceived having during the birth as low (significantly below the scale mid-point) on all 3 dimensions (all *t*s < -6.00; *p*s < .001), confirming that maternal control was generally regarded as low. Participants' scores on the measure of imagination were significantly higher than the scale mid-point, $t(139) = 13.04$, $p < .001$, indicating the participants had engaged with the birth story task as requested. There were no significant differences between conditions on the measures of control or imagination (all *F*s < 1.36; *p*s > .24; η_p^2s < .01).

The effect of self-affirmation and fear of childbirth on anxiety and mood

In order to explore whether fear of childbirth moderated any impact of the self-affirmation manipulation on anxiety, we conducted a hierarchical multiple regression analysis. Standardized baseline anxiety scores were entered at step 1, condition (dummy coded with the self-affirmation condition allocated a value of 1 and the control condition a value of 0) was entered at step 2, standardized fear of childbirth scores were entered at step 3 and the interaction between condition and standardized fear of childbirth scores was entered at step 4. Continuous independent variables were standardized prior to analysis to reduce multi-collinearity; condition was dummy coded in line with the recommendations of Aiken & West (1991). Post manipulation anxiety scores were entered as the dependent variable; these latter data were not standardized in order to facilitate interpretation of figures and comparisons between studies. The resultant regression equation is summarized in Table 2.

[Table 2 near here]

Critically the interaction between condition and fear of childbirth was significant, $\Delta F(1, 132) = 4.31$, $p = .040$, $\Delta R^2 = .01$, demonstrating that fear of childbirth moderated the impact

of self-affirmation on anxiety. Simple slopes analysis (Figure 3) revealed that the self-affirmation manipulation was associated with higher levels of anxiety for those high in fear of childbirth and lower levels of anxiety for those low in fear of childbirth.

[Figure 3 near here]

To determine whether fear of childbirth moderated any impact of the self-affirmation manipulation on positive mood, we conducted the equivalent regression for post manipulation positive mood, controlling for standardized baseline positive mood scores at step 1 (Table 2). Again, the interaction between condition and fear of childbirth was significant, $\Delta F(1, 132) = 6.58$, $p = .011$, $\Delta R^2 = .01$, demonstrating that fear of childbirth also moderated the impact of self-affirmation on positive mood. Simple slopes analysis (Figure 4) revealed that the self-affirmation manipulation was associated with less positive mood for those high in fear of childbirth and more positive mood for those low in fear of childbirth.

[Figure 4 near here]

The effect of self-affirmation and confidence about giving birth on anxiety and mood

In order to explore whether confidence about giving birth moderated any impact of the self-affirmation manipulation on anxiety or mood, we conducted parallel regression analyses to those described above, with the exception that standardized confidence about giving birth scores were entered at step 3 and the corresponding interaction term was entered at step 4. The resultant regression analyses are summarized in Table 3. Confidence about birth did not significantly moderate the impact of condition on either outcome variable.

[Table 3 near here]

Discussion

The findings of Study 2 provide support for the hypotheses that, under circumstances where one might predict detrimental effects of self-affirmation on responses to a stressful event, these may be particularly apparent for those most vulnerable to (or – more specifically –

fearful of) the stressor. Specifically, self-affirmed women who were high in fear of childbirth tended to report greater anxiety and less positive mood after imagining themselves as the labouring mother in a traumatic birth story compared to their non-affirmed counterparts. By contrast, self-affirmed women low in fear of childbirth tended to report lower levels of anxiety and more positive mood. There was no evidence that confidence about giving birth moderated the effects of self-affirmation on outcomes.

General discussion

Overall, the findings of Study 1 reveal that self-affirmation can precipitate negative responses to an imagined stressful event occurring in a central life domain characterised by low levels of control – in this instance, a stressful birth scenario. The findings of Study 2 further document how such negative effects may be particularly apparent for women who are most fearful of childbirth, where fear of childbirth was used to provide an indicator of psychological vulnerability to the stressor under investigation (see also Sherman et al., 2009). These findings are consistent with the line of reasoning that self-affirmation might result in negative outcomes when defensive responses are advantageous (Sherman & Hartson, 2011) and contribute to a nascent literature documenting adverse consequences of self-affirmation on outcomes (e.g., Munro & Stansbury, 2009; Vohs, Park, & Schmeichel, 2013). The findings also complement a body of literature which has identified individual differences in vulnerability to the threat as an important moderator of self-affirmation effects (Harris, Mayle, Mabbot, & Napper, 2007; Harris & Napper, 2005; Sherman et al., 2009).

More specifically, the findings of Study 1 suggest that the sense of perspective and reduction in defensive processing fostered by self-affirmation could potentially backfire in the face of threats occurring in central life domains and characterised by low control. Defensive responses, such as being able to distance oneself psychologically from the situation and deny the importance of what is happening, may provide a valuable (and perhaps

the only) means of regulating adverse responses to such stressors. Furthermore, Study 2's findings suggest that reliance on such strategies may be particularly pronounced for those individuals most vulnerable to (or, more accurately, fearful of) the threat, with the consequence that these individuals might be most adversely affected by self-affirmation in such situations. In the context of childbirth, increased anxiety could precipitate further complications and be associated with poor outcomes. For example, experiencing negative emotions during birth is a risk factor for postpartum post-traumatic stress (Ayers, Bond, Bertullies, & Wijma, 2016).

The absence of a main effect of self-affirmation on outcomes in Study 2 is somewhat challenging to interpret. One potential explanation pertains to differences in sample characteristics between studies. Participants in Study 2 were, on average, 7 years younger than those Study 1. Furthermore, the majority were students and only a very small minority were co-habiting with their partner. As such, childbirth may represent a distant future event for these individuals, the importance (or centrality) of which is temporally discounted (see Frederick, Loewenstein, & O'Donoghue, 2002). Consequently, Study 2 participants may not have been reliant on defensive responses to negate the threat posed by the birth story, unless they were particularly fearful of childbirth. Given that self-affirmation should produce detrimental effects only when defensive responses are (a) utilized and (b) advantageous (Sherman & Hartson, 2011), this may be one reason why we found no evidence of an overall negative impact of self-affirmation on anxiety or mood in Study 2. Indeed, simple slopes analyses revealed that participants low in fear of childbirth tended to benefit from self-affirmation in a similar manner to that reported in prior applications of self-affirmation to stress (e.g., Creswell et al., 2005; Sherman et al., 2009). We should emphasise, however, that this demographic explanation is purely speculative and other reasons may underpin the absence of a main effect in Study 2. Irrespective of the explanation, our findings highlight the

importance of considering individual difference variables when exploring the impact of self-affirmation on outcomes (Düring & Jessop, 2014; Harris & Epton, 2010).

One core limitation to both studies is the reliance on an imagined stressful situation, specifically a hypothetical birth scenario. While scores indicate that participants were able to successfully imagine themselves in the place of the woman giving birth, the ecological validity of the study would, of course, have been improved by exploring the effects of self-affirmation on women during labour. As outlined previously, however, the nature of our hypotheses – coupled with the direction of our results - suggest that conducting such a study would be unacceptable from an ethical perspective.

Nonetheless, we cannot be certain that the apparent detrimental effects of the self-affirmation manipulation on outcomes would hold in a parallel 'real life' stressful situation. Indeed, both samples were predominantly nulliparous, which may have impacted their ability to imagine the birth authentically. Furthermore, we did not to restrict our sample to women who were planning to have children and/or women of childbearing age, which may have impacted the personal relevance of the stressful scenario. It is conceivable that, while self-affirmation may foster less defensive processing of imagined stressful events with attendant implications for psychological responses, its impact on people who are actually experiencing central domain stressors characterised by low levels of control might be different. Future research would certainly benefit from exploring the impact of self-affirmation on outcomes in a sample experiencing such stressful life events, if a situation can be envisaged where there would be no sustained adverse impact for recipients of the intervention.

A second limitation to the present research is our reliance on self-report measures of psychological reactions to the stressor, notably anxiety and mood. Research exploring whether that the effects reported here extend to physiological measures tapping stress responses would certainly be informative. It might also be beneficial to include a measure of

perceived stress to determine whether participants actually viewed the event as less stressful when self-affirmed.

In summary, the results of the current research are the first to show that self-affirmation can exacerbate negative psychological responses to imagined stressful life events under certain conditions and for certain individuals. By extension, the findings suggest that self-affirmation should not be regarded as a panacea to be rolled out in times of stress. Indeed, we recommend that self-affirmation should be implemented with caution, and only to the extent that the increased perspective and reduced defensiveness associated with self-affirmation is likely to be advantageous. Under other circumstances, self-affirmation may be harmful (Sherman & Hartson, 2011), in effect weakening the psychological immune system and leaving people more open to adverse consequences of having their defences undermined.

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Table 1. Mean anxiety and positive mood scores by condition and time, Study 1.

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	Control	Self-affirmation
	M (SD)	*M (SD)*
Anxiety		
Baseline	36.74 (9.07)	37.49 (9.22)
Post-manipulation	37.80 (10.39)	42.23 (12.24)
Positive mood		
Baseline	26.75 (4.24)	26.27 (4.55)
Post-manipulation	26.01 (4.28)	24.38 (5.70)

Table 2. Summary of hierarchical multiple regression analyses exploring moderation by fear of childbirth, Study 2.

Variables entered	**Anxiety**				Variables entered	**Positive Mood**			
	ß Step 1	ß Step 2	ß Step 3	ß Step 4		ß Step 1	ß Step 2	ß Step 3	ß Step 4
Baseline anxiety	.76***	.76***	.75***	.75***	Baseline positive mood	.86***	.86***	.85***	.86***
Condition		-.04	-.03	-.03	Condition		.00	.00	.00
Fear of Childbirth			.21***	.07	Fear of Childbirth			-.07	.06
Condition X Fear of Childbirth				.18*	Condition X Fear of Childbirth				-.17*
ΔR^2	.58***	.00	.04***	.01*	ΔR^2	.74***	.00	.01	.01*
ΔF	183.80***	0.42	14.93***	4.31*	ΔF	380.37***	0.00	2.88	6.58*

Note total df = 136. Step 1 change in R^2 and F are equivalent to the Step 1 model R^2 and F.

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

Table 3. Summary of hierarchical multiple regression analyses exploring moderation by confidence about giving birth, Study 2.

Variables entered	**Anxiety**				Variables entered	**Positive Mood**			
	ß Step 1	ß Step 2	ß Step 3	ß Step 4		ß Step 1	ß Step 2	ß Step 3	ß Step 4
Baseline anxiety	.76***	.76***	.75***	.76***	Baseline positive mood	.86***	.86***	.86***	.86***
Condition		-.04	-.04	-.04	Condition		.00	.00	.00
Confidence			-.03	.05	Confidence			.03	-.08
Condition X Confidence				-.10	Condition X Confidence				.13
ΔR^2	.58***	.00	.00	.00	ΔR^2	.74***	.00	.00	.01
ΔF	183.80***	0.42	0.24	1.04	ΔF	380.37***	0.00	0.37	3.10

Note total df = 136. Step 1 change in R^2 and F are equivalent to the Step 1 model R^2 and F.

*** $p < .001$.

Figure Captions

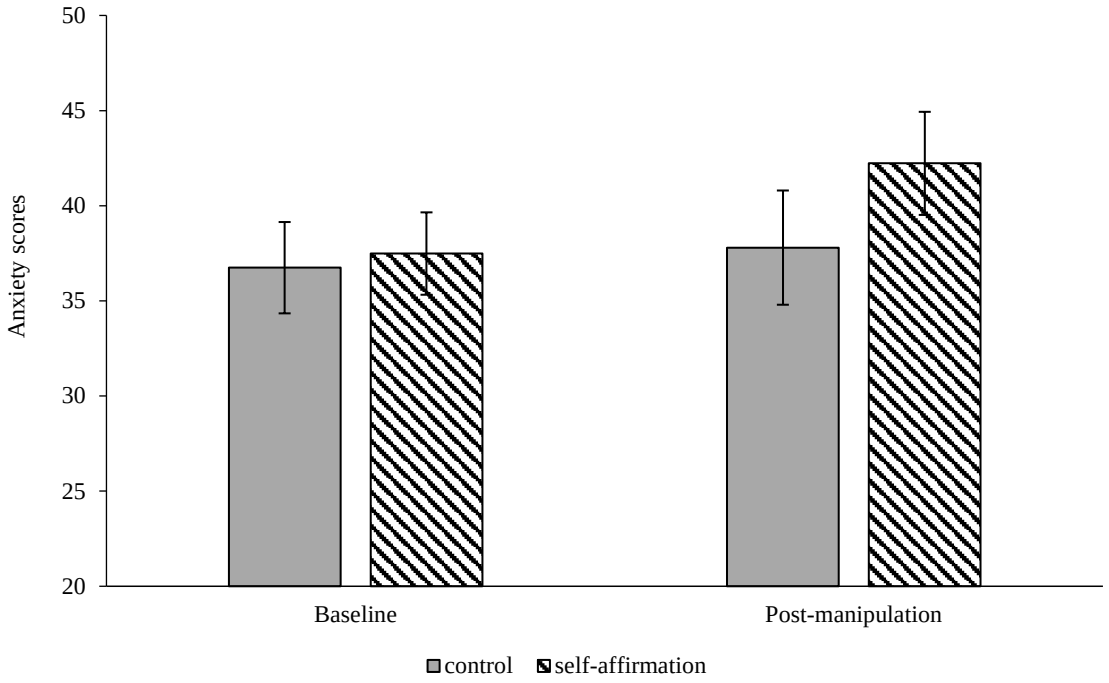
Figure 1. Mean anxiety scores as a function of condition and time, Study 1. Error bars represent 95% confidence intervals.

Figure 2. Mean positive mood scores as a function of condition and time, Study 1. Error bars represent 95% confidence intervals.

Figure 3. Anxiety regressed onto condition for participants with low, mean and high fear of childbirth, Study 2.

Figure 4. Positive mood regressed onto condition for participants with low, mean and high fear of childbirth, Study 2.

Figure 1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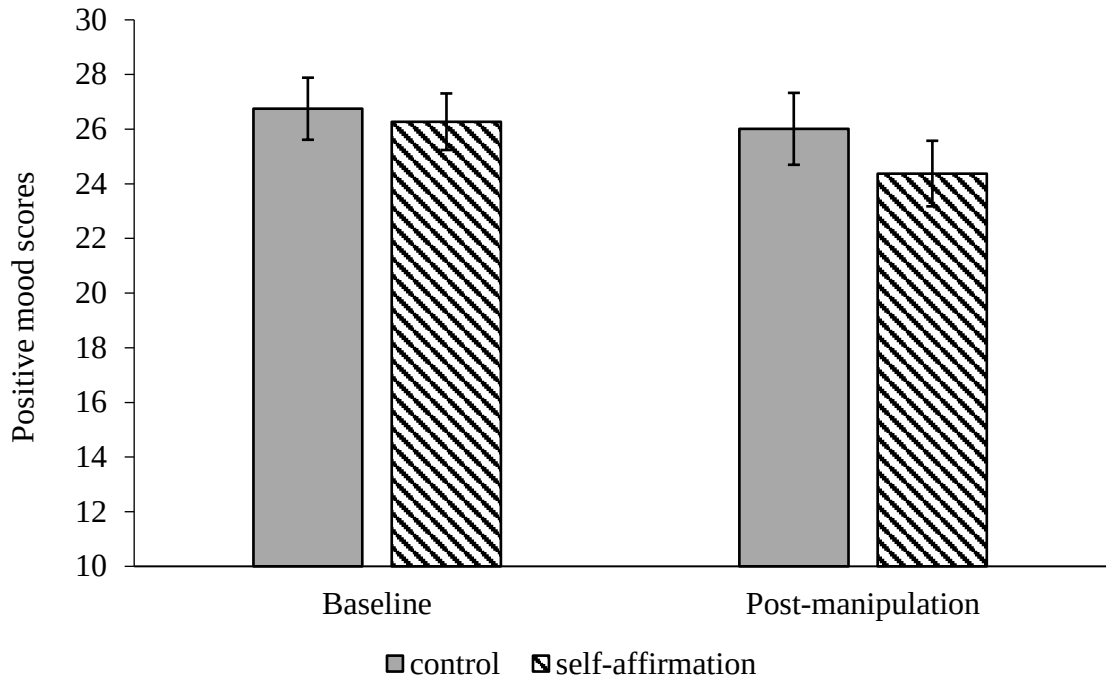
Anxiety scores
Baseline
Post-manipulation
control
self-affirmation

Figure 2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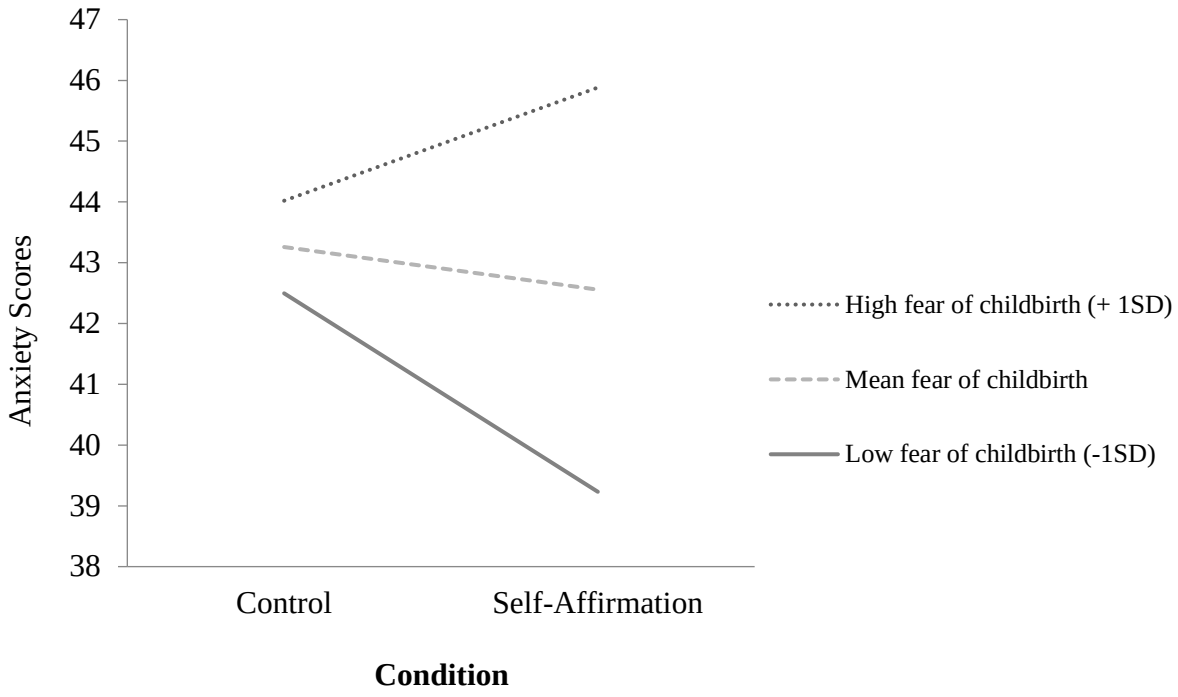
Positive mood scores
Baseline
Post-manipulation
control
self-affirmation

Figure 3


47
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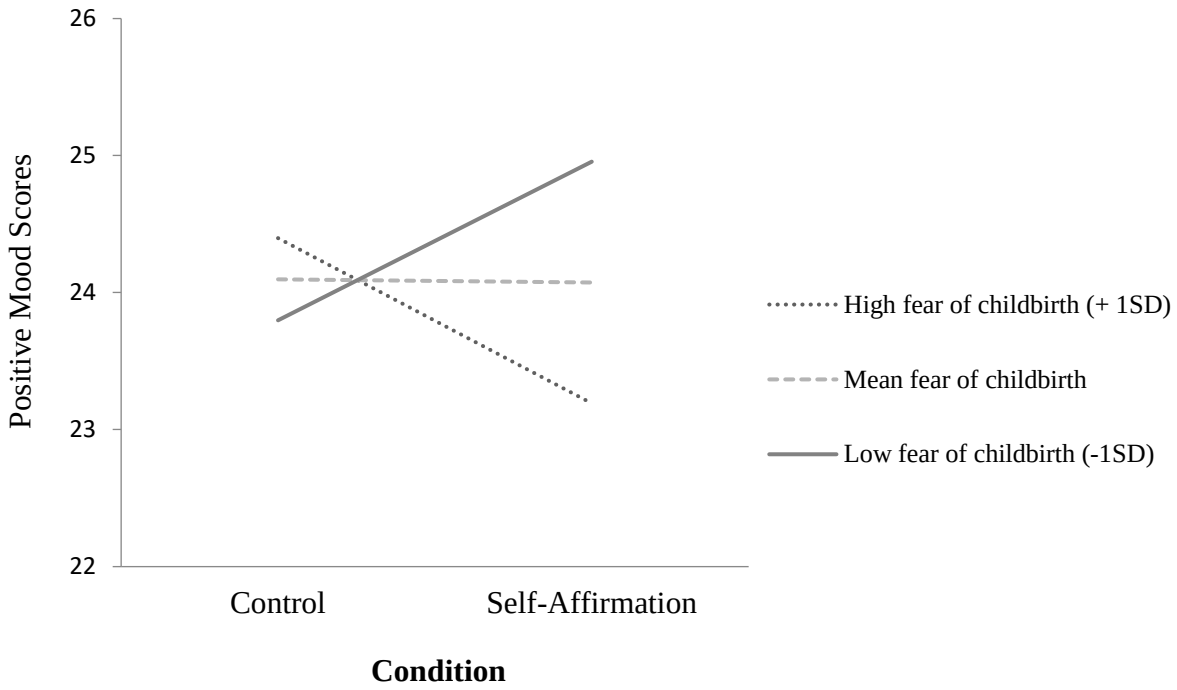
Anxiety Scores
Control
Self-Affirmation
Condition
High fear of childbirth (+ 1SD)
Mean fear of childbirth
Low fear of childbirth (-1SD)

Figure 4


26
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Positive Mood Scores
Control
Self-Affirmation
Condition
High fear of childbirth (+ 1SD)
Mean fear of childbirth
Low fear of childbirth (-1SD)