Examining self-affirmation as a tactic for recruiting inactive women into exercise interventions
More, Kimberly R.; Phillips, Leigh Alison; Green, Zoie; Mentzou, Aikaterini

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Recruitment of insufficiently active individuals into exercise interventions is difficult due to many different barriers, including motivational barriers and negative body image. **Objective:** The present study provided an initial conceptual test of whether self-affirmation can help increase recruitment of insufficiently active women to an exercise intervention. **Design:** Emerging adult women were randomly assigned to complete a self-affirmation or control task prior to reading the same message concerning the consequences of inactivity. **Measures:** In addition to completing demographic and body image measures at baseline, U.S. undergraduate participants (N = 254) indicated their interest in registering for an intervention and their intention to exercise after the experimental manipulation. **Results:** Data did not support hypotheses that: (1) self-affirmed women would find the message less threatening and less manipulative, (2) self-affirmed women would have higher intentions to exercise, (3) self-affirmed women would be more likely to register interest for a future exercise intervention, and (4) condition and body dissatisfaction would interact such that the intervention would be particularly beneficial for women with high body dissatisfaction. Results revealed that 70% of participants were unwilling to register for an exercise intervention. **Conclusion:** Results indicate that other novel exercise intervention recruitment techniques need to be tested.

Keywords: Self-affirmation, exercise, intervention, women
Examining Self-Affirmation as a Tactic for Recruiting Inactive Women into Exercise Interventions

Recruiting individuals to health behavior change interventions is notoriously difficult, with only 55% of randomized control trials meeting their *a priori* recruitment targets (Sully et al., 2013). Recruitment of inactive individuals to exercise interventions may be especially difficult as exercise requires a substantial amount of physical exertion and time resources, both of which are perceived as barriers to engagement (Lovell et al., 2010). This is problematic from a public health perspective as the benefits of regular exercise on the reduction of risk for chronic disease development (e.g., Kyu et al., 2016) and for improving the management of pre-existing chronic conditions (e.g., Colberg et al., 2010) are well-known. Targeting avoidance of exercise in inactive women is especially valuable as they constitute a high-risk group with higher levels of physical inactivity in comparison with their male counterparts (World Health Organization, n.d.). Specifically, research has shown that only 34% of eligible inactive women targeted in an intervention will be recruited (Korde et al., 2009). Physical inactivity may be exacerbated for women with high levels of body dissatisfaction – a common phenomenon in women that is a documented risk factor for physical inactivity (Frederick et al., 2006; More et al., 2019; Neumark-Sztainer et al., 2006). In light of this, the present research provides a preliminary conceptual test of self-affirmation as a novel method for recruiting insufficiently active women – including especially high-risk women who are dissatisfied with their bodies – to exercise interventions.

Exercise recruitment materials and interventions often include descriptions of the consequences of inactivity or the benefits of exercise, which is thought to improve recruitment to randomized clinical trials (Caldwell et al., 2010; Orrow et al., 2012). However, inactive
individuals may perceive these messages as threatening, which may result in disengagement with the recruitment process. Specifically, when an individual encounters information that threatens the integrity of their self-image, the individual may be more likely to engage in cognitive defensive strategies, which results in the original threatening message being dismissed (for a review see Sherman & Cohen, 2006). For example, if individuals receive information linking physical inactivity to inflammatory and metabolic diseases, they may decide that it does not apply to them due to their age or that the message content was overblown and manipulative in nature. This response occurs because people are inherently motivated to protect perceptions of their self-integrity since threats indicate a failure to meet social and cultural standards of behaviour (Sherman & Cohen, 2006; Leary & Baumeister, 2000). Unfortunately, this motivation to protect self-integrity leads to self-defensive behavior, which can be maladaptive as it prevents individuals from properly perceiving the risks associated with their behavior, which is detrimental as perception of risk motivates engagement in important health behaviors including exercise (Renner & Schupp, 2011; Sherman & Cohen, 2006).

Self-affirmation is one process that has been used to reduce individuals’ defensive cognitive strategies that lead to dismissal of threatening information. Self-affirmation theory (Steele, 1988) contends that validating oneself on a personally important value, separate from the message content, protects self-integrity and prevents perceived social and cultural failure (Sherman & Cohen, 2006). That is, self-affirmation promotes acceptance of threatening messages by attesting that one’s self-worth is not contingent on the behavior described in such messages. A meta-analysis of self-affirmation interventions has shown that self-affirmation is effective for changing not only health-related behavioral intentions, but also actual health behavior (Epton et al., 2015). Moreover, self-affirmation interventions have been successfully
used to expose individuals to the health implications associated with exercise behavior or lack thereof. Specifically, self-affirmation interventions have been shown to increase acceptance of threatening information about exercise behavior in comparison with control, especially in individuals who were classified as insufficiently active (Good et al., 2015). Further, self-affirmation interventions have been shown to improve attitudes towards exercise as well as exercise intentions resulting in increased physical activity (Cooke et al., 2014). However, research has shown that the effects of self-affirmation on physical activity behavior are not long-lasting. Regarding short-term follow-ups, Strachan and colleagues (2020) found no difference in intentions or actual physical activity behaviour between control and intervention participants at a one-week follow-up. Not surprisingly, when considering long-term assessments, one study found no significant differences between intervention and control groups at a one-year follow-up (Mancuso et al., 2012). Thus, it is likely that self-affirmation in and of itself is not enough to result in sustained exercise engagement. However, it is possible that self-affirmation interventions could be an effective means of recruiting these high-risk individuals, such as inactive women, to more intensive exercise interventions.

Self-affirmation interventions have been shown to be especially valuable for individuals who have low levels of self-esteem (Düring & Jessop, 2015). Specifically, low self-esteem women and men who received a self-affirmation intervention were more open to acknowledging the risks associated with physical inactivity and had higher intentions to exercise. It has been suggested that individuals with low self-esteem may have greater benefits from self-affirmation interventions as they do not have a wealth of positive self-feelings (Pietersma & Dijkstra, 2012; Sherman & Cohen, 2006). One specific type of low self-esteem is body dissatisfaction, which is often referred to as body-esteem or evaluations of one’s own body or physical appearance.
Individuals with low body-esteem are at an elevated risk of insufficient levels of physical activity (Kruger et al., 2008; More et al., 2019; Neumark-Sztainer et al., 2006) and, therefore, may respond especially well to a self-affirmation intervention.

The purpose of the present study was to provide a preliminary conceptual test of the effectiveness of self-affirmation as a pre-intervention for recruiting insufficiently active women to exercise programs and to evaluate its relative efficacy for different levels of body-esteem. As highlighted by Strachan and colleagues (2020), the majority of previous exercise-related self-affirmation studies utilize sub-optimal samples who are not pre-screened based on baseline physical activity levels. This likely leads to reductions in perceived threat as active individuals are unlikely to be threatened by exercise-related messages. To this end, in line with the Strachan et al. (2020) study we recruited individuals who were insufficiently active and disguised the purpose of our study to avoid recruiting only those with a pre-existing interest in changing their exercise behaviour. It was hypothesized that (1) women who self-affirm would find an exercise-promotion message to be less threatening and less manipulative than women who do not self-affirm (i.e., control group), (2) women who self-affirm would have greater intentions to pursue exercise in comparison with control, (3) women who self-affirm would be more interested in participating in a future exercise intervention in comparison to control, and (4) self-affirmation would be particularly beneficial (for exercise intention and signing up for an exercise intervention) for those who score high (vs low) on a measure of body dissatisfaction. That is, body dissatisfaction was hypothesized to moderate the impact of the intervention on outcomes.

**Method**

**Participants and Procedure**
The sample consisted of 315 women (intervention = 163; control = 152) recruited through the psychology subject pool from a Midwestern University in the United States. Participants were recruited if they did not regularly engage in exercise. Eligibility was assessed using Stage of Change for exercise behavior (Prochaska & DiClemente, 1982). Participants were eligible to participate if they were in the pre-contemplation (i.e., ‘I currently do not exercise and I do not intend to start’), contemplation (i.e., ‘I currently do not exercise, but I am thinking about starting’), or preparation stages (i.e., ‘I currently exercise some, but not regularly (regularly is 3x per week or more for at least 30 minutes a session)’) of behavior change. That is, participants were eligible to participate if they did not already regularly engage in exercise, as maintenance of regular exercise engagement is needed to thwart the consequences of insufficient physical activity (Kyu et al., 2016). Stage of Change was used in lieu of exercise behavior as a screening measure as it is less likely to fluctuate due to temporary lapses in exercise engagement.

To reduce the likelihood of self-selection bias, the purpose of the intervention was disguised with participants being told that the study was about ‘personal values’ and ‘memory’. Participants came to the lab and reported body dissatisfaction, importance of values, and exercise behavior at baseline, among other variables unrelated to exercise. Following the administration of the aforementioned measures, participants were randomized to either the control or intervention (self-affirmation) condition using a random number generator. Participants completed a standard self-affirmation or control task (Cohen et al., 2000; Epton, 2015): they first ranked 11 values from most to least important and were subsequently asked to write about the personal importance of the value that they rated as most important (self-affirmation condition) or the importance of their lowest rated value for the average college student (control condition). Next, participants were told that they would be completing an objective memory test.
in which they would read scientific facts and try to remember as much of the content as possible.

Participants read a loss-framed message where the risk of physical inactivity was presented to them (e.g., increased risk of obesity, type-2 diabetes, cardiovascular disease, high blood pressure, negative mood, depression, cancer), which was created for the purpose of the present study. Participants were allowed to spend as much time as they desired reading the message.

To assess whether participants actually read the message concerning exercise behavior, they were asked 11 questions assessing their memory of the content presented in the message (e.g., ‘How many minutes of moderate exercise per week constitutes regular exercise’). The memory questionnaire was presented immediately after the removal of the exercise message. Although the survey was delivered online via Qualtrics, the memory questionnaire was completed using pencil and paper. Memory questionnaires were scored to reflect a score out of 11. During the first semester of data collection, participants were given five dollars if they correctly answered 80% of the questions. However, compensation for accuracy on the memory questionnaire created issues such as participants cheating. Thus, we removed the five-dollar compensation for the second semester of data collection. As such, opportunity to receive compensation will be tested as a covariate in all analyses. The outcome variables were (1) degree of fear and defensive processing in response to the exercise-promotion message, (2) degree of intention for increasing subsequent exercise behavior, and (3) whether participants registered interest for signing up for a subsequent exercise intervention or not. Considering the present study used deception, by concealing the purpose of the study to participants during the registration phase, participants were fully debriefed on the purpose of the study.

A power analysis was conducted a priori to decide how many women should be sampled to be able to detect the difference between independent group means, one-tailed test, with $\beta = .80$
and $\alpha = .05$. A recent meta-analysis examining the impact of self-affirmation interventions on health-related intentions and behavior found a small to medium effect of self-affirmation on each outcome (Epton et al., 2015). Assuming a small-medium effect ($d = .32$), the aim was to collect data from 244 participants (122 per group). The data collection termination rule used was to stop collecting data at the end of the semester in which $\beta = .80$, $\alpha = .05$ was reached (Simmons et al., 2011). The hypotheses and data analysis plan were pre-registered on the Open Science Framework (https://osf.io/jbsx5/). Our ethics approval precludes sharing the data publicly due to privacy reasons. Specifically, in the present study participants reported their email address and wrote self-affirmation or control statements that may contain personally identifying information. Deidentified data (i.e., with the removal of email addresses and written statements) can be requested from the corresponding author.

**Baseline Measures**

**Body Dissatisfaction**

Due to the dissatisfaction women can have with their overall appearance as well as with specific components of their appearance (e.g., thinness), a comprehensive approach was utilized (Frederick et al., 2006). Specifically, both general body dissatisfaction and thinness dissatisfaction were measured. General body dissatisfaction was measured using the Body Shape Satisfaction Scale (BSS; Pingitore et al., 1997). The BSS is a 10-item scale that assesses dissatisfaction with specific body parts (e.g., ‘hips’ or ‘waist’). Participants rated their dissatisfaction with individual body parts on a five-point Likert-type scale ranging from ‘very satisfied’ to ‘very dissatisfied’. Higher scores corresponded with higher levels of dissatisfaction ($\alpha = .89$).
Thinness dissatisfaction was measured using the Stunkard Figure Rating Scale (Stunkard et al., 1983). Participants were shown nine depictions of women ranging from thin to obese. Participants were first asked to choose the figure that they believed most closely resembled their own body. Next, participants were asked to choose which figure best resembled the body shape that they would like to have. Desired body shape was subtracted from actual body shape. Positive scores were indicative that the participant desired to be thinner, whereas negative scores were indicative that the participant desired to be larger.

**Demographics**

Age, race, ethnicity, and body mass index (BMI) were assessed via self-report measures.

**Random Response Check**

Two random response checks were embedded within other measures in the baseline survey. The first item required participants to answer ‘2’ (i.e., ‘If you are reading this, answer 2’) and the second item required participants to answer ‘agree a little’ (i.e., ‘If you are reading this, answer agree a little’). Previous research has shown that random responding has been shown to alter effect sizes (Credé, 2010). In light of this, we took a conservative approach and eliminated participants who failed either of the random response checks.

**Experimental Manipulation**

**Important Values**

The importance of personal characteristics and values were measured using the Sources of Validation Scale (Harber, 1995). The scale was prefaced with ‘Below is a list of characteristics and values, some of which may be important to you, some of which may be unimportant. Please rank these values and qualities in order of their importance to you from 1 to 11 (1 = most important item, 11 = least important item). Use each item only once’. Values and
characteristics were: ‘Artistic skills/aesthetic appreciation’, ‘Sense of humor’, ‘Relations with friends/family’, Spontaneity/living life in the moment’, ‘Musical ability/appreciation’, ‘Creativity’, ‘Business/managerial skills’, ‘Romantic values’, and ‘Social Skills’. The values ‘Physical attractiveness’ and ‘Athletic ability’ were removed for the purpose of the present study because they relate to body image and exercise, respectively. In light of this, these values were replaced with ‘Kindness, and ‘Academic ability’.

**Self-affirmation Manipulation**

A standard values essay and matched control procedure was used (e.g., Good et al., 2015; McQueen & Klein, 2006; Sillero-Rejon et al., 2018). Participants in the self-affirmation condition were asked to write why the value that they rated as most important is of personal importance to them (e.g., ‘Try to recall a situation where your most important value (e.g., Kindness) guided your behavior’). Participants in the control condition were asked to write why the value that they rated as least important may be important to another college student (e.g., ‘Imagine a situation where (e.g., Kindness) may be of importance to the average college student’). Participants were required to write at least three sentences (i.e., minimum 250 characters). To ensure that participants wrote about the designated value, two researchers independently coded whether participants wrote about the appropriate value and whether it was important to the self or an average college student. Participants were removed from all analyses if they did not follow their respective instructions. This task was chosen because meta-analytic evidence has shown that self-affirmation interventions have the largest influence on behaviour when the manipulation is comprised of a values essay (Epton et al., 2015).

**Follow-up Measures**

**Fear and Defensive Processing**
A five-point Likert-type scale ranging from ‘strongly disagree’ to ‘strongly agree’ was used to assess fear and defensive processing. Items were proceeded with the stem ‘The information in the passage I just read…’ Fear was measured using the items: (1) ‘was threatening’, (2) ‘made me feel anxious’, and (3) ‘made me fearful’ (α = .79; Witte, 2010).

Defensive processing was assessed using the items: (1) ‘was not believable’, (2) was ‘exaggerated’, and (3) ‘tried to manipulate my feelings’ (α = .58; van Koningsbrunnen et al., 2009; Renninger & Dodge, 2019).

**Interest in Future Exercise Intervention**

One item was used to assess whether participants were interested in signing up for a future exercise intervention (i.e., ‘Thank you for participating in our study on personal values and memory. For your effort, we would like to grant you the opportunity to participate in future research occurring in our lab. Would you like to register for an exercise intervention taking place in the Healthy Habits Lab?’). Participants who responded ‘yes’ were prompted to provide their email to allow for future contact.

**Exercise Intentions**

Intentions for increasing subsequent exercise behavior were measured using the Theory of Planned Behavior Questionnaire (Ajzen, 1991; 2013). Participants read a prompt (i.e., ‘Regardless of whether you would like to participate in a future intervention taking place in the Healthy Habits Lab, do you intend to exercise for at least 30 minutes, five times per week for the next three weeks?’) and then rated their intentions on a seven-point Likert-type scale ranging from ‘likely’ to ‘unlikely’. This item corresponds to 150 minutes of activity per week, which is the amount of moderate activity that is required to reduce the health risks associated with insufficient activity (Shiroma et al., 2014).
Statistical Analyses

Due to the variation in payment availability, opportunity to receive compensation was tested as a covariate in all analyses. Additionally, participants’ memory questionnaire score served as a screening procedure and all analyses were conducted with and without individuals who received a score lower than eight out of 11. There were no significant differences between analyses and, therefore, the results are reported with the inclusion of all participants regardless of their memory questionnaire score (Steegen et al., 2016).

Hypotheses 1-3 were tested using a series of one-way ANCOVAs (i.e., exercise intention, fear, and defensive processing) and a binomial logistic regression (i.e., exercise intervention sign up). A series of linear (i.e., exercise intention) and binomial logistic regressions (i.e., exercise intervention sign up) were utilized to test hypothesis 4. Whether payment was offered was controlled for using a stepwise regression procedure. Group membership (i.e., intervention or control) and body dissatisfaction (general or thinness) were used as independent variables. The interactions between group membership and body dissatisfaction (mean centered) were used as independent variables.

Results

Preliminary Results

Two independent coders assessed compliance to the writing prompt. Compliance was coded by assessing (1) whether participants in the intervention condition wrote about their most important value, (2) whether participants in the control condition wrote about their least important value, (3) whether participants in the intervention group wrote about a time in their own life, (4) whether participants in the control group only wrote about an average college student (i.e., did not write about a time in their own lives). Coders agreed on 96% (i.e., $n = 302$)
of cases. The remaining 13 cases were resolved with discussion. Participants were eliminated if they cheated on the memory questionnaire (caught and noted by research assistant; \( n = 5 \)), if they did not adhere to their assigned writing prompt (\( n = 47 \)), if they failed either of the random response checks (\( n = 4 \)), or if they did not complete the memory questionnaire (\( n = 5 \)). Thus, the final sample consisted of 254 women (intervention: \( n = 129 \); control: \( n = 125 \)). Participants ranged from 18-28 years of age (\( M = 19.19, SD = 1.54 \)) and were of a healthy weight on average (BMI: \( M = 23.89, SD = 4.92 \)). Most participants self-identified as European American (74%). Other reported ethnicities included Latin American (8.3%), Asian (6.3%), African American (5.5%), Middle Eastern (5.1%), and Native American (0.8%).

Assumptions of linear regression were tested for continuous outcomes (i.e., linearity, normality of residuals and, homoscedasticity) and were supported. The assumption of multicollinearity was also supported using both variance inflation factors (VIFs) and correlations. The interaction term between body image (general and thinness dissatisfaction) and condition and the body image variable had VIF scores >10, which can be expected considering the shared variance between individual predictors and interaction terms. Additionally, assumption check results did not change when the interaction term was removed to correct for multicollinearity (Steegen et al., 2016). Linearity for continuous predictors (i.e., general body dissatisfaction and thinness dissatisfaction) was also assessed for the binomial logistic regressions using the Box-Tidwell Test (Box & Tidwell, 1962). Linearity was supported for the relationships between both continuous predictors (i.e., general and thinness body dissatisfaction) and exercise intervention sign-up. Specifically, the interactions between the continuous predictor and their natural log did not significantly predict intervention sign-up.
Mean imputation was used to correct for missing values in multi-item scales so long as the majority of items were not missing. Only one participant had missing values present. This participant was missing all items pertaining to the fear and defensive processing scales and the exercise intention and intervention sign-up items. Thus, no missing values were corrected in the data. Multivariate outliers were analyzed using Mahalanobis distances (\( p > .001 \)). There were no multivariate outliers for hypotheses 1-3. Multivariate outliers were not detected for hypothesis 4 concerning general body dissatisfaction when considering exercise intention and intervention sign-up as outcomes. However, multivariate outliers were detected for hypothesis 4 concerning payment offered, condition, thinness dissatisfaction, the interaction between thinness dissatisfaction and condition, and intention (\( n = 3 \))/intervention sign-up (\( n = 1 \)). Results were analyzed both with and without the inclusion of the multivariate outlier(s) but are reported with the inclusion of outliers as no differences were found in the aforementioned analyses including those with the removal of individuals who failed the memory questionnaire (Steegen et al., 2016).

The control and intervention group were not different at baseline in terms of Stage of Change or General Body Dissatisfaction (see Table 1 for descriptive statistics and correlations). However, the two groups did differ in terms of thinness dissatisfaction, with the intervention group desiring to be significantly larger than the control group. However, controlling for the interaction between thinness dissatisfaction and group membership did not influence hypotheses 1-3. Therefore, the analyses are presented without the use of this covariate (Steegen et al., 2016).

Participants duration of physical activity per week was assessed using the International Physical Activity Questionnaire and associated scoring procedures (Booth, 2000; International Physical Activity Questionnaire, n.d.). Specifically, all daily values that exceeded 3 hours per
day were truncated to 180 minutes total (Moderate \( N = 2 \); Vigorous \( N = 1 \)). Additionally, all values less than 10 minutes per average on an exercise day were truncated to 0 (Moderate \( N = 5 \); Vigorous \( N = 1 \)). Total Metabolic Equivalent Minutes (i.e., MET minutes) of exercise per week were calculated where one minute of moderate activity is multiplied by 4 and one minute of vigorous activity is multiplied by 8. To meet the physical activity guidelines of engaging in 150 minutes of moderate or 75 minutes of vigorous physical activity per week (Shiroma et al., 2014), an individual would have to engage in 600 MET minutes of activity. A one-sample t-test revealed that the present sample \( (M_x = 496.23, SD = 693.33) \) engaged in significantly fewer than 600 MET minutes of physical activity per week \( (t(246) = -2.35, p = .019) \). Specifically, on average the present sample engaged in the equivalent of 124.05 minutes of moderate activity or 62.02 minutes of vigorous activity per week. Average MET minutes per week did not significantly differ between the intervention and the control group using an independent samples t-test \( (t(245) = 1.85, p = .065) \). The majority of sample did not engage in at least 600 MET minutes per week (i.e., 73.7%). Regarding the participants who reported engaging in 600 or more MET minutes per week, it is important to note that all of these participants reported that they did not exercise on a regular basis. Thus, the snapshot of weekly exercise provided by the present survey may not be representative of their typical exercise behaviour. Additionally, retrospective self-reports on physical activity levels likely provide inaccurate estimates of behaviour. Results did not vary when participants were constricted to those who engaged in less than 600 MET minutes over the previous week.

**Tests of Hypotheses**

The first hypothesis – that women who self-affirmed would find the message less threatening and less manipulative – was not supported, defensive processing: \( F(1, 250) = 3.81, p \)
The four hypotheses, that women who self-affirmed would have greater intentions to exercise, $F(1, 250) = 0.12, p = .726$, and would be more likely to show interest in a future exercise intervention, $(X^2(2, n = 253) = .65, p = .724)$, were not supported. Whether payment was offered was not significantly related to the outcome variables in any of the analyses. Exclusion of participants who failed the memory questionnaire did not influence the results for hypotheses 1-3. Additionally, exclusion of participants who engage in at least 600 MET minutes over the previous week did not influence the results for hypotheses 1-3.

The fourth hypothesis, that condition and body dissatisfaction would interact such that the intervention would be particularly beneficial for women with higher levels of body dissatisfaction, was not supported. First, group membership, body dissatisfaction (both general and thinness), and the interaction term did not predict intentions to pursue exercise (see Table 2). Second, group membership, body image (both general and thinness), and the interaction terms did not predict intervention interest using binary logistic regression analyses. In these analyses, whether payment was offered was entered in the first block, participant condition and body image were entered in the second block, and the interaction between the relevant body image measure and condition was entered in the third block. Specifically, with regards to analyses including general body image, none of the models improved upon the null model or subsequent models where applicable: Block 1 ($X^2(1, n = 253) = .16, p = .691$), Block 2 ($X^2(3, n = 253) = .99, p = .803$), and Block 3 ($X^2(4, n = 253) = 3.21, p = .523$). With regards to analyses including thinness dissatisfaction, none of the models improved upon the null model or subsequent models where applicable: Block 1 ($X^2(1, n = 253) = .16, p = .691$), Block 2 ($X^2(3, n = 253) = 2.15, p = .542$), and Block 3 ($X^2(4, n = 253) = 3.88, p = .423$). The entirety of these results did not vary...
with the exclusion of participants who failed the memory questionnaire, with the removal of multivariate outliers, or with the removal of participants who engaged in at least 600 MET minutes over the previous week.

**Discussion**

Physically inactive individuals are at an increased risk of developing life-threatening health conditions (Kyu et al., 2016). Unfortunately, this information may be difficult to effectively communicate in health intervention settings as people have a well-known tendency to dismiss information that threatens their integrity and self-worth (Sherman & Cohen, 2006). Self-affirmation interventions have been shown to lead to increased acceptance of information that is perceived as threatening, including information that pertains to exercise (Good et al., 2015). This is especially important given that perception of health-risk is likely needed to motivate behavior change (Renner & Schupp, 2011; Sherman & Cohen, 2006). In light of this, self-affirmation as a pre-intervention designed to recruit insufficiently active women to exercise interventions was conceptually tested. Of specific interest was whether self-affirmation would be an especially valuable technique to recruit individuals who feel dissatisfied with their bodies (i.e., low body-esteem) as they are high risk in terms of actively avoiding exercise, and self-affirmation interventions have been found to be particularly valuable for individuals with low self-esteem (Mendelson et al., 2001; More et al., 2019).

The results of this initial conceptual test of self-affirmation as a pre-intervention recruitment technique suggest that self-affirmation is not an effective means of recruiting insufficiently active women to exercise interventions. Specifically, there were no significant differences between the intervention group and the control group in terms of fear and defensive processing. Additionally, there were no significant differences between groups in terms of
intention to pursue exercise, interest in registering for a future exercise intervention, and there was no special benefit of the intervention for women who reported being dissatisfied with their bodies (i.e., low body-esteem). Interestingly, approximately 70% of individuals in each group were not interested in registering for a future exercise intervention despite being classified as insufficiently active and having recently learned or been reminded about the specific consequences of said inactivity. Thus, it is clear that researchers and interventionists must explore other recruitment techniques that aim to increase participant registration in exercise-related interventions. This exploration should include empirical research on the boundary conditions of self-affirmation interventions for improving health-related intentions and behaviors.

Although these results help shed light on how the vast majority of insufficiently active women are not interested in engaging with exercise-related interventions, there are limitations that must be addressed. First, only data from relatively young and healthy college women was collected and, therefore, the results may not generalize to other populations, such as young adults who do not attend college, adults in other age groups, or men (Peterson, 2001). However, examining effective ways to recruit insufficiently active college women to exercise interventions is still important, considering that college women report low levels of physical activity, are not meeting guidelines for physical activity engagement (Huang et al., 2003), and suffer from particularly low levels of body-esteem (Sheldon, 2010). Second, although self-affirmation has been shown to be effective across ethnicities, past meta-analyses have shown that it is not as effective for white individuals, which the present sample was largely composed of (Epton et al., 2015). Third, previous research conducted using college students has had the control groups think about their least important value in terms of someone else (e.g., Cohen et al., 2000; Good et
It is possible that this manipulation is flawed as it may inherently lead to self-other comparisons and, in turn, a self-enhancement effect (e.g., see Suls et al., 2002). Although any control participants who clearly self-affirmed were removed, it is possible that control participants were inadvertently self-affirming by comparing themselves to the average college student. Fourth, it should be noted that the exercise intention item may have been perceived as too challenging for some participants, despite participants in all both groups scoring above the scale median. However, we framed our intention item around national guidelines as this is what is known to lead to substantial health benefits (Shiroma et al., 2014). Fifth, although participants in both groups scored above the scale median on fear processing, it is possible that the messages were not threatening enough. People encounter health-related messages regularly (e.g., at the doctor’s office, on social media, on busses) which may have reduced the perceived severity of the message content. Future research will be needed to assess how message framing (e.g., loss vs gain-framed or health vs appearance-framed) influences defensive processing of health-related messages. A sixth limitation worth noting is that participants may have been more willing to participate in the offered exercise intervention if immediate support had been offered rather than offering support for behavior change in the future (Ferrer & Cohen, 2018). It is possible that participants were disinterested in engaging with a future intervention due to perceived barriers to exercise engagement such as an unspecified time commitment and an unspecified intensity of exercise. Additionally, although the present sample had free access to gym facilities and fitness classes on campus, they may have perceived other barriers, such as low levels of social support (Grubbs & Carter, 2002). However, it should be noted that the present study assessed interest in a future intervention and to that end it can be inferred that participants would receive more details prior to actually committing to registration. It is also not possible to determine whether
participants were disinterested in participating in an exercise intervention or another study in general. To this end, future research should offer an immediate intervention that includes more specific details regarding time commitment and exercise intensity expected to determine the robustness of the results presented here. Finally, although feelings of success and failure as brought on by the manipulation were not directly assessed, it should be noted that the intervention manipulation was checked by assessing adherence to the writing prompt such that only the intervention group wrote about a time in their own lives related to their most important value. Additionally, it is important to note that direct manipulation checks in self-affirmation research have been shown to dampen intervention effects by causing the control group to engage in self-affirmation strategies (e.g., McQueen & Klein, 2006).

The limitations may have resulted in the null effect of the self-affirmation intervention. However, it is also possible that the following more substantive processes could be at play. Previous research examining the impact of self-affirmation interventions on promoting intentions to exercise and actual behavioural shifts are mixed. Although some previous research has shown that self-affirmation can positively shift exercise-related attitudes, intentions, and behaviour (Cooke et al., 2014; Good et al., 2015), our research findings have aligned with studies which have shown no such effects (Strachan et al., 2020). The meta-analytic evidence that shows self-affirmation influences health-related behaviour and intentions (Epton et al., 2015; Sweeney & Moyer, 2014) may be especially or only the case for simple-to-perform health behaviours (e.g., such as vaccine uptake) in comparison with difficult to perform health behaviours (e.g., changes in diet or exercise). To be maintained, complex behaviours need to be regulated through processes that are more complex than initial engagement such as through motivation change, habit formation, or identity development (Rhodes, 2017). To that end, even if self-affirmation
was sufficient to change initial behavioural engagement, it would not be sufficient to instill
maintenance (Mancuso et al., 2012; Strachan et al., 2020). The influence of self-affirmation
interventions on simple vs. complex health-behaviours has yet to be assessed in meta-analytic
moderation analyses. The present study did not assess actual behaviour change, however, the act
of registering interest for a future exercise intervention implies that behaviour change would be
expected in the future and so could have influenced the effectiveness of the intervention.

Despite the aforementioned limitations, it is nonetheless interesting that the majority of
insufficiently active women were uninterested in registering for an exercise intervention even
after learning about, or being reminded of, the consequences of remaining insufficiently active.
Although participants in both groups reported moderate intentions to regularly engage in future
exercise, it is known that the majority of intentions are not translated into behavior (Sheeran &
Webb, 2016). Thus, future research is needed to determine how researchers and interventionists
can effectively recruit insufficiently active individuals to exercise interventions. This research is
likely to be especially important when considering groups who are predisposed to inflammatory
and metabolic disease. Future research should explore the boundary conditions of self-
affirmation, such as type of control condition, and whether the support offered is immediate, or
in the case of the present study, delayed (Ferrer & Cohen, 2018). Additionally, promoting self-
compassion in insufficiently active individuals may be an especially viable option to promote
intervention recruitment (Homan & Sirois, 2017). Although this process is more time consuming
than self-affirmation, self-compassion predicts better physical health because of health behavior
engagement, such as exercise (Homan & Sirois, 2017; Magnus et al., 2010). Concerning
individuals who are dissatisfied with their bodies, body-functionality interventions may be an
especially valuable pre-intervention technique (Alleva et al., 2018). That is, due to the tendency
for dissatisfied individuals to avoid exercise, improving body image may be an important first step to promoting exercise engagement (More et al., 2019; Neumark-Sztainer et al., 2006).

Conclusion

This research provided an initial conceptual test of self-affirmation as a pre-exercise intervention recruitment technique for insufficiently active women. Although self-affirmation was not effective in terms of eliciting interest for a future intervention, evidence is provided that novel means of recruiting insufficiently active women to interventions is necessary. Specifically, it was found that approximately 70% of participants were not interested in registering for an exercise intervention even though they had recently learned about, or had been reminded of, the consequences of their physical inactivity. In light of this, two methods that may increase registration in exercise interventions were proposed.
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https://www.who.int/dietphysicalactivity/factsheet_women/en/
### Table 1

*Frequencies and Means (SD) for Dependent Variables by Experimental Condition with Correlations (N = 254)*

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*Note:* For baseline, stage of change was assessed using chi-square analysis. General body dissatisfaction and thinness dissatisfaction assessed using independent t-tests. Correlations for the control group appear in brackets.
## Table 2
Regression Analysis Results for Hypothesis 4: Intention to Exercise

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