

A Randomized Comparative Trial of Self-Affirmation and Psychoeducation Interventions
for Improving Body Image in Young Women

By

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M.A. (Clinical Psychology), Lakehead University, Canada, 2012

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
in Clinical Psychology

Department of Psychology

Lakehead University

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Acknowledgements

I would first like to thank Dr. Ron Davis for his mentorship and supervision, both in research and clinical work, over the years. Your guidance, time, and patience has been vital to both the development of this research, and my personal development as a clinician and professional. I would also like to extend my gratitude to my committee members, Dr. Mazmanian, Dr. Wakewich, and Dr. Carter-Major for their time, thoughtful consideration, and feedback on this dissertation. I would also like to acknowledge and thank members of Dr. Davis' lab, past and present, for their thoughtful criticisms, questions, and encouragement throughout my time at Lakehead. I am especially grateful to my family, who have always been unconditionally proud of me, believed that I could achieve this, and whose support has helped make it possible. And thank you to my partner, for tolerating and supporting me throughout the last few years of this process.

Abstract

Body image concerns are a widespread experience, particularly for young women, and are associated with a number of undesirable consequences, including eating disorders. Self-affirmation theory provides a framework for understanding poor body image as well as a potential means for improving the problematic cognitions and emotions associated with such concerns. The present randomized comparative trial was designed to investigate the utility of a self-affirmation intervention for improving body image concerns. Lakehead University women with a desire to improve their body image were randomly assigned to a self-affirmation intervention (SA; $n = 190$) where they engaged in self-affirmation exercises designed to teach them to affirm nonappearance domains of self-worth. The efficacy of SA was compared to a psychoeducational video intervention (PE; $n = 189$) that addressed body image and associated concerns. Results indicated that both interventions were successful at reducing concerns with weight and shape, eating-related concerns, investment in appearance contingent self-worth, and impairment associated with these concerns at the end of the 28-day intervention period and at 3-month follow-up. However, PE was superior at addressing eating-related concerns and impairment in functioning. Moderation analyses were unsuccessful at predicting intervention outcome based on participant baseline levels of self-esteem, positive and negative affect, ruminative thinking, and coping flexibility. Exploratory analyses determined that 14% of the variance in postintervention and 3-month follow-up weight and shape concerns was attributed to initial ratings of confidence in the interventions and the number of exercises participants completed. Results are discussed in terms of their relevance to the self-affirmation and broader psychotherapy literature, strengths and limitations, as well as implications for future research.

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A Randomized Comparative Trial of Self-Affirmation and Psychoeducation Interventions for Improving Body Image in Young Women

The construct of body image refers broadly to an individual's attitudes and perceptions of their physical appearance, including body weight and shape, as well as other physical characteristics (Cash & Pruzinsky, 2004). Body image dissatisfaction is a prevalent and widespread concern, particularly for women in Western cultures (Swami et al., 2010). One study indicated that 65% of first-year university students had concerns about their present body image (Luevorasirikul, Boardman, & Anderson, 2012). Importantly, negative body image has been linked to a number of mental health concerns including eating disorders and depressive symptoms (Cash & Pruzinsky, 2004; Stice & Bearman, 2001). The prevalence and potential implications of concerns with body image have led researchers to investigate the development of body image as well as interventions designed to improve it.

A number of factors are implicated in the development of body image including cultural socialization, interpersonal experiences, personality factors, and physical characteristics (Cash, 2004). High family support, low levels of perceived sociocultural pressure from others regarding the thin ideal, positive physical self-concept, and active coping skills have been shown to contribute to women's overall wellness and, subsequently, increased positive body image (Snapp, Hensley, Choate, & Ryu, 2012). Similarly, adolescents who felt intelligent, perceived their family members to be well off, reported ease of talking with a father figure, and believed that their teachers were interested in them reported having a more positive body image (Fenton, Brooks, Spencer, & Morgan, 2010). Body acceptance by others as perceived by adolescent females has also been shown to predict increases in body appreciation over time (Andrew, Tiggemann, & Clark, 2016).

Conversely, a number of factors have been linked to poor body image. In female adolescents, a higher body mass index (BMI), greater thin-ideal internalization, and lower autonomy predicted more negative body image at 1-year follow-up (Clark & Tiggemann, 2008). Stress has been found to account for a significant proportion of variance in body image that was also influenced by self-esteem and gender (Murray, Byrne, & Rieger, 2011). Finally, lower self-esteem has been associated with higher body dissatisfaction (Mellor, Fuller-Tyszkewics, McCabe, & Ricciardelli, 2010).

Models conceptualizing body image are typically comprised of one or more of four dimensions: perception, cognition, affect, and behaviour (Banfield & McCabe, 2002). For example, one exploratory factor analysis revealed three underlying body image factors: cognitions and affect regarding body, body importance and dieting behaviour, and perceptual body image (Banfield & McCabe, 2002). The most widely accepted model of body image suggests two basic attitudinal elements of body image, evaluation and investment, which adequately addresses all four proposed dimensions (Cash, 2004). Evaluation is comprised of satisfaction with body image as compared to internalized appearance ideals. Investment refers to the degree of importance placed on appearance as evidenced by cognitions, behaviours and self-schemas. Self-schemas regarding appearance “reflect one’s core, affect-laden assumptions or beliefs about the importance and influence of one’s appearance in life, including the centrality of appearance to one’s sense of self” (Cash, 2004, p. 42).

These self-schemas are triggered by internal or environmental events and cues and are thus largely state dependent. Self-schemas about body image have implications for a myriad of other cognitions and behaviours. For example, Melnyk, Cash, and Janda (2004) investigated body image states in college women by having them report current body image experiences

twice a day for 6 days. Greater levels of negative body image were associated with less trait body image satisfaction, increased investment in appearance, increased dysfunctional eating attitudes, and increased use of maladaptive coping strategies. Further, the variability of body image states was predicted by the participants' degree of psychological investment in their appearance, dysfunctional eating attitudes, and appearance-fixing coping strategies. This finding has been replicated longitudinally (Rudiger, Cash, Roehrig, & Thomson, 2007). Greater levels of positive state body image were associated with less investment in appearance, less body image dissatisfaction and cognitive distortions, and fewer problematic eating attitudes. Similarly, greater investment in appearance and greater body image cognitive distortions predicted increased day-to-day body image variability. Finally, Verplanken and Vesvik (2008) found among adolescents that the frequency and automaticity of negative body image thinking uniquely accounted for variance in self-esteem and eating disturbance over and above cognitions specific to body dissatisfaction.

It is likely that appearance self-schemas are triggered by environmental cues, such as social comparisons. Ridolfi, Myers, Crowther, and Ciesla (2011) had participants complete questionnaires at randomly selected times throughout the day to assess the relationship between body image and affect, and the level of social comparisons to media and peers the individuals engaged in. Comparisons to media stimuli were associated with increased body checking, negative affect, and guilt. Comparisons to peers were associated with greater body checking and guilt, and cognitive distortions moderated the relationship between social comparisons and body checking. Using a similar ecological momentary assessment methodology, upward appearance-related comparisons were shown to be associated with increases in negative affect, body dissatisfaction, and thoughts of exercising in both body dissatisfied and satisfied women

(Leahey, Crowther, Mickelson, 2007). Although women with high body dissatisfaction with or without eating pathology made more upward appearance comparisons and were more negatively affected by these comparisons than low body dissatisfied women, all women experienced negative emotions and cognitions following an upward comparison, including increases in guilt, body dissatisfaction, and dieting cognitions (Leahey, Crowther, & Ciesla, 2011).

In light of the above findings, targeting and decreasing psychological investment in appearance may be a viable means of improving body image in women. One way of modifying these cognitions would be to increase investment in nonappearance domains of self-worth, thereby decreasing stake in the appearance domain and reducing potential threats to body image. Researchers have recently begun to examine the utility of self-affirmation theory for explaining body image cognitions.

Self-Affirmation and Body Image

Self-affirmation theory proposes that in order to maintain self-integrity in response to threatening stimuli, individuals affirm nonrelated domains of the self (Steele, 1988). Grounded in the social psychology of reflection upon core personal values, self-affirmation theory was proposed as a “self-system” that explains the behaviour of individuals when faced with a threat to the self (Cohen & Sherman, 2014). According to the theory, individuals are fundamentally motivated to maintain the integrity of the self, or the belief that one is a good person. Consequently, when an aspect of self-worth is threatened, people are motivated to respond in a way that serves to restore their self-worth. Individuals can do this by way of actions that affirm the general integrity of the self, even if they do not respond directly to the provoking threat (Steele, 1988). Thus, an individual can respond to a threat to a certain aspect of the self by

affirming another area of their self-concept. In this way, the direct threat does not have to be addressed or resolved.

For instance, when exposed to a body image threat, such as gazing into a mirror, the person may react by affirming their academic successes. This would serve a protective function by resulting in derogation of the immediate threat to body image and affirmation of another important aspect of the self. This serves to boost self-resources, broaden perspective on self-concept, and separate self from the threat, thereby reducing its negative psychological impact (Critcher & Dunning, 2015; Sherman, 2013). Bergstrom, Neighbours, and Malheim (2000) proposed that self-affirmation theory may provide a framework for understanding decreases in body self-esteem following a threat to body image. The authors surmised that if an individual is exposed to a body image threat, the resulting negative cognitions might be addressed and compensated for by reaffirming other nonthreatened aspects of the self, such as academics. Bergstrom et al. investigated this notion in a study where women with low and high BMIs were exposed to images of thin models. Women with higher BMIs appeared to self-affirm after viewing the images by increasing their ratings of the importance of nonappearance domains of self-worth. Women with lower self-esteem also rated these nonappearance domains as more important regardless of BMI. As predicted by self-affirmation theory, these results suggest that when women with higher BMIs or lower self-esteem are exposed to a threat to the appearance domain of the self, they seek to reaffirm their self-worth by investing stake in other domains of the self.

Jarry and Kossert (2007) also examined the effect of a self-esteem threat and images of thin models on body image within the context of self-affirmation. Participants received failure or success feedback following a written test and then viewed media images of thin models.

Those participants that received failure feedback indicated that they felt more satisfied with their appearance than those that received success feedback. These results suggest that women who received failure feedback self-affirmed in the appearance domain as another source of self-worth. According to self-affirmation theory, this would occur in order to restore overall self-worth; therefore, a domain other than the threatened domain would require affirmation. In this case, the threat targeted an academic domain which led participants to invest a greater stake in the appearance domain and subsequently maintain global self-worth. These studies provide preliminary evidence that self-affirmation theory may function as a means of understanding body image. However, a more detailed explanation of self-affirmation theory is necessary to understand its full implications.

Four primary components of self-affirmation theory are integral to its understanding (Sherman & Cohen, 2006):

1. *People are motivated to protect the perceived integrity and worth of the self.* An individual's self-worth is comprised of a number of domains, or contingencies of self-worth that include an individual's roles, values, social identities, belief systems, and goals (Crocker & Wolfe, 2001; Sherman & Cohen, 2006). When one is exposed to a threat to an important aspect of the self, these systems are activated in order to maintain self-worth.
2. *Motivations to protect self-integrity can result in defensive responses.* Defensive responses often rapidly result from motivations to repair the threatened domain. Defensive responses where individuals devalue the importance of domains that are threatened are particularly evident within self-affirmation theory. However, such

devaluations, while they may serve to sustain self-worth, prevent further possibility of improvement in the given domain (Major, Spencer, Schmader, Wolfe, & Crocker, 1998).

3. *The self-system is flexible.* This reflects the notion that people naturally focus on successes in their life in order to cope with perceived or actual failures.

4. *People can be affirmed by engaging in activities that remind them of “who they are”.*

This serves to reduce the potential impact of threats to self-integrity. When these domains are affirmed, threatening information becomes less powerful as the individual is reminded of a broader, more comprehensive understanding of the self.

Research examining self-affirmation theory has largely focused on its potential utility for reducing the defensive processing that results from threatening health information. Of note, those individuals who are most at risk of developing health concerns tend to respond with the greatest levels of defensiveness and are less likely to accept or respond to threatening health messages (Ditto & Lopez, 1992). Self-affirmation studies have demonstrated small, but reliable positive effects on the acceptance of health-risk information, intentions to change behaviour, and subsequent behaviours (Epton, Harris, Kane, van Koningsbruggen, & Sheeran, 2014; Howell, 2016; Sweeney & Moyer, 2015). Studies utilizing a self-affirmation manipulation, in which individuals affirm a core value of the self prior to being exposed to threatening health information, have resulted in significant increases in the acceptance of information regarding the risks of smoking, Type 2 Diabetes, excessive sun exposure, and alcohol consumption (Armitage, Harris, Hepton, & Napper, 2008; Jessop, Simmonds, & Sparks, 2009; Klein & Harris, 2009; van Koningsbruggen & Das, 2009). Similarly, although self-affirmed hemodialysis patients did not differ from matched controls on ratings of health-risk information, they did display evidence of improved adherence to treatment protocol (Wileman et al., 2014; Wileman et al., 2016).

Affirming important values has the potential to counteract chronic threats to the self. One study investigated the effect of a values affirmation on African American students' sense of academic belonging during adolescence (Cook, Prudie-Vaughns, Garcia, & Cohen, 2012). Students completed affirmation exercises where they wrote about important values approximately four times during a year, prior to class exams. Control participants completed similar exercises where they did not affirm values. Results indicated that students in the control condition displayed a decreased sense of belonging, with increases in the number of low-performing students dropping out in seventh grade. Conversely, affirmed students did not display this trend. Further, those in the affirmed condition displayed less fluctuation in academic belonging and less contingent academic self-esteem than those in the control condition.

Similarly, Latino college students completed a values affirmation during their first or second year of college where they wrote about a core personal value. A control group of Latino students wrote about a less important value. Following this one-off self-affirmation, affirmed students had higher grade point averages than controls over 2 years (Brady et al., 2016). It was proposed that engaging in the single affirmation exercise shifted the way in which Latino students responded to encountered stressors, resulting in subsequent spontaneous self-affirmations. Specifically, when exposed to an academic stressor salience task, affirmed Latino students generated more self-affirming and less self-threatening thoughts and feelings, as well as reporting a greater sense of adequacy. Given these findings, it is plausible that self-affirmation may serve as a potential means of reducing the influence of chronic threats to other domains of self-esteem, such as body image.

Some self-affirmations seem to increase bias and subsequently solidify resistance to change (Sherman & Cohen, 2006). This primarily occurs when individuals affirm domains that

are the same as the threatened domain. Same-domain affirmations have been shown to result in increased certainty and self-confidence, leading to increased bias, inflexibility, and outcomes that contrast with those of different-domain affirmations (Blanton, Cooper, Skurnik, & Aronson, 1997). For example, if an individual received a threat to body image, they could reaffirm in the appearance domain by noting the ways in which they could go about improving their appearance. This would serve to solidify the importance of this domain and reduce flexibility toward considering alternate domains of self-worth. The unique outcomes of same-domain affirmation are particularly relevant to the study of body image, where interventions often focus on having individuals affirm characteristics of their bodies in an attempt to improve their cognitions about them.

A previous study (Ransom, 2011) attempted to replicate findings consistent with the self-affirmation literature related to body image. Specifically, it was hypothesized that individuals receiving a threat to the self would divest their stake in a relevant domain and increase their stake in other nonrelevant domains of self-worth. Participants role played the part of a therapist seeing a client (played by an experimenter) who presented with either a body image or academic-related problem. Participants were videotaped during the 5-min interaction, following which they viewed their “session” on a widescreen television. Measures of self-esteem, positive and negative affect, and a scale that measured invested stake in contingencies of self-worth were administered pre- and post-roleplay. Of note, the results of the study partially contradicted the previous literature such that participants with low appearance self-esteem increased their stake in the appearance domain following the appearance role play. However, participants did invest greater stake in all domains generally. Further, participants with low appearance self-esteem exhibited less positive affect and greater negative affect while viewing the videotape of their role

play than did participants with high appearance self-esteem. This was true regardless of whether self-esteem was assessed prior to or following the role play. Notably, only appearance self-esteem was a significant predictor of affect; neither academic self-esteem nor a measure of global self-worth was predictive of participant's affective viewing responses.

Although these results were somewhat contrary to the previous literature, they are consistent with findings that self-esteem can lead to differences in self-affirmation. For example, individuals with low self-esteem have been found to rationalize esteem-threatening decisions more than individuals with high self-esteem, presumably because they had less favourable self-concepts to draw from in order to self-affirm (Steele, Spencer, & Lynch, 1993). Further, the findings concerning affect suggest that viewing their role play operated as a body image exposure. Therefore, those participants with low appearance self-esteem seemed to find the exposure more threatening to the self, resulting in decreased positive affect and increased negative affect. This fits with previous research that has found that exposing women to their bodies and having them focus on them, either by mirror exposure or videotaped images, results in decreases in mood and appearance self-esteem, particularly for women with greater body image concerns (Hilbert, Tuschen-Caffier, & Vogeles, 2002; Tuschen-Caffier, Cogeles, Bracht, & Hilbert, 2002). Thus, the results of Ransom (2011) suggest that simply exposing women to their own bodies for a relatively brief duration poses a significant enough threat to individuals with low appearance self-esteem that it results in negative outcomes.

Based on these results, Ransom (2011) hypothesized that appearance self-esteem may function as a means by which body image concerns are perpetuated over time. A model of integrated findings from this study is useful in explaining this cycle (see Figure 1). As indicated by the solid lines in the figure, when individuals with low appearance self-esteem are exposed to

a threat to the self, such as a body image exposure, they tend to invest more self-worth in the appearance domain of contingent self-worth; this reaction solidifies the notion that appearance is very important to them. The threat to body image may be particularly pervasive for an individual with low appearance self-esteem because of a discrepancy experienced between their actual and ideal appearance. Thus, it would follow that positive and negative affect subsequently decreases and increases, respectively, because of the negative discrepancy-related cognitions. Furthermore, negative affect may serve to reinforce negative body image cognitions related to initial levels of low appearance self-esteem, thereby serving to sustain a poor body image.

In this model, a self-perpetuating cycle begins whereby the individual repeatedly reinforces the notion that they do not meet their own appearance standards. Further, individuals are reminded that it is very important for them to meet these standards. This cycle, when left uninterrupted, would continue to operate throughout a person's life and promote enduring concerns with body image. This cyclical interpretation speaks to the enduring experience of concerns with body image across the lifespan. Indeed, substantial research indicates that levels of body dissatisfaction remain high through a woman's lifetime (Johnston, Reilly, & Kremer, 2004; Runfola et al., 2013; Tiggemann & Lynch, 2001; Tiggeman & Stevens, 1999). Further, this cycle suggests other factors may be implicated in sustaining the cycle of poor body image, the most notable being self-esteem.

Self-esteem. As mentioned previously, self-affirming cognitions and behaviours appear to function differently according to an individual's level of self-esteem. Individuals with higher self-esteem appear to be more likely to self-affirm, presumably because they possess more favourable self-concepts with which to self-affirm. Further, individuals with low self-esteem appear to find threats to the self more threatening than those with higher self-esteem. However,

this threat seems to dissipate when low self-esteem individuals have the opportunity to self-affirm. For example, one study demonstrated that when individuals with low self-esteem were not able to self-affirm, they experienced a stronger threat to self when confronted with a high achiever. This threat response was reduced when they were given the opportunity to self-affirm personal values (Van Dijk, van Koningsbruggen, Ouwerkerk, & Wesseling, 2011).

Self-esteem may serve as a mediator or moderator of self-affirmation processes (Sherman & Cohen, 2006). That is, self-affirming may result in increases in state self-esteem. This may then allow individuals to become open to accepting threatening information that might otherwise threaten and lower their state self-esteem. Evidence for this notion comes from a study by Fein and Spencer (1997) whose research found that individuals who were self-affirmed by receiving positive personality feedback exhibited increases in state self-esteem. Further, these participants did not display increases in defensive stereotyping behaviours that were exhibited by participants that did not self-affirm. Importantly, decreases in stereotyping behaviour were mediated by increases in state self-esteem. In the same way, individuals that are given the opportunity to self-affirm personal values exhibited lower cortisol responses to stress as compared to participants who are not given the opportunity to self-affirm (Creswell et al., 2005). The relationship between value affirmation and perceived stress responses was found to be moderated by the self-resources endorsed by the participants, including trait self-esteem. Specifically, those participants that reported high self-resources and had self-affirmed personal values reported less perceived stress than did nonaffirmed participants with lower self-resources. Conversely, Armitage and Rowe (2011) found in two experiments that self-affirming led to more positive interpersonal feelings, but no changes in self-esteem.

Self-affirmation may provide individuals with access to a broader perspective of the areas from which they derive their self-esteem. This notion is based on the idea that self-affirmations expand the size of an individual's self-concept. Following such expansions of self-concept, threats are directed toward a more specific, but not less important, domain of the self and do not target self-worth overall. In a set of studies, Critcher and Dunning (2015) examined whether self-affirmations enhanced individuals' perspectives of the self. Their findings indicated that when allowed to self-affirm by writing about the most valued part of their identity, students saw academics as a less influential domain of the self, compared to those participants that did not self-affirm. In a second study, half of participants were able to self-affirm important values prior to completing a challenging task that was designed to induce a threat to the self. They then completed a scale measuring positive and negative feelings of self-worth. Results indicated that affirmed participants maintained positive feelings of self-worth as compared to participants that did not self-affirm. According to the authors, nonaffirmed participants experienced a narrowing of their self-concept, which subsequently resulted in negative affect. Conversely, affirmed participants' self-concepts were broadened. This suggests that self-affirming may provide individuals with access to greater self-resources with which to self-affirm.

A related concept to self-esteem is that of contingencies of self-worth. These are the domains or categories on which an individual may stake their self-esteem so that their view of their value or self-worth depends on their perceived successes or failures in that domain (Crocker & Wolfe, 2001). Given the invested stake in such domains, self-esteem is most likely to be threatened by perceived or experienced failures in these areas (Crocker, Luhtanen, Cooper, & Bouvrette, 2003). In order to measure contingencies of self-worth, Crocker et al. (2003) developed a psychometric measure called the Contingencies of Self-Worth Scale (CSWS) which

consists of the following seven domains of contingent self-worth: Competition, Approval from Others, Family Support, Appearance, God's Love, Virtue, and Academic Competence. This measure identifies the degree to which individuals stake their self-worth in a specific domain. Further, it is useful for identifying self-affirming cognitions by measuring the degree to which an individual changes their stake in a domain of self-worth (Ransom, 2011).

Research investigating contingencies of self-worth provides evidence of a relationship between contingent self-esteem and emotional and behavioural constructs. Importantly, self-esteem varies in response to these constructs. For example, the role of contingent academic competence self-worth was explored longitudinally in university students (Crocker, Karpinski, Quinn, & Chase, 2003). Self-esteem, positive affect, and identification with one's academic major increased on days students received good grades and decreased on days that they received poor grades. As well, basing self-esteem on academic competence moderated the effect of bad grades. Similarly, Park, Crocker, and Keifer (2007) found that participants with low contingent academic and general self-esteem downplayed the importance of appearing competent to others when they received failure feedback. In contrast, those participants with high general self-esteem and high contingent academic self-esteem showed increases in state self-esteem and desire to appear competent following failure feedback. These findings suggest that initial levels of self-esteem may lead to differential outcomes in terms of self-affirming.

Contingent self-esteem has also been found to influence symptoms of depression. Sargent, Crocker, and Luhtanen (2006) tracked depressive symptoms in college students over the course of their first semester of college. Increases in depressive symptoms were predicted by higher levels of external contingencies of self-worth (e.g., approval from others, appearance, competition, academic competence). Conversely, internal contingencies of self-worth (e.g.,

God's love, virtue) were not associated with levels of depressive symptoms. A similar study (Burwell & Shirk, 2006) tracked depressive symptoms in adolescents and also found that contingencies of self-worth predicted change in depressive symptoms over time. Depressive symptoms did not predict change in contingencies over time, suggesting a causal relationship of contingencies as predictors of depressive symptoms.

Contingencies of self-worth have also been shown to relate to behavioural outcomes. One study examined the social motivations of participants with high and low self-esteem following a threat to a domain of contingent self-worth (Park & Maner, 2009). An interaction between an individual's trait self-esteem and contingencies of self-worth predicted whether individuals desired social contact following a threat to the self. Individuals with high self-esteem and high appearance contingent self-worth indicated that they wished to connect with close others following a threat to physical attractiveness. Conversely, individuals with low self-esteem and high appearance contingent self-worth indicated that they wished to avoid social contact, instead focusing on less interpersonally focused coping strategies such as enhancing physical attractiveness. Again, the contingent self-esteem research suggests differences in affirmation-type cognitions based on initial self-esteem levels as well as possible divergent behavioural consequences.

Several studies have focused specifically on the association between appearance contingent self-worth and body image in women. The first study examined whether objectified body consciousness, defined as an outsider's perspective of one's own body, mediated the relationship between appearance contingent self-worth and low levels of appearance self-esteem in 465 female undergraduates (Noser & Zeigler-Hill, 2014). A multiple mediation model indicated that the association between appearance contingent self-worth and low levels of

appearance self-esteem was significantly mediated by body surveillance and body shame. The authors proposed that greater body consciousness may potentially contribute to low levels of appearance self-esteem. A similar study examined whether appearance-based contingent self-esteem and actual-ideal body image discrepancies influenced the association between low levels of global self-esteem and disordered eating symptoms in 877 college women (Zeigler-Hill & Noser, 2015). Results of a moderated mediation analysis showed that the association between global self-esteem and disordered eating was mediated by actual-ideal body image and that this mediation was further moderated by appearance-based contingent self-esteem.

O'Driscoll and Jarry (2015) explored whether the effects of interpersonal rejection on self-esteem and body satisfaction were moderated by body weight contingent self-worth. Participants were assigned to either a neutral control condition or an interpersonal rejection condition where they were told that they would be working alone on a decision-making task because no other participants wished to work with them. Women with higher body weight contingent self-worth reported lower appearance self-esteem and body satisfaction in both conditions. Further, women with higher body weight contingent self-worth reported greater appearance self-esteem and body satisfaction in reaction to the interpersonal rejection. The same pattern was not observed for women with lower body weight contingent self-worth. Appearance contingent self-worth thus plays a role in shaping body image concerns, and may be instrumental in subsequently improving them. Thus, the research literature appears to suggest that initial levels of self-esteem may be implicated in predicting who responds best to self-affirmation interventions; however, other individual differentiating factors, such as mood, may also be implicated.

Positive and negative affect. The broaden-and-build theory of positive emotions (Fredrickson, 2013) provides a compelling conceptualization of the relationship between cognitive and affective states that is applicable to the study of body image. This theory is based on the notion that positive emotions, such as joy, interest, contentment, pride, and love, possess the ability to *broaden* an individual's thought-action repertoires and *build* their enduring personal resources (Fredrickson, 2001). Such positive emotions are contrasted with negative emotions that have the ability to narrow thought-action repertoires, or the range of potential actions the body and the mind are prepared to engage in.

Research suggests that negative emotions narrow the scope of attention and thinking. Negative emotions are said to narrow individuals' momentary thought-action repertoires by bringing action urges forth (e.g., fight, flight) in an attempt to protect them from the stimulus evoking the negative emotion (Fredrickson, 2001). On the other hand, broaden-and-build theory suggests that positive emotions broaden such thought-action repertoires, thereby allowing individuals to utilize more flexible and broad ideas and action urges (Fredrickson, 2001). For example, in one study (Fredrickson & Branigan, 2005) participants viewed films with either a positive or a negative valence and then completed either a visual processing or thought-action task. Those participants who viewed the films evoking positive emotions showed evidence of a broadened scope of attention during the visual processing task. Further, they exhibited broadened thought-action repertoires when asked to list all the things they would like to do in the moment following the film. Importantly, negative emotions led to narrowed thought-action repertoires when compared to the neutral films.

The broadened cognition caused by positive emotions then leads to behaviours that are more flexible and that result in the building of personal resources like mindfulness, resilience,

social closeness and physical health (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009). These authors tracked participants' daily emotions for 1 month and found that positive emotions mediated the relationship between pre- and posttest resilience. Similarly, Fredrickson, Cohn, Coffey, Pek, and Finkel (2008) found that participants who practiced loving-kindness meditations, which focus on increasing warmth and caring for self and others, displayed increases in personal resources like mindfulness and social support. These resource increases were found to be the result of increases in daily experiences of positive emotions.

Additionally, emotions may be viewed as self-perpetuating systems that are driven and sustained by the causal relationships that exist between cognitive, behavioural, and somatic processes (Garland et al., 2010). Within the context of broaden-and-build theory, if these emotions are negative, the systems can be described as *downward spirals*. These spirals explain how emotions can combine with the cognitive and behavioural symptoms of mood disorders, for example, and interact to produce subsequent emotions, cognitions, and behaviours. As these emotions continue, emotion-consistent appraisals, in this case negative appraisals, lead to cognitive biases when interpreting new experiences and potentially persisting negative beliefs about the self and world. Other cognitive styles, such as rumination or catastrophizing, can also play a role in these downward spirals. These beliefs, repeatedly coupled with negative emotion and self-imposed isolation, serve to continue to narrow the spiral that continues to taper as the cycle continues. Such a pattern is likely to lead to depression in vulnerable individuals (Garland et al., 2010). This pattern is also reminiscent of the body image cycle proposed above (Ransom, 2011).

Conversely, positive emotions can lead to self-perpetuating cycles, referred to as *upward spirals* that ultimately lead to positive coping. Much like negative emotions impact cognitions

and behaviours, positive emotions predict positive emotional experiences (Fredrickson & Joiner, 2002). For example, one study found that initial levels of positive affect predicted increased broadened coping, and that initial broadened coping predicted increased positive affect (Fredrickson & Joiner, 2002). These positive emotions then serve to broaden individuals' mindsets, behavioural repertoires, and openness to social experiences (Garland et al., 2010). That is, individuals experiencing positive emotions are going to be more likely to be open to new social or behavioural experiences. These experiences then increase the likelihood of more positive experiences and serve to build social relationships and other protective resources in the process. Thus, a cycle is started whereby broadened coping leads to positive emotions, eventually developing into increased psychological resilience and well-being (Fredrickson, 2005). Those individuals who experience greater daily positive than negative emotions tend to exhibit what is termed *human flourishing*. Human flourishing consists of a combination of general life satisfaction, broadened thought-action repertoires and behavioural flexibility, personal and social resources, and resilience (Fredrickson & Losada, 2005). One would expect that positive body image could also be a result of such flourishing.

Parallels between self-affirmation theory and broaden-and-build theory in a body image context. If one considers the processes of self-affirmation and broaden-and-build theory in the context of body image, several similarities can be noted. These parallels suggest that these processes either operate similarly or are describing the same process using contrasting cognitive and affective approaches. Indeed, the two cycles appear to follow similar pathways. Both self-affirmation and broaden-and-build theory processes result in negative outcomes by way of rigid or defensive thinking. In both cases, when responding to a body image threat, those individuals who continue to perceive the threat as personally threatening narrow their focus and continue to

attend to the threatened domain. Further, negative affect appears to play an essential role in sustaining and reinforcing the cyclical process of both theories. Lastly, when positive outcomes occur, both models result in individuals positively reframing their experience.

Differences between the two theories occur primarily in their focus; self-affirmation on cognitive processes and broaden-and-build theory on affective processes. However, given the well-established relationship between cognitive and affective processing, this difference could be relatively trivial, as either process would inevitably result in influencing the other. These theories may prove useful to both the understanding of the body image cycle, and the interventions designed to improve it.

The hypothesis that self-affirmation may lead to improved positive outcomes was explored in several studies investigating the benefits of self-affirmation on psychological well-being (Armitage, 2016; Nelson, Fuller, Choi, & Lyubomirsky, 2014). The first study tested the utility of a brief self-affirmation intervention for protecting subjective well-being, interpersonal feelings and self-esteem in a community sample of 140 women 46 years of age and older (Armitage, 2016). Participants were presented with a series of “If... then” statements where they were provided with a potentially threatening sentence stem and asked to complete the stem with a self-affirmation. Women who self-affirmed had significantly greater well-being at follow-up than the control condition. Notably, the self-affirmation intervention did not significantly influence self-esteem or interpersonal feelings.

The second two studies investigated the potential benefits of self-affirmation on psychological well-being in two cultures (Nelson et al., 2014). In the first study, 35 South Korean university students engaged in a value-based self-affirmation where they wrote about a personally important value once a week for 2 weeks. Compared to a control group, these

participants showed increased eudaimonic well-being (i.e., need satisfaction, meaning, and flow) after the intervention. In the second study, 33 U.S. university students engaged in the same self-affirmation exercise for 4 weeks. After 2 weeks, participants showed evidence of increased eudaimonic well-being and increased hedonic well-being (i.e., affect balance). After 4 weeks, the increases in affect balance were only noted for participants who were initially low in eudaimonic well-being. Based on these studies, positive and negative affect may not only increase the likelihood of effective self-affirmation, but may also be influenced by the act of self-affirming itself.

Coping flexibility. Research findings from the self-affirmation and broaden-and-build theory literature suggest that these psychological processes lead to increased openness and cognitive flexibility. It is reasonable to presume that a similar process, coping flexibility, may also be related to these constructs and predict the likelihood of their occurrence. Further, given the findings that poor body image is associated with maladaptive processes, coping flexibility may have implications for individuals attempting to process threats to body image.

Coping has been defined as the “thoughts and behaviours that people use to manage the internal and external demands of situations that are appraised as stressful” (Folkman & Moskowitz, 2004, p. 746). These situations are also personally significant and taxing (Folkman & Moskowitz, 2004). Of note, coping responses often occur in reaction to the feeling that important goals have been threatened. According to the cognitive theory of stress and coping, there are different types of coping including problem-, emotion-, and meaning-focused. Problem-focused coping tends to occur in situations where solutions can be acquired, while emotion-focused coping typically occurs when situations have to be accepted as they are. The final type of coping is meaning-focused which is hypothesized to result in positive emotions that

restore coping resources and provide the motivation required to sustain problem-focused coping (Folkman, 2008).

Another important component of coping is the ability for individuals to recognize when coping strategies are not appropriate for different stressful events, and to implement different coping strategies when necessary. This component has been termed coping flexibility and is defined as the “ability to discontinue an ineffective coping strategy... and produce and implement an alternative coping strategy” (Kato, 2012, p. 263). Evidence suggesting that coping flexibility may be useful in improving body image comes from literature exploring depressive symptoms. One study assessed the role of coping flexibility for symptoms of depression and anxiety (Fresco, Williams & Nugent, 2006). Results of a structural equation model showed that explanatory (i.e., arriving at the explanations of events) and coping flexibility (i.e., attempts to cope with negative events) partially mediated the prediction of negative affect while coping flexibility partially mediated the influence of explanatory flexibility. A more recent study found that evaluation coping and adaptive coping were significantly associated with lower levels of depressive symptoms (Kato, 2015). Similarly, a coping flexibility intervention was designed and implemented in an attempt to decrease symptoms of depression (Cheng, Kogan, & Chio, 2012). Outcomes indicated that individuals who learned skills designed to teach flexible coping reported greater increases in coping flexibility and reductions in depressive symptoms than those in a cognitive-behavioural or control group.

The ability to determine whether a coping strategy is ineffective, and to then implement a different coping strategy, is particularly relevant to individuals experiencing a threat to body image. In such a situation, individuals would be required to use cognitive and behavioural strategies to cope with associated distressing thoughts and feelings (Cash, 2004). However,

given the prevalence of poor body image, it may be assumed that individuals do not flexibly cope with threats to body image. In a study by Koff and Sangani (1997), the use of different coping strategies resulted in different outcomes with respect to body image concerns. Emotion-oriented coping and avoidance by distraction were positively associated with eating disturbances and psychological distress. On the contrary, task-oriented strategies and avoidance by social diversion were negatively or unrelated to problematic outcomes.

A number of coping strategies have been associated with attempts to cope with threats to body image. Cash, Santos, and Williams (2004) identified three internally consistent body-image coping factors during the development of their Body Image Coping Strategies Inventory. These factors include avoidance, appearance fixing, and positive rational acceptance. The avoidance factor reflects an attempt to circumvent the stressful context and emotions of body image. Appearance fixing refers to focusing on and attempting to change or hide aspects of one's appearance. Finally, positive rational acceptance refers to accepting body image distress as temporary or illogical and refocusing on other personal assets. Results of their study indicated that more favourable body image was associated with less avoidant and appearance-fixing coping, and greater positive rational acceptance coping. Importantly, each coping strategy contributed significantly to the prediction of problematic eating attitudes and behaviours, such that greater problematic eating was associated with increased appearance and avoidance coping, and less positive rational acceptance.

What is unclear is how often individuals engage in such coping strategies and how flexibly they can move between one strategy and another. Smith-Jackson, Reel, and Thackeray (2011) conducted semi-structured interviews with female college students in an effort to determine body image coping strategies and their perceived effectiveness. Women reported that

they engaged in a number of coping strategies including exercise, healthy eating, appearance changing, talking to friends or family, religion/spirituality, spending time alone, getting out and doing something, and self-acceptance. Participants noted that women tend to get caught in a cycle of body image concerns where they can either choose to believe they cannot change their appearance or decide to engage in self-improvement strategies. Women endorsed unsuccessful strategies that included avoidance or appearance-fixing coping more often than acceptance-based coping. Notably, unsuccessful coping can lead to problematic patterns of cognition, such as ruminative thinking.

Rumination. The proposed cycle of body image maintenance (Ransom, 2011) is reminiscent of ruminative cognitions, or repetitive, negative and self-focused thinking about the past (Trapnell & Campbell, 1999). As such, it is plausible that ruminative thinking plays a role in sustaining the body image cycle. According to self-regulation theory (Carver & Scheier, 1990), the thoughts and actions of individuals are regulated by comparisons between their current states and their desired goal states. If these states match, people continue their behaviours or choose different goals to pursue. However, if there is a discrepancy between these states, individuals will take steps to reduce this discrepancy. To the degree that repeated attempts to reduce the discrepancy are unsuccessful, individuals will begin to experience negative ruminative thoughts.

This theory fits well with the discrepancy hypothesized for those participants with low appearance self-esteem in the Ransom (2011) study. Specifically, it was hypothesized that these participants experienced a discrepancy between their current and ideal appearance, leading to increases in negative affect. Further, these participants increased stake in appearance contingent self-worth suggesting that they affirmed the importance of this domain and would likely

subsequently attempt to reduce this discrepancy. Importantly, because society tends to promote a degree of thinness that is unachievable for most individuals to acquire in a healthy manner (Tiggemann, 2005), the likelihood that the desired goal state will be met is low. Therefore, it is plausible that unless individuals change their cognitions and cease ruminative thinking, the cycle of negative body image is likely to continue.

Researchers have found evidence that rumination plays a role in maintaining cognitions about body image and often involves patterns of thinking that are difficult to interrupt (Ohring, Graber, & Brooks-Gunn, 2002). For example, Grabe, Hyde, and Lindberg (2007) conducted a longitudinal study investigating self-objectification and depression in a community sample of adolescent girls. Results supported a model where body shame and rumination directly mediated the relationship between self-objectification and depression. This study also suggests that both cognitive (rumination) and affective (shame) processes are involved in sustaining the relationship between self-monitoring and mood. In another study investigating the relationship between state body image distress and rumination with undergraduate students (Etu & Gray, 2010), an imagined negative body image scenario was sufficient to induce distress when students ruminated. Specifically, those students who were instructed to read, and ruminate about, a body image scenario reported greater state body image dissatisfaction and anxiety than students who were instructed to think about a neutral topic. These findings provide evidence that having a ruminative response style may predict body image dissatisfaction and anxiety.

Rumination can also result in behavioural consequences relevant to body image and disordered eating behaviours. One study (Gordon, Holm-Denoma, Troop-Gordon, & Sand, 2012) found that body dissatisfaction and the tendency to ruminate interacted to predict binge eating symptoms. In a sample of undergraduate students, those with high levels of body

dissatisfaction who also ruminated were most likely to report binge eating. This interaction was significant after controlling for sex, depressive symptoms, and body mass. Interestingly, this interaction appeared to be specific to body dissatisfaction, as the model was not predictive of problematic alcohol use. Similarly, in a sample of healthy females, rumination about eating and concerns with weight and shape were uniquely associated with eating disorder symptoms, even when controlling for anxiety and depressive symptoms (Cowdrey & Park, 2012). Further, in a small clinical sample of individuals with a diagnosis of Anorexia Nervosa, ruminations on eating, weight and shape were predictive of eating disorder symptoms, even when anxiety and depression were controlled. These results suggest that rumination on eating, weight and shape may be a process that exacerbates eating disorder symptoms.

Self-affirmation and ruminative cognitions. Given the problematic consequences of ruminative thinking, a number of cognitive strategies have been suggested as useful for reducing these thoughts. Unfortunately, these strategies are often effective only in the short-term. One of the most prominent strategies is distraction from the ruminative thoughts. However, research findings have established that attempting to distract or avoid thinking about a thought, particularly in regard to a blocked goal, may result in increased accessibility of the unwanted thought (Wegner, Schneider, Carter & White, 1987). Distraction is also only temporary given that until a desired goal or outcome is reached, the unwanted cognitions will continue to persist. Ultimately, attaining one's goal is the most effective method of stopping rumination. However, in the context of body image, persistent attempts to attain an unrealistic body shape and weight are unlikely to result in goal attainment. Such attempts may lead to problematic eating and increased body dissatisfaction. Thus, a cognitive strategy that does not attempt to suppress a

problematic thought, but instead increases the accessibility of other thoughts may prove useful in ending rumination related to body image concerns.

Self-affirmation theory may provide an avenue by which individuals may reduce ruminative thinking. Some researchers have suggested that self-affirmation is effective because it promotes trivialization of a blocked goal (e.g., that body image is not as important as other domains of self-worth; Simon, Greenberg, & Brehm, 1995). In this case, comparisons may be made between the blocked goal and a salient personal value. According to these researchers, self-affirmation increases the salience of a personal value, which in turn leads people to compare the importance of a blocked goal and the personal value. As a result, the blocked goal may seem of lesser subjective significance, and consequently the impact of goal blockage may be attenuated.

Indeed, research suggests that individuals stop ruminating about a blocked goal when they can affirm another important aspect of the self. In a series of studies Koole, Smeets, van Knippenberg, and Dijksterhuis (1999) demonstrated that when given failure feedback on an IQ test, rumination was reduced when participants were able to self-affirm either before or after the failure. Self-affirmation was also shown to lead to increased positive affect, which mediated the effect of self-affirmation on rumination. Similarly, research has indicated that thinking about one's values and the reasons why they are important, tends to shift cognitions towards superordinate and structured thinking. That is, self-affirmation appears to lead individuals to observe an increased sense of structure within their selves and to show greater abstract, structured thinking than detailed, concrete thinking (Wakslak & Trope, 2009). This suggests that self-affirmation may reduce rumination by way of broadening access to other domains of self-worth.

To summarize the above, self-affirmation theory appears to provide a framework for understanding poor body image, as well as individual responses from threats to body image. Further, several factors may be implicated in the process of self-affirmation as well as body image. Self-affirmation appears to operate differently depending on an individual's self-esteem, which may also be implicated as a mediator or moderator of self-affirmation. Similarly, broaden-and-build theory suggests that positive and negative affect may influence self-affirmation processes by providing individuals with broader or narrower thought-action repertoires to self-affirm. Coping flexibility may also be implicated in both self-affirmation and body image. Individuals with greater coping flexibility are more likely to recognize problematic coping patterns and find alternative ways to cope, suggesting that they may be more amenable to self-affirming. Finally, ruminative thinking may play a role both in the development and maintenance of problematic body image concerns. Each of these factors are implicated in both self-affirmation processes and problematic body image concerns; thus, it is conceivable that interventions designed with these factors in mind may be useful at addressing body image concerns.

Body Image Interventions

A number of psychological interventions have been developed to attempt to address the cognitive, behavioural, and emotional consequences of poor body image in women. Cognitive-behavioural therapy (CBT) is generally recognized as the "gold standard" treatment for the cognitive and behavioural symptoms associated with body image concerns. Indeed, the models presented above suggest that CBT would be an ideal approach to disrupting the cyclical nature of body image cognitions due to the therapy's focus on the relationship between cognitions, emotions, and behaviours. However, given that cognitions can be targeted in a number of ways,

interventions often include different components and implement different methodologies that may prove to be of greater or lesser effectiveness. In fact, a review examining the characteristics and effectiveness of 18 body image interventions determined that all led to some degree of improved body image (Jarry & Berardi, 2004). Similarly, a meta-analysis of 62 stand-alone body image interventions indicated small-to-medium improvements in body image (Alleva, Sheeran, Webb, & Miles, 2015). What is unclear, however, is which components of such interventions are required for change to occur, and the efficacy of these components. As a result of these different and often heterogeneous methodologies, researchers have started to explore stand-alone treatments for body image intervention. An established approach to improving body image will be discussed, followed by a proposed novel approach derived from the previously discussed literature. Table 1 provides a summary of the discussed interventions.

Psychoeducation. Psychoeducation is defined as the “didactic provision of information about the nature of a disorder for the purposes of fostering attitudinal and behavioural change in the recipient” (Davis, Olmstead, Rockert, Marques, & Dolhanty, 1997). Psychoeducation programs directed at addressing body image typically cover topics related to sociocultural ideals of beauty, the normalization of body dissatisfaction, the associated consequences of lower self-esteem, eating disorders, and isolation (Winzelberg, Abascal, & Taylor, 2004). Importantly, these programs also offer solutions to the distress experienced by individuals with poor body image including teaching coping strategies like relaxation or encouraging healthy social networks.

A number of studies have investigated the effectiveness of self-directed body image CBT programs aimed at improving body image with a focus on psychoeducation and self-monitoring. One study compared two psychoeducation programs, one which included psychoeducation and

self-monitoring and another that included psychoeducation and self-monitoring as well as cognitive restructuring (Strachan & Cash, 2002). Participants in both groups were required to complete weekly readings and assignments and complete self-monitoring records of body image beliefs. The second program added a component where participants also monitored cognitive distortions and assumptions related to body image. After 6 weeks, both groups displayed evidence of significantly reduced scores on body dissatisfaction, appearance investment, body image dysphoria, and social anxiety, as well as improvements in social self-esteem. Body image behaviours like avoidance and checking did not decrease over the course of the study. Given these findings, it is possible that the specific weight and shape focused components of body image interventions may not be necessary for change. However, it is notable that the study showed high rates of attrition (53%). Although specific reasons for dropout were not determined, the authors hypothesized that the lack of contact with the researchers may have been responsible. Specifically, participants only interacted with the researchers during a brief phone conversation regarding study enrollment and returned questionnaires by postal mail.

In a follow-up study of the aforementioned psychoeducation plus self-monitoring program, Cash and Hrabosky (2003) attempted to address participant compliance by increasing face-to-face contact with researchers. Participants met individually with a researcher three times during the 3-week intervention. Results indicated that from pre- to posttest, participants reported improved appearance satisfaction and decreased investment in their appearance as a source of self-evaluation. Improved self-esteem, eating attitudes, and social anxiety were also observed. No participants dropped out throughout the course of the study. However, this study is not directly comparable to the authors' prior work due to differences in the study length that may account for participant retention. Further, questionnaire materials were returned in person as

opposed to mailed in to researchers. Thus, it is not possible to discern whether increased contact with the researcher was responsible for decreased attrition.

The utility of a psychoeducational intervention for college students was tested in both a preliminary and follow-up trial (Stice & Ragan, 2002; Stice, Orjada, & Tristan, 2006). The program consisted of twice weekly 1.5 hr meetings that took place over 15 weeks. Psychoeducational content focused on epidemiology, etiologic models, risk factors, prevention, and treatments for eating concerns and obesity. Both the preliminary and follow-up trial showed significant decreases in thin-ideal internalization, body dissatisfaction, dieting, and eating disorder symptoms. The follow-up study determined that these effects were maintained at 6-month follow-up.

Another psychoeducation program, *Turning Points 2*, (TP; Davis & Saxberg, 2005) has been shown to result in measurable improvements in body image over the course of the program. The program consists of 14 video segments each approximately 15 min in length that feature six female university students and a moderator discussing topics such as body image, relationships, eating behaviours, mood, and physical activity. The segments effectively cover discussions focused on normalizing body dissatisfaction, sociocultural standards of beauty, healthy eating behaviours, the factors related to the maintenance and consequences of negative body image, relationships, and self-care (McMahan, 2009). In one study (Bone, 2006), 53 female adolescents were administered the program during school physical education classes. Students watched two video segments followed by group discussions on consecutive days over the course of 2 weeks. Following completion of the intervention, statistically significant reductions in scores on the Eating Disorder Examination-Questionnaire (EDE-Q) Restraint and Shape Concerns subscales were noted. The effectiveness of this program was mirrored in 26 university undergraduates

who viewed the program independently over 2 weeks. Results indicated significant improvements in body image, increases in self-esteem, and decreases in dieting behaviour and eating concerns (McMahan, 2009).

While psychoeducation programs appear to be effective for improving body image concerns, it is unclear which components of the programs are necessary for such changes. Further, it is becoming increasingly important to identify the *active* ingredients of interventions that are necessary for change (Armitage, 2012). According to Armitage, if such components are identified, interventions may then be streamlined in such a way as to provide brief, low-intensity interventions that can be delivered on a larger scale. Thus, it is prudent to identify possible mechanisms of change and test them individually.

Self-affirmation intervention. As discussed previously, the tendency for individuals with low appearance self-esteem to engage in same-domain affirmations may serve to sustain the cycle of poor body image (Ransom, 2011). As such, it seems plausible that teaching individuals to engage in different-domain affirmations may serve to decrease their investment in appearance self-worth. Interestingly, one study noted that exposure to a public service advertisement displaying images of realistic female body types, with text emphasizing the diversity of body shape, only improved young women's body satisfaction when they already had a healthy body image (Park, McSweeney, & Yun, 2009). For those women with low body satisfaction, body satisfaction actually decreased further. Here, self-affirmation theory would suggest that the advertisement acted as a threat to the self and because poor body image is salient to the individual, any attempt to self-affirm is directed to the same domain. As previously discussed, same-domain affirmations have been shown to be problematic and lead to negative outcomes. This suggests that interventions designed to attempt to change women's maladaptive body image

concerns may not be an ideal approach. Instead, it may be of greater benefit for interventions to focus on highlighting other domains of the self, as opposed to directly targeting the appearance domain of self-worth.

A few interventions have attempted to address body image concerns in ways that reflect such different-domain affirmations. For example, one 9-week intervention focused on changing aspects of adolescents' self-esteem by teaching them ways to deal with stress, build a positive sense of self and positive self-evaluations, and improve relationship and communication skills (O'Dea & Abraham, 2000). Lessons consisted of weekly 50-80 min sessions delivered by a teacher. Outcomes indicated that the intervention was effective in improving female adolescents' ratings of their physical appearance as perceived by others, preventing increases in weight-losing behaviours that were noted in control students, and lowering drive for thinness and body dissatisfaction. While these outcomes are promising, limitations of the intervention included requiring a moderator for program delivery and problems generalizing to older samples. Specifically, it may be proposed that by young adulthood, the concepts that the intervention targets would be more solidified and less amenable to change. Further, over the 12-month follow-up, students in the intervention group showed evidence of a significant increase in desire to lose weight. Finally, self-affirmation was only one component of a more comprehensive curriculum, thereby limiting the degree to which these changes can be attributed to self-affirming exercises.

Several studies have more directly addressed the question of whether self-affirmation has the potential to improve body image. One study (Bucchianeri & Corning, 2012) had 86 college women with poor body image self-affirm by ranking a list of values and writing about the role of the most important value in their life. Participants then read an article describing the health risks

associated with poor body image and disordered eating which theoretically served as a threat to the self. Compared to a control group that did not self-affirm, those that did displayed lower body dissatisfaction, greater intentions to reduce their criticisms about their bodies, and an increased openness to the threatening information about body dissatisfaction. A particular strength of this intervention was that it was delivered as a “one-off” and required little time commitment on the part of the participants and researchers. However, what is unclear is how long the demonstrated positive effects of the self-affirmation would last. Further, measurement of investment in various domains of self-worth would have been useful for determining whether changes in outcomes were related to changes in investment. In this particular study, researchers measured only the degree to which participants were dissatisfied with certain parts of their body. Such a measure provides a narrow view of body dissatisfaction as opposed to a more comprehensive measure of body image. As such, an intervention exploring the effects of repeated self-affirmations on body image and investment in appearance domains of self-worth over time would be of value in ascertaining the efficacy of this type of intervention.

A similar study examined whether a self-affirmation manipulation had the potential to increase body satisfaction and whether this occurred by causing participants to shift the domains upon which they based their self-esteem (Armitage, 2012). Female adolescents completed a self-affirmation manipulation where they elaborated on past tasks of kindness or a control task where they gave opinions on unrelated issues. Next, they completed measures of body satisfaction, domains of self-esteem, and global self-esteem. Results indicated that those adolescents in the self-affirmed condition showed significantly greater body satisfaction and perceived less threat from having to rate their body shape and weight when compared with those in the control group. Importantly, mediation analyses showed that increases in global self-esteem and shifts away

from domains of body shape and weight accounted for these results. While this study again provides evidence that self-affirming can have positive effects from a one-off intervention, the longevity of such effects is unknown. Further, this intervention was conducted with adolescents, thereby limiting the generalizability of the intervention to this demographic.

A recent study examined whether affirming the trait of kindness could regulate state disgust toward one's physical appearance, which has been linked to body dissatisfaction and eating disorders (Powell, Simpson, & Overton, 2015). In the first of two studies, 56 participants engaged in a kindness self-affirmation exercise where they indicated whether they had ever engaged in certain behaviours related to kindness (e.g., "Have you ever attended to the needs of another person?"). In the second study, 116 participants engaged in the same self-affirmation exercise, but completed the intervention online. Results indicated that the self-affirmed in both studies reported significantly less disgust toward their appearance. These findings, taken together, suggest that self-affirmation may be useful as a means of regulating body image cognitions.

Self-affirmation has the potential to be effective as an intervention, particularly if participants are required to engage in implementation intentions. Implementation intentions are described as specific plans that work by linking particular situations with behavioural responses (Gollwitzer & Brandstätter, 1997). It is hypothesized that implementation intentions increase an individual's awareness of particular situations and consequently trigger appropriate behavioural responses (Gollwitzer & Schaal, 1998). Implementation intentions generally are phrased as "If... then..." statements. For example, "If I feel threatened or anxious, then I will think about the things I value about myself" (Armitage, Harris, & Arden, 2011). An investigation of the utility of implementation intentions in the context of self-affirmation exposed participants to

threatening information about the health risks associated with alcohol consumption (Armitage et al., 2011; Armitage, Rowe, Arden, & Harris, 2014). Participants who had self-affirmed by completing a series of implementation intentions, like the example above, consumed less alcohol per day and displayed evidence of increased perception of threat and lower derogation of the health-risk message.

In a similar study, self-affirmed participants were able to report greater implementation intentions following the reading of an article linking excessive alcohol consumption to breast cancer (Ferrer, Shmueli, Bergman, Harris, & Klein, 2012). Importantly, this effect was only found for those participants that displayed positive affect following the threatening message. Armitage (2007) found that having participants engage in an implementation intention resulted in increased fruit consumption. This finding was expanded by Harris et al. (2014) who found that self-affirmed participants exposed to advice regarding fruit and vegetable consumption reported eating more fruit and vegetables at 7-week and 3-month follow-up. Consumption was higher when self-affirmed participants also engaged in implementation intentions. Engaging in implementation intentions has also been linked to transitions through the stages of change (Armitage, 2006). Finally, an implementation intention-based stress management support tool was effective in reducing stressed-induced high-calorie snack consumption, compared to a control group (O'Connor, Armitage, & Ferguson, 2015). Thus, it appears that self-affirmations, in conjunction with implementation intentions, may provide a viable means of cognitive and behavioural change that could be applicable to body image.

In sum, interventions directed at improving body image for adolescent and young adult females have demonstrated certain effectiveness. However, at present, the mechanisms of change leading to such benefits have so far not been elucidated. It is possible that programs may

be more comprehensive than they need be, requiring more resources and time than necessary to produce the salubrious benefit. Further, implementations of the majority of body image interventions have necessitated the presence of a moderator, therapist, teacher, or researcher. This can limit the degree to which programs can be implemented because of the monetary resources involved and scheduling limitations on both the part of the moderator and participants. As such, the utility of brief, low-intensity interventions such as self-affirmation have begun to be explored. While the outcomes of such interventions are promising, a number of questions remain unanswered, such as the durability of beneficial effects over time. The current study was designed to address these questions by providing repeated exposure to a self-affirmation intervention for body image and tests its effectiveness in a randomized comparative trial with a 3-month follow-up to ascertain durability.

Online interventions. As body image concerns are widespread, the advantages of providing wide-reaching and cost effective treatments on the Internet have begun to be explored (Melioli et al., 2015). Indeed, the Internet is an intriguing method of delivering interventions due to its ease of accessibility, broad reach, anonymity, and familiarity to the target population (Zabinski, Wilfley, Calfas, Winzelberg, & Taylor, 2004). Online interventions can also circumvent barriers to help-seeking and allow for earlier intervention (Bauer et al., 2013). Lack of therapist, researcher, or moderator involvement combined with ease of access allows such interventions to be delivered on the participants' own time, in their own space, according to a schedule that suits them best. Similarly, with the increased popularity of mobile communication devices, it is possible to deliver interventions that are more easily accessible. This increases portability and availability, which is particularly relevant for interventions where real-time access is preferred. Finally, such accessible, low-intensity interventions can easily be

administered on a large scale. Thus far, online interventions appear to be as effective as face-to-face delivered programs for addressing body image concerns.

One controlled trial compared the Internet-delivered *Student Bodies* psychoeducational intervention with the classroom-delivered *Body Traps* and a wait-list control condition (Celio et al., 2000). Both 8-week interventions were designed to reduce body dissatisfaction and weight concerns. Participants in both groups completed academic readings, written reflections, and participated in group discussions. Results indicated that those individuals in the Internet condition displayed significant reductions in weight and shape concerns compared to those in the control condition. However, the classroom-delivered intervention outcomes were not significantly different from the control group. A meta-analysis of the *Student Bodies* program was evaluated in six U.S. and four German randomized controlled trials including a total of 990 female high school and college students (Beintner, Jacobi, & Taylor, 2012). Results indicated that the intervention resulted in moderate effect sizes for reduction of eating disorder-related attitudes, negative body image, and the desire to be thin. There were no differences in outcomes between the U.S. and German trials. While this study seems promising, the benefits of conducting the intervention online are lacking. Specifically, the *Student Bodies* intervention still required a moderator and scheduling of chat sessions. As well, it is unclear which program components were necessary for change in outcome.

One study directly compared a body image intervention delivered either face-to-face or online (Gollings & Paxton, 2006). The intervention consisted of eight, 90-min weekly group sessions moderated by a therapist. Significant improvements in body image, eating behaviours, self-esteem, and symptoms of depression and anxiety were noted for both groups. There were no

differences in outcomes of body dissatisfaction, disordered eating, and psychological variables for individuals in the face-to-face versus internet-delivered interventions.

An online intervention directed at improving the eating habits and body image of college women at risk for developing an eating disorder was examined (Zabinski et al., 2004). The intervention utilized an Internet-based moderated chat room group, offered once a week for 8 weeks. Psychoeducation readings, online support chat rooms, homework assignments, and the completion of weekly summaries were utilized. Results indicated a reduction of eating disorder symptoms and increases in self-esteem at follow-up, compared to wait-list controls. Importantly, users reported high satisfaction with the delivery mode of intervention. A comparable intervention directed at adolescent girls implemented six 90-min small group sessions facilitated by a therapist online (Heinicke, Paxton, McLean, & Wertheim, 2007). Clinically significant improvements were evident for measures of body dissatisfaction, disordered eating and depression. Again, both of these studies required moderators for implementation and results did not significantly differ from a face-to-face intervention.

Hötzel et al. (2014) investigated the utility of an internet-based program for enhancing motivation for change in women with eating disorder symptoms. Participants received six online sessions of motivational enhancement therapy where participants were required to complete writing tasks relating to the session material. Individualized feedback on the writing tasks was provided by study authors. Compared to a waiting-list control condition, the intervention group demonstrated stronger increases in motivation and self-esteem and greater eating-disorder symptom reduction.

One further study has been successful in implementing self-affirmations within a web based program (Fielden, Little, & Sillence, 2011). Fifty-eight participants were self-affirmed by

a series of questions and written responses designed to target important values. A control group completed a personal opinions questionnaire. Participants were then provided with threatening health information about eating habits and physical activity. Results showed that this intervention was effective as participants in the self-affirmation scored higher on measures of intention to change than the control group.

In sum, online interventions appear to be as effective as face-to-face interventions for disseminating psychoeducational materials and for providing cognitive-based interventions for body image. However, the current research does not appear to be taking advantage of the full benefits that could potentially be realized through online implementation. Rather, most existing interventions simply adapt face-to-face interventions for online use by interchanging traditional group formats with chatrooms. While such interventions have proven useful, they are still limited by the barriers of requiring resources and scheduling. The present study tested the utility of an online intervention that does not require a moderator and that was easily accessible to participants on their own time.

The Present Study

Given the pervasive and multifaceted nature of body image concerns, interventions targeted at modifying the cognitive components of the construct are likely to result in improvement. However, which cognitions require addressing for interventions to be effective is currently unknown. Self-affirmation theory provides a framework that appears to describe the experience of women when exposed to a threat to self-esteem. That is, women with low appearance self-esteem invest greater stake in the appearance domain of self-worth which serves to reinforce the importance of appearance and sustain a problematic body image (Ransom,

2011). Teaching women to affirm nonappearance domains of self-worth in response to a body image threat seems to be a viable intervention for improving body image.

Thus, the first objective of this study was to determine whether there is differential efficacy between a novel self-affirmation intervention and a psychoeducation intervention in improving the body image of young women over the course of 28 days. The self-affirmation intervention was designed to teach individuals to self-affirm domains of self-worth other than the appearance domain when they experience a threat to their body image. In order to test the efficacy of the self-affirmation intervention, a comparison psychoeducation condition was used that has been shown to be effective in reducing body image concerns (McMahan, 2009).

Psychoeducation was used as a comparative control, as opposed to a wait-list control, for several reasons. First, comparative trials are used to test the hypothesis that a novel intervention is equivalent in efficacy to a previously established intervention approach, in this case, psychoeducation. While the lack of a wait-list control group can cause concerns with the internal validity of the study, this limitation is less relevant when the comparison treatment has already been tested and found effective compared to wait-list controls (Hart, Fann, & Novack, 2008). As previously discussed, Internet-based psychoeducation interventions have been found to result in small to moderate effect sizes for the reduction of eating disorder-related attitudes and negative body image, using the same measurements of outcome utilized in the present study (Beintner et al., 2012). Second, use of a comparative intervention allows for the control of participant expectancies with respect to their potential improvement. The psychotherapy literature has established that participant expectancies have considerable implications for participant success in improving over the course of therapeutic intervention (Greenberg, Constantino, & Bruce, 2006). As such, differences in participant expectancies between groups may confound the interpretation

of outcome differences (Holroyd, Powers, & Andrasik, 2005). The comparison of two interventions that appear credible and the measurement of participant expectations helps to control for these potential between-group differences in the present study.

Both of the interventions used in the present study are ideal for head-to-head comparison as each focuses on improving the body image of young women. Similarly, each program requires about the same amount of time commitment on the part of the recipient. Finally, each program can be easily administered online without the assistance of the researcher, moderator, or a clinician. Intervention outcomes were assessed by measuring change from baseline to postintervention and 3-month follow-up. Primary outcomes assessed the impact of the interventions on cognitive measures of body weight and shape concern, and appearance contingent self-worth. Secondary outcomes investigated change on more behavioural concomitants of body image concern: dietary restraint, eating concerns, and interference of such concerns on everyday functioning. No specific predictions were made with respect to the differential efficacy of the interventions.

The second objective of this study was to examine who responds best to the interventions. As suggested by the previously discussed research, it was hypothesized that greater levels of self-esteem, positive affect, coping flexibility, and reduced levels of ruminative thinking would predict increased response to the interventions. Individuals with higher levels of global esteem were predicted to respond better to the affirmation intervention because they would have a greater repertoire of personal resources upon which to self-affirm. Those with higher levels of positive affect were expected to respond better to the self-affirmation intervention as they would have broader thought-action repertoires with which to self-affirm. Individuals with greater coping flexibility were expected to respond better to the self-affirmation

intervention given that they should be able to better recognize problematic coping patterns and substitute new cognitions with which to cope. Finally, individuals with less ruminative thinking styles were expected to have greater response to the self-affirmation intervention. This is because self-affirmation and broaden-and-build theory implicate ruminative thinking as playing a prominent role in the development and sustainment of body image concerns.

Method

Participants

Three-hundred and seventy-nine female participants were recruited for this study from the Lakehead University population using mass emails (see Appendix A) and advertisements posted on the Lakehead campus (see Appendix B). Recruitment took place during the winter and fall semesters of 2013-2014 (wave one) and 2014-2015 (wave two). Eligible university participants earned two bonus points in qualified psychology classes during the first wave of the study and three bonus points during the second wave. During wave two, participants were offered \$10 Tim Horton's gift cards for completion of the 3-month follow-up questionnaire. All participants who completed the 3-month follow-up questionnaire received entry into a draw for one of 10 \$25 Amazon.ca electronic gift cards.

Materials

Outcome measures. The following outcome measures were administered at baseline, postintervention, and 3-month follow-up.

Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994; see Appendix C). The EDE-Q consists of 36-items rated on a 7-point Likert scale ranging from 0 (*no days/not at all*) to 6 (*every day/markedly*). Items load on to four subscales: Dietary Restraint, Eating Concern, Shape Concern, and Weight Concern. The Shape and Weight Concern

subscales were used as primary outcome measures of body image. The Dietary Restraint and Eating Concern subscales were used as secondary outcome measures. Participants were asked to report the number of days that cognitions and behaviours occurred over the past 28 days.

Internal consistency for the four subscales is reported as having alpha coefficients ranging from .78 to .93 (Luce & Crowther, 1999). Test-retest reliabilities have been shown to range from .81 (Dietary Restraint) to .91 (Shape Concern) over 7 days (Rose, Vaewsom, Rosselli-Navarra, Wilson, & Weissman, 2013).

Clinical Impairment Assessment (CIA; Fairburn, 2008; see Appendix D). The CIA is designed to assess the severity of psychosocial impairment resulting from an eating disorder over the past 28 days. For the present study, it was used as a secondary outcome measure. The CIA consists of 16-items rated on a 4-point Likert scale ranging from 0 (*not at all*) to 3 (*a lot*). Each question is preceded by, “Over the past month, to what extent have your eating habits, exercising, or feelings about your eating, shape or weight...”. Sample items include “made you feel guilty” and “interfered with you doing things you used to enjoy”. A cut-point of 16 on the scale is predictive of eating disorder case status with a reported sensitivity of 76% and specificity of 86% (Bohn et al., 2008). Chronbach’s alpha has been measured at .94 (Reas, Rø, Kapstad, & Lask, 2010). Test-retest reliability has been shown to be acceptable at .86 (Bohn et al., 2008).

Contingencies of Self-Worth Scale (CSWS; Crocker, Luhtanen, Cooper, & Bouvrette, 2003; see Appendix E). The CSWS scale was used as a measure of participants’ investment in appearance contingent self-worth, relative to other domains of self-worth. Specifically, it was intended to measure shifts in domains of self-worth away from the appearance domain. The scale consists of 35 items that are rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The scale measures seven dimensions of self-worth: Academics,

Appearance, Approval from Others, Competition, Family Support, God's Love, and Virtue. Sample items include "When I think I look attractive, I feel good about myself" and "Doing something I know is wrong makes me lose my self-respect". Test-retest reliabilities have been shown to range from .62 (Academic Competence) to .92 (God's love) (Crocker et al., 2003). The CSWS has been shown to be sensitive to change over time (Ransom, 2011).

Predictor variables. The following measures were administered in the baseline questionnaire and were used as predictors of the previously discussed outcome measures.

Demographics Questionnaire (see Appendix F). The demographics questionnaire requested participants provide basic demographic information, including height and weight. It also included questions pertaining to a previous or current eating disorder diagnosis and treatment. Participants who indicated they were currently in treatment for an eating disorder were excluded from participating in the study.

Stages of Change Inventory (SCI; Davis, 1996; see Appendix G). The SCI was used to differentiate participants' motivations for participating in the study. The SCI was developed as a stage of change scale adapted to measure eating disorder behaviours and body image. The present study used the item directed at addressing whether participants have felt they "must control their weight or shape over the past 3 months". Potential responses to this question correspond to the transtheoretical model of behaviour change (Prochaska & Di Clemente, 1982). Specifically, the SCI measures whether participants are in the precontemplation, contemplation, action, maintenance, or recovery stage of change or whether participants have never experienced a desire to control their weight or shape. Potential participants whose responses indicated that they were in the precontemplation or recovery stages of change, or indicated no historical concern with weight or shape were excluded from participating in the study.

Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965; see Appendix H). The RSES was used as a measure of participants' level of global self-esteem. The RSES consists of 10-items that are reported on a 4-point Likert-type scale, ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Sample items include "I take a positive attitude toward myself" and "At times I think I am no good at all". The internal consistency of the RSES is reported to be high with Cronbach's alpha ranging from .85 to .88 (Rosenberg, 1965).

Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988; see Appendix I). The PANAS consists of 20 adjectives representing positive or negative affective states. The PANAS was used to measure positive and negative affect at baseline. The items are endorsed on a scale from 1 (*very slightly or not at all*) to 5 (*extremely*) and requested participants to respond with how they felt in the present moment, as opposed to how they have felt over the past couple of weeks. Higher scores on the PANAS indicate higher positive or negative affect. Chronbach's alphas for the PANAS-PA and PANAS-NA subscales range from .86 to .90 and .84 to .87, respectively (Watson et al., 1988).

Coping Flexibility Scale (CFS; Kato, 2012; see Appendix J). The Coping Flexibility Scale was used as a measure of baseline coping flexibility. The CFS consists of 10 items rated on a 4-point Likert scale from 1 (*not applicable*) to 4 (*very applicable*). Higher scores indicate greater coping flexibility. The 10 items can be divided into two subscales: the Evaluation Coping subscale and the Adaptive Coping subscale. Evaluation coping occurs when individuals are able to abandon unsuccessful coping strategies. Adaptive coping occurs when individuals contemplate other possible coping strategies. Sample items include "When a stressful situation has not improved, I try to think of other ways to cope with it" and "I am aware of how successful or unsuccessful my attempts to cope with stress have been". Cronbach's alphas range from .72

to .88 for the Evaluative Coping subscale and .78 to .89 for the Adaptive Coping subscale. Test-retest reliability coefficients over 6 weeks were .73 for the Evaluation Coping and .71 for the Adaptive Coping subscale (Kato, 2012).

Rumination Reflection Questionnaire – Rumination subscale (RRQ; Trapnell & Campbell, 1999; see Appendix K). Scores on the RRQ rumination subscale were used to measure rumination at baseline. The RRQ:R consists of 12 items rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Sample items include “I often find myself re-evaluating something I’ve done” and “My attention is often focused on aspects of myself I wish I’d stop thinking about”. Internal consistency is high with a Cronbach’s alpha of .90 (Trapnell & Campbell, 1999).

Intervention Materials. The following materials were to be completed by participants every second day as part of their associated interventions. They served both as portions of the self-affirmation intervention and indices of participant compliance.

Self-Affirmation Morning Survey (SAMS; see Appendix L). The SAMS was created for the present study to function as a self-affirmation implementation intention exercise. The survey consists of 15 questions asking participants to match a sentence stem that describes a certain body image cognition or behaviour with a sentence completion option that describes a cognition targeting a nonappearance related domain of self. The sentence stems were constructed using items from the Body Image Concerns Inventory (BICI; Littleton, Axsom, & Pury, 2005) that had the highest mean values as rated by university women in a previous study (Ransom, 2011). The sentence completion options were similarly constructed using items from five domains of the CSWS that had the highest mean values in the same study. These domains included: Academics, Family Support, Competition, Virtue, and Approval from Others. The appearance domain was

omitted as it would lead to a same-domain affirmation. An item from the God's Love subscale was omitted because of the low mean values in the previous study and replaced with an item measuring spirituality generally.

Self-Affirmation Record (SAR; see Appendix M). The SAR created for this study required participants to record their use of the self-affirmation implementation intentions chosen in the morning survey. Participants chose the thought or behaviour that they engaged in, and the appropriate sentence completion stem that they decided to use. They were required to give a brief example of their specific thought in order to ensure that they spent some time considering their thought process. Finally, they were asked to indicate the degree to which they believed the thought on a 5-point Likert scale ranging from 1 (*don't believe it at all*) to 5 (*believe it completely*).

Turning Points 2 (TP2) Questionnaire (McMahan, 2009; see Appendix N). The TP2 questionnaire was developed by McMahan in order to assess participant impressions of the completed daily TP2 video and exercises. It consists of 6-items about the video segment, online chapter, and optional homework activities.

Study website. The study website was located at <http://www.myibi.me>.¹ The website was hosted by Cloudaccess.net (Brooks, 2010; <http://www.cloudaccess.net/>) and uses the Joomla! 2.5.7 (Joomla!; <http://www.joomla.org/>) content management system. TP videos were hosted directly on the secure website server. The website was optimized for mobile viewing so that participants could easily access the website from their mobile phones or other mobile devices. Participants were required to create a user login name and password that was linked to a user ID

¹ Interested readers can access all of the intervention materials at the website address (<http://www.myibi.me/>) using the Username: Reader and Password: Reader. Please note, study participants only had access to the materials specific to their own intervention group.

for the duration of the study. Following the provision of consent, only the user ID was linked to any questionnaire responses. Each user only had access to the information relevant to their randomly assigned condition.

Procedure

Potential participants were directed to the study website (<http://www.myibi.me/>) that contained all of the online materials necessary for their participation. Participants were required to create an account on the study website with a login consisting of a username and password. Although an email address was required to register, and for study participation, it was not linked to survey responses. Participants were automatically assigned a unique ID number for the remainder of the study. Potential participants were informed that the study was investigating two interventions for improving body image and that they would be randomly assigned to one of these interventions. The participant information and consent forms (see Appendices O & P) were publically available on the website for potential participants to read. Participants indicated their consent after creating an account, prior to completing the initial questionnaire package. Upon consenting, participants proceeded to complete the demographics questionnaire (see Appendix F) and SCI (see Appendix G). If participants met the inclusion criteria discussed above (i.e., not currently diagnosed or in treatment for an eating disorder and interested in improving their body image), they were then directed to the remainder of the baseline measures (see Appendices C-E; H-K). If participants did not meet inclusion criteria, they were informed of this and thanked for their time.

Participants were randomly assigned to one of the two experimental conditions according to a random numbers generated schedule. The researcher assigned the condition to the participant's user login and emailed the participant with information relevant to their condition

(see Appendices Q & R). Following this, participants in each intervention were provided with reminder emails every second day (see Appendix S) prompting them to participate in the tasks for their respective intervention. Those participants in PE were instructed to complete their exercises in a private, quiet, comfortable location. At the end of each exercise participants were asked to provide ratings of how *credible* the intervention was regarding its ability to help people feel less distress about their bodies. *Confidence* that the intervention would help participants with their body image was also rated (see Appendix T).

At the end of 28 days participants were provided with the postintervention questionnaire consisting of the same measures completed at baseline. Upon completion of the postintervention questionnaire, participants were thanked and reminded that they would be contacted to complete the identical 3-month follow-up questionnaire.

Self-Affirmation Intervention (SA). Participants in the SA intervention were asked to complete the SAMS (see Appendix L) every second morning for 28 days. They were also asked to access the website throughout the day whenever they noticed themselves engaging in one of the thoughts or behaviours listed in the morning survey and to complete the SAR (see Appendix M). The program website was designed to be accessible to mobile devices, enabling users to access the record frequently and conveniently. Participants were emailed every second morning (see Appendix S) with a reminder to complete the SAMS and subsequent SAR.

Psychoeducation (PE) Intervention. Participants in the PE intervention took part in the *Turning Points* program (Davis & Saxberg, 2005), developed at Lakehead University. TP consists of 14 video segments that display university women addressing various issues related to body image, healthy eating, physical activity, mood regulation, and relationships. All segments are approximately 15 min duration and are accompanied by a companion chapter that reviews

and elaborates on the video content. Participants were instructed to watch one TP segment every second day and complete the online TP questionnaire (see Appendix N). Participants were also given the option of reading the accompanying chapter. Participants were emailed the morning of every second day with a reminder to complete the video viewing and questionnaire (see Appendix S).

Results

Results are presented in the following order. First, the analytic approaches to examining the two primary objectives of the study are described. Next, descriptions of data preparation and psychometrics are provided. Participant characteristics are then examined, including participant attrition, baseline group differences, and intervention exercise completion. Intervention credibility and participant confidence ratings are then presented with respect to group differences, as well as change over the course of the intervention. Differential efficacy of the interventions is then assessed by examining change in primary and secondary outcome variables at postintervention and 3-month follow-up. Potential predictors of outcome as moderated by intervention are then evaluated. Finally, exploratory analyses stemming from the above findings serve to conclude the results section.

Data Analytic Approach

As randomized trials are prone to missing data due to participant attrition, the analytic strategies of the present study used intention-to-treat (ITT) analyses. Such analyses include all randomized participants, ignoring withdrawal and noncompliance with intervention protocol. While ITT analyses generally provide more conservative estimates of efficacy, this is preferable to the potentially inaccurate overestimates derived from using only completer data (Gupta,

2011). The present study utilized both multilevel modelling (MLM) and last observation carried forward (LOCF) approaches to ITT.

Multilevel modelling. MLM via SPSS mixed was used for several analyses in this study. MLM approaches to data analyses are useful for data with a hierarchical structure where observations are nested within a higher grouping variable (Tabachnick & Fidell, 2006). For example, repeated measurements can be nested within individuals as in the present study (see Figure 2). MLM is able to account for several concerns that can arise from violation of the assumptions of repeated-measures ANOVA. Past research has cited the benefits of repeated-measures MLM over ANOVA; for instance, that it can result in greater power (Quené & Van den Bergh, 2004).

Assumptions of independence. According to the assumption of independence, cases are assumed to be independent of one another. Thus, this assumption is violated by repeated measurements of the same individual over time. This violation is addressed using MLM by accounting for correlated cases caused by the second level factor (Tabachnick & Fidell, 2006).

Missing data. ANOVA results in listwise deletion for any participants missing data on one or more measurement occasions. For repeated-measures designs that are susceptible to participant drop-out, such an approach can result in significant loss of data. MLM uses Maximum Likelihood (ML) estimation to obtain estimates of unknown parameters present in the data (Singer & Willett, 2003). ML estimates are the approximations for values of the unknown population parameters that maximize the probability of observing a particular sample of data. An important assumption of MLM is that data are missing at random; that is, the pattern of missing data is not predictable from the existing data. Using Little's missing completely at

random test (Tabachnick & Fidell, 2006), missing data in the present analyses were not found to be significantly predictable ($ps > .05$).

Fixed and random effects. In most statistical analyses, it is assumed that regression parameters are fixed and that the intercept and slope are consistent over time and participants (Field, 2009). This is not an assumption of MLM, which allows for random parameters. This permits one to test the fit of models where slopes and intercepts are allowed to vary.

Treating time more flexibly. In MLM, the time variable can be treated as continuous, providing an understanding of the rate of change over time, in addition to comparisons of estimated marginal mean differences. Estimated marginal means, as opposed to observed means, are predicted mean values adjusted for the covariates in the model. MLM also allows for the inclusion of unevenly spaced time points. This is in contrast to the ANOVA approach that focuses on assessing mean differences and assumes equally spaced time points.

Model construction. Models were constructed in the current study using the approach described by Singer and Willett (2003). Prior to analyses, predictor variables were centered to improve interpretation of the models. These models were fit using the following steps:

1. Empirical growth plots were examined for growth patterns.
2. Unconditional means models were fit where the fixed intercept is the only fixed-effect parameter. This is conceptually an “empty” model that is used to assess initial variation in outcome.
3. Unconditional linear growth models were fit where time was added to the model as a fixed effect.
4. Unconditional nonlinear models were fit:

- a) random-intercept model: This model allows for random intercepts to be modelled for each individual participant.
 - b) random-intercept and slope model: This model allows for random intercepts and slopes to be modelled for each individual participant.
 - c) quadratic model: This model added a fixed quadratic effect of time to the model to test for curvature in the data.
5. Models in the previous two steps were compared using -2LL. This change in the value of -2LL and the increased amount of variance explained was then assessed for statistical significance using the following equation (Field, 2009):

$$X^2_{Change} = (-2\text{Log-Likelihood}_{Previous}) - (-2\text{Log-Likelihood}_{New})$$

$$df_{Change} = \text{Number of Parameters}_{Previous} - \text{Number of Parameters}_{New}$$

6. Predictors, control variables, and interactions were added to the models.

MLM assumptions. The assumptions of MLM and steps taken to examine them in the present study are as follows:

1. MLM assumes that residuals are normally distributed. This assumption was tested via visual inspections of normal probability plots and histograms of the residuals.
2. MLM assumes that residuals have constant variance. This assumption was tested via scatterplots of the residuals and predicted values. A scatterplot of residuals and time points was also examined to determine equal variance over values of time.
3. MLM assumes that random coefficients are normally distributed. The random coefficients are the distances from the population average predicted values to the conditional, subject-specific predicted values. These are known as empirical best linear unbiased predictors (EBLUPS) which are predictions of the random effects based on the

observed data. SPSS does not directly provide EBLUPS, but will provide predicted values for subject-specific intercepts and the population average predicted values. One can then take the difference of these values to calculate the distance between them. These values are then tested for normality using a normal probability plot and histograms of the residuals.

4. MLM assumes that random coefficients have constant covariance matrices. This assumption was examined via scatterplots of the residuals and predicted values. A scatterplot of the residuals and time points was also examined to determine equal variance over the values of time.

Ensuring that MLM assumptions were met for the models examined in the present study allowed for increased certainty that models were appropriately fit to the data. Appropriate model fit provides greater confidence in the outcomes derived from the models.

Moderated Multiple Regression. The prediction of outcome variables was explored using a series of moderated multiple regressions (MMRs). Analyses tested whether intervention group moderated the relationship between the proposed predictor variables (PANAS:PA, PANAS:NA, RSES, RRQ:R, and CFS) and the outcome variables (EDEQ:SC, EDEQ:WC, EDEQ:R, EDEQ:EC, CIA, and CSWS:App). Moderation analyses allow one to examine whether the effect of a predictor variable on an outcome variable depends on a moderator variable (Hayes, 2013). All models were simple moderation models (see Figure 3) which estimated the outcome variable Y from the predictor X and the proposed moderator M , as depicted in the following equation:

$$Y = a + b_1X + b_2M + e$$

Where a is the least squares estimate of the intercept, b_1 is the least-squares estimate of the population regression coefficient for X , b_2 is the least-squares estimate of the population coefficient for M , and e is the residual term (Aguinis, 2004).

The final simple linear moderation model includes a variable constructed as the product of X and M , and is depicted as follows:

$$Y = a + b_1X + b_2M + b_3XM + e$$

Where b_3 is the least-square estimate of the population regression coefficient for the product term.

The current study implemented a MMR model in order to examine the prediction of primary and secondary outcome variables (Y) from the predictor variables (X) and intervention condition (M). All MMRs were conducted using the PROCESS macro for SPSS model number 1 (Hayes, 2013).

MMR assumptions and best practices. MMR models require that the following assumptions be met. Tests of these assumptions are not available through use of the PROCESS macro. Thus, all but the final assumption were investigated through SPSS analysis.

1. MMR models require homoscedasticity of residuals, that is, constant variance across values of each predictor (Aguinis, 2004). Homoscedasticity was examined by inspecting scatterplots with the standardized residuals plotted on the Y axis and the standardized predicted values of the dependent variable on the X axis. Scatterplots were examined for data points that were evenly dispersed around zero (Field, 2009).
2. MMR models require that residuals are independent. This assumption was tested using the Durbin-Watson test of serial correlation between errors (Field, 2009). Values can range from 0 to 4, with values less than 1 or greater than 3 suggesting cause for concern.

3. MMR models require that residuals are normally distributed. This assumption was explored via visual examination of histograms and normal P-P plots.
4. MMR models assume that there is less than complete multicollinearity, or perfect correlation, between predictors. This assumption was tested using the tolerance statistic, with values below 0.1 indicating multicollinearity concerns (Field, 2009).
5. MMR models using categorical moderators require homogeneity of error variance, which assumes that the variance in Y remaining after predicting Y from X is equal across subgroups. This assumption was tested using the program ALTMMR (Aguinis, Peterson, & Pierce, 1999) which produces Barlett's M, a test of whether the null hypothesis of homogeneity of error variance should be rejected (Aguinis, 2004).
6. Finally, all predictors were first mean centered prior to the creation of product terms in order to aid in the interpretability of the MMR results (Hayes, 2013).

Data Preparation

Five participants were removed from the dataset as they were permitted to participate due to a technical error that would have otherwise excluded them from participating due to their SCI responses. One participant completed the postintervention questionnaire but did not complete any study exercises; her postintervention scores were therefore removed.

Outliers were identified for each variable prior to analysis where the standardized value of a raw score was defined as $z > 3.29$ (Field, 2009). In circumstances where outliers were noted and significant skewness of the distribution existed, statistical transformations were conducted. In the event that outliers remained, they were replaced with the next highest value with a z-score < 3.29 , plus an appropriate constant. Outliers are described for each analysis below.

Normality of data distributions was also evaluated and determined to be significantly skewed where $Z_{\text{skewness}} (\text{Skewness} - 0 / \text{SE}_{\text{skewness}})$ exceeded the convention of 1.96 consistent with two-tailed $p < .05$. Appropriate transformations to achieve normality are described for each analysis below.

Psychometric Variables

Descriptive information, reliability coefficients, and intercorrelations matrix of the psychometric variables at baseline are presented in Table 2. Significant correlations were in the expected direction for all variables. Cronbach's alpha for the CFS Adaptive Coping subscale was low ($\alpha = .45$). Therefore, the CFS total score ($\alpha = .86$) was used in analyses rather than separately analyzing the two subscales.

Two primary datasets were used to examine study objectives. Analyses of treatment efficacy, which utilized MLM, used a restructured *person-period* dataset with one row per individual time-point (i.e., each participant had three rows of data). Moderation hypotheses and exploratory analyses utilized a last observation carried forward (LOCF) dataset where baseline scores were carried forward to postintervention, and postintervention scores were carried forward to 3-month follow-up. This dataset was organized at *person-level* where each person had one record and multiple variables for each measurement occasion.

For the restructured person-period dataset, both the EDE-Q:SC and EDE-Q:WC were well distributed. The CSWS:App, EDE-Q:R, EDE-Q:EC, and CIA subscales were negatively skewed and corrected with square root transformations.

For the person-level LOCF dataset, after observations were carried forward, two participants were missing values for the CSWS scale at postintervention, and three participants were missing values on the CSWS at 3-month follow-up. Baseline CSWS scores were carried

forward. The EDE-Q:SC and CSWS:App scales showed evidence of a slight skew at baseline. However, the skewness statistics at postintervention and 3-month follow-up were acceptable, and so the variables were left untransformed. On the CSWS:App scale, three outliers at baseline, two outliers at postintervention, and one outlier at 3-month follow-up were addressed. The EDE-Q:EC, EDE-Q:R, and CIA scales were negatively skewed at each time point; the EDE-Q:EC and CIA scales were normalized with square root transformations, while a log transformation addressed the skew of the EDE-Q:R scale.

Predictor variables were also examined for normality. The PANAS:PA scale was slightly skewed ($Z_{\text{skewness}} = -2.24$); however as neither square root or log transformations improved the skew of the variable, it was retained as is. The PANAS:NA and RRQ:R scales were both square root transformed to achieve acceptable skewness.

Participants

The total number of participants who participated in the trial was 379. Their flow through the study is detailed below (see Figure 4). The age of participants was $M = 21.08$ ($SD = 5.04$). Body mass index (BMI) was $M = 26.03$ ($SD = 6.30$). The majority of participants self-identified as Caucasian (73%), followed by 11% as “Canadian”, Aboriginal (7%), and Other (9%) including mixed ethnicity. The majority of participants identified as single (86%), followed by married (12%), and divorced/separated (2%). Most participants were full- or part-time students (92%). Five percent of participants indicated that they had been diagnosed with an eating disorder in the past; 4% of participants had received treatment for an eating disorder in the past. Thirty percent of participants indicated that they had received counselling for mental health concerns unrelated to an eating disorder in the past, while 10% were currently in counselling.

To determine whether this intervention-seeking sample differed from a comparable nonintervention-seeking sample, the present sample was compared to normative data from 723 U.S. college women aged 18-25 (Luce, Crowther, & Pole, 2008). Table 3 displays the standard score², Cohen's d ³, and percentile equivalent of the intervention-seeking sample's mean score at baseline and postintervention relative to the nonintervention-seeking sample of Luce et al. The intervention sample percentile score equivalents at baseline range from a low of 59% (EDE-Q:R) to 83% (EDE-Q:SC) with a median percentile equivalent of 75%. At postintervention, percentile score equivalents ranged from a low of 52% (EDE-Q:R) to a high of 68% (EDE-Q:SC and EDE-Q:WC) with a median of 62%. These results indicate that participants of the present study were normatively above average on the outcome variables at baseline.

Attrition. The flow of participants through the present study is detailed in Figure 4. Four-hundred and fifty-eight individuals were assessed for eligibility. Three-hundred and seventy-nine participants met inclusion criteria and were randomly allocated to one of the interventions⁴. Of these enrollees, 66% completed the postintervention questionnaire, whereas 45% completed 3-month follow-up.

A series of MANOVAs were conducted to determine whether there were any differences between (a) participants who enrolled in the study but did not complete any intervention exercises (i.e., pretreatment dropouts, $n = 44$), (b) participants who completed intervention exercises but did not complete the postintervention questionnaire (i.e., in-treatment dropouts, $n =$

$$^2 Z_M = [M - \mu] / [\sigma^2/n]$$

³ $d = [M_{\text{intervention-seeking}} - \mu_{\text{nonintervention-seeking}}] / \sigma_{\text{nonintervention-seeking}}$. Cohen's d effect size conventions are provided in Appendix U.

⁴ The majority (97%) of participant exclusions from the study were due to responses on the SCI; specifically, 16 participants reported never having felt that they must control their weight or shape, 54 participants reported feeling they must control their weight or shape but not seeing it as a personal problem, and seven participants reported having completely overcome feelings of having to control their weight or shape.

85), and (c) participants who completed intervention exercises as well as the postintervention questionnaire (i.e., completers, $n = 250$). The first MANOVA tested potential differences in dropout status on the primary outcome variables (EDE-Q:SC, EDE-Q:WC, CSWS:App). There was no significant multivariate effect, $F(6, 750) = 1.22, p = .295$, Wilks' $\Lambda = .981$. Similarly, there was no significant multivariate effect for the secondary outcome variables (EDE-Q:R, EDE-Q:EC, CIA), $F(6, 748) = 1.07, p = .380$, Wilks' $\Lambda = .983$, nor the predictor variables (PANAS:PA, PANAS:NA, RSES, RRQ:R, and CFS), $F(10, 744) = 0.97, p = .466$, Wilks' $\Lambda = .974$.

A significant multivariate effect was found for a MANOVA that included age and BMI, $F(4, 750) = 2.72, p = .030$, Wilks' $\Lambda = .972$. Tests of between-group effects indicated a significant effect for age, $F(2, 376) = 3.13, p = .044$, and for BMI, $F(2, 376) = 3.06, p = .048$. Follow-up multiple comparisons for age indicated a marginally significant difference ($p = .052$) between pretreatment dropouts ($M = 19.52, SD = 2.25$) and completers ($M = 21.48, SD = 5.45$). Similarly, follow-up multiple comparisons for BMI indicate a marginally significant difference ($p = .055$) between pretreatment dropouts ($M = 23.84, SD = 4.75$) and completers ($M = 26.26, SD = 6.48$). These results indicate that pretreatment dropouts were younger and had lower BMI relative to completers. Attrition has the potential to deteriorate the generalizability of outcomes depending on whether participants who remained in the study differ from those who dropped out. As previously described, the ITT analyses used in the present study included all participant data, thereby lessening the impact of this threat to external validity. However, it should be acknowledged that study completers tended to be older and have higher BMI.

Baseline group differences. The means and standard deviations of participants' scores at baseline are presented in Table 4. Potential differences between the two interventions at baseline

were examined with respect to the primary and secondary variables using a series of separate MANOVAs. A MANOVA including the three primary outcome variables (EDE-Q:SC, EDE-Q:WC, CSWS:App) revealed a nonsignificant main effect of condition, $F(3,375) = 2.19$, $p = .088$, Wilks' $\Lambda = .983$. However, analysis of univariate between-group effects revealed significant group differences between SA ($M = 5.58$, $SD = .76$) and PE ($M = 5.38$, $SD = .86$) on the CSWS:App scale, $F(1, 377) = 6.02$, $p = .015$. A MANOVA of the three secondary outcome variables (EDE-Q:R, EDE-Q:EC, CIA) was not significant, $F(3,375) = 1.06$, $p = .366$, Wilks' $\Lambda = .992$.

A MANOVA including the predictor variables (PANAS:PA, PANAS:NA, RSES, RRQ:R, CFS) was not significant, $F(5, 375) = 1.13$, $p = .344$, Wilks' $\Lambda = .985$. However, examination of the univariate between-group effects revealed significant group differences between SA ($M = 26.32$, $SD = 5.28$) and PE ($M = 27.42$, $SD = 4.86$) on the RSES, $F(1, 377) = 4.46$, $p = .035$. Finally, a MANOVA including age and body mass index (BMI) did not reveal significant group differences, $F(2,376) = 0.15$, $p = .863$, Wilks' $\Lambda = .999$. These results indicate that SA had higher CSWS:App and lower RSES than PE. To control for these differences, all of the following analyses with regard to differential outcome included baseline CSWS:App and RSES as covariates in the models.

Exercise completion. Recall, participants were instructed to complete 14 exercises, one every other day during the 28-day active intervention period (see Table 5)⁵. Visual inspection of the number of exercises completed in each group indicated a bimodal distribution with more participants completing either a low or high number of exercises. The distribution of exercise completion in both interventions was further investigated using survival analysis. Kaplan-Meier

⁵ A summary of SA and PE intervention exercise responses is available in Appendix V.

curves and survival analyses provide a means of measuring time-to-event data (Rich et al., 2010). Survival analyses use median statistic which are ideal compared to the use of the mean given the potential influence on the latter of extreme scores at either end of a distribution (Field, 2009). Median values may be interpreted with respect to spread of the middle 50% of scores around them as in the interquartile range (IQR; Field, 2009).

For the current survival analysis, event was defined as the last exercise completed. Censorship occurs when the event being studied has not taken place as defined by the completion of all 14 exercises. The resulting survival curve is displayed in Figure 5. The median number of exercises completed was 10 (IQR = 12) in SA and 13 (IQR = 10) in PE. There was a significant difference in completion of number of exercises between interventions according to the Log-Rank test which tests the H_0 that there is no difference in the shape of survival curves, $\chi^2(1, 379) = 7.60, p = .006, r = .14^6$. Specifically, a greater proportion of PE participants completed more exercises than SE over the course of the interventions. Further exploratory analyses of this observation are reported in a subsequent section of Results.

Credibility and Confidence Ratings

Recall, participants rated credibility and confidence of the intervention following each exercise completed on a scale from 0 (*no credibility/confidence*) to 100 (*maximum credibility/confidence*). At baseline, there was a marginally significant difference between SA ($M = 54.38, SD = 24.13$) and PE ($M = 59.28, SD = 23.96$) for ratings of credibility, $F(1, 333) = 3.48, p = .063$. For ratings of confidence, there was no significant difference between SA ($M = 51.81, SD = 24.67$) and PE ($M = 53.94, SD = 24.03$) at baseline, $F(1, 333) = 0.64, p = .426$.

⁶ Calculation for r and associated effect size conventions are provided in Appendix U.

The trajectories of credibility and confidence ratings over the course of the interventions were subjected to further analyses. Linear growth curve analyses were conducted using MLM. Random-intercept and slope models best fit the data; that is, participant intercepts and slopes were allowed to vary. Interventions were dummy-coded; SA = 0 and PE = 1. Time was dummy-coded as 0 for the first exercise through to 13 for the last exercise 14. Thus, the intercept represents participant baseline scores. Cohen's *d* effect sizes were calculated using the *t* statistic (see Appendix U). As credibility and confidence were highly negatively skewed, analyses were conducted on both raw scores and square-root normalized scores. As outcomes did not significantly differ between analyses, the untransformed results are presented herein.

For credibility ratings, results indicated a significant main effect of exercise, $F(1, 227) = 40.32, p < .001, b = 0.79, t(214) = 5.92, p < .001, d = 0.65$; and a main effect of intervention, $F(1, 329) = 10.06, p = .002, b = -7.72, t(329) = -3.17, p = .002, d = -0.35$. There was no significant Exercise \times Intervention interaction, $F(1, 227) = 2.51, p = .115, b = -0.32, t(227) = -1.58, p = .207, d = -0.17$. The lack of significant interaction indicates that, although credibility increased as exercise completion increased, the rate of change did not significantly differ between interventions. A plot of the growth curve estimates is provided in Figure 6.

Regarding confidence ratings, results indicated a significant main effect of exercise, $F(1, 229) = 33.34, p < .001, b = 0.94, t(216) = 6.29, p < .001, d = 0.69$; a main effect of intervention, $F(1, 329) = 3.91, p = .049, b = -4.93, t(329) = -1.98, p < .049, d = -0.22$; and an Exercise \times Intervention interaction, $F(1, 229) = 7.07, p = .008, b = -0.59, t(229) = -2.66, p = .008, d = -0.29$. Participants in PE had greater increases in confidence as they completed more exercises than those in SA. Reverse coding of intervention allowed for an assessment of the main effect of exercise for SA, which also indicated a significant increase in confidence scores over time, $F(1,$

229) = 33.34, $p < .001$, $b = 0.35$, $t(239) = 2.10$, $p < .05$, $d = .21$. A plot of the growth curve estimates is provided in Figure 7.

To summarize thus far, credibility and confidence increased in both interventions as more exercises were completed. However, PE participants showed a greater increase in confidence over the intervention period. Additional exploratory analyses related to these findings are reported in a subsequent section of Results.

Efficacy Analysis of Primary Outcome Variables

Multilevel modelling was used to investigate the efficacy of SA and PE on the three primary outcome variables; EDE-Q:SC, EDE-Q:WC, and CSWS:App. Longitudinal change was dummy-coded in the models such that baseline = 0, postintervention = 1, and 3-month follow-up = 4. This coding accounts for the unevenly spaced measurement time points. SA was dummy-coded as 0 and PE as 1. Baseline values of the outcome variable, as well as baseline CSWS:App and RSES, were entered into the model as covariates to control for observed baseline group differences. As previously noted, CSWS:App was square-root transformed to achieve normality. Modelling CSWS:App with the transformed and untransformed scores did not differ in outcome; thus, untransformed results are presented. Exploration of model assumptions indicated an acceptable fit for each of the three estimated models.

A quadratic random-intercept model best fit the data for each outcome variable. Parameter estimates, coefficients, 95% confidence intervals, p values, and Cohen's d are provided in Table 6. Cohen's d was calculated using the t statistic (see Appendix U). Results indicated significant main effects of time for all three primary outcome variables: EDE-Q:SC, $F(1, 592) = 215.55$, $p < .001$; EDE-Q:WC, $F(1, 590) = 127.33$, $p < .001$; and CSWS:App, $F(1, 589) = 58.19$, $p < .001$. Similarly, a significant quadratic time effect was observed for each of

the three variables: EDE-Q:SC, $F(1, 476) = 164.66, p < .001$; EDE-Q:WC, $F(1, 576) = 80.48, p < .001$; and CSWS:App, $F(1, 575) = 42.52, p < .001$. These results indicate that scores on the primary outcome variables significantly declined over time, followed by an increase in scores when approaching 3-month follow-up.

The quadratic main effects of time for EDE-Q:SC and EDE-Q:WC are presented in Figure 8, averaged across intervention. The figure includes lines representing the means of the subscales derived from the normative data presented earlier. The quadratic main effect of time for CSWS:App is presented in Figure 9. In both figures, it is evident that while there is a reverse in the change of slope over time, the decreases made from baseline to postintervention were not lost to follow-up. In other words, there was no return to baseline.

There were no significant main effects for intervention: EDE-Q:SC, $F(1, 768) = 0.170, p = .681$; EDE-Q:WC, $F(1, 769) = 0.162, p = .688$; and CSWS:App, $F(1, 778) = 0.546, p = .460$. Further, there were no significant Intervention \times Time interactions: EDE-Q:SC, $F(1, 592) = 1.99, p = .159$; EDE-Q:WC, $F(1, 591) = 0.088, p = .767$; and CSWS:App, $F(1, 589) = 0.034, p = .853$. Finally, there were no significant Intervention \times Time \times Time interactions: EDE-Q:SC, $F(1, 578) = 1.49, p = .223$; EDE-Q:WC, $F(1, 577) = 0.021, p = .886$; CSWS:App, $F(1, 575) = 0.000, p = .995$. To summarize, there were no significant differences between interventions in rate of change over time with respect to primary outcome variables.

Estimated marginal means, between-group, and within-group effect sizes are presented in Table 7. Cohen's d effect sizes were calculated using the standardized mean difference (see Appendix U). Pairwise comparisons indicated no significant between-group differences on outcome variable means at postintervention or 3-month follow-up, with one exception: On the EDE-Q:SC subscale, scores were significantly lower ($p = .037$) for PE ($M = 2.46, SD = 1.15$)

than SA ($M = 2.71$, $SD = 1.20$). However, using Cohen's (1992) effect size conventions, the associated effect size was small ($d = 0.21$) and was no longer apparent at 3-month follow-up ($p = .125$). Within-group effect sizes from baseline to postintervention were medium to large, ranging from 0.53 to 1.15. From postintervention to 3-month follow-up, within-group effect sizes would be regarded as less than small.

Thus, analyses of primary outcome variables indicate that both interventions resulted in medium to large decreases in weight and shape concerns as well as appearance contingent self-worth over the course of the interventions. These decreases were maintained at 3-month follow-up. Further, there were no significant differences between interventions in achieving these changes in outcome.

Efficacy Analysis of Secondary Outcome Variables

Multilevel modelling was also used to investigate the efficacy of SA and PE on the three secondary outcome variables; EDE-Q:R, EDE-Q:EC, and CIA. Coding and covariates included in the model were the same as in the analyses above. Again, quadratic random-intercept models best fit the data and model assumptions indicated acceptable fit. Parameter estimates, coefficients, 95% confidence intervals, p values, and Cohen's d for each analysis are provided in Table 8.

Results indicated significant main effects of time for all three secondary outcome variables: EDE-Q:R, $F(1, 591) = 81.56$, $p < .001$; EDE-Q:EC, $F(1, 590) = 95.27$, $p < .001$; and CIA, $F(1, 589) = 147.50$, $p < .001$. Similarly, all three secondary outcome variables had significant quadratic main effects of time: EDE-Q:R, $F(1, 577) = 54.81$, $p < .001$; EDE-Q:EC, $F(1, 576) = 61.50$, $p < .001$; and CIA, $F(1, 575) = 96.96$, $p < .001$. These results indicate that scores on the secondary outcome variables significantly decreased over time and then began to

increase while approaching 3-month follow-up. There were no significant main effects for intervention: EDE-Q:R, $F(1, 778) = 0.06, p = .814$; EDE-Q:EC, $F(1, 773) = 0.129, p = .719$; and CIA, $F(1, 770) = 0.06, p = .805$).

The quadratic main effects of time for EDE-Q:R and EDE-Q:EC are presented in Figure 10, averaged across interventions. The figure includes lines representing the means of the subscales derived from the normative data presented earlier. The quadratic main effect of time for CIA is presented in Figure 11. In both figures, while there is a notable reverse in the change of slope over time, there was no return to baseline.

There were significant Time \times Intervention interactions for all three secondary outcome variables: EDE-Q:R, $F(1, 591) = 5.47, p = .019$; EDE-Q:EC, $F(1, 590) = 4.04, p = .045$; and CIA, $F(1, 589) = 4.42, p = .035$. Figures 12 to 14 display the Time \times Intervention interactions from baseline to postintervention. There were no significant Intervention \times Time \times Time interactions: EDE-Q:R, $F(1, 577) = 3.59, p = .058$; EDE-Q:EC, $F(1, 576) = 3.26, p = .072$; and CIA, $F(1, 575) = 3.44, p = .064$. These results indicate that while scores on the secondary outcome variables declined over time in both groups, the decrease in change was greater for PE than for SA.

Estimated marginal means, between-group, and within-group effect sizes are presented in Table 9. Pairwise comparisons showed significant between-group differences on all secondary outcome variable means at postintervention. On the EDE-Q:R subscale, scores were significantly lower ($p = .001$) for PE ($M = 0.93, SD = 0.48$) than SA ($M = 1.07, SD = 0.50$) at postintervention. This significant difference was maintained at 3-month follow-up ($p = .004$). However, the associated effect size was small ($d = 0.29$). On the EDE-Q:EC subscale, scores were significantly lower ($p = .005$) for PE ($M = 0.82, SD = 0.44$) than SA ($M = 0.93, SD = 0.45$)

at postintervention. The associated effect size was small ($d = 0.25$) and the difference was not maintained at 3-month follow-up ($p = .086$). On the CIA subscale, scores were significantly lower ($p = .004$) for PE ($M = 2.71$, $SD = 1.13$) than SA ($M = 3.02$, $SD = 1.17$) at postintervention. The between-group effect size was small ($d = 0.27$) and the difference was not maintained at 3-month follow-up ($p = .066$). Within-group effect sizes from baseline to postintervention were medium to large, ranging from 0.40 to 1.02. From postintervention to 3-month follow-up, within-group effect sizes were less than small.

Summary. To summarize, SA successfully reduced concerns with body weight and shape and contingent appearance self-worth at postintervention. Importantly, improvements noted in these outcomes were maintained at 3-month follow-up. There were no significant differences between SA and PE at reducing weight and shape concerns, or investment in appearance self-worth over the 3-month assessment period. SA was also successful at reducing eating concerns and the interference of such concerns on daily functioning at postintervention and 3-month follow-up. However, PE was superior at addressing these concerns at both time points. Thus, SA has been shown to be an effective means of improving body image and associated concerns. What remains unclear is whether certain participant characteristics predict differential response to the interventions.

Predictors of Outcome Variables

Recall that the second objective of the present study was to examine who responds best to the respective interventions. It was hypothesized that higher RSES, PANAS:PA, and CFS at baseline would result in greater decreases in body image concerns at postintervention. Conversely, lower levels of RRQ:R and PANAS:NA would lead to improvements in body image at postintervention. Further, it was hypothesized that intervention would moderate these

relationships. Moderated multiple regressions (MMRs) were conducted to test whether intervention moderated the relationship between the proposed predictor variables (PANAS:PA, PANAS:NA, RSES, RRQ:R, and CFS) and the outcome variables (EDEQ:SC, EDEQ:WC, CSWS:App, EDEQ:R, EDEQ:EC, and CIA). These analyses used the LOCF person-level dataset. SA was dummy-coded as 0 and PE as 1. Predictor variables were mean centered prior to being entered into the models. Baseline outcome variable values were entered as covariates in each model. Assumptions for the models were acceptably met with the exception of one violation of homogeneity discussed below.

The first group of MMRs predicted the primary outcome variables, beginning with the EDE-Q:SC subscale (see Table 10). There was no evidence of a moderation effect for any of the analyses. Main effects for intervention were significant for the majority of analyses, listed here according to model predictor: PANAS:PA, $t = -2.06, p = .041$; PANAS:NA, $t = -2.16, p = .032$; RSES, $t = -2.23, p = .027$; CFS, $t = -2.08, p = .040$. These results indicate that PE had significantly lower postintervention EDE-Q:SC scores than SA. This is consistent with the postintervention mean differences noted in the previous analysis of differential efficacy. There was also a main effect of RRQ:R, $t = 2.21, p = .028$, such that participants with higher baseline RRQ:R reported higher EDE-Q:SC at postintervention in both interventions.

The next two MMRs predicted EDE-Q:WC and CSWS:App. As displayed in Table 10, there was no evidence of a moderation effect for any of the analyses. Further, there was only one significant main effect; specifically, an effect of RRQ:R, $t = 2.82, p = .005$, on the CSWS:App subscale, such that participants with higher baseline RRQ:R reported higher CSWS:App at postintervention in both interventions.

The second group of MMRs predicted the secondary outcome variables. On the EDE-Q:EC subscale, there was no evidence of a moderation effect for any of the analyses (see Table 11). Main effects for intervention were significant for each analysis, listed here according to the model predictor: PANAS:PA, $t = -2.50, p = .013$; PANAS:NA, $t = -2.60, p = .010$; RSES, $t = -2.67, p = .010$; RRQ:R, $t = -2.53, p = .012$; CFS, $t = -2.54, p = .011$. These results indicate that there were significant differences between interventions on postintervention EDE-Q:EC. These findings are consistent with the analyses of differential efficacy previously discussed.

On the EDE-Q:R subscale, there was no evidence of a moderation effect for any of the analyses (see Table 11). The rule of thumb for homogeneity was not met when PANAS:PA was used as a predictor. However, James' J statistics ($0.06, U_{crit} = 3.87, p > .05$) and Alexander's A statistic ($A = 0.06, p = .807$) further confirmed the lack of significant moderation. Main effects for intervention were significant in each analysis, listed according to the relevant predictor: PANAS:PA, $t = -2.84, p = .005$; PANAS:NA, $t = -2.94, p = .003$; RSES, $t = -3.09, p = .002$; RRQ:R, $t = -2.87, p = .004$; CFS, $t = -2.88, p = .004$. These results indicate that there were significant differences between interventions on postintervention EDE-Q:R, consistent with the previous analyses.

On the CIA subscale, there was no evidence of a moderation effect of any of the analyses (see Table 11). Main effects for intervention were significant in each analysis, again listed according to the relevant predictor: PANAS:PA, $t = -2.55, p = .011$; PANAS:NA, $t = -2.62, p = .009$; RSES, $t = -2.59, p = .010$; RRQ:R, $t = -2.56, p = .011$; CFS, $t = -2.58, p = .010$. These results indicate that there were significant differences between interventions on postintervention CIA, consistent with the previous analyses. There was also a main effect of PANAS:PA, $t = -$

2.12, $p = .034$, such that participants with higher PANAS:PA at baseline reported lower CIA at postintervention in both interventions.

Summary. Results of the MMR analyses failed to uncover any indication of differential response between interventions for any of the baseline predictor variables. The few significant main effects of the predictors indicated that higher baseline PANAS:PA predicted lower CIA at postintervention. Similarly, higher baseline RRQ:R predicted higher EDE-Q:SC and CSWS:App at postintervention. However, none of the other proposed predictor variables were significantly related to postintervention outcome variables. It is notable that only three significant main effects of the proposed predictor variables, out of 30 analyses, were observed. If one were to apply a Bonferroni correction to these analyses, where the significance cut-off is set to α/n , the null hypothesis would be rejected if the p value is less than $.05/30 = .002$. According to this adjusted correction, none of the significant main effects of the predictor variables would remain significant. Not only did intervention fail to moderate the association between the proposed predictors and outcome, but none of the proposed predictors were significantly associated with any of the primary or secondary outcomes.

Exploratory Analyses

Both interventions were successful in reducing concerns with weight and shape over the course of the intervention period. However, intervention was not found to moderate this response given the hypothesized baseline predictor variables. Exploratory analyses focused on examining potential alternative predictors of body image outcome; specifically, the number of exercises completed by participants, as well as initial credibility and confidence ratings. In contrast to the previous moderation analyses, which measured whether the association between the predictor and outcome variables depended on the moderator variable, exploratory analyses

used mediation analyses. Mediation focuses on *how* the predictor variable exerts its effect on the outcome variable, through a causal mediator variable. That is, variation in X causes variation in the mediator M , which in turn causes variation in Y .

The relationship between the proposed predictor variables and decreases in weight and shape concerns were explored using a series of simple mediation models. Simple mediation models allow for examination of the direct and indirect effects of X on Y through an intervening variable M . Hayes' (2014) SPSS Process macro model four was used to test mediation models. Bootstrapping procedures were used and the sample size was resampled 10,000 times to calculate 95% confidence intervals (CI). If the resulting CIs do not contain zero, then the regression coefficient b which tests the indirect effect of X on Y through M is determined to be different from zero with 95% confidence.

Exploratory analyses were conducted using the LOCF person-level dataset. A composite weight and shape concerns (EDEQ:WS) scale was constructed from the average of the EDE-Q:SC and EDE-Q:WC subscales.⁷ Initial credibility and confidence ratings were square-root normalized. Exercise completion was subjected to the log transformation to achieve a normal distribution. Mediation models included baseline CSWS:App and RSES to control for previously reported baseline group differences. Assumptions of exploratory analyses were checked following the same approach described for the previous MMR analyses. No obvious violations of assumptions were noted in the data. Intercorrelations among the variables entered into the model are presented in Table 12.

The first mediation model tested whether the relationship between exercise completion and 3-month follow-up EDEQ:WS was mediated by postintervention EDEQ:WS. Results

⁷Composite EDEQ:WS was created because EDE-Q:SC and EDE-Q:WC (a) did not differ in outcome and (b) were themselves strongly correlated at the level $r = .91$ at baseline.

indicated a significant indirect effect of exercise completion on 3-month follow-up through postintervention EDEQ:WS, $b = -0.56$, 95% CI $[-.7395, -.3950]$. Figure 15 displays the associated unstandardized regression coefficients. These results indicate that greater exercise completion results in lower 3-month follow-up EDEQ:WS. This effect was mediated by higher exercise completion causing lower postintervention EDEQ:WS, which subsequently results in lower 3-month follow-up EDEQ:WS.

Recall that, on average, PE completed more exercises than SA over the course of the intervention period. It is plausible that intervention may moderate the pathway between exercise completion and postintervention EDEQ:WS. Conditional process modelling or path analysis can be used to “understand and describe the conditional nature of the mechanism or mechanisms by which a variable transmits its effect on another” (Hayes, 2013, p. 327). A form of path analysis is known as moderated mediation. In this case, a first stage moderated mediation model, where the effect of exercise completion on postintervention EDEQ:WS was allowed to be moderated by intervention was used to test this notion (Hayes, 2015). Using PROCESS model seven, the resulting index of moderated mediation was $b = -.16$ with a 95% CI $[-.4410, .1354]$ that straddled zero, indicating a nonsignificant moderated mediation model. Thus, there was no difference in the association between exercise completion and postintervention EDEQ:WS based on intervention.

Two simple mediation models were then separately tested with initial credibility and confidence ratings in the prediction of 3-month follow-up EDEQ:WS with postintervention EDEQ:WS as a mediator. Follow-up moderated mediation models tested whether intervention moderated the pathways between initial credibility and confidence and 3-month follow-up EDEQ:WS through postintervention EDEQ:WS. Both simple mediation models produced

significant indirect effects with initial credibility, $b = -0.06$, 95% CI [-.1180, -.0215] and initial confidence, $b = -0.09$, 95% CI [-.1403, -.0442] as predictors. Figures 16 and 17 display the resulting regression coefficients. These results indicate that higher initial credibility and confidence ratings resulted in lower 3-month follow-up EDEQ:WS. This effect was mediated by higher initial credibility and confidence causing lower postintervention EDEQ:WS, which in turn caused lower 3-month follow-up EDEQ:WS. Both moderated mediation models for initial credibility and confidence resulted in indices of moderated mediation that straddled zero, $b = .04$, 95% CI [-.0520, .1315] and $b = .01$, 95% CI [-.0750, .0985], respectively. Thus, intervention did not moderate the association between initial credibility or confidence and 3-month follow-up EDEQ:WS through postintervention EDEQ:WS.

These analyses indicate that exercise completion and initial credibility and confidence predict 3-month follow-up EDEQ:WS through postintervention EDEQ:WS. Given these findings, hierarchical multiple regressions were conducted to examine whether the linear combination of these three variables predicted immediate and follow-up outcomes. Initial credibility and confidence were entered in the first step, followed by exercise completion at the second step. Initial credibility was not a significant predictor of postintervention EDEQ:WS ($p = .772$) and was removed from subsequent models.

Hierarchical multiple regression predicted postintervention EDEQ:WS with initial confidence entered at step one and exercise completion at step two. Resulting regression coefficients are presented in Table 13. Initial confidence contributed significantly to the regression model, $F(1, 334) = 22.38$, $p < .001$, and accounted for 6.3% of the variation in postintervention EDEQ:WS. Introducing exercise completion to the model explained an additional 7.6% of variation in outcome with a significant change in R^2 , $F(1, 332) = 29.47$, $p <$

.001. Together, these two predictor variables accounted for 13.9% of the variation in postintervention EDEQ:WS.

The same regression model was then tested in the prediction of 3-month follow-up EDEQ:WS. Associated regression coefficients are presented in Table 13. Results were nearly identical to the previous analysis, with initial confidence contributing significantly to the regression model, $F(2, 334) = 26.72, p < .001$, and accounting for 7.4% of the variation in 3-month follow-up EDEQ:WS. Exercise completion explained an additional 6.9% of the variation in outcome, $F(1, 332) = 26.69, p < .001$, with a significant change in R^2 , $F(1, 332) = 26.69, p < .001$. The two predictor variables together accounted for 14.3% of the variation in 3-month follow-up WS Concerns.

Overall Summary of Results

The primary objective of the present study was to examine whether SA would be an effective means of improving the body image concerns of young women. To determine the relative efficacy of this novel self-affirmation intervention, it was compared to a more conventional intervention called psychoeducation. Results confirmed that engaging in SA over a period of 28 days was an effective means of decreasing the primary study outcomes: concerns with weight and shape and investment in appearance contingent self-worth. Moderate to large effects from baseline to postintervention were noted in both interventions. Between-groups effects sizes at postintervention were trivial. While there was a small differential effect at postintervention in favour of PE on the EDE-Q:SC subscale, this effect disappeared at 3-month follow-up. Importantly, these improvements were maintained 3 months following the intervention period.

Self-affirmation was also effective at improving the secondary outcomes in this study: dietary restraint, eating concerns, and interference in daily functioning due to these concerns. However, PE proved to be superior at addressing these outcomes at both postintervention and 3-month follow-up. Within-group baseline to postintervention effect sizes demonstrated moderate effects for SA and large effects for PE. Between-group effect sizes were small.

The secondary objective of the present study was to examine who responds best to the interventions given baseline levels of global self-esteem, positive and negative affect, coping flexibility, and rumination. Moderation analyses of these four hypothesized predictors failed to produce statistically significant prediction in outcome. However, exploratory analyses indicated that exercise completion and initial confidence ratings accounted for 14% of the variation in body image outcomes at postintervention and 3-month follow-up.

Discussion

The findings of the present study build upon the current literature that suggests self-affirmation may be an effective approach to improving body image. Recall that Armitage (2012) found that self-affirmed adolescent girls showed significantly greater body satisfaction than a control group. Similarly, Bucchianeri and Corning (2012) demonstrated reduced body dissatisfaction in women following self-affirmation compared to a control group. Finally, Powell et al. (2015) demonstrated that participants who self-affirmed trait kindness reported significantly less disgust toward their appearance than controls. Results of the current study mirror these collective findings such that young women who participated in SA showed improvements in concerns with body weight and shape, eating-related concerns, investment in appearance contingent self-worth, and interference from these concerns on daily functioning.

The present study expands upon the previous literature by providing an assessment of the effect of multiple self-affirmation exercises, as well as extending the follow-up period. While the aforementioned studies examined the effect of one-off self-affirmation exercises, participants in the present study completed an average of 10 such exercises over an extended 28-day intervention period. Further, the typical participant maintained body image improvements observed at postintervention over the subsequent 3-month follow-up. To the author's knowledge, this is the first study to show longer-term effects of self-affirmation on body image outcomes. The optimal "dose" of self-affirming exercises required to bring about maintained gains in body image remains unclear, an issue that will be elaborated upon in a later section. However, obtained correlations indicate that the more exercises one completes, the better the outcome at both postintervention and at 3-month follow-up. This finding is consistent with the previously observed large meta-analytic effect sizes with respect to the effect of homework compliance upon therapeutic outcomes (Kazantzis, Whittington, & Dattilio, 2010).

We had predicted that engaging in SA would not only decrease concerns with weight and shape, but also decrease investment in appearance contingent self-worth. Given the tenets of self-affirmation theory, participants experiencing a threat to the self should decrease investment in the threatened domain, and increase investment in other domains of self-worth. While statistically significant decreases in CSWS:App were noted over time, participants in both groups rated CSWS:App around a mean of five at baseline, postintervention, and 3-month follow-up: for example, responding "*somewhat agree*" to the statement "When I think I look attractive, I feel good about myself". This suggests that participants did not substantially decrease their investment in appearance contingent self-worth. Recall that Armitage (2012) found that following a one-off self-affirmation, affirmed adolescent girls showed significantly

greater body satisfaction than girls who completed a control task. Notably, mediation analyses indicated that this effect was due to increases in self-esteem and shifts away from using body shape and weight as sources of self-esteem. These findings appear to contrast with the results of the current study.

There are two possible reasons for the differences between the present study and that of Armitage (2012). First, we did not measure CSWS:App directly following a potential threat to the self. As such, CSWS:App was not measured subsequent to a self-affirmation. This may have attenuated the observed effect in the present study. In contrast, Armitage (2012) presented self-affirmed participants with a threat to body image by having them rate their appearance using figure rating scales (Stunkard, Sørensen, & Schulsinger, 1983). Subsequently, affirmed girls perceived less threat from rating their appearance and also derived less self-esteem from body weight and shape. To attempt to mirror his finding, one would need to replicate the present intervention and then subject participants to a threat to their body image. This would provide an opportunity to examine change in CSWS:App following a threat to appearance self-worth. If participants respond to the threat by investing greater stake in nonappearance domains of self-worth, Armitage's (2012) findings would be indirectly replicated through the use of a different measure.

Second, and following from the above, the measures used to operationalize domains of self-worth differed between the two studies. Armitage (2012) measured the proportion of self-worth derived from weight and shape using the Shape and Weight Based Self-Esteem (SAWBS) Inventory (Geller, Johnston, & Madsen, 1997). This measure requires participants to divide a circle into segments that indicate the proportion of their self-esteem derived from seven possible domains of self-worth (e.g., body shape and weight, competence at school, friendships) where

the angle of the relevant segment indicated the amount of self-esteem derived from a respective domain. This method required participants to consider their self-worth as a whole and evaluate domain proportions directly. In contrast, while the CSWS employed in the present study likewise assesses the importance of domains of worth, it does not readily translate into proportional comparison among the domains like the SAWBS used by Armitage. Consequently, for these two reasons, findings with respect to changes in domains of self-worth as a function of self-affirmation are difficult to directly compare between this study and that of Armitage. Nonetheless, Armitage's findings are intriguing and theoretically consistent with the self-affirmation literature, warranting further attempts at replication using more comparable measures and methodology.

While the effects of SA and PE did not significantly differ on the primary outcome variables, PE was found to be superior to SA on the secondary outcomes. This finding is logical given the content of PE. Specifically, the secondary outcome measures address restrained eating, eating concerns, and the degree to which weight, shape, exercise, and eating concerns impact an individual's life. These topics are directly addressed in PE which has specific videos covering topics of healthy eating, set point theory, physical activity, and significant interpersonal relationships. By contrast, SA was not designed to directly address these concerns. Thus, it is understandable that PE produced greater improvements within these particular domains of functioning that served as secondary outcomes in the present.

While identifying significant change in outcome is an essential measure of the success of an intervention, it is also prudent to determine potential predictors and moderators of change. Identification of moderators of treatment allow for the prediction of which individuals may respond best to a particular intervention (Kraemer, Wilson, Fairburn, & Agras, 2002). Thus, the

second objective of the present study was to examine who responded best to the interventions. It was hypothesized that greater levels of self-esteem, positive affect, coping flexibility and lower levels of ruminative thinking and negative affect at baseline would predict better response to the intervention. Further, it was hypothesized that intervention would moderate the relationship between predictor and outcome, such that these predictors would be of greater significance for SA than PE.

Contrary to hypotheses, the hypothesized variables failed to predict any of the postintervention measures when analyzed as regressions with intervention as a moderator. A couple of possibilities may account for this failure in prediction. First, the premise upon which these hypotheses were made may have been based upon faulty logic. It was hypothesized that higher global self-esteem and positive affect would predict improved outcomes in SA as these individuals would have more favourable and broader self-concepts with which to self-affirm. It was also hypothesized that individuals with greater coping flexibility would respond better to SA as they would be better able to recognize problematic coping patterns and substitute new cognitions to cope. Similarly, individuals with less ruminative thinking styles were expected to respond better to SA due to the prominent role of rumination in the development and maintenance of body image concerns and SA's purported ability to reduce ruminative thinking. Given the findings of the present study, none of these predictors appear to impact individuals' success in achieving change in outcome.

While the hypothesized predictors did not prospectively predict outcomes in the present study, concurrent correlational measurement of the predictors and outcomes provides evidence of significant relationships between these variables. As seen in Table 2, with the exception of coping flexibility, all predictors were significantly associated with the majority of the outcome

variables as measured at baseline, in the hypothesized direction. Given these significant associations, it remains conceivable that the predictors examined here may still relate to both self-affirmation and body image concerns.

It is possible that these hypothetical predictor variables may be better conceptualized as mediators of outcome. Consider the following: Armitage (2012) found that the relationship between self-affirmation and better body satisfaction was mediated by increases in global self-esteem and decreases in the proportion of global self-esteem as derived from body shape, weight, and the face. In a similar vein, our hypothetical predictors comprising self-esteem, affect, rumination, and coping may in fact mediate the association between engagement in self-affirmation and consequent decreases in body image concerns. For instance, engaging in self-affirmation may increase self-esteem, positive affect, and coping flexibility; decrease rumination; lead to broader thought-action repertoires, flexibility in thinking, and clarity of thought; all producing a final common pathway characterized by improved body image.

Unfortunately, this hypothetical mediation account could not be tested in the present study due to the simultaneous measurement of predictor and outcome variables. An important assumption of mediation is temporal precedence: the putative causal variable must precede the consequent effect (Hayes, 2014). The design of the present study violates this tenet. One cannot determine whether change in proposed predictors mediated change in outcome, or whether change in the outcome mediated change in the predictors. Future research into the utility of self-affirmation as an intervention would benefit from research designs modelled to address these specific mediation requirements. Such studies could continue to randomize the *X* variable, and measure the outcome variable at a time that follows the measurement of the proposed mediator variable. Alternatively, parallel process latent growth curve modelling could be used to

investigate such mediation processes (Cheong, MacKinnon, & Khoo, 2003). The benefit of this approach is that it allows for the modelling of repeated measurements and trajectories over time. Thus, at present, the means by which self-affirmation exerts its beneficial effect upon participant's body image remains unknown. However, one clue from this study lies in the exploratory analyses conducted.

While the proposed predictor variables were not successful at predicting outcome, exploratory analyses provide evidence that certain baseline characteristics can successfully predict postintervention body image concerns. Specifically, initial confidence ratings and exercise completion accounted for 14% of the variation in weight and shape concerns at postintervention and 3-month follow-up. Initial confidence alone accounted for 6.3% of variation in weight and shape concerns at postintervention and 7.4% at 3-month follow-up. Thus, it appears that participants' initial confidence in the intervention can be a reliable predictor of how well one eventually responds to it. As previously mentioned, this finding is consistent with the broader psychotherapy literature wherein participant expectations with regard to outcome at the beginning of the intervention process have substantial implications for their success in improvement over the course of that intervention (Greenberg et al., 2006).

Such expectancy effects, or the process by which expectations about therapeutic outcome become self-fulfilling prophecies, are often found to be influential predictors of outcome (Tambling, 2012). Lambert (1992) provided an estimate that at least 15% of the improvement in psychotherapy can be attributed to expectancy effects. Individuals with positive expectations about therapy experience better outcomes than those with ambivalent or negative expectations (Greenberg et al., 2006). Meta-analytic findings have provided small effect size estimates ($d = .24$) among 46 independent samples of psychotherapy clients with respect to the expectancy-

outcome relationship (Constantino, Arnkoff, Glass, Ametrano, & Smith, 2011). These findings emphasize the importance of expectations about intervention outcome in the therapeutic process itself.

These findings also speak to the importance of an intervention's ability to instill within an individual their expectation of hope for improved outcome. Individuals are more likely to engage in therapy if they hope that the therapist or intervention can be helpful (Frank & Frank, 1991). This may be particularly important for self-directed interventions such as the ones employed in the present study. Indeed, participants enrolled in an online body image intervention were more likely to complete it if they harboured greater baseline expectations for outcome (Geraghty, Wood, & Hyland, 2010). This hope and expectancy for change may also provide momentum for therapy involvement and subsequent outcomes. For example, the relationship between baseline expectancy for change in anxiety symptoms and initial change in Cognitive-Behavioural Therapy (CBT) has been found to be mediated by early homework compliance (Westra, Dozois, & Marcus, 2007). As observed, confidence and exercise completion were significantly positively correlated in the present study, although with an associated small effect size. Future research could attempt to determine potential causal links between confidence, exercise completion, and outcome using repeated assessments of each variable over the intervention period. This would allow for an assessment of whether initial confidence causes greater investment in an intervention program—as determined by exercise completion—and whether greater investment results in improved outcome.

The interventions studied herein did not involve a clinician or moderator. Hence, outcome expectancies were shaped solely by introductory emails sent to participants at the beginning of the interventions. Participants in SA were provided with an introductory email

discussing two extant “one-off” self-affirmation interventions that indicated improved body image outcome (see Appendix Q). The likelihood that SA would lead to beneficial outcomes for participants was strongly emphasized. Similarly, participants in PE were provided with an email detailing the success of the program at improving body image and self-esteem and decreasing dieting behaviours and eating concerns in university undergraduate women (see Appendix R). These introductory emails may have served to increase participants’ confidence that the respective interventions were likely to work for them as well. Given the important role that expectations play in subsequent outcome, future studies might explore comparisons of interventions delivered with varying levels or types of introductory contact (e.g., with or without experimenter contact). This may help further elucidate the process of shaping participant expectations, particularly within the context of online interventions.

Exploratory analyses also revealed that greater rate of exercise completion predicted lower postintervention concerns with weight and shape, but this relationship did not differentially depend on type of intervention. This is important to note given the finding that PE participants completed more exercises than SA over the course of the intervention period. While the test of intervention as a moderator did not prove significant, it is still worth discussing potential reasons why PE participants completed more exercises than SA. First, it is possible that participants in PE may have been motivated to complete more exercises based on the nature of the program itself. That is, PE was designed as a modular program wherein each module represents a different topic. Conversely, while SA participants could choose different options for their exercises, they nevertheless enacted the exact same exercise activity each time. Participants may have been less inclined to complete SA exercises, perhaps due to a lack of novelty. Second, SA required active cognitive engagement in exercise completion while PE allowed for passive

observation of the videos. Such passive engagement may have led to the completion of more PE exercises.

Third, it is possible that SA participants achieved maximum benefit in outcome with the completion of fewer exercises. This hypothesis brings to mind considerations of the dose-effect versus good-enough-level models of change throughout the therapy process literature (Owen, Adelson, Budge, Kopta, & Reese, 2014). The dose-effect model proposes that each individual therapeutic exposure is analogous to a dose of treatment and that individuals will benefit at the same rate for a given number of doses or exercises as in the present context. The good-enough level model proposes that the therapeutic process is more flexible and that individuals remain in therapy until they feel “good enough”. Both models could potentially explain the findings of the present study.

In the context of the dose-effect model, it is possible that the “dose” of SA can be lower than the “dose” of PE in order to achieve a comparable unit of change in outcome. Indeed, decreases in body image concerns have been noted following one-off self-affirmation exercise administration (Armitage, 2012; Bucchianerio & Corning, 2012; Powell et al., 2015). In the context of the good-enough level model, participants may have achieved satisfactory benefit from fewer doses of SA than participants in PE. Recall the remarkable findings of Brady et al. (2016) who found enduring 2-year benefit from a one-off self-affirmation. These intriguing findings suggest that one-off self-affirmation interventions may result in subsequent spontaneous affirmations, defined as “the tendency to spontaneously call to mind self-affirming topics, in the form of important life domains, values, and personal traits and activities and to spontaneously downplay self-threatening topics... at later moments of stress” (Brady et al., 2016, p. 354). Could this effect be applicable to body image research? Specifically, following the completion

of an initial self-affirmation, a cycle may begin wherein the benefits derived from the initial affirmation result in increased agency and psychological resources. When a body image stressor arises, the individual would then have these resources to draw upon and be able to respond to the threat in a more adaptive way by spontaneously generating self-affirming responses. Future research could utilize ecological momentary assessment methodology to investigate potential spontaneous self-affirmations. Using a mobile device, participants could be randomly prompted throughout the day to report body image threats, and indicate their subsequent response style. Within this context, one could also compare a group of self-affirmed participants to a non-affirmed group. This may provide further evidence of spontaneous self-affirmations, as well as explore individual differences in participant tendencies to naturally spontaneously self-affirm.

Evaluation of Treatment Attrition and Compliance

While the evaluation of change in outcome is essential to determining the success of an intervention, it is also integral to consider rates of treatment attrition and compliance. Even if an intervention is successful at achieving change, its utility is limited if individuals do not continue to engage in the intervention. In terms of study retention rates, Fernandez, Salem, Swift, & Ramtahal (2015) distinguish between *pretreatment* (i.e., participants randomized to an intervention group that did not complete any exercises) and *during-treatment* dropout (i.e., participants who completed study exercises but not postintervention or follow-up questionnaires). Retention rates can be of particular concern for intervention studies, especially those administered via online format. In the present study, 11.6% of the sample were pretreatment dropouts. When compared to the meta-analytically derived 24.2% rate for e-therapy studies (Fernandez et al., 2015), the pretreatment dropout rate in the present study compares favourably. Regarding during-treatment dropout, 36% of SA participants and 31% of

PE participants did not complete postintervention questionnaires. These dropout rates are comparable to e-therapy during-treatment dropout rates of 34.2% (Fernandez et al., 2015). The overall completion rate in this study of 45% is thus comparable to meta-analytic findings 42% among more than 16 such trials.

These dropout rates highlight the need to address the high attrition associated with internet-delivered intervention trials. Indeed, pretreatment and during-treatment dropout rates have been found to be about 10 to 15 percentage points higher for e-therapies as compared to group or individual therapy (Fernandez et al., 2015). Regular contact with a researcher or moderator has been proposed as a means of improving participant attrition and increase homework completion in offline body image interventions with promising results (Cash & Hrabosky, 2003). However, the benefits of improved attrition and homework completion rates need to be balanced with the advantages of self-directed online intervention programs. Other avenues to improve attrition and intervention compliance might include more thorough assessment of participant motivations for engaging in the intervention, potentially improving intervention engagement and expectations via an introductory meeting with a researcher or clinician, and/or reducing the length of the intervention period.

Limitations

Of course, the present study is not without limitations. Potential threats to internal validity must be considered. Campbell and Stanley (1963) noted seven possible threats to internal validity that are relevant to the present study, including: history, maturation, statistical regression, selection, testing, instrumentation, and mortality. The first four of these threats are relevant to the present study. With regard to the threat of *history*, the possibility that influential external events may have occurred during the 28-day intervention period or 3-month follow-up

period cannot be ruled out. However, given that data collection took place over a 2-year period, the likelihood that specific events or time periods influenced study outcome is not likely.

Similarly, *maturation*, or the natural improvement of participants' body image is unlikely, but cannot be ruled out. As well, baseline testing of participants may have influenced subsequent change in scores at postintervention and 3-month follow-up. The high face validity of the baseline questionnaires may have increased awareness of body image concerns, potentially influencing subsequent outcome. Finally, *statistical regression* is a potential concern.

Participants in the present study scored higher than a normative sample on both primary and secondary outcome measures at baseline. Thus, there is potential that the change in outcome observed may have been a product of regression to the mean. However, recall that previously conducted controlled trials of a similar online psychoeducation intervention, delivered to a comparable population, have found small to moderate effect sizes using the EDE-Q subscales as outcome measures, when compared to wait-list controls (Beinter et al., 2012). These prior findings serve to increase confidence in the conclusions drawn from the present study. Further, the use of a comparative intervention allowed for the control of participant expectancies, which were found to have significant predictive value for variance in outcome. Nonetheless, future research could rule out the above potential threats to internal validity with the addition of an untreated control group.

Regarding the study's *selection* methods, though participants were randomly assigned to their respective intervention, they did self-select to participate. It is important to note that approximately 95% received compensation for their participation through additional credits toward their psychology course. It is possible that this value-added incentive actually increased participant completion of (a) more intervention exercises and/or (b) assessment occasions.

Further, participant demand characteristics cannot be ruled out. It was clear to participants that their exercise completion would be recorded and that they would be completing a follow-up questionnaire. The description of the study as a body image improvement program made the purpose of the interventions clear. Thus, it is possible that the expectations of the study may have influenced participant outcome. On the one hand, this could be considered a limitation. However, as demonstrated, it is exactly the effect of expectancy upon outcome that is so compelling an observation of this study.

External validity, or the degree to which the findings of the present study can be generalized to other populations and settings, is also a potential limitation (Campbell & Stanley, 1963). It remains to be seen whether the findings presented here can be replicated outside of the current sample of young women recruited from the Lakehead University population.

Strengths

The present study has several strengths worth noting. The remaining three potential threats to internal validity—instrumentation, testing, and mortality—likely have minimal influence. As questionnaires were administered identically at each measurement occasion, outcome change not likely due to the *instrumentation* utilized. The outcome measures used demonstrated acceptable test-retest reliabilities, reducing the likelihood that changes in participant scores were due to repeated *testing*, or practice effects. Finally, participant *mortality*, or differential drop-out between groups is not a likely concern. Although participant attrition was notable overall, the number of participants completing each intervention did not substantially differ. Specifically, by 3-month follow-up, 88 participants remained in SA and 82 in PE.

This study also demonstrates the success of two relatively brief interventions at decreasing body image concerns in substantial sample of young women. Recurrent exercises in

both interventions required only approximately 15 min every second day for 28 days. This is a relatively small time investment given the measurable improvements in body image outcomes. Further, both interventions were delivered entirely online without a facilitator and with limited time required of the study administrator. Such ease of administration makes both interventions practical for widespread dissemination with low resource investment.

The inclusion of the 3-month follow-up builds upon the previous research on self-affirmation as an intervention for body image (Armitage, 2012; Bucchianeri & Corning, 2012; Powell et al., 2015). Not only did the present study demonstrate the ability of a self-affirmation intervention to improve body image, but it also showed that these effects could be maintained over a 3-month follow-up period. Similarly, the use of intention-to-treat analyses provides more conservative estimates of efficacy, increasing certainty in the observed outcomes (Heritier, Gebiski, & Keech, 2003). Including all participants in analyses, as opposed to only including sufficiently compliant participants, helps to reduce bias and improve generalizability of an intervention to “real-world” scenarios.

Future Research

Future research directed at exploring the utility of self-affirmation as an intervention for body image concerns can take several pathways. As previously mentioned, one first step may be to determine the optimal “dose” of self-affirmation exercises required to result in change in outcome. Previous research has demonstrated that one “dose” of self-affirmation can decrease body image concerns; however, the long-term effects of one exercise are unknown. In contrast, the present study had the potential for participants to complete upward of 14 self-affirmation exercises over the period of 28 days. It would be useful to determine the optimal number of

exercises to achieve body image improvement as this may solidify self-affirmation's status as a brief intervention for body image concerns.

Elucidating the processes by which self-affirmation leads to improved body image concerns may also provide insight into positive body image itself. Positive body image is recognized as a multifaceted, holistic, construct that is distinct from negative body image (Tylka & Wood-Barcalow, 2015). The construct of positive body image includes body appreciation, body acceptance, broad conceptualizations of beauty, and adaptive investment in appearance. Recall that Ransom (2011) found that participants with high appearance self-esteem did not increase stake in appearance self-worth following a body image exposure, instead investing stake in other domains of self-worth more generally; that is, these participants naturally self-affirmed. The research literature thus far has focused on the utility of self-affirmation as an intervention for poor body image. However, it may also be useful to examine whether self-affirmation spontaneously occurs in individuals with positive body image. Emerging research suggests that some individuals have a tendency to spontaneously self-affirm in response to daily threats (Emanuel et al., 2016). Further exploration may help discern whether self-affirmation may serve as a protective factor with regard to body image concerns, potentially providing a useful intervention for integration in the body image prevention literature.

Another option for future research may be directed at exploring the utility of self-affirmation within a clinical sample of individuals with disordered eating. Indeed, the concepts of self-affirmation theory are already present in an evidence-based, manualized cognitive-behavioural therapy treatment for eating disorders (CBT-E; Fairburn, 2008). Specifically, in the module dedicated to over-evaluation of weight and shape, an exercise has clients complete a pie chart depicting the proportion of their self-worth dedicated to concerns with weight, shape, and

eating. The purpose of the exercise is to illustrate the therapeutic process of increasing investment in other domains of self-worth (i.e., other pie pieces) and decreasing the amount of investment in weight, shape, and eating concerns. As this exercise is just one component of a comprehensive treatment program, it may be useful to determine the specific effects of a self-affirmation intervention on weight and shape concerns in a clinical population.

Conclusion

The present study was designed to determine the utility of an online self-affirmation intervention for improving body image concerns. Young women engaged in self-affirmation exercises designed to teach them to affirm nonappearance-related domains of self-worth over the course of 28 days. As observed, participants experienced improvements in weight and shape concerns and decreased their investment in appearance contingent self-worth. Importantly, these improvements were similar to the outcomes noted in a comparative psychoeducation program and were maintained at 3-month follow-up. Thus, both interventions serve as viable and effective means of assisting young women with improving not only the way they feel about their bodies, but in reducing their investment in appearance contingent self-worth. Further, engaging in the self-affirmation intervention was effective at reducing dietary restraint, eating concerns, and the degree to which such concerns interfered with daily functioning. Although moderation analyses were not successful in determining whether either intervention was more successful at improving outcomes given baseline self-esteem, positive or negative affect, rumination, or coping flexibility, the role of these predictors as potential mediators of self-affirmation cannot be ruled out. Exploratory analyses emphasized the importance of initial confidence in the body image interventions at leading to subsequent improved outcomes. In sum, these findings provide

further evidence for the utility of self-affirmation as an effective intervention for body image concerns.

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Table 1

Summary of Psychoeducation, Self-Affirmation and Online Interventions for Body Image Concerns

Authors	Samples	Treatment conditions	Treatment duration	Advantages	Limitations
Psychoeducation interventions					
Strachan & Cash, 2002	86 women & 3 men	Psychoeducation plus self-monitoring ($n = 47$)	8 weeks	Statistically significant improvements in body dissatisfaction, social anxiety, social self-esteem, and depression.	High program attrition (53%)
	Mean age = 38 years	Psychoeducation plus self-monitoring and cognitive restructuring ($n = 42$)			Unclear which program components resulted in change.
Stice & Ragan, 2002	66 female undergraduates	Intervention group ($n = 17$)	15 weeks	Significant decreases (medium effect size) in thin-ideal internalization, body dissatisfaction, dieting behaviours and eating disorder symptoms from pre- to posttest.	Average of 3% reduction in body mass from pre- to posttest for intervention subjects and 4% increase in control subjects.
	Modal age = 21 years	Control group ($n = 49$)			
					No follow-up.
					(continued)

Authors	Samples	Treatment conditions	Treatment duration	Advantages	Limitations
					Small sample size. Possibly biased due to implementation as psychology course.
Cash & Hrabosky, 2003	25 (22 women and 3 men) college students Mean age = 24.7 years	Psychoeducation and self-monitoring	3 weeks	Significantly greater satisfaction with appearance. Reported less situational body-image dysphoria, less weight-related concern, and less investment in appearance as a source of self-evaluation.	No comparison condition. No follow-up. Unclear which program components resulted in change.
Stice, Orjada, & Tristan, 2006	95 undergraduate women Mean age = 21.3 years	Intervention group ($n = 25$) Control group ($n = 70$)	15 weeks	Significant reductions in thin-ideal internalization, body dissatisfaction, dieting and eating disorder symptoms. Effects persisted through 6-month follow-up.	Unclear which program components resulted in change.
Bone, 2006	53 adolescent females Mean age = 14.7 years		2 weeks	Significant reductions on the Restraint and Shape Concerns subscales of the EDE-Q. Self-selected sample.	No control group. Unclear which program components resulted in change.
					(continued)

Authors	Samples	Treatment conditions	Treatment duration	Advantages	Limitations
McMahan, 2009	52 undergraduate women Mean age = 23.4 years	Psychoeducation group ($n = 26$) Mindfulness Group ($n = 26$)	2 weeks	Both interventions associated with significant improvement in body image and self-esteem and reductions in eating concerns and dieting behaviour.	Unclear which program components resulted in change.
Self-Affirmation interventions					
O'Dea & Abraham, 2000	470 secondary students (173 males and 297 females) Mean age = 13 years	Intervention group ($n = 275$) Control group ($n = 195$)	9 weeks	Significantly improved body satisfaction; decreased importance of evaluation by others; physical appearance rated as less important. Results maintained 1-year later.	As self-affirmation exercises were part of a larger program, it is unclear how much of a role they played in findings. Time-consuming and resource-intensive program implementation as part of class work.
Bucchianeri & Corning, 2012	86 undergraduate women Mean age = 19.2 years	Self-affirmation group ($n = 43$) Control group ($n = 43$)	One time delivery	Self-affirmed participants displayed lower body dissatisfaction, greater intentions to reduce criticisms about their bodies, and increased openness to threatening information. Delivered in "one-shot" format.	Long-term effects of self-affirmation unknown. Mechanism of change unclear. Narrow perspective of body dissatisfaction.

(continued)

Authors	Samples	Treatment conditions	Treatment duration	Advantages	Limitations
Armitage, 2012	Adolescents (115 boys and 105 girls) Mean age = 14 years	Self-affirmation group ($n = 153$) Control group ($n = 105$)	One time delivery	Self-affirmed participants showed significantly greater body satisfaction and perceived less threat from having to rate their body shape and weight. Change mediated by shifts away from domains of body shape and weight. Delivered in “one-shot” format.	Long-term effects of self-affirmation unknown. Adolescent sample.
Powell, 2015	Study 1: 56 (37 women, 19 men) Mean age = 33.2 Study 2: 116 (83 women, 33 men) Mean age = 24.9	Study 1: Self-Affirmation group ($n = 56$) Control group ($n = 255$) Study 2: Self-Affirmation group ($n = 116$) Control group ($n = 192$)	One time delivery One time delivery	Self-affirmed participants reported significantly less disgust toward their appearance. Study 2 took place entirely online.	Long-term effects of self-affirmation unknown.
Online interventions					
Celio et al., 2000	76 University women Mean age = 19.6 years	Student Bodies (Internet program; $n = 24$)	8 weeks	Internet condition displayed significant reductions in weight and shape concerns compared to control condition.	Required offline resources (i.e., moderator) for implementation. (continued)

Authors	Samples	Treatment conditions	Treatment duration	Advantages	Limitations
		Body Traps (classroom program; $n = 15$)			Unclear if all program components are necessary.
		Wait-list Control ($n = 19$)			Small sample sizes.
Zabinski, Wilfley, Calfas, Winzelberg, & Taylor, 2004	60 university women. Mean age = 18.9 years	Intervention ($n = 30$) Control ($n = 30$)	8 weeks	Reduction of eating disorder symptoms and increased self-esteem. High satisfaction with program delivery reported.	Required offline resources (i.e., moderator) for implementation. Unclear if all program components are necessary.
Gollings & Paxton, 2006	40 women Mean age = 21.6 years	Internet Group Intervention ($n = 18$) Face-to-Face Group ($n = 15$)	8 weeks	Significant improvements in body image, eating and psychological variables. No differences between groups.	Required offline resources (i.e., moderator) for implementation. Unclear if all program components are necessary. Small sample sizes.

(continued)

Authors	Samples	Treatment conditions	Treatment duration	Advantages	Limitations
Heinicke, Paxton, McLean, & Wertheim, 2007	73 adolescent girls Mean age = 14.4 years	Intervention group ($n = 36$) Delayed treatment control group ($n = 37$)	6 weeks	Significant improvements in body dissatisfaction, disordered eating, and depression observed at postintervention and 2- and 6-month follow-up.	Required offline resources (i.e., moderator) for implementation. Online intervention did not differ from offline.
Hötzel et al., 2014	212 women Mean age = 27.1	Intervention group ($n = 103$) Waiting-list control ($n = 109$)	6 weeks	Significant improvements in motivation to change problematic eating behaviours and cognitions and self-esteem.	Drop-out rate of 41% Required moderator feedback

Table 2

Psychometric Properties and Intercorrelations of Outcome and Predictor Variables

Variable	<i>M</i>	<i>SD</i>	Range	<i>Z</i> _{Skewness}	α	1	2	3	4	5	6	7	8	9	10	11	12	
1. EDE-Q: Global	2.64	1.16	0.0-5.7	2.54*	.93	-												
2. EDE-Q:EC	1.63	1.26	0.0-5.2	6.16*	.77	.83**	-											
3. EDE-Q:R	1.96	1.34	0.0-6.0	4.98*	.76	.75**	.52**	-										
4. EDE-Q:SC	3.72	1.41	0.0-6.0	-2.34*	.89	.91**	.65**	.52**	-									
5. EDE-Q:WC	3.24	1.44	0.0-6.0	-1.50	.80	.91**	.69**	.52**	.88**	-								
6. CIA	16.10	10.21	0.0-48.0	6.05*	.94	.80**	.76**	.50**	.73**	.74**	-							
7. CSWS:App	5.48	0.82	3.3-7.0	-2.83*	.63	.29**	.16**	.23**	.34**	.23**	.21**	-						
8. PANAS:PA	30.52	7.17	10.0-48.0	-2.24*	.87	-.21**	-.20**	-.03	-.25**	-.23**	-.27**	-.06	-					
9. PANAS:NA	26.04	7.92	10.0-46.0	2.17*	.87	.42**	.42**	.24**	.40**	.40**	.48**	.16**	-.06	-				
10. RSES	26.87	5.10	10.0-40.0	-0.08	.88	-.45**	-.39**	-.24**	-.47**	-.43**	-.49**	-.19**	.52**	-.46**	-			
11. RRQ:R	3.84	0.65	1.5-3.5	-4.83*	.91	.30**	.25**	.16**	.34**	.27**	.29**	.36**	-.16**	.39**	-.37**	-		
12. CFS	16.17	4.43	5.0-29.0	0.78	.81	.01	.02	.06	-.04	-.02	-.02	-.01	.38**	-.08	.33**	-.07	-	

EDE-Q = Eating Disorder Examination-Questionnaire; EC = Eating Concerns; R = Dietary Restraint; SC = Shape Concerns; WC = Weight Concerns; CIA = Clinical Impairment Assessment; CSWS:App = Contingencies of Self-Worth Scale: Appearance subscale; PANAS = Positive and Negative Affect Schedule; PA = Positive Affect; NA = Negative Affect; RSES = Rosenberg Self-Esteem Scale; RRQ:R = Rumination Reflection Questionnaire: Rumination subscale; CFS = Coping Flexibility Scale.

* $p < .05$. ** $p < .01$.

Table 3

Standard Scores and Percentile Equivalents of Baseline and Postintervention Intervention Sample Means

Measure	Nonintervention-seeking sample ^a (<i>N</i> = 723)		Intervention-seeking sample (<i>N</i> = 379)									
	<i>M</i>	<i>SD</i>	Baseline					Postintervention				
			<i>M</i>	<i>SD</i>	<i>z</i> ^b	<i>d</i>	<i>P</i> ^c	<i>M</i>	<i>SD</i>	<i>z</i> ^b	<i>d</i>	<i>P</i> ^c
EDE-Q:R	1.62	1.54	1.96	1.34	4.30*	-0.22	59	1.56	1.33	-0.76	0.04	52
EDE-Q:EC	1.11	1.11	1.63	1.26	9.12*	-0.47	68	1.30	1.21	3.33*	-0.17	57
EDE-Q:SC	2.27	1.54	3.72	1.41	18.33*	-0.94	83	2.99	1.60	9.10*	-0.47	68
EDE-Q:WC	1.97	1.56	3.24	1.44	15.85*	-0.81	79	2.70	1.58	9.10*	-0.47	68
EDE-Q:Global	1.74	1.30	2.64	1.16	13.48*	-0.69	75	2.14	1.27	5.99*	-0.31	62

EDE-Q = Eating Disorder Examination-Questionnaire; R = Dietary Restraint; EC = Eating Concerns; SC = Shape Concerns; WC = Weight Concerns; *d* = Cohen's *d* measure of effect size.

^aNonintervention-seeking sample norms Luce et al., 2008. ^bOne-sample *z*-test of null hypothesis that intervention sample and nonintervention-seeking sample are equal. ^cPercentile equivalent of intervention-seeking sample mean relative to nonintervention-seeking sample distribution.

**p* < .05

Table 4

Descriptive Statistics of the Primary and Secondary Outcome Variables by Intervention Group

Measure	Self-affirmation		Psychoeducation	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Primary outcome variables				
EDE-Q:SC	3.82	1.39	3.62	1.44
EDE-Q:WC	3.33	1.45	3.14	1.43
CSWS:App	5.58	0.77	5.37	0.86
Secondary outcome variables				
EDE-Q:R	1.98	1.42	1.93	1.25
EDE-Q:EC	1.72	1.30	1.54	1.20
CIA	16.92	10.86	15.26	9.46

EDE-Q = Eating Disorder Examination-Questionnaire; SC = Shape Concerns; WC = Weight Concerns; CSWS:App = Contingencies of Self-Worth Scale: Appearance subscale; R = Dietary Restraint; EC = Eating Concerns; CIA = Clinical Impairment Assessment.

Table 5

Number of Self-Affirmation and Psychoeducation Exercises Completed by Participants

No. exercises	Self-affirmation (<i>n</i> = 190)	Psychoeducation (<i>n</i> = 189)
	No. participants	No. participants
0	18	26
1	23	6
2	15	8
3	10	3
4	4	5
5	2	3
6	6	4
7	3	3
8	3	4
9	4	4
10	9	9
11	13	4
12	11	10
13	15	24
14	54	76

Table 6

Intervention Effects for Primary Outcome Variables

Variable	Parameter	Coefficient	<i>t</i>	95% CI	<i>p</i>	<i>d</i>
EDE-Q:SC	Intercept	3.70	52.96	[3.56, 3.84]	<.001	5.44
	Time	-1.53	-11.54	[-1.79, -1.27]	<.001	-1.19
	Time × Time	0.30	9.50	[0.24, 0.36]	<.001	0.98
	Intervention	0.04	0.41	[-0.15, 0.24]	.681	0.04
	Intervention × Time	0.27	1.41	[-0.11, 0.64]	.159	0.14
	Intervention × Time × Time	-0.06	-1.22	[-0.15, 0.03]	.223	-0.13
	Baseline EDE-Q:SC	0.82	26.20	[0.76, 0.88]	<.001	2.69
	Baseline CSWS:App	0.03	0.51	[-0.07, 0.12]	.608	0.05
	Baseline RSES	0.01	0.96	[-0.01, 0.02]	.336	0.10
EDE-Q:WC	Intercept	3.22	47.60	[3.08, 3.35]	<.001	4.89
	Time	-1.07	-8.30	[-1.32, -0.81]	<.001	-0.85
	Time × Time	0.20	6.53	[0.14, 0.26]	<.001	0.67
	Intervention	0.04	0.40	[-0.15, 0.23]	.688	0.04
	Intervention × Time	0.05	0.30	[-0.31, 0.42]	.767	0.03
	Intervention × Time × Time	-0.01	-0.14	[-0.09, 0.08]	.886	-0.01
	Baseline EDE-Q:WC	0.81	28.87	[0.76, 0.87]	<.001	2.97
	Baseline CSWS:App	0.02	0.44	[-0.07, 0.11]	.660	0.05
	Baseline RSES	0.01	0.79	[-0.01, 0.02]	.431	0.08
CSWS:App	Intercept	5.45	129.67	[5.37, 5.54]	<.001	13.32
	Time	-0.46	-5.61	[-0.63, -0.30]	<.001	-0.68
	Time × Time	0.09	4.66	[0.05, 0.13]	<.001	0.48
	Intervention	0.04	0.74	[-0.07, 0.16]	.460	0.08
	Intervention × Time	0.02	0.19	[-0.21, 0.25]	.853	0.02
	Intervention × Time × Time	-0.00	-0.01	[-0.06, 0.06]	.995	0.00
	Baseline CSWS:App	0.74	27.22	[0.69, 0.79]	<.001	2.80
	Baseline RSES	-0.01	-1.87	[-0.02, 0.00]	.062	-0.19

Note. CI = Confidence interval; EDE-Q = Eating Disorder Examination-Questionnaire; SC = Shape Concerns; WC = Weight Concerns; CSWS:App = Contingencies of Self-Worth Scale: Appearance subscale; RSES = Rosenberg Self-Esteem Scale.

Table 7

Estimated Marginal Means, Standard Deviations, and Cohen's d by Intervention for Primary Outcome Variables

Primary Variables	Baseline		Postintervention		Within-group d^a	3-month follow-up		Within-group d^b
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		<i>M</i>	<i>SD</i>	
EDE-Q:SC								
SA	3.73	0.96	2.71	1.20	0.94	2.62	1.41	0.05
PE	3.69	0.96	2.46	1.15	1.15	2.40	1.44	0.04
[Between-group d]			[0.21] ^c			[0.15] ^d		
EDE-Q:WC								
SA	3.24	0.94	2.42	1.56	0.78	2.31	1.36	0.08
PE	3.20	0.93	2.34	1.11	0.84	2.16	1.40	0.14
[Between-group d]			[0.06] ^c			[0.11] ^d		
CSWS:App								
SA	5.48	0.58	5.13	0.73	0.53	5.20	0.87	-0.09
PE	5.44	0.58	5.07	0.70	0.58	5.07	0.87	0.00
[Between-group d]			[0.08] ^c			[0.15] ^d		

Note. Estimated marginal means are predicted values based on covariates entered into the model; EDE-Q = Eating Disorder Examination-Questionnaire; SC = Shape Concerns; WC = Weight Concerns; CSWS:App = Contingencies of Self-Worth Scale: Appearance Subscale; SA = Self-Affirmation; PE = Psychoeducation.

^aWithin-group Cohen's d from baseline to postintervention. ^bWithin-group Cohen's d from postintervention to 3-month follow-up.

^cBetween-group Cohen's d at postintervention. ^dBetween-group Cohen's d at 3-month follow-up.

Table 8

Intervention Effects for Secondary Outcome Variables

Variable	Parameter	Coefficient	<i>t</i>	95% CI	<i>p</i>	<i>d</i>
EDE-Q:R ^a	Intercept	1.29	45.57	[1.23, 1.35]	<.001	4.68
	Time	-0.45	-8.15	[-0.56, -0.34]	<.001	-0.84
	Time × Time	0.09	6.68	[0.06, 0.11]	<.001	0.69
	Intervention	0.01	0.21	[-0.07, 0.09]	.832	0.02
	Intervention × Time	0.19	2.36	[0.03, 0.34]	.019	0.24
	Intervention × Time × Time	-0.04	-1.92	[-0.07, 0.00]	.055	-0.20
	Baseline EDE-Q:R	2.00	26.37	[1.84, 2.14]	<.001	2.71
	Baseline CSWS:App	-0.01	-0.30	[-0.04, 0.03]	.761	-0.03
	Baseline RSES	0.00	1.53	[-0.00, 0.01]	.126	0.16
EDE-Q:EC ^a	Intercept	1.16	44.96	[1.11, 1.21]	<.001	4.62
	Time	-0.42	-8.44	[-0.52, -0.32]	<.001	-0.87
	Time × Time	0.08	6.91	[0.06, 0.11]	<.001	0.71
	Intervention	0.01	0.36	[-0.06, 0.09]	.716	0.04
	Intervention × Time	0.14	2.01	[-0.00, 0.28]	.045	0.21
	Intervention × Time × Time	-0.03	-1.80	[-0.06, 0.00]	.072	-0.18
	Baseline EDE-Q:EC	0.80	28.05	[0.74, 0.85]	<.001	2.88
	Baseline CSWS:App	-0.00	0.04	[-0.03, 0.03]	.966	0.00
	Baseline RSES	0.00	0.32	[-0.00, 0.01]	.751	0.03
CIA ^a	Intercept	3.78	56.47	[3.65, 3.91]	<.001	5.80
	Time	-1.31	-10.22	[-1.56, -1.06]	<.001	-1.05
	Time × Time	0.26	8.39	[0.20, 0.32]	<.001	0.86
	Intervention	0.02	0.24	[-0.16, 0.21]	.811	0.02
	Intervention × Time	0.39	2.11	[0.03, 0.75]	.035	0.22
	Intervention × Time × Time	-0.08	-1.86	[-0.17, 0.00]	.063	-0.19
	Baseline CIA	0.82	26.53	[0.75, 0.88]	<.001	2.73
	Baseline CSWS:App	0.04	0.92	[-0.05, 0.13]	.360	0.09
	Baseline RSES	-0.01	-0.82	[-0.02, 0.01]	.416	-0.08

Note. CI = Confidence Interval; EDE-Q = Eating Disorder Examination-Questionnaire; R = Dietary Restraint; EC = Eating Concerns; CIA = Clinical Impairment Assessment; RSES = Rosenberg Self-Esteem Scale.

^aVariables have been square root transformed.

Table 9

Estimated Marginal Means, Standard Deviations, and Cohen's d by Intervention for Secondary Outcome Variables

Secondary Variables	Baseline		Postintervention		Within-group d^a	3-month follow-up		Within-group d^b
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		<i>M</i>	<i>SD</i>	
EDE-Q:R ^c								
SA	1.29	0.40	1.07	0.50	0.49	1.07	0.59	0.00
PE	1.29	0.40	0.93	0.48	0.81	0.91	0.60	0.04
[Between-group d]			[0.29] ^d			[0.27] ^e		
EDE-Q:EC ^c								
SA	1.16	0.37	0.93	0.45	0.56	0.88	0.54	0.10
PE	1.16	0.37	0.82	0.44	0.84	0.80	0.55	0.04
[Between-group d]			[0.25] ^d			[0.15] ^e		
CIA ^c								
SA	3.78	0.94	3.02	1.17	0.72	2.89	1.36	0.10
PE	3.77	0.93	2.71	1.13	1.02	2.65	1.40	0.05
[Between-group d]			[0.27] ^d			[0.17] ^e		

Note. Estimated marginal means are predicted values based on covariates entered into the model; EDE-Q = Eating Disorder Examination-Questionnaire; R = Dietary Restraint; EC = Eating Concerns; CIA = Clinical Impairment Assessment; SA = Self-Affirmation; PE = Psychoeducation.

^aWithin-group Cohen's d from baseline to postintervention. ^bWithin-group Cohen's d from postintervention to 3-month follow-up.

^cVariables have been square root transformed. ^dBetween-group Cohen's d at postintervention. ^eBetween-group Cohen's d at 3-month follow-up.

Table 10

Moderated Regression Results of the Unstandardized Regression Coefficients $b(SE)$ Predicting Postintervention Primary Outcome Variables

Variable	PANAS:PA	PANAS:NA ^a	RSES	RRQ:R ^a	CFS
Prediction of EDE-Q:SC					
Constant	0.25 (0.04)	0.16 (0.15)	0.09 (0.14)	0.30 (0.14)*	0.19 (0.13)
M = Intervention	-0.25 (0.12)*	-0.26 (0.12)*	-0.27 (0.12)*	-0.24 (0.12)	-0.25 (0.12)*
X = Predictor	-0.02 (0.01)	-0.04 (0.08)	0.01 (0.01)	0.66 (0.30)*	-0.02 (0.01)
X × M	0.01 (0.02)	0.23 (0.16)	-0.02 (0.02)	0.32 (0.57)	-0.00 (0.03)
Baseline EDE-Q:SC	0.74 (0.04)**	0.77 (0.04)**	0.78 (0.04)**	0.72 (0.04)**	0.76 (0.04)**
Overall Model <i>F</i>	96.10 **	95.53**	101.43**	92.47**	97.30**
Prediction of EDE-Q:WC					
Constant	0.22 (0.11)*	0.16 (0.12)	0.13 (0.12)	0.24 (0.12)*	0.19 (0.11)
M = Intervention	-0.11 (0.11)	-0.12 (0.11)	-0.13 (0.11)	-0.10 (0.11)	-0.12 (0.11)
X = Predictor	-0.01 (0.01)	-0.05 (0.07)	0.01 (0.01)	0.40 (0.28)	-0.06 (0.14)
X × M	0.01 (0.01)	0.14 (0.14)	-0.03 (0.02)	-0.33 (0.53)	0.02 (0.03)
Baseline EDE-Q:WC	0.76 (0.04)**	0.78 (0.04)**	0.80 (0.04)**	0.76 (0.04)**	0.78 (0.04)**
Overall Model <i>F</i>	113.14**	110.48**	116.57**	107.47**	107.00**
Prediction of CSWS:App					
Constant	1.42 (0.25)***	1.37 (0.25)***	1.49 (0.26)***	1.68 (0.27)***	1.40 (0.26)***
M = Intervention	-0.10 (0.07)	-0.10 (0.07)	-0.09 (0.07)	-0.09 (0.07)	-0.10 (0.07)
X = Predictor	-0.01 (0.00)	-0.03 (0.04)	-0.01 (0.01)	0.54 (0.19)*	0.00 (0.01)
X × M	0.00 (0.01)	0.08 (0.09)	-0.01 (0.01)	-0.18 (0.35)	0.01 (0.02)
Baseline CSWS:App	0.70 (0.05)**	0.71 (0.05)**	0.69 (0.05)**	0.65 (0.05)**	0.70 (0.05)**
Overall Model <i>F</i>	64.32**	66.12**	63.40**	68.86**	62.28**

Note. EDE-Q = Eating Disorder Examination-Questionnaire; SC = Shape Concerns; WC = Weight Concerns; CSWS:App = Contingencies of Self-Worth Scale: Appearance subscale; PANAS = Positive and Negative Affect Schedule; PA = Positive Affect; NA = Negative Affect; RSES = Rosenberg Self-Esteem Scale; RRQ:R = Rumination and Reflection Questionnaire: Rumination subscale; CFS = Coping Flexibility Scale.

^aVariables have been square root transformed.

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

Table 11

Moderated Regression Results of the Unstandardized Regression Coefficients b (SE) Predicting Postintervention Secondary Outcomes

Variable	PANAS:PA	PANAS:NA ^a	RSES	RRQ:R ^a	CFS
Prediction of EDE-Q:EC					
Constant	0.03 (0.01)*	0.03 (0.01)	0.03 (0.01)	0.03 (0.01)*	0.03 (0.01)*
M = Intervention	-0.04 (0.02)*	-0.04 (0.02)*	-0.04 (0.01)*	-0.04 (0.02)*	-0.04 (0.02)*
X = Predictor	-0.00 (0.00)	-0.01 (0.01)	0.00 (0.00)	0.01 (0.04)	-0.00 (0.00)
X × M	0.00 (0.00)	0.02 (0.02)	-0.00 (0.00)	-0.00 (0.07)	0.00 (0.00)
Baseline EDE-Q:EC	0.73 (0.04)**	0.76 (0.04)**	0.76 (0.04)**	0.74 (0.04)**	0.74 (0.04)**
Overall Model F	126.90**	113.92**	118.48**	112.42**	111.02**
Prediction of EDE-Q:R					
Constant	0.05 (0.02)*	0.05 (0.02)*	0.05 (0.02)*	0.05 (0.02)*	0.05 (0.02)*
M = Intervention	-0.05 (0.02)*	-0.05 (0.02)*	-0.05 (0.02)*	-0.05 (0.02)*	-0.05 (0.02)*
X = Predictor	-0.00 (0.00)	-0.01 (0.01)	0.00 (0.00)	0.00 (0.04)	0.00 (0.00)
X × M	0.00 (0.00)	0.03 (0.02)	-0.00 (0.00)	-0.03 (0.08)	0.00 (0.00)
Baseline EDE-Q:R	0.70 (0.04)**	0.71 (0.04)**	0.73 (0.04)**	0.70 (0.04)**	0.70 (0.04)**
Overall Model F	81.07**	80.66**	85.69**	76.47**	75.78**
Prediction of CIA					
Constant	0.29 (0.17)	0.18 (0.19)	0.23 (0.18)	0.24 (0.16)	0.20 (0.16)
M = Intervention	-0.29 (0.11)*	-0.30 (0.11)*	-0.29 (0.11)*	-0.29 (0.11)*	-0.29 (0.11)*
X = Predictor	-0.02 (0.01)*	-0.02 (0.08)	-0.00 (0.01)	0.18 (0.27)	-0.01 (0.01)
X × M	0.01 (0.01)	0.14 (0.15)	-0.01 (0.02)	0.02 (0.51)	-0.00 (0.03)
Baseline CIA	0.77 (0.05)**	0.80 (0.05)**	0.79 (0.05)**	10.78 (0.04)**	0.79 (0.04)**
Overall Model F	127.54**	98.10**	99.50**	98.35**	109.89**

Note. EDE-Q = Eating Disorder Examination-Questionnaire; EC = Eating Concerns; R = Dietary Restraint; CIA = Clinical Impairment Assessment; PANAS = Positive and Negative Affect Schedule; PA = Positive Affect; NA = Negative Affect; RSES = Rosenberg Self-Esteem Scale; RRQ:R = Rumination and Reflection Questionnaire: Rumination subscale; CFS = Coping Flexibility Scale.

^aVariables have been square root transformed.

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

Table 12

Intercorrelations of Exploratory Variables

Variable	1	2	3	4	5
1. Exercise Completion	-				
2. Initial Credibility	.10*	-			
3. Initial Confidence	.11*	.74***	-		
4. Postintervention EDEQ:WS	-.30***	-.17**	-.25***	-	
5. 3-Month Follow-up EDEQ:WS	-.29***	-.18***	-.27***	.85***	-

Note. EDEQ:WS = Eating Disorder Examination-Questionnaire Weight and Shape Concerns composite.

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

Table 13

Hierarchical Multiple Regression Analyses Predicting Postintervention and 3-Month Follow-Up EDEQ:WS From Initial Confidence and Exercise Completion

Variable	Postintervention EDEQ:WS			3-month follow-up EDEQ:WS		
	<i>b</i>	<i>SE b</i>	β	<i>b</i>	<i>SE b</i>	β
Step 1						
Constant	3.67	0.21		3.74	0.21	
Initial Confidence	-0.21	0.05	-.25*	-0.23	0.05	-.27*
Step 2						
Constant	5.18	0.34		5.19	0.35	
Initial Confidence	-0.19	0.04	-.22*	-0.21	0.04	-.25*
Exercise Completion	-0.95	0.17	-.28*	-0.91	0.18	-.26*
Total R^2	.14			.14		

Note. EDEQ:WS = Eating Disorder Examination-Questionnaire Weight and Shape Concerns composite.

* $p < .001$.

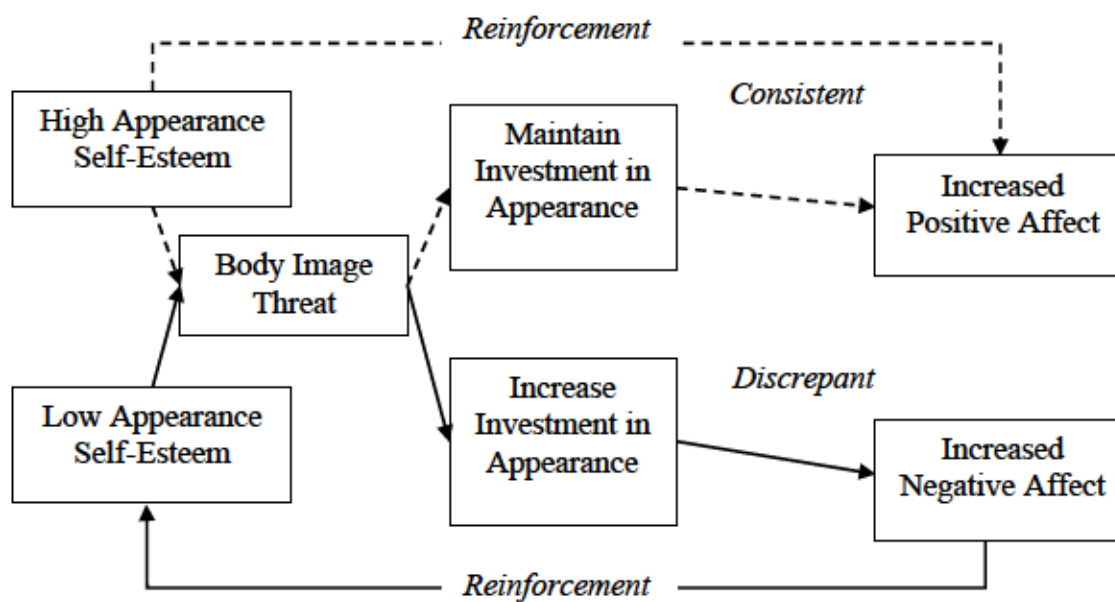


Figure 1. Hypothesized model of the cyclical nature of body image and experience (Ransom, 2011).

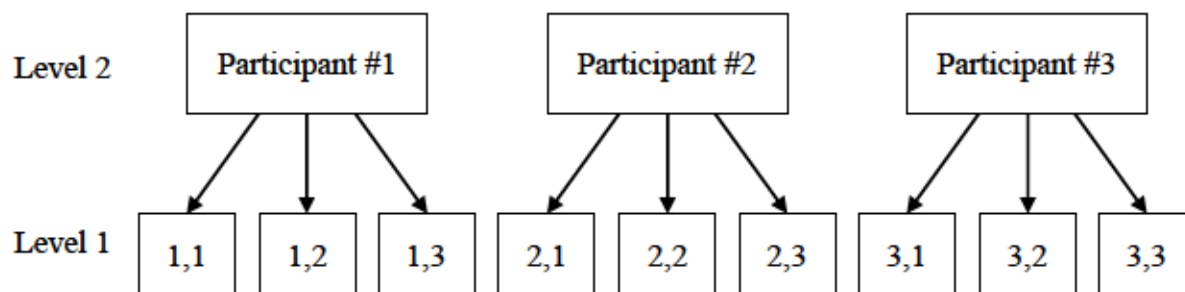


Figure 2. Two-level repeated measures multilevel model where repeated measurements (Level 1) observations are nested within individuals (Level 2).

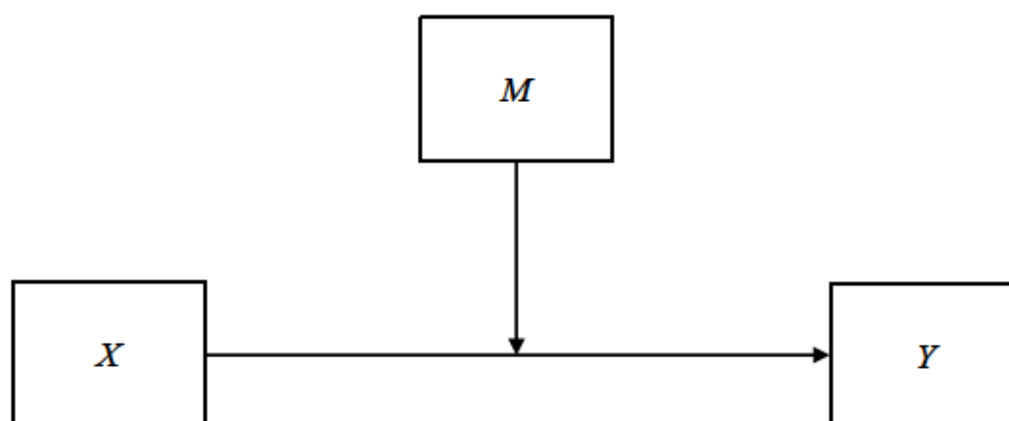


Figure 3. Simple Moderation Model.

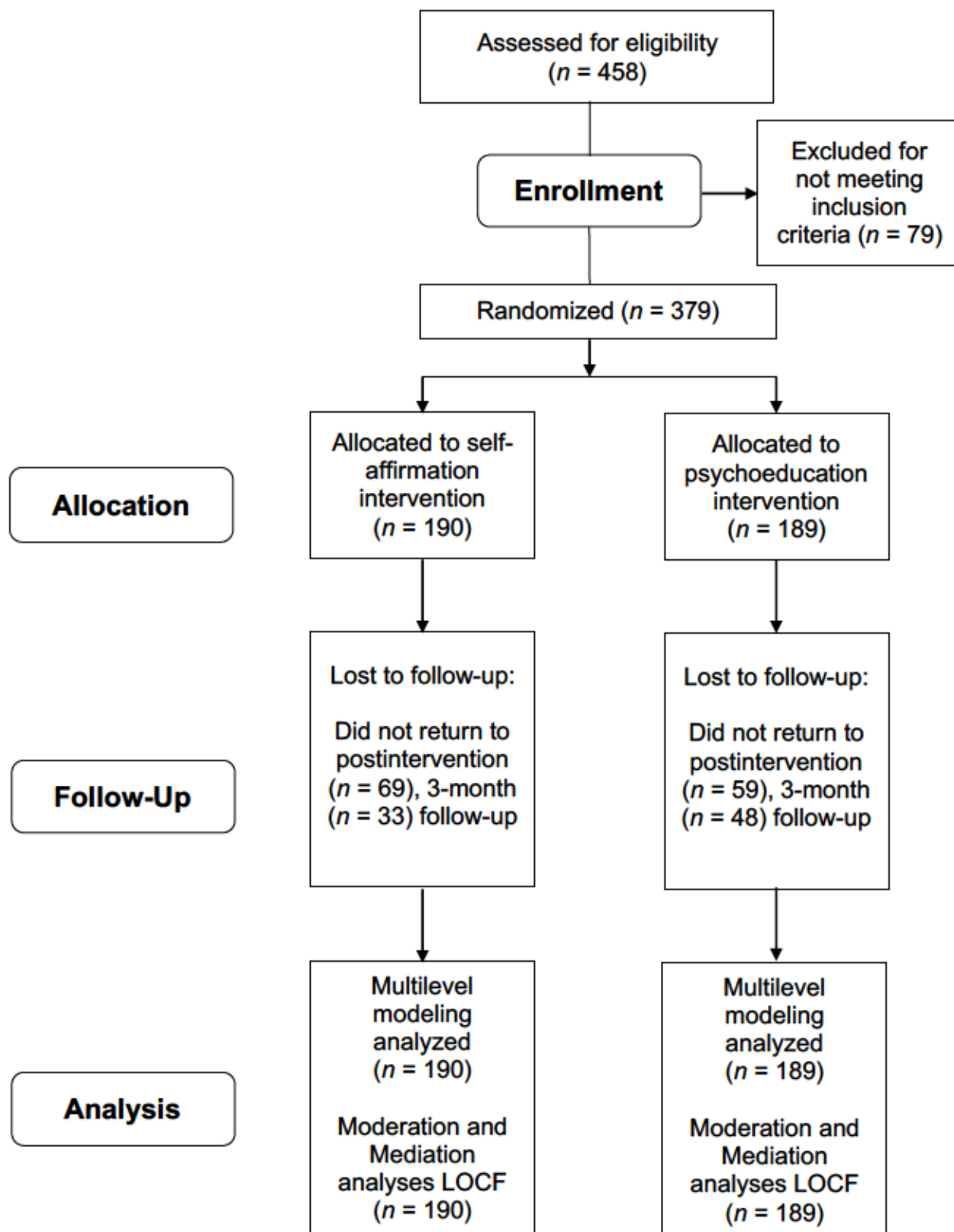


Figure 4. Participant flow chart following Consolidated Standards of Reporting Trials guidelines. LOCF = Last observation carried forward.

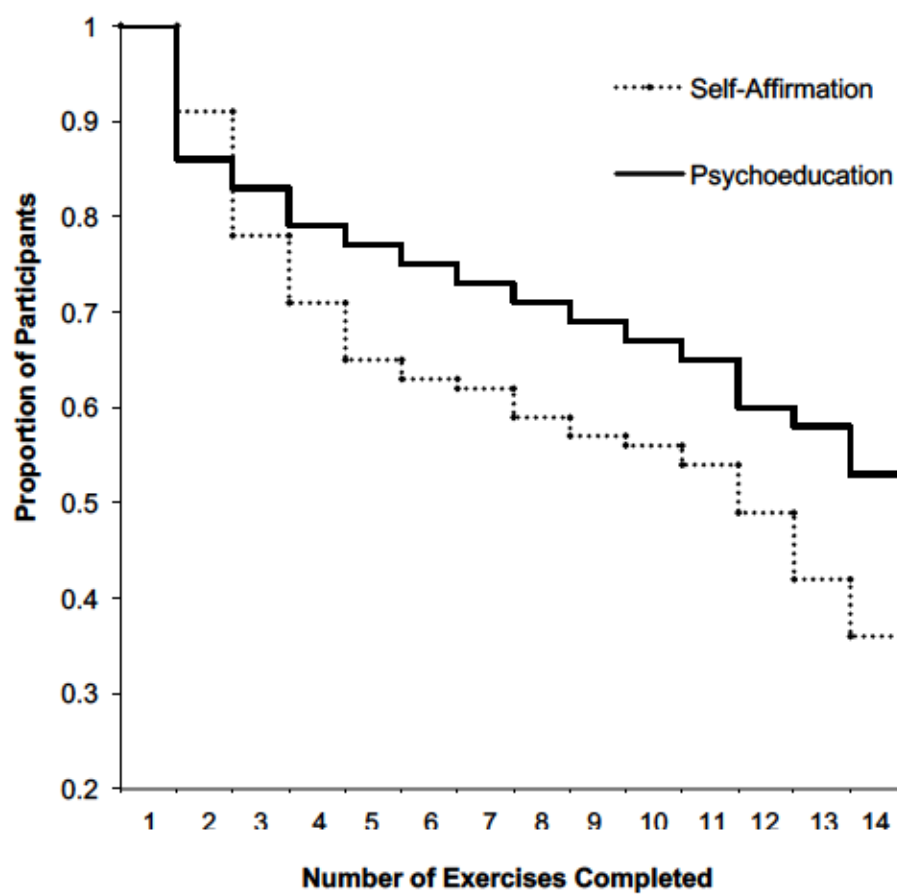


Figure 5. Survival function displaying proportion of participants completing intervention exercises by group.

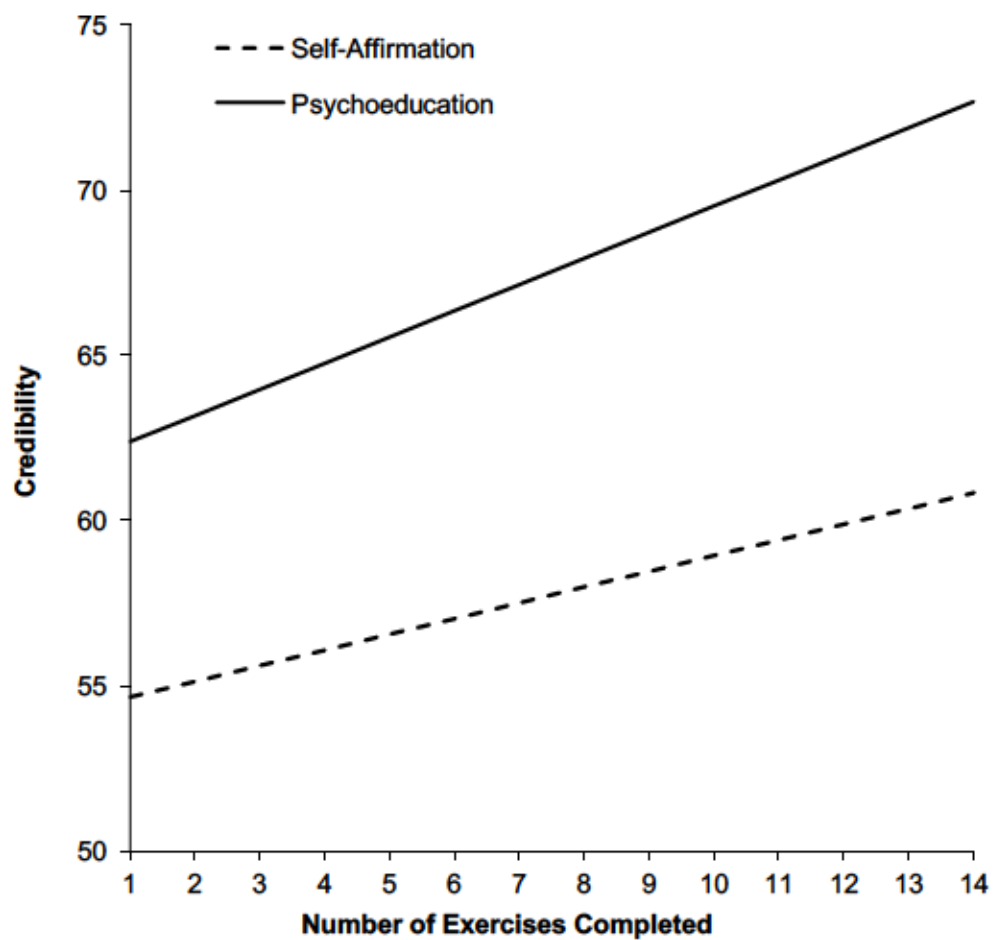


Figure 6. Plot of linear growth trajectories for credibility over number of exercises completed by intervention.

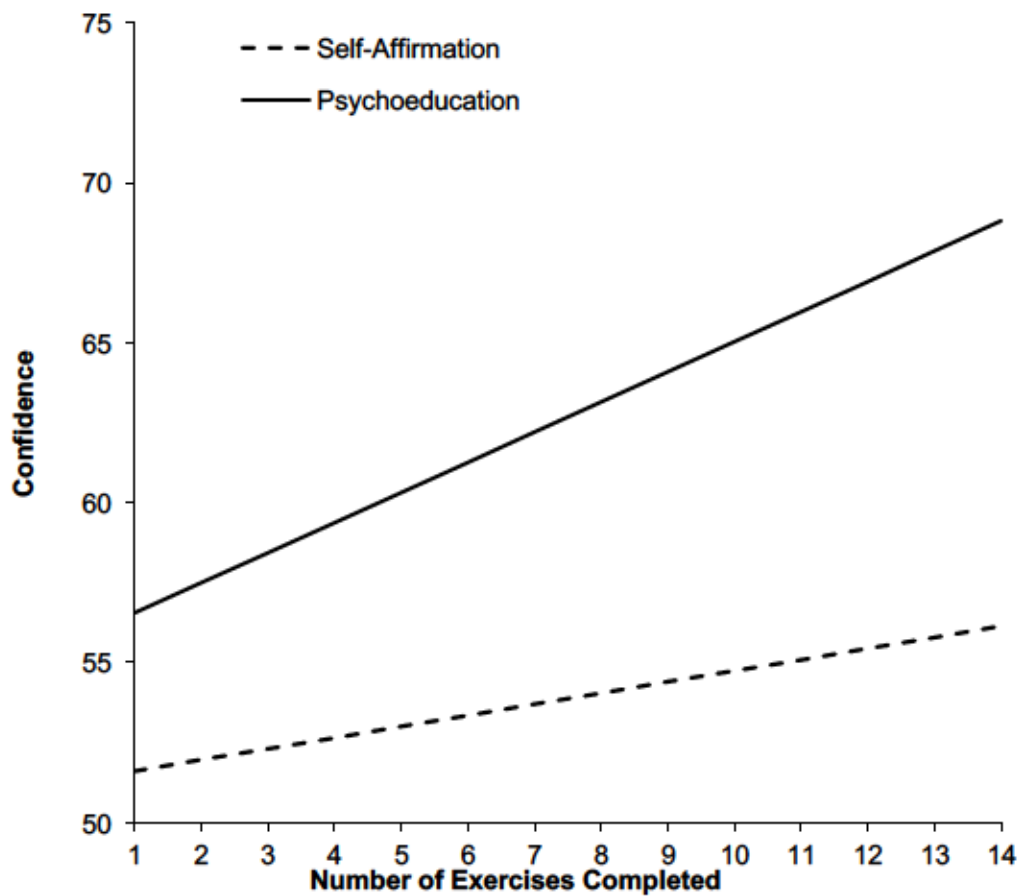


Figure 7. Plot of linear growth trajectories for confidence over number of exercises completed by intervention.

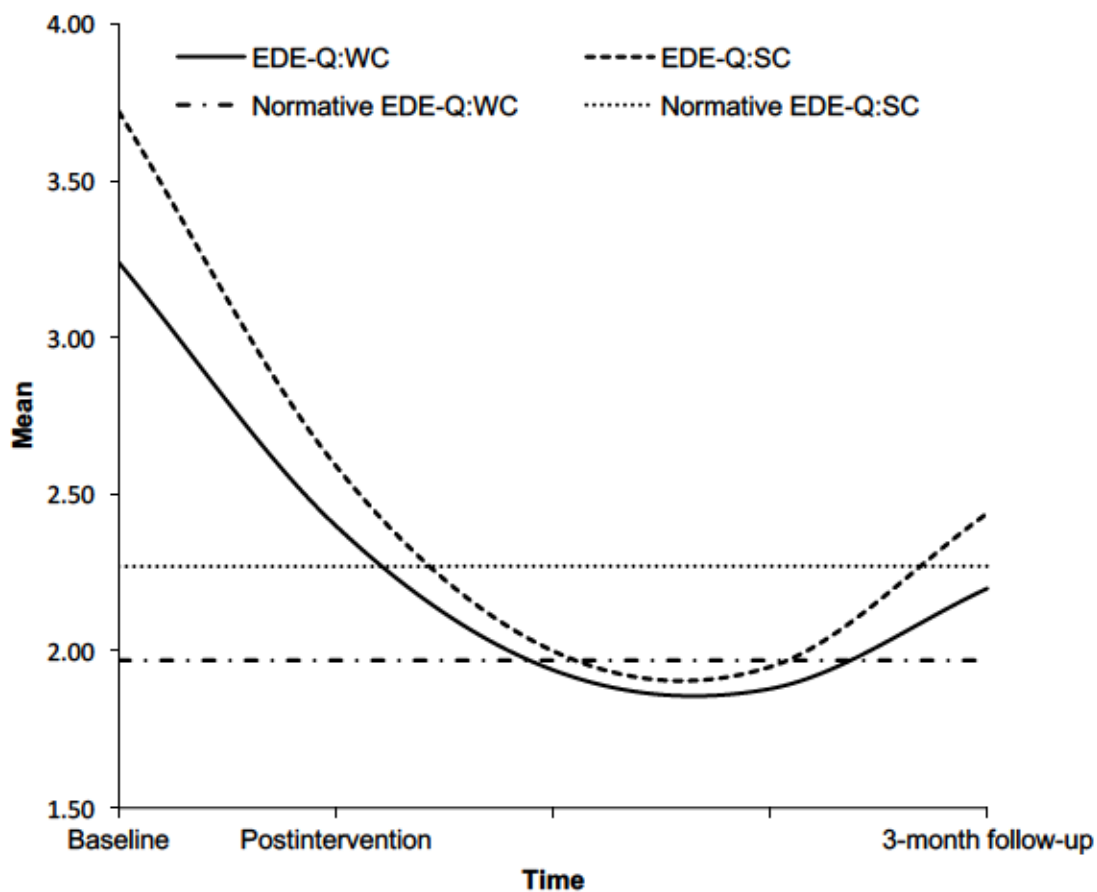


Figure 8. Quadratic trajectories of the Eating Disorder Examination-Questionnaire Weight and Shape Concerns subscales over time, averaged across intervention. Normative scores derived from nonintervention-seeking sample norms of Luce et al., 2008.

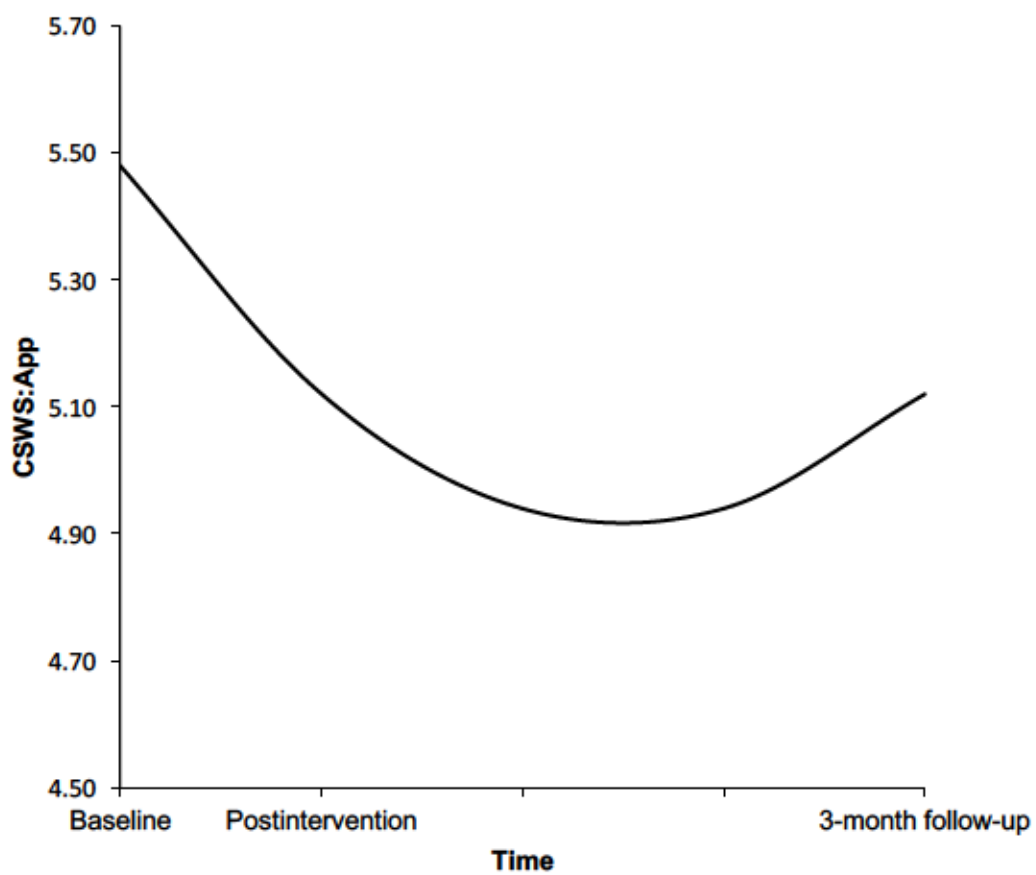


Figure 9. Quadratic trajectory of the Contingencies of Self-Worth Scale: Appearance subscale over time, averaged across intervention.

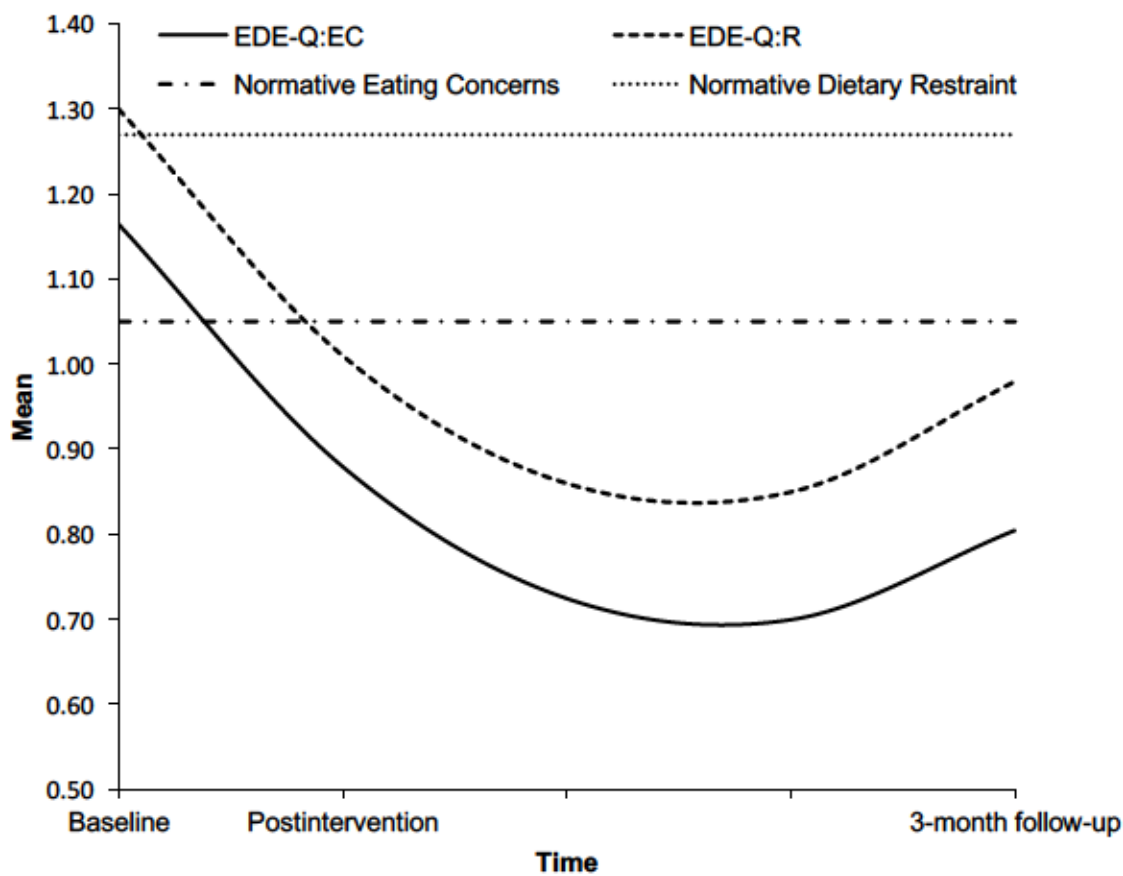


Figure 10. Quadratic trajectories of the Eating Disorder Examination-Questionnaire Eating and Dietary Restraint Concerns subscales over time, averaged across intervention. Normative scores derived from nonintervention-seeking sample norms of Luce et al., 2008.

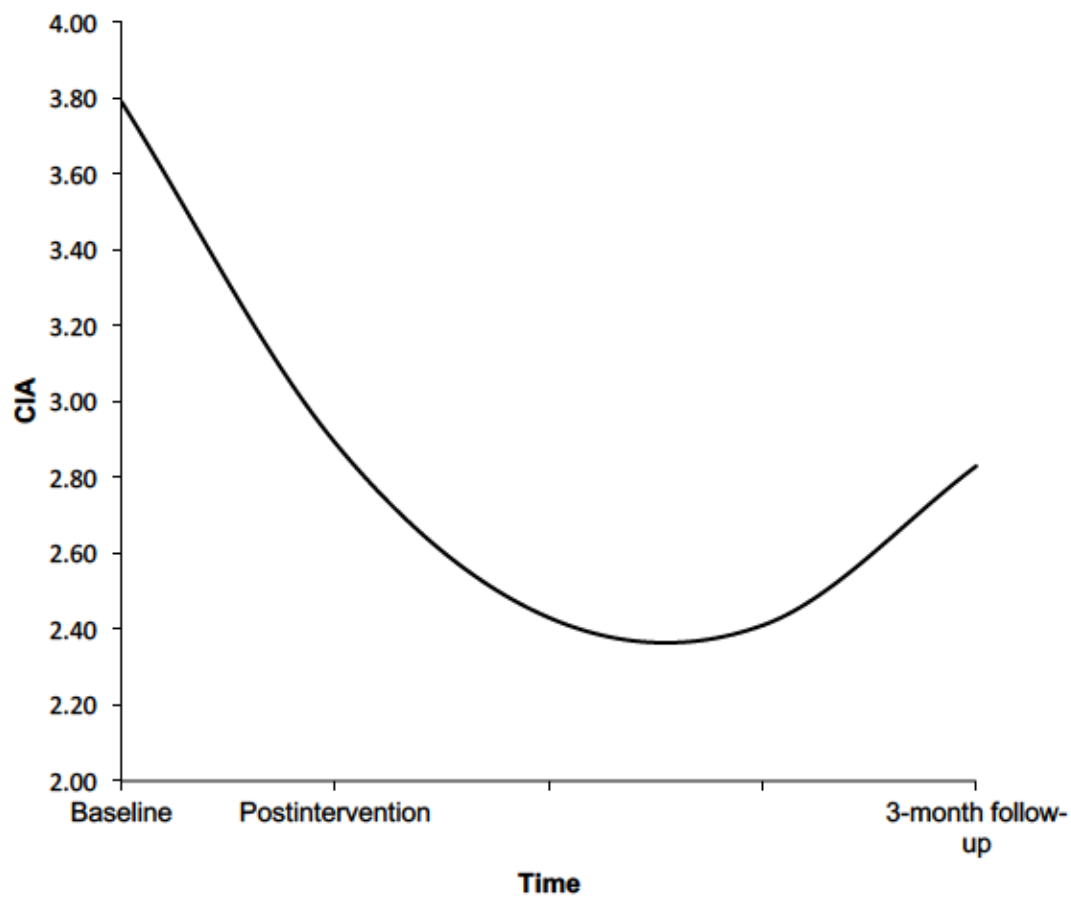


Figure 11. Quadratic trajectory of the Clinical Impairment Assessment over time, averaged across intervention.

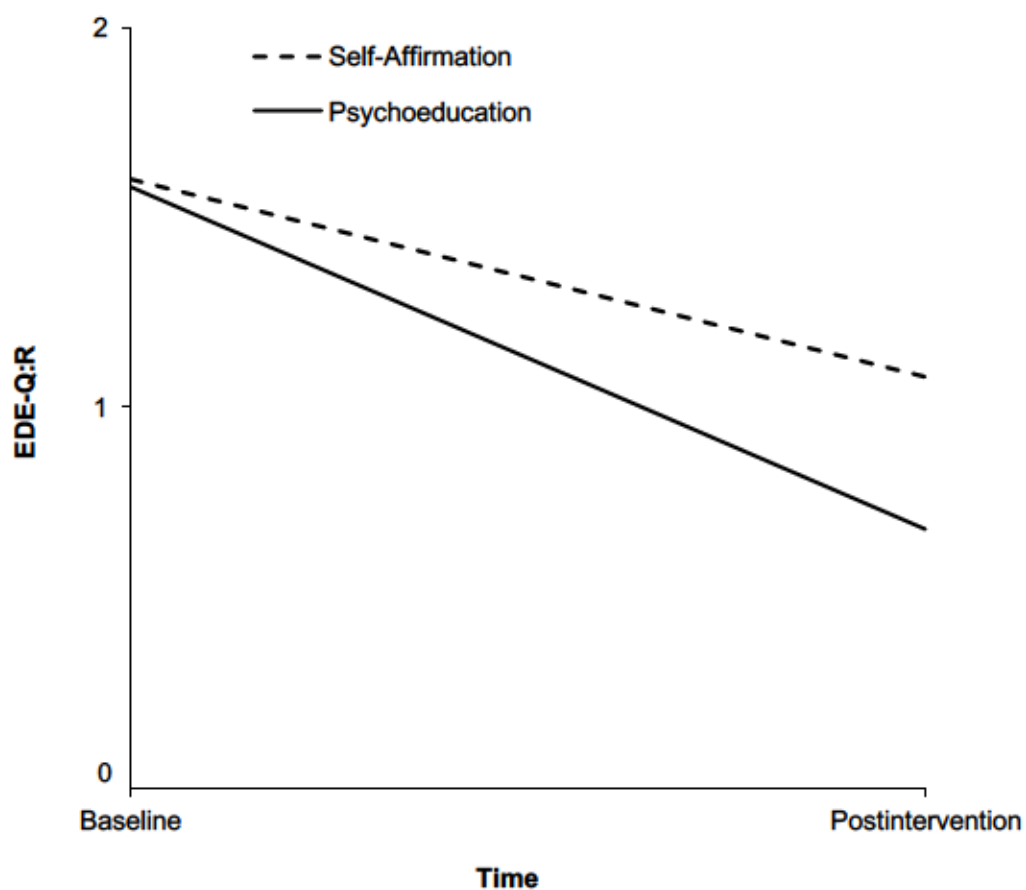


Figure 12. Plot of predicted Time \times Intervention interaction for the Eating Disorder Examination-Questionnaire: Dietary Restraint (EDE-Q:R) subscale from baseline to postintervention.

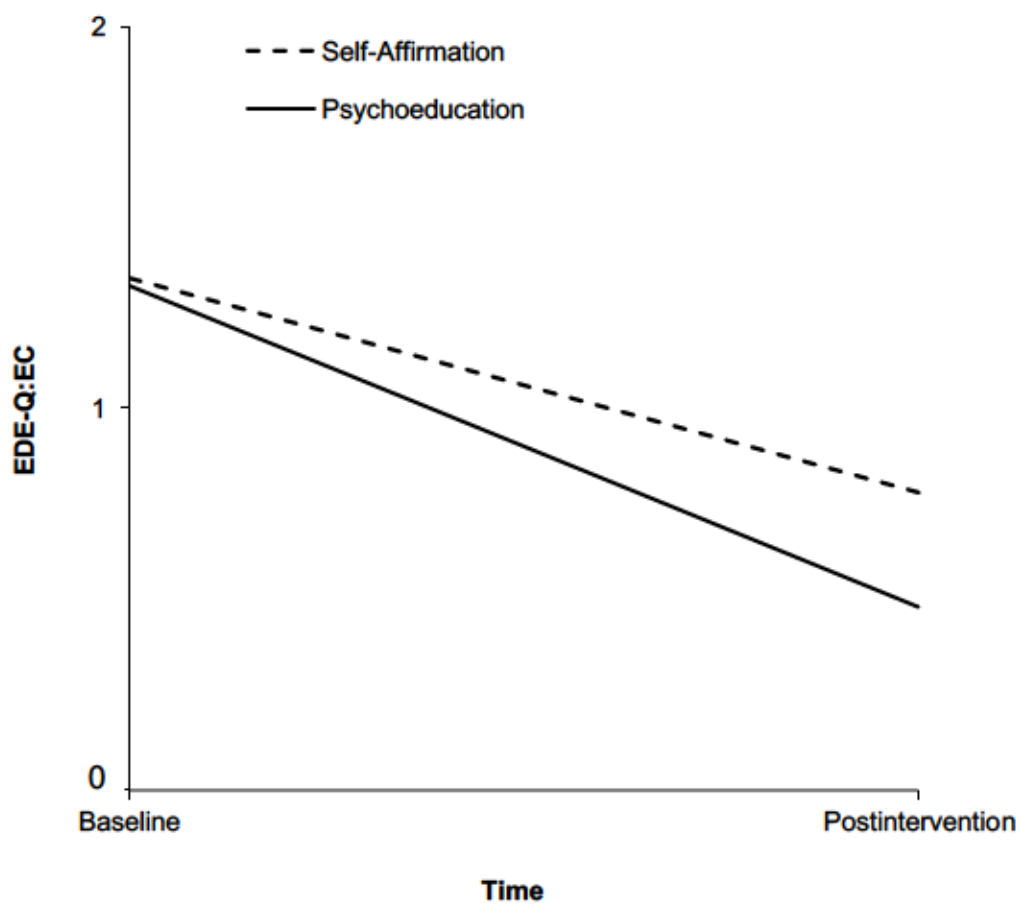


Figure 13. Plot of predicted Time \times Intervention interaction for the Eating Disorder Examination-Questionnaire: Eating Concerns (EDE-Q:EC) subscale from baseline to postintervention.

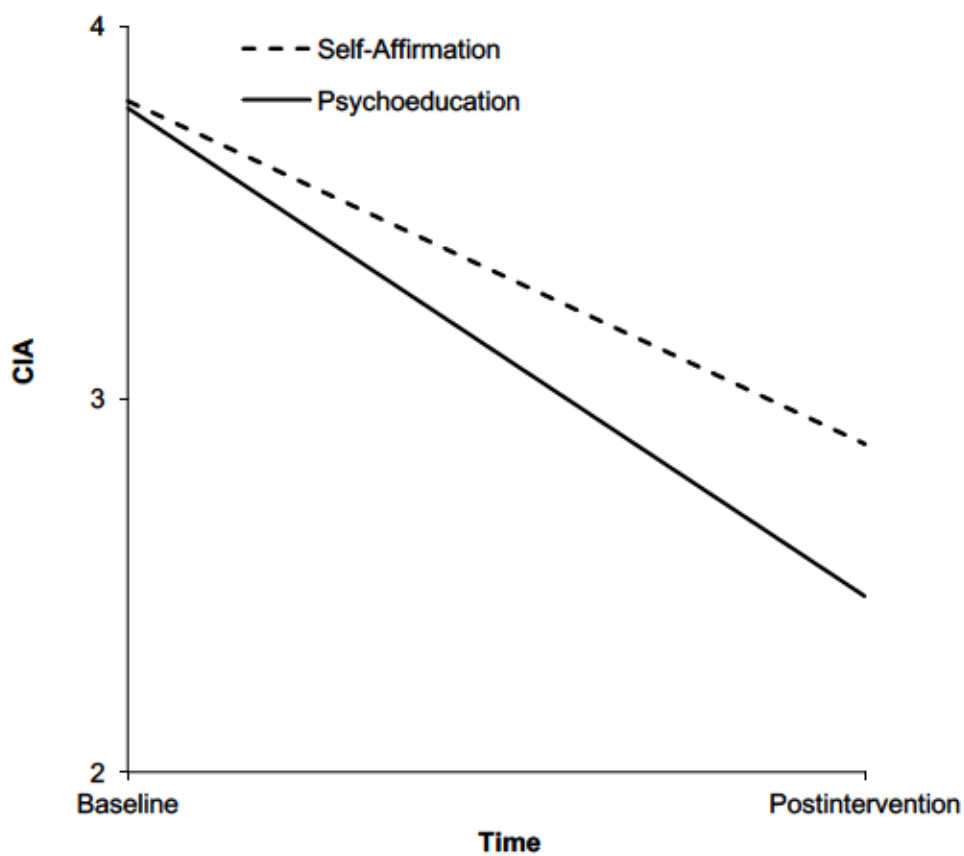


Figure 14. Plot of predicted Time \times Intervention interaction for the Clinical Impairment Assessment (CIA) from baseline to postintervention.

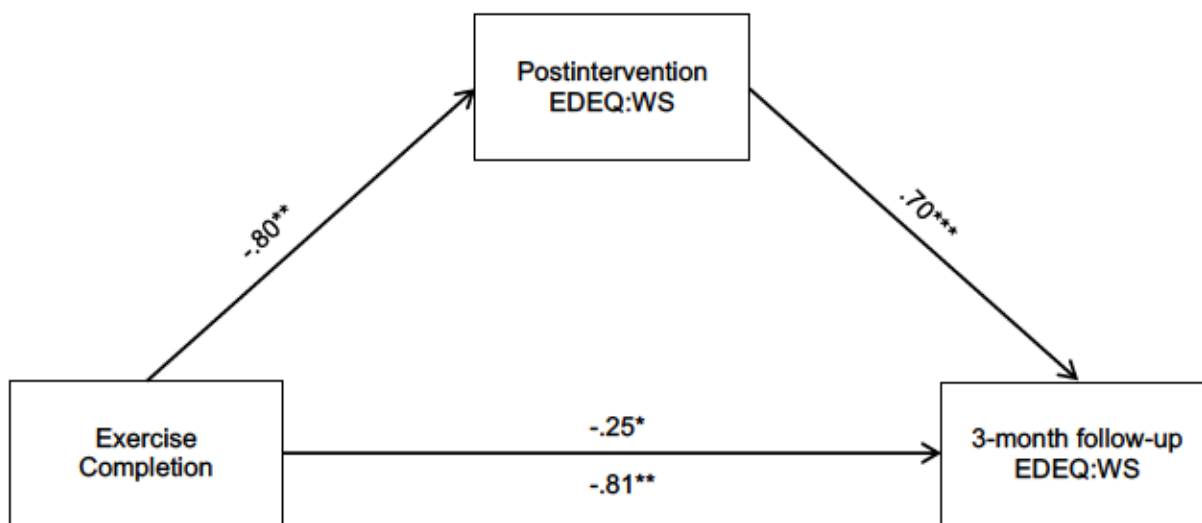


Figure 15. Simple mediation model of the effect of exercise completion on 3-month follow-up EDEQ:WS through postintervention EDEQ:WS. The coefficient above the path from exercise completion to 3-month follow-up EDEQ:WS represents the direct effect; the coefficient below this path represents the total effect of the model. EDEQ:WS = Eating Disorder Examination-Questionnaire Weight and Shape Concerns composite.

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

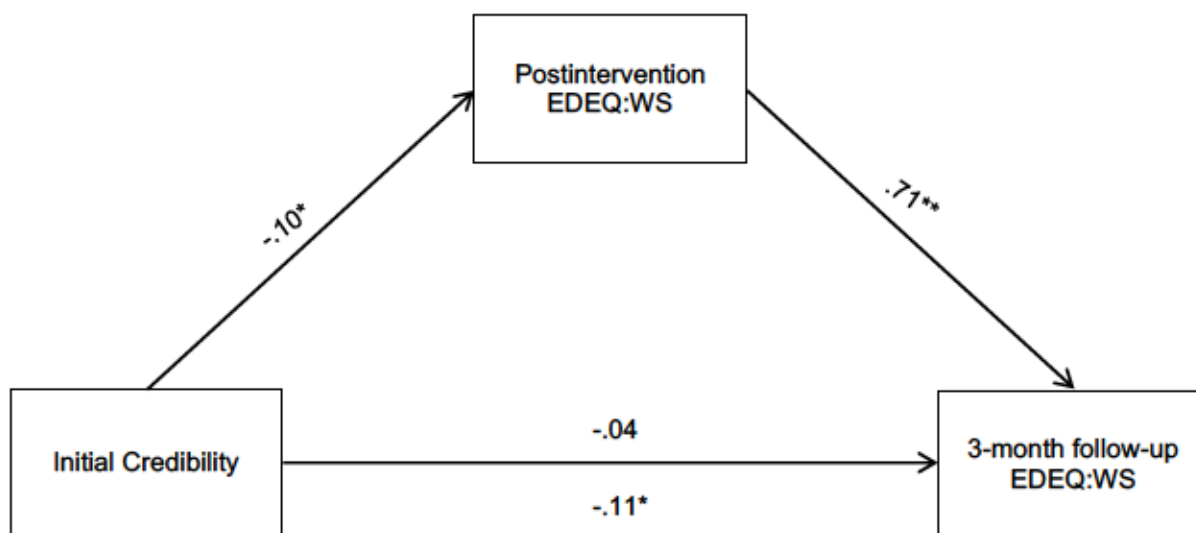


Figure 16. Simple mediation model of the effect of initial credibility on 3-month follow-up EDEQ:WS through postintervention EDEQ:WS. The coefficient above the path from initial credibility to 3-month follow-up EDEQ:WS represents the direct effect; the coefficient below this path represents the total effect of the model. EDEQ:WS = Eating Disorder Examination-Questionnaire Weight and Shape Concerns composite.

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

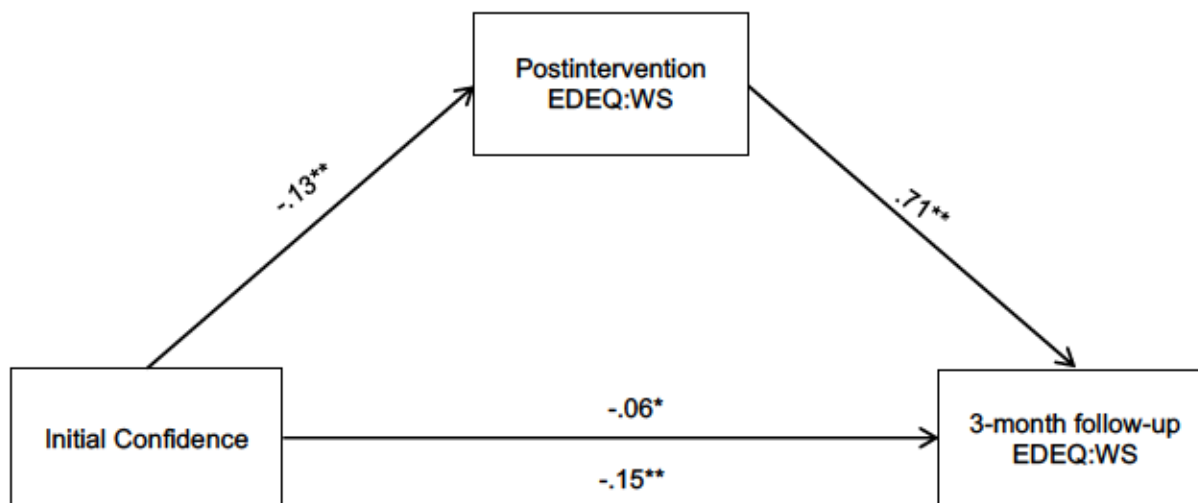


Figure 17. Simple mediation model of the effect of initial confidence on 3-month follow-up EDEQ:WS through postintervention EDEQ:WS. The coefficient above the path from initial confidence to 3-month follow-up EDEQ:WS represents the direct effect; the coefficient below this path represents the total effect of the model. EDEQ:WS = Eating Disorder Examination-Questionnaire Weight and Shape Concerns composite.

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

Appendix A

Participant Recruitment Email

Dear potential participant,

My name is Danielle Ransom and I am a graduate student working with Dr. Ron Davis in the Department of Psychology at Lakehead University. I am currently looking for women aged 18-25 who experience difficulty with their body image (their attitudes or feelings about their physical appearance) to volunteer to take part in the Body Image Improvement Program. This program is designed to improve your body image over the course of one month (28 days). If you are in an eligible psychology course at Lakehead University, you will receive two bonus points for your participation.

If you are interested in learning more about the program, and what your involvement would look like, please visit: <http://www.myibi.me> for more information. Feel free to contact me with any questions you may have.

Thanks!

Danielle Ransom, M.A.
Department of Psychology, Lakehead University
E-Mail: dransom@lakeheadu.ca

Appendix C

Eating Disorder Examination Questionnaire (EDE-Q)

Instructions: The following questions are concerned with the past four weeks (28 days) only. Please read each question carefully. Please answer all the questions. Thank you.

Questions 1 to 12: Please indicate the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days) only.

	On how many of the past 28 days...	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
1.	Have you been deliberately <u>trying</u> to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
2.	Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?	0	1	2	3	4	5	6
3.	Have you <u>tried</u> to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
4.	Have you <u>tried</u> to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
5.	Have you had a definite desire to have an <u>empty</u> stomach with the aim of influencing your weight or shape?	0	1	2	3	4	5	6
6.	Have you had a definite desire to have a <u>totally flat</u> stomach?	0	1	2	3	4	5	6
7.	Has thinking about <u>food, eating or calories</u> made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	1	2	3	4	5	6
8.	Has thinking about <u>shape or weight</u> made it very difficult to concentrate on things you are interested in (for example, working, following a conversation or reading)?	0	1	2	3	4	5	6
9.	Have you had a definite fear of losing control over eating?	0	1	2	3	4	5	6

- | | | | | | | | | |
|-----|--|---|---|---|---|---|---|---|
| 10. | Have you had a definite fear that you might gain weight? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 11. | Have you felt fat? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 12. | Have you had a strong desire to lose weight? | 0 | 1 | 2 | 3 | 4 | 5 | 6 |

Questions 13-18: Please fill in the appropriate number in the boxes on the right. Remember that the questions only refer to the past four weeks (28 days).

Over the past four weeks (28 days)...

13. Over the past 28 days, how many times have you eaten what other people would regard as an unusually large amount of food (given the circumstances)? _____
14. On how many of these times did you have a sense of having lost control over your eating (at the time that you were eating)? _____
15. Over the past 28 days, on how many DAYS have such episodes of overeating occurred (i.e., you have eaten an unusually large amount of food and have had a sense of loss of control at the time)? _____
16. Over the past 28 days, how many times have you made yourself sick (vomit) as a means of controlling your shape or weight? _____
17. Over the past 28 days, how many times have you taken laxatives as a means of controlling your shape or weight? _____
18. Over the past 28 days, how many times have you exercised in a "driven" or "compulsive" way as a means of controlling your weight, shape or amount of fat, or to burn off calories? _____

Questions 19 to 21: Please select the appropriate number. Please note that for these questions the term "binge eating" means eating what others would regard as an unusually large amount of food for the circumstances, accompanied by a sense of having lost control over eating.

	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
19. Over the past 28 days, on how many days have you eaten in secret (i.e., furtively)? ... Do not count episodes of binge eating	0	1	2	3	4	5	6

		None of the times	A few of the times	Less than half	Half of the time	More than half	Most of the time	Every time
20.	On what proportion of the times that you have eaten have you felt guilty (Felt that you've done wrong) because of its effect on your shape or weight? ... Do not count episodes of binge eating	0	1	2	3	4	5	6
		Not at all		Slightly		Moderately		Markedly
21.	Over the past 28 days, how concerned have you been about other people seeing you eat? ... Do not count episodes of binge eating	0	1	2	3	4	5	6

Questions 22 to 28: Please select the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days).

	Over the past 28 days...	Not at all		Slightly		Moderately		Markedly
22.	Has your <u>weight</u> influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
23.	Has your <u>shape</u> influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
24.	How much would it have upset you if you had been asked to	0	1	2	3	4	5	6

	weight yourself once a week (no more, no less, often) for the next four weeks?							
25.	How dissatisfied have you been with your <u>weight</u> ?	0	1	2	3	4	5	6
26.	How dissatisfied have you been with your <u>shape</u> ?	0	1	2	3	4	5	6
27.	How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)?	0	1	2	3	4	5	6
28.	How uncomfortable have you felt about <u>others</u> seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)?	0	1	2	3	4	5	6

Appendix D

Clinical Impairment Assessment

Please indicate which best describes how your eating habits, exercising or feelings about your eating, shape or weight have affected your life over the past 4 weeks (28 days). Thank you.

0 = Not at all

1 = A little

2 = Quite a bit

3 = A lot

Over the past 28 days, to what extent have your

... eating habits

... exercising

or feelings about your eating shape or weight...

1. ... made it difficult to concentrate?
2. ... made you feel critical of yourself?
3. ... stopped you going out with others?
4. ... affected your work performance (if applicable)?
5. ... made you forgetful?
6. ... affected your ability to make everyday decisions?
7. ... interfered with meals with family or friends?
8. ... made you upset?
9. ... made you feel ashamed of yourself?
10. ... made it difficult to eat out with others?
11. ... made you feel guilty?
12. ... interfered with your doing things you used to enjoy?
13. ... made you absent-minded?
14. ... made you feel a failure?
15. ... interfered with your relationships with others?
16. ... made you worry?

Appendix E

Contingencies of Self-Worth Scale

INSTRUCTIONS: Please respond to each of the following statements by circling your answer using the scale from “1= Strongly Disagree” to “7=Strongly Agree”. If you haven’t experienced the situation described in a particular statement, please answer how you think you would feel if that situation occurred.

1 = Strongly Disagree

2 = Disagree

3 = Disagree Somewhat

4 = Neutral

5 = Agree Somewhat

6 = Agree

7 = Strongly Agree

1. When I think I look attractive, I feel good about myself.
2. My self-worth is based on God’s love.
3. I feel worthwhile when I perform better than others on a task or skill.
4. My self-esteem is unrelated to how I feel about the way my body looks.
5. Doing something I know is wrong makes me lose my self-respect.
6. I don’t care if other people have a negative opinion about me.
7. Knowing that my family members love me makes me feel good about myself.
8. I feel worthwhile when I have God’s love.
9. I can’t respect myself if others don’t respect me.
10. My self-worth is not influenced by the quality of my relationships with my family members.
11. Whenever I follow my moral principles, my sense of self-respect gets a boost.
12. Knowing that I am better than others on a task raises my self-esteem.
13. My opinion about myself isn’t tied to how well I do in school.
14. I couldn’t respect myself if I didn’t live up to a moral code.
15. I don’t care what other people think of me.
16. When my family members are proud of me, my sense of self-worth increases.
17. My self-esteem is influenced by how attractive I think my face or facial features are.
18. My self-esteem would suffer if I didn’t have God’s love.
19. Doing well in school gives me a sense of self-respect.
20. Doing better than others gives me a sense of self-respect.
21. My sense of self-worth suffers whenever I think I don’t look good.
22. I feel better about myself when I know I’m doing well academically.
23. What others think of me has no effect on what I think about myself.
24. When I don’t feel loved by my family, my self-esteem goes down.
25. My self-worth is affected by how well I do when I am competing with others.
26. My self-esteem goes up when I feel that God loves me.
27. My self-esteem is influenced by my academic performance.
28. My self-esteem would suffer if I did something unethical.
29. It is important to my self-respect that I have a family that cares about me.
30. My self-esteem does not depend on whether or not I feel attractive.

31. When I think that I'm disobeying God, I feel bad about myself.
32. My self-worth is influenced by how well I do on competitive tasks.
33. I feel bad about myself whenever my academic performance is lacking.
34. My self-esteem depends on whether or not I follow my moral/ethical principles.
35. My self-esteem depends on the opinions others hold of me.

Appendix F

Demographics Questionnaire

1. What is your current age?
2. What is your current height (m/ft/in)?
3. What is your current weight (kg/stones/lbs)? Guess if you do not know.
4. What is your relationship status?
 - a. Married / Common-law
 - b. Divorced / Separated
 - c. Single
 - d. Widowed
5. In what country do you currently reside?
 - a. Canada
 - b. United States of America
 - c. United Kingdom
6. Please provide your ethnicity: _____
7. What is your primary source of income?
 - a. Wage Earner
 - b. Self-Employed
 - c. Unemployed
 - d. Disability benefits
 - e. College student
 - f. University student
 - g. Homemaker
 - h. Other: _____
8. Do you currently have a diagnosis of an eating disorder?
 - a. Yes
 - b. No
9. If yes, are you currently receiving treatment for an eating disorder?
 - a. Yes
 - b. No
10. Have you received a formal diagnosis of an eating disorder in the past?
 - a. Yes
 - b. No
11. If yes, have you received treatment for an eating disorder in the past?
 - a. Yes
 - b. No
12. Have you received counselling from a mental health professional in the past for any other mental health concern?
 - a. Yes
 - b. No
13. Are you currently receiving counselling from a mental health professional for any other mental health concern?
 - a. Yes
 - b. No

Appendix G

Stages of Change Inventory

Some people feel they must control their weight or shape.

- 0 I have never felt that I must control my weight or shape in my entire life.
- 1 I have felt that I must control my weight or shape within the past 3 months but I am not concerned about it. I just don't see it as a personal problem.
- 2 I have felt that I must control my weight or shape within the past 3 months and it concerns me. I would like to stop feeling this way but I really haven't done anything about it so far.
- 3 I have felt that I must control my weight or shape within the past 3 months and it concerns me. I am really trying stop feeling this way but sometimes I still have his problem.
- 4 I used to feel that I must control my weight or shape but I have stopped feeling this way in the last 3 or more months. I am concerned that I could start feeling this way again if I am not careful.
- 5 I used feel that I must control my weight or shape but I have stopped feeling this way in the past 3 or more months. I believe that I have completely overcome this feeling I am confident that I will not start to feel this way again in the future.

Appendix H

Rosenberg Self-Esteem Scale

Please circle the appropriate answer per item. Use the following scale:

0 = Strongly Disagree

1 = Disagree

2 = Agree

3 = Strongly Agree

1. I feel that I'm a person of worth, at least on an equal basis with others.
2. I feel that I have a number of good qualities.
3. All in all, I am inclined to feel that I am a failure. *
4. I am able to do things as well as most people.
5. I feel I do not have much to be proud of. *
6. I take a positive attitude toward myself.
7. On the whole, I am satisfied with myself.
8. I wish I could have more respect for myself.*
9. I certainly feel useless at times. *
10. At times I think I am no good at all. *

Appendix I

Positive and Negative Affect Schedule

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you have felt this way in general. Please indicate which rating best applies to you by circling the response:

1 = Very slightly or not at all

2 = A little

3 = Moderately

4 = Quite a bit

5 = Extremely

Scared

Nervous

Jittery

Irritable

Hostile

Afraid

Guilty

Ashamed

Attentive

Interested

Alert Excited

Enthusiastic

Inspired

Proud

Upset

Distressed

Determined

Strong

Active

Appendix J

The Coping Flexibility Scale

0 = Not Applicable

1 = Somewhat Applicable

2 = Applicable

3 = Very Applicable

When we feel stress, we try to cope using various actions and thoughts. The following items describe stress-coping situations. Please indicate how these situations apply to you by choosing one of the following for each situation:

1. When a stressful situation has not improved, I try to think of other ways to cope with it.
2. I only use certain ways to cope with stress. [R]
3. When stressed, I use several ways to cope and make the situation better.
4. When I haven't coped with a stressful situation well, I use other ways to cope with that situation.
5. If a stressful situation has not improved, I use other ways to cope with that situation.
6. I am aware of how successful or unsuccessful my attempts to cope with stress have been.
7. I fail to notice when I have been unable to cope with stress. [R]
8. If I feel that I have failed to cope with stress, I change the way in which I deal with stress.
9. After coping with stress, I think about how well my ways of coping with stress worked or did not work.
10. If I failed to cope with stress, I think of other ways to cope.

Evaluation Coping subscale: 2, 6, 7, 8, and 9

Adaptive Coping subscale: 1, 3, 4, 5, and 10.

Appendix K

Rumination Reflection Questionnaire – Rumination Subscale

For each of the statements located below, please indicate your level of agreement or disagreement by choosing one of the categories next to each statement.

1 = Strongly Disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree

1. My attention is often focused on aspects of myself I wish I'd stop thinking about
2. I always seem to be rehashing in my mind recent things I've said or done.
3. Sometimes it is hard for me to shut off thoughts about myself.
4. Long after an argument or disagreement is over with, my thoughts keep going back to what happened.
5. I tend to "ruminate" or dwell over things that happen to me for a really long time afterward.
6. I don't waste time rethinking things that are over and done with.
7. Often I'm playing back over in my mind how I acted in a past situation.
8. I often find myself re-evaluating something I've done.
9. I never ruminate or dwell on myself for very long.
10. It is easy for me to put unwanted thoughts out of my mind.
11. I often reflect on episodes in my life that I should no longer concern myself with.
12. I spend a great deal of time thinking back over my embarrassing or disappointing moments.

Appendix L

Self-Affirmation Morning Survey

Please answer the following questions using the pull-down menu. Then, throughout the day, when you notice yourself having one of these thoughts, login to the site and complete the “Self-Affirmation Record”.

Sentence Stems

1. If I feel there are certain aspects of my appearance that I would like to change, I will...
2. If I am dissatisfied with some aspect of my appearance, I will...
3. If I feel others are more attractive than me, I will...
4. If I find myself examining flaws in my appearance, I will...
5. If I find myself trying to camouflage certain flaws in my appearance, I will...
6. If I feel there are certain aspects of my appearance that are extremely unattractive, I will...
7. If I feel ashamed of some part of my body, I will...
8. If I find myself spending a significant amount of time checking my appearance in the mirror, I will...
9. If I find myself trying to hide a certain aspect of my body with my clothing, I will...
10. If I feel reluctant to engage in social activities because I am unhappy with my appearance, I will...
11. If I find myself seeking reassurance from others about my appearance, I will...
12. If I find myself comparing my appearance to that of fashion models or others, I will...
13. If I fear that others will discover flaws in my appearance, I will...
14. If I find myself buying clothing to hide a certain aspect of my appearance, I will...
15. If I feel others are speaking negatively about my appearance, I will...

Sentence Completion Options

Think about how well I am doing at school or at work.
 Think about how good it makes me feel that others love me.
 Think about how proud others are of me.
 Think about how I feel when I do better than others on a task.
 Think about how important my moral principles are to me.
 Think about how good it makes me feel that I am an ethical person.
 Think about how good my relationships are with others.
 Think about how it’s not important what others think of me.
 Think about how good being athletic makes me feel.
 Think about how important my spirituality is to me.

Appendix M

Self-Affirmation Record

What thought or behaviour did you have or engage in? [Sentence completion stems]

What thought did you choose to have instead? [Sentence completion options]

Please give a brief example of what you thought about more specifically?

How much do you believe this thought?

Don't believe it at all.

Believe it a little.

Moderately believe it.

Mostly believe it.

Completely believe it.

Appendix N

Turning Points 2 Questionnaire

1. Which TP2 segment title did you watch today?
2. How much of the segment did you watch?
 - a. All
 - b. Part of it
 - c. None, never got around to viewing it
3. With whom did you watch the segment?
 - a. Alone
 - b. A friend
 - c. Other (partner, family member, etc.)
4. Which of the following activities did you complete (indicate all that apply)
 - a. Read the accompanying online chapter.
 - b. Completed the chapter exercises (if applicable)
 - c. Followed an internet link provided in the chapter (if applicable)
 - d. Engaged in a discussion regarding the segment's topics with someone
 - e. Other
5. I found this TP2 segment interesting.
 - a. Not at all
 - b. A little
 - c. Moderately
 - d. Quite a bit
 - e. Very much
6. This TP2 segment led me to reconsider some of my opinions.
 - a. Not at all
 - b. A little
 - c. Moderately
 - d. Quite a bit
 - e. Very much

Appendix O

Participant Information Letter

Dear Potential Participant:

My name is Danielle Ransom and I am a graduate student in the Department of Psychology at Lakehead University. I am currently looking for women aged 18-25 that are interested in **improving their body image** to take part in a research project.

For participation in this study, you will first complete a confidential online survey that asks you questions about different aspects of your thoughts, emotions and feelings about your body. This online survey will take about 45 min of your time. Following this, for a period of 28 days, you will be asked to engage in one of the two following exercises, each which take approximately the same amount of time. Depending on your assigned group, you will either:

- Go online to complete a daily brief questionnaire in the morning and then complete a short record of your thoughts throughout the day, as needed.

OR

- Watch one video segment (about 15 minutes) online every other day, followed by a brief questionnaire and an optional chapter reading.

At the end of 28 days, you will be provided with a followup questionnaire to complete. Finally, 3 months following the 28 day period, you will be contacted via email to complete an online followup questionnaire. These final two questionnaires will take approximately 15 min to complete.

If you are a student in an eligible Psychology course at Lakehead University, you can earn two bonus points toward your course mark.

Participation in this study requires that you have regular access to the internet throughout the day. The ability to access the internet on a mobile device is preferred, but not required. Regular access to a laptop and the internet is also sufficient.

There is no risk to participants of any physical harm. Participants may feel some transient degree of naturally occurring stress that could be expected to occur for some people while filling out the questionnaires.

This research project is being conducted under the supervision of Dr. Ron Davis and has been approved by the Lakehead University Senate Research Ethics Board. If you have any concerns regarding this study you are welcome to contact the Research Ethics Board at 343-8283. Only Dr. Davis and I will have access to the information you provide. Further, your responses will not be identified by your name. When the study is completed, the information is securely stored at

Lakehead University for seven years. A report of the findings will be available to those interested upon request.

Participation in this study is completely voluntary and you can withdraw at anytime without penalty. I sincerely appreciate your cooperation. Feel free to contact myself with any questions about this study.

Thank you,

Danielle Ransom, M.A.
Department of Psychology, Lakehead University
dransom@lakeheadu.ca

Dr. Ron Davis, C. Psych., Associate Professor
Department of Psychology, Lakehead University
E-mail: ron.davis@lakeheadu.ca; Telephone: 343-8646

I have read the above information and wish to continue with this survey. Click button if you agree.

Appendix P

Participant Consent Form

By providing my name and student number below, I indicate that I have read and understood all of the information in the previous window. I further understand and agree to the following:

1. I agree to participate in this study.
2. I am a volunteer and can withdraw at any time from this study without penalty or consequence.
3. I may choose not to answer any question asked in the questionnaires without penalty or consequence.
4. There are no anticipated physical risks associated with participation in this study. Should I experience any psychological distress or discomfort, I am entitled to a list of counselling resources from the researcher.
5. My data will remain confidential and will be securely stored in the Department of Psychology at Lakehead University for 5 years.
6. My information will remain anonymous should any publications or public presentations come out of this study.
7. I may receive a summary of this research upon completion of this study.
8. I give my permission to be contacted by email for the purpose of participation in this study.

I have read and understand the above "Consent to Participate."

If you are a Lakehead University student, please provide your name, student number and the name of the professor whose course the bonus points count toward. This information will only be used as an indication of your consent to participate to ensure you receive two bonus points (if applicable). Please note that your information will be kept separate from your responses. Also, the information you provide here will NEVER be used for any purpose other than the bonus point.

Full Name: _____
Lakehead University Student Number: _____
Professor's Name and Course Number and Section _____

Appendix Q

Self-Affirmation Introduction Email

Dear Participant,

Welcome to the (my) Improving Body Image Program!

This email will provide you with the information necessary for your participation in the program over the next 28 days. As indicated in the Information letter, you were randomly assigned to one of the interventions currently being tested as part of this program. You have been assigned to the Self-Affirmation Group.

Participation in the Self-Affirmation group requires you to do the following, starting tomorrow:

- a. Login to myibi.me every other day in the morning (you will receive a reminder email) and complete the Daily Self-Affirmation Questionnaire and,
- b. Login to myibi.me and complete the Self-Affirmation Record throughout the day when you encounter thoughts you practiced affirming in the morning.

The myibi.me website has been designed to be easily accessible via a mobile device, like your phone. This will allow you to complete a record as soon as you notice a thought, so that you don't forget to do so later on in the day. Also, it is handy to click the "remember me" box when logging in on your mobile device so that you don't have to enter your user id and password each time.

So, what is this self-affirmation stuff all about and why will it help to improve your body image? Well, according to self-affirmation theory, when people experience a threat to the self, like a threat to body image, they should look to other areas or domains of the self in order to maintain their self-esteem or self-worth. For example, if you were to feel bad about your body because you felt others were more attractive than you, you might think "Well, I feel like others are more attractive than me, but that's not so big a deal because my family and friends care about me anyway". Indeed, this seems to be the way that women with positive body image think. On the other hand, we have found that when women with more negative thoughts about their appearance experience a threat to their body image, they tend to focus even more on their appearance. So, they might think "I feel like others are more attractive than me, and being attractive is really important to me, so I must do something about it".

By now, it may seem pretty clear that the first way of thinking is going to result in women feeling better about themselves, while the second way of thinking is likely to make women feel pretty lousy. In fact, this is exactly what our previous research has shown. The intervention you're about to start participating in is designed to help you think in a way more similar to the first example, that is, to self-affirm areas of the self that are different from appearance. Several research studies that have already been completed have shown that self-affirming improves body satisfaction and reduces the amount of threat women perceive from body image threats (Bucchianeri & Comins, 2012; Armitage, 2012). Even more impressively, this research has

shown improvements in as little as one session. This suggests that if you practice these self-affirmation exercises over the period of 28 days, the chances that your body image will improve are quite high.

Of course, your chances of improving your body image will be higher if you remember to login to the study website each day to complete the exercises and actively practice and record your self-affirming thoughts about your body throughout the day.

Thanks so much for agreeing to participate in this study, and good luck on your journey toward improving your body image! Feel free to contact me should you have any questions throughout your participation in the study.

Danielle Ransom

Danielle Ransom, M.A., Doctoral Student in Clinical Psychology
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References:

Armitage, C.J. (2012). Evidence that self-affirmation reduces body dissatisfaction by basing self-esteem on domains other than body weight and shape. *Journal of Child Psychology and Psychiatry*, 53, 81-88. doi:10.1111/j.1469-7610.2011.02442.x

Bucchianeri, M.M., & Corning, A.F. (2012). An experimental test of women's body dissatisfaction reduction through self-affirmation. *Applied Psychology: Health and Well-Being*, 4, 188-1. doi:10.1111/j.1758-0854.2012.01068.x

Appendix R

Turning Points Introduction Email

Dear Participant,

Welcome to the (my) Improving Body Image Program!

This email will provide you with the information necessary for your participation in the program over the next 28 days. As indicated in the Information letter, you were randomly assigned to one of the interventions currently being tested as part of this program. You have been assigned to the Turning Points 2 Group.

Participation in the Turning Points 2 group requires you to do the following, starting tomorrow morning:

- a. Login every other day and watch the next Turning Points 2 video in the series (you'll receive a reminder email),
- b. Read the accompanying chapter (optional, but recommended) and,
- c. Complete the associated questionnaire.

The myibi.me website has been designed to be easily accessible via a mobile device, like your phone. However, given the data requirements of the Turning Points videos, this is not recommended unless you have an unlimited data plan on your phone or you have access to wireless internet.

So, what is this program all about and how will it help you improve your body image? Well, the Turning Points 2 program (Davis et al., 2004) is a psychoeducation program that is designed to improve body image. There are 14 video segments in the program that won't take up too much of your time, as they are only about 15 min long. Each video features six female university students (real ones, no actors) and a moderator discussing different topics like body image, relationships, eating behaviours, mood, and physical activity. Over the course of the program, you'll have heard a number of discussions about the factors that lead to more negative thoughts about one's body and the consequences of these negative thoughts. Importantly, you'll also learn some effective ways of coping or dealing with these thoughts. There will also be some associated chapters that you can read that summarize the conversations in the video segment and provide supporting information.

But, will this program help improve your body image? Well, there's some good evidence that it will. One study that looked at the effects of this program found that scores on a questionnaire that measured concerns with shape and dietary restraint significantly decreased from the beginning to the end of the program (Bone, 2006). In another study that looked at female university undergraduates, students that completed the program showed significant improvements in body image, increases in self-esteem and decreases in dieting behaviour and eating concerns (McMahan, 2009). So, the short answer to that question, is yes! However, you're

more likely to see improvements if you do spend the time watching the videos and reading the associated chapters.

Thanks so much for agreeing to participate in this study, and good luck on your journey toward improving your body image! Feel free to contact me should you have any questions throughout your participation in the study.

Danielle Ransom, M.A., Doctoral Student in Clinical Psychology
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References:

Davis, R., McVey, G., Heinmaa, M., Stephens, D., Mercier, M., Degagne-White, K., Esposti, J., Bourret, K., Strudle, K., Heimonen, T., Lucier, M. K., & Crowther-Rakochoy, W. (2004). Turning points for teens: Ontario community-based treatment for adolescent eating disorders. Funded by the Ontario Ministry of Health and Long-Term Care, 2004-2006.

Bone, M. (2006). Body and affect words: Valence, cognitive specificity, and temporal change among young women. Unpublished Master's thesis, Lakehead University, Department of Psychology, ON, Canada.

McMahan, A. (2009). A randomized, controlled trial of mindfulness plus exposure for improving body image in women. Unpublished doctoral dissertation, Lakehead University, Department of Psychology, ON, Canada.

Appendix S

Participant Reminder Email

Good Morning,

This is a reminder to complete today's exercise as part of the Improving Body Image Program. Please go to <http://myIBL.me> to login and complete your tasks for the day.

Thank you,

Danielle Ransom, M.A.
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dransom@lakeheadu.ca

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Department of Psychology, Lakehead University
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Appendix T

Treatment Credibility and Confidence Measure

1. Please indicate how credible this intervention is regarding its ability to help people feel less distress about their bodies on a scale from 0 (No credibility) to 100 (Maximum credibility). Credibility rating: _____
2. Please indicate your confidence that this intervention will help you with your body image on a scale from 0 (No confidence) to 100 (Maximum confidence). Confidence rating: _____

Appendix U

Effect Size Calculations and Conventions

Cohen's d Effect Size Conventions (Cohen, 1992):

Small = 0.20

Medium = 0.50

Large = 0.80

Means and Standard
Deviations:

$$d = \frac{\bar{X}_2 - \bar{X}_1}{S_{pooled}}$$

t Tests:

$$d = t \sqrt{\frac{n_1 + n_2}{n_1 n_2}}$$

Pearson Correlation Coefficient Effect Size Conventions:

Small = 0.10

Medium = 0.30

Large = 0.50

Chi-square:

$$d = \sqrt{\frac{\chi^2}{N}}$$

Appendix V

Summary of Intervention Exercise Responses

Self-Affirmation Intervention

The Self-Affirmation Morning Survey (SAMS) had participants engage in a self-affirmation implementation intention exercise every second morning over the 28-day intervention. Participants were presented with a series of sentence stems describing body image cognitions (e.g., “If I feel ashamed of some part of my body, I will...”). They were asked to match the sentence stem with a sentence completion option that described a nonappearance-related cognition. Across all exercises completed, participants most frequently chose to endorse the relationship domain of self-worth ($M = 37\%$; e.g., “...think about how good it makes me feel that others love me”), followed by the approval from others domain (28%; e.g., “...think about how it’s not important what others think of me”) as a sentence completion options. The lowest endorsed domain of self-worth was the spirituality domain ($M = 2\%$; e.g., “...think about how important my spirituality is to me”).

After completing the SAMS, participants were asked to login and complete the Self-Affirmation Record (SAR) when they noticed themselves having one of the thoughts listed in the SAMS. Participants were asked to report their use of the self-affirmation implementation intentions chosen in the morning survey. Overall, participants completed an average of 3.27 ($SD = 4.06$) SARs over the intervention period. Of the 190 participants, 25% did not complete any SARs. Thus, completion of the SAR was low over the course of the intervention period.

On the SARs completed, participants most frequently reported that they felt dissatisfied with some aspect of their appearance (15%), felt that there were certain aspects of their appearance that they would like to change (13%), and found themselves examining flaws in their appearance (13%). The lowest endorsed behaviour was finding themselves buying clothing to hide a certain aspect of their appearance (2%). In response to these cognitions, participants reported self-affirming by thinking about how good it makes them feel that others love them (20%) and thinking about how it’s not important what others think about them (20%). Eight-five percent of participants at least moderately believed their self-affirmation on a 5-point Likert scale ranging from 1 (*don’t believe it at all*) to 5 (*believe it completely*). Thus, participants most frequently reported self-affirming the domains that they indicated in the SAMS and found their self-affirming thought to be believable.

Psychoeducation Intervention Questionnaire

On the PE questionnaires, the majority of participants reported watching the videos alone (89%). Fifty-five percent of participants reported reading the optional chapter accompanying the video segment and 14% reported completing associated chapter exercises. Twenty-seven percent

engaged in a discussion about the video segment's topic with someone else. Seventy-six percent of participants rated the video segments as at least moderately interesting.