

Running Head: Self-affirmation and physical activity

Self-affirmation promotes physical activity

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## Abstract

The present study tests whether a self-affirmation intervention (i.e., requiring an individual to focus on a valued aspect of their self-concept, like honesty), can increase physical activity and change Theory of Planned Behavior (TPB) variables linked to physical activity. Eighty young people completed a longitudinal intervention study. Baseline physical activity was assessed using the Godin Leisure Time Physical Activity Questionnaire (LTPAQ). Next, participants were randomly allocated to either a self-affirmation or a non-affirmation condition. Participants then read information about physical activity and health, and completed measures of TPB variables. One week later, participants again completed LTPAQ and TPB items. At follow up, self-affirmed participants reported significantly more physical activity, more positive attitudes towards physical activity, and higher intentions to be physically active, compared with non-affirmed participants. Neither attitudes nor intention mediated the effects of self-affirmation on physical activity. Self-affirmation can increase levels of physical activity and TPB variables. Self-affirmation interventions have the potential to become relatively simple methods for increasing physical activity levels.

*Keywords:* Self-affirmation, health behavior, intention, attitude, physical activity

## Self-affirmation promotes physical activity

Physical inactivity contributes to the development of over 20 chronic diseases, including coronary heart disease, diabetes, cancer, and obesity (World Health Organization, 2002). Individuals are recommended to engage in at least 30 minutes of moderate intensity physical activity, five times a week (US Department of Health and Human Services, 2010); however, many people fail to meet these targets (US Centers for Disease Control, 2008). Given the consequences of a sedentary lifestyle, it is imperative to promote regular physical activity. The present study uses an intervention based on self-affirmation theory (Steele, 1988) to try to increase physical activity among young people. It is important to target young people because a decline in activity often occurs on leaving secondary school (Wengreen & Moncur, 2009).

Self-affirmation theory (Steele, 1988) proposes that individuals prefer to see themselves as “adaptively and morally adequate” (p. 262). Messages recommending health behavior change may challenge this sense of adequacy and create a need to restore it, for example by denigrating the message (Harris & Epton, 2009). This can lead to individuals being unpersuaded by health messages (e.g., Liberman & Chaiken, 1992). According to self-affirmation theory, individuals are primarily concerned with the threat to their global sense of self-worth. However, they can counter a threat to the self in one domain by affirming an aspect of their identity in another, unrelated, domain. Self-affirmation theory proposes that by affirming in this way individuals are able to buffer their global sense of self-worth against threat, thereby making them potentially more open to threatening information. For example, asking an individual to affirm a cherished personal value (e.g., honesty) boosts their global sense of self-worth, making them more receptive to information about another aspect of their self, such as their health-related behavior.

Research supports the hypothesis that self-affirmation in an unrelated domain reduces defensiveness and increases acceptance of personally relevant health information (Harris & Epton, 2009; McQueen & Klein, 2006; Sherman, Nelson & Steele, 2000). For example, Harris and Napper (2005) found that participants who self-affirmed prior to reading a leaflet linking alcohol consumption with breast cancer reported higher risk perceptions, greater ease of imagining developing breast cancer, and stronger intentions to reduce alcohol consumption than participants who did not self-affirm. In addition, there is some evidence that self-affirmation can also promote health behavior change. Epton and Harris (2008) found self-affirmed individuals reported consuming significantly more portions of fruit and vegetables over a week. The authors argued self-affirmation achieved this effect by promoting greater acceptance of the benefits of fruit and vegetable consumption on reading the message, (i.e., response efficacy), which, in turn, encouraged participants to eat more. Recently, Logel and Cohen (2012) found that self-affirmed participants reported lower weight and BMI after two months compared with control participants. Taken together, results indicate self-affirmation can change important health outcomes and suggest that self-affirmation might be an effective intervention strategy to increase physical activity. The present study provides the first test of a self-affirmation intervention on reactions to an intervention promoting physical activity.

The present study also tested the impact of self-affirmation on Theory of Planned Behavior variables (TPB; Ajzen, 1991). According to the TPB, behavioral intentions (e.g., 'I intend to engage in physical activity next week') are the most proximal predictors of subsequent behavior. Intentions are predicted by three variables, attitudes (positive or negative evaluations about performing a behavior), subjective norms (perceptions of important others' approval for performing a

behavior), and perceived behavioral control (PBC; perceptions of control over performing a behavior). PBC can also directly predict behavior. McEachan, Conner, Taylor and Lawton's (2011) meta-analysis shows that both intentions ( $r+ = 0.45$ ) and PBC predict physical activity ( $r+ = 0.31$ ), while physical activity intentions correlate with attitudes ( $r+ = 0.51$ ), subjective norms ( $r+ = 0.32$ ) and PBC ( $r+ = 0.47$ ).

Consequently, TPB variables were measured in the present study for the following reasons. First, despite widespread use of the TPB to predict health behaviors (McEachan et al., 2011), few self-affirmation studies on health behaviors (e.g., Harris & Napper, 2005; Jessop, Simmonds & Sparks, 2009) have included TPB measures. Second, where they have, findings have been mixed. Harris and Napper (2005) found that self-affirmation did not affect TPB variables applied to alcohol consumption, whereas Jessop et al. (2009) found that self-affirmation increased attitudes toward sunscreen use, but did not affect intentions. Third, Epton and Harris (2008) found that self-affirmation increased response efficacy, which is akin to attitudes in the TPB, as both involve evaluations of the likely outcomes of behavior. Moreover, response efficacy mediated the effects of self-affirmation on self-reported fruit and vegetable consumption. Thus, although it is unclear if self-affirmation affects TPB variables, initial findings suggest it may. By measuring TPB variables we can test the idea that self-affirmation affects behavior by changing variables linked to behavior performance.

Epton and Harris (2008) suggest that self-affirmation promoted greater message acceptance, which increased ratings of response efficacy, and thus enhanced fruit and vegetable consumption. This suggests that any effects of self-affirmation on physical activity could be mediated by TPB variables: self-affirmation may increase physical activity by promoting greater acceptance of a message recommending

physical activity, which prompts individuals to modify the perceptions (i.e., attitudes, subjective norms, PBC, intentions) they associate with physical activity. Based on this reasoning, and the results of McEachan et al.'s (2011) meta-analysis – that intentions have a larger relationship with physical activity than does PBC, and that attitudes better predict intentions than do subjective norms or PBC – we predicted that changes in attitudes and intentions would be more likely to mediate the effects of self-affirmation on physical activity than would changes in subjective norms or PBC. Consequently, the present study tested three hypotheses: Participants who self-affirm (H1) will demonstrate increased physical activity at follow-up, (H2) will show positive changes in attitudes and intentions and (H3) the hypothesized changes in attitudes and/or intentions will mediate the impact of self-affirmation on physical activity.

## Method

### *Participants*

Eighty young people (50% female, aged 19-21,  $M = 20.00$ ,  $SD = 1.65$ ) completed both parts of the study in return for course credit. All participants were students at a British University. Participants were recruited to a study called “The impact of personality on physical activity” and were randomly allocated to either self-affirmation condition ( $N = 40$ ) or non-affirmation condition ( $N = 40$ ) using a computer-generated sequence.

### *Materials and Measures*

*Physical activity questionnaire* Physical activity was measured using the Godin-Shepard Leisure-Time Physical Activity Questionnaire (LTPAQ; Godin, 2011). The LTPAQ correlates with measures of physical fitness ( $VO_2$  max, body fat percentage) and can be used to classify people as fit versus unfit. Total leisure activity is calculated by multiplying weekly frequencies of strenuous, moderate and mild

exercise by their respective metabolic equivalent task (MET) values of nine, five and three (one MET is defined as the energy expenditure and caloric requirement at rest) and summing the products. In the present study the default wording used in the measure was changed from “more than 15 minutes” to “at least 30 minutes” to reflect the UK target for activity (Department of Health, 2004). Godin (2011) comments that this should not affect validity of the measure.

*Self-affirmation manipulation* Following Fein and Spencer (1997), participants ranked a list of 11 values (e.g., creativity, intelligence) in order of importance from ‘1’ = most important to ‘11’ = least important. Participants in the self-affirmation condition were then asked to write about their most important value and why this value was important to them. Participants in the non-affirmation condition were then asked to write about their least important value, and why this value could be important to the average student.

*Manipulation Check* We used the eight-item measure developed by Napper, Harris, and Epton (2009) to assess self-affirmation (e.g., ‘the personal values task made me think about ‘My failings’ to ‘My successes’) on a seven-point scale from -3 to 3.

*Physical Activity Factsheet* The factsheet was based on information from the UK Department of Health and the British Heart Foundation about how physical activity affects health. The factsheet began by outlining the risks of a sedentary lifestyle, such as coronary heart disease, obesity, and stress. The factsheet then emphasized the benefits of being active (improved mood, reduced health risks). This emphasis on the positive aspects of activity was intended to target individuals’ attitudes.

*TPB Questionnaire* The TPB questionnaire was developed following Ajzen’s (2002) recommendations. Multiple items, each using a seven-point scale, assessed each TPB variable and were similar to Abraham and Sheeran’s (2004) items. Attitude items

included “For me to exercise five times a week for thirty minutes would be” (worthless/worthwhile), subjective norms items included “Most people who are important to me think I (should/should not) exercise five times in the next week, PBC items included “For me to exercise five times a week for thirty minutes would be” (difficult/easy) and intention items included “I plan to exercise five times a week for thirty minutes” (unlikely/likely). TPB constructs had satisfactory internal consistency (Cronbach  $\alpha$  values  $\geq 0.70$ ) except for subjective norms at follow-up ( $\alpha = 0.59$ ).

### *Procedure*

Participants were tested either individually or in groups of up to five. On arrival, they were handed a sealed envelope containing the study materials, including the self-affirmation or non-affirmation manipulation. All envelopes were prepared before recruitment began, the affirmation condition to which participants were assigned having been previously determined using a computer-generated sequence, thereby ensuring the experimenter was blind to condition. Participants began by giving informed consent and demographic data before completing the baseline LTPAQ. Next, they completed the manipulation and manipulation check, after which they read the physical activity factsheet and completed the TPB questionnaire. At this point, participants were thanked and told they would receive a follow-up email; this was sent one week later with the LTPAQ and TPB questionnaires attached. Finally, participants were emailed a full debrief.

### *Data Analysis*

First, independent t-tests compared scores for each condition on the manipulation check and baseline LTPAQ measures to assess randomization to condition. Second, mixed model analysis of variance (ANOVA) was used to test the effect of the affirmation manipulation on physical activity and TPB variables.



Affirmation condition was the independent-groups factor and time point (baseline and follow-up for physical activity, post-message and follow-up for TPB variables) was the repeated measures factor. Finally, we used Preacher and Hayes (2008) bootstrapping methods for testing multiple mediation to test if the impact of condition on physical activity was mediated by relevant TPB variables.

## Results

### *Self-affirmation manipulation check and randomization check*

Participants in the self-affirmed condition had significantly higher manipulation check scores,  $M_{SA} = 1.28$ ;  $SD = 1.16$ ;  $M_{NA} = -0.45$ ;  $SD = 1.80$ ;  $t(78) = 5.08$ ,  $p < 0.01$ ,  $d = 1.14$ , showing they were more affirmed. There were no baseline differences in LTPAQ scores between conditions  $M_{SA} = 53.13$ ;  $SD = 29.16$ ;  $M_{NA} = 52.98$ ;  $SD = 32.01$ ;  $t(78) = 0.02$ ,  $p = .983$ ,  $d = 0.01$  (see Table 1).

INSERT TABLE 1 HERE

### *Does self-affirmation alter physical activity and physical activity cognitions?*

We ran a mixed model ANOVA for LTPAQ scores. There were significant main effects of condition and time, modified by a significant condition x time interaction  $F(1, 78) = 66.53$ ,  $p < 0.001$ , partial  $\eta^2 = .46$ . There were no baseline differences between conditions in physical activity, but at follow-up self-affirmed participants engaged in significantly more activity ( $M = 77.90$ ,  $SD = 31.52$ ) than non-affirmed participants ( $M = 44.48$ ,  $SD = 31.45$ ;  $t(78) = 4.75$ ,  $p < .001$ ,  $d = 1.06$ ; see Figure 1).

INSERT FIGURE 1 HERE

We ran mixed model ANOVAs for TPB variables (see Table 2). For attitudes, there was a significant main effect of condition qualified by a significant condition x time interaction. Attitudes did not differ significantly by condition immediately after

the manipulation ( $t(78) = 1.71, p = .091, d = .38$ ), but at follow-up self-affirmed participants had significantly more positive attitudes than non-affirmed participants ( $t(1,78) = 3.97, p < .001, d = .89$ ). For intentions, there were significant main effects of condition and time qualified by a significant condition x time interaction  $F(1,78) = 31.31, p < .001, \text{partial } \eta^2 = .29$ . Intentions did not differ significantly by condition immediately after the manipulation ( $t(78) = 1.35, p = .181, d = .33$ ), but at follow-up self-affirmed participants had significantly more positive intentions than non-affirmed participants ( $t(78) = 4.55, p < .001, d = 1.02$ ). For PBC and subjective norms there were no significant effects of condition or time, and neither interaction term was significant (see Table 2).

INSERT TABLE 2 HERE

#### *Mediators of the impact of self-affirmation on physical activity*

We used Preacher and Hayes' (2008) method for testing multiple mediation to see if attitudes and intentions, the two TPB variables influenced by self-affirmation, mediated the effect of self-affirmation on physical activity. However, neither intentions (specific indirect effect = 1.485, s.e. = 2.069, bootstrap 95% confidence interval (CI) = -0.878 – 8.491) nor attitudes (specific indirect effect = 2.677, s.e. = 2.346, bootstrap 95% CI = -0.277 – 9.459), measured immediately after the message, mediated the effects of self-affirmation on self-reported physical activity.

#### Discussion

In the present study, self-affirmation, prior to the provision of information about physical activity and its effects on health, increased self-reported physical activity. Self-affirmed participants reported engaging in significantly more physical activity at one-week follow-up compared with non-affirmed participants. The observed difference between LTPAQ scores in the two conditions is large enough to

be considered a level of physical activity offering “substantial” health benefits (Godin, 2011). Self-affirmed participants also demonstrated stronger intentions and more positive attitudes, compared with participants who did not affirm; however, these changes did not mediate the direct effect of self-affirmation on physical activity.

This is the first study to show such effects of self-affirmation on physical activity. The health benefits of physical activity are well established (WHO, 2002). Over the duration of the study, affirmed participants increased their activity relative to baseline, while non-affirmed participants’ activity levels decreased. The effects of the manipulation over time are promising signs of its potential for promoting sustained behavior change. Self-affirmed participants’ cognitions were more positive towards physical activity than were non-affirmed participants’ cognitions, consistent with results from self-affirmation studies on other health behaviors (e.g., Epton & Harris, 2008; Jessop et al., 2009). However, cognitions did not reach statistically significant change until one-week post manipulation, suggesting that there could be post-experimental consequences of self-affirming. Of note, research into the sustained benefits of self-affirmation on educational attainment in African American and Latino American students has also demonstrated effects of the manipulation beyond the immediate setting, effects interpreted in terms of the consequences for construal level and identity-threat processes (see Sherman et al., 2013 for a discussion). However, we did not predict these effects here, which require replication.

The self-affirmation manipulation did not alter subjective norms or PBC. This may be due to the factsheet focusing on the benefits of activity, rather than others’ approval of activity or perceived control over activity. However, it is important to note that the subjective norm measure had low reliability at follow-up, which may have affected the outcome. Regarding PBC, a recent review (Ashford, Edmunds &

French, 2010) indicates that persuasive messages are ineffective at increasing physical activity self-efficacy (a construct similar to PBC), which suggests that the use of a factsheet here may not be an ideal way to target this variable, even were the PBC content of the leaflet enhanced.

The hypothesis that attitudes and/or intentions would mediate the effect of self-affirmation on physical activity was not supported. Previous studies testing mediation of self-affirmation effects by social cognitive variables have reported contrasting results: for example, whereas Epton and Harris (2008) found that response efficacy mediated the impact of self-affirmation on self-reported fruit and vegetable consumption, Jessop et al. (2009) found no mediation of the effects of self-affirmation by attitudes. Present results are consistent with those of Jessop et al., and suggest that attitudes may not mediate the effects of self-affirmation; however, only a small number of studies have conducted mediation analyses, so strong conclusions are currently unwarranted.

Nevertheless, there are several plausible explanations for the lack of mediation by the TPB variables measured here. First, self-affirmation has been shown to increase belief accessibility (van Koningsbruggen, Das & Roskos-Ewoldsen, 2009). It is known that more accessible attitudes and intentions have stronger relationships with behavior (Cooke & Sheeran, 2004). It is possible, therefore, that self-affirmed participants had more accessible beliefs (not measured here), which remained salient for the duration of the study, and led to the reported increase in physical activity. Second, self-affirmation may promote physical activity by increasing the likelihood that participants will spontaneously form implementation intentions (i.e., plans specifying when, where and how to perform a behavior, Gollwitzer, 1999), which have been shown to promote physical activity (e.g., Darker, French, Eves &

Sniehotta, 2010; Zhang & Cooke, 2012). For example, Ferrer, Shmueli, Bergman, Harris and Klein (2012) found that self-affirmation led to spontaneous formation of implementation intentions, so it is possible that self-affirmed participants in the present study formed more implementation intentions and that these implementation intentions helped participants to increase their physical activity. Third, it may be that self-affirmed participants experienced a sense of positive affect that led them to report more positive attitudes and intentions and promoted higher levels of physical activity. Consistent with this, Ferrer et al. (2012) showed that the effects of self-affirmation on implementation intention formation were restricted to participants who experienced positive affect post-message. However, studies that have tested for effects of self-affirmation on positive affect per se have found no evidence that self-affirmation manipulations increase positive affect (see Harris & Epton, 2009, for a review). Finally, the experimental materials may have induced cognitive dissonance (Festinger, 1957) in participants, which was reconciled by reporting enhanced levels of physical activity at follow up. If self-affirmed participants felt dissonance more acutely, this could produce the obtained pattern of effects. None of these possibilities can be ruled out and each awaits further investigation.

The present study has several limitations. Physical activity was measured using a self-report measure. However, LTPAQ scores have been shown to have good reliability and to correlate with objective markers of physical fitness, including VO<sub>2</sub> max and percentage body fat (Godin, 2011). Nevertheless, future research should examine the effects of self-affirmation on objective measures of physical activity such as accelerometers. Physical activity was measured over an interval of one week and studies of longer duration can now examine whether these positive initial effects are maintained over the medium to long term. In this regard, it is encouraging that self-

affirmed participants possessed more positive attitudes and intentions at follow-up because these cognitions are linked to increased physical activity and/or intentions.

Future studies would also benefit from including measures of message acceptance and derogation as has been done in previous studies (Harris & Epton, 2009) to enhance our understanding of self-affirmations effects on physical activity and TPB variables. Studies that extend the current one by including also a no-message control condition would enable researchers and practitioners to disentangle the effects of combining self-affirmation with health messages from the effects of self-affirmation in the absence of such information. Participants in the study were students, raising questions about the generalisability of the findings. However, beneficial effects of self affirmation on cognition and motivation have been found in participants with low socioeconomic status for smoking (Armitage, Harris, Hepton & Napper, 2008) and in retail workers for alcohol consumption (Armitage, Harris & Arden, 2011), providing hopeful indications that the present findings may not be limited to student samples.

Consideration also needs to be given to the physical activity message used in this study. The health leaflet may not have been viewed as threatening by participants because it focused mainly on the benefits of physical activity. However, messages do not need to focus on negative health outcomes to pose a threat; drawing participants' attention to physical activity guidelines should challenge their global sense of self-worth because doing so reminds them or makes them aware that they are not meeting these guidelines, which threaten their sense of self-adequacy. Finally, TPB constructs were not measured at baseline, so there could have been pre-existing differences between participants in the two conditions on these variables. However, by randomizing participants to condition we minimized the chance of individual

differences between the two groups in measured and unmeasured variables, suggesting that this is unlikely

In conclusion, the present study highlights the impact of self-affirmation on physical activity. Of course, replication of results is required; however, the current findings suggest that self-affirmation may have the potential to contribute to brief interventions to increase physical activity levels and key associated cognitions.

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Table 1: Descriptive statistics for study variables according to experimental group

Variable	Time	SA group	NA group
		Mean (SD)	Mean (SD)
<b>LTPAQ score</b>	Baseline	53.13 (29.16)	52.98 (32.01)
	1 week follow-up	77.90 <sub>a</sub> (31.52)	44.48 <sub>b</sub> (31.45)
<b>Intentions</b>	Post message	4.34 (1.82)	3.81 (1.35)
	1 week follow-up	5.26 <sub>a</sub> (1.75)	3.55 <sub>b</sub> (1.61)
<b>Attitudes</b>	Post message	5.21 (1.28)	4.74 (1.18)
	1 week follow-up	5.61 <sub>a</sub> (1.25)	4.57 <sub>b</sub> (1.08)
<b>Subjective norms</b>	Post message	4.04 (1.13)	4.09 (1.24)
	1 week follow-up	4.30 (1.10)	4.14 (1.22)
<b>Perceived behavioral control</b>	Post message	4.60 (1.50)	4.70 (1.62)
	1 week follow-up	4.99 (1.57)	4.69 (1.47)

Note. Values with different subscripts differ by at least  $p < .05$ .

Table 2: ANOVA results for physical activity and TPB cognitions

Variable	Main effect of condition			Main effect of time			Condition x time interaction		
	<i>F</i>	Partial eta <sup>2</sup>	<i>p</i>	<i>F</i>	Partial eta <sup>2</sup>	<i>p</i>	<i>F</i>	Partial eta <sup>2</sup>	<i>p</i>
<b>LTPAQ score</b>	6.40	.08	.010	15.92	.17	.001	66.53	.46	.001
<b>Intentions</b>	9.25	.11	.003	9.74	.11	.003	31.31	.29	.001
<b>Attitudes</b>	8.99	.10	.004	1.39	.02	.242	9.20	.11	.003
<b>Subjective norms</b>	0.05	.00	.816	2.31	.03	.132	1.07	.01	.304
<b>Perceived behavioral control</b>	0.09	.00	.761	3.03	.04	.086	3.44	.04	.067

Figure 1. LTPAQ scores at baseline and follow-up by experimental group

