The roles of self-compassion, body surveillance, and body appreciation in predicting intrinsic motivation for physical activity: Cross-sectional associations, and prospective changes within a yoga context

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ABSTRACT

Engaging in physical activity for the immediate internal experiences it brings (e.g., pleasure, satisfaction) is critical for long-term exercise adherence. Investigations of how factors such as body image contribute to intrinsic motivation for physical activity are needed. The present study examined body surveillance and body appreciation as mediators of the relationship between self-compassion and intrinsic motivation for physical activity cross-sectionally and prospectively. One sample of college women completed measures of study variables at one time point (Sample 1; $N = 269$, $M_{age} = 19.96$) and a second sample did so during Weeks 1, 8, and 16 while participating in a 16-week yoga course (Sample 2; $N = 323$, $M_{age} = 20.31$). In Sample 1, latent variable structural equation modeling supported body appreciation as a mediator between self-compassion and intrinsic motivation for physical activity. In Sample 2, latent growth curve analyses revealed that change in self-compassion predicted changes in body surveillance and body appreciation in expected directions. Further, change in body appreciation positively predicted change in intrinsic motivation. Targeting self-compassion and body appreciation may help support women's intrinsic motivation for physical activity.

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1. Introduction

Although body image has been identified as playing an important role in predicting physical activity behavior (Johnson, Fallon, Harris, & Burton, 2013), investigations have often lacked a clear theoretical framework for understanding this relationship. Self-determination theory (SDT; Ryan & Deci, 2000, 2007) provides a useful framework for examining how various factors such as body image may impact physical activity motivation and behavior (Hurst, Dittmar, Banerjee, & Bond, 2017). SDT describes both autonomous and controlling sources of motivation and how these regulatory systems are differentially connected to adaptive behavior, such as sustained pursuit of goals focused on health and well-being. Autonomous forms of motivation are consistently and positively linked to physical activity behavior (Teixeira, Carraça, Markland, Silva, & Ryan, 2012).

Intrinsic motivation is the most autonomous form of motivation and represents the fullest internalization and integration of motivation with the self (Ryan & Deci, 2000, 2007). More specifically, intrinsic motivation for physical activity entails engaging in physical activity for the immediate internal experiences of joy, satisfaction, pleasure, accomplishment, and/or absorption in the task. Empirical evidence strongly supports intrinsic motivation as the strongest motivational predictor of sustained physical activity behavior (Teixeira et al., 2012). Given the importance of intrinsic motivation as a long-term behavioral regulator and the relevance of body image variables to physical activity behaviors, understanding how body image may reduce or support intrinsic motivation for physical activity is an important research objective.

A key body image variable that may act as an obstacle to intrinsic motivation for physical activity, particularly for women, is body surveillance (i.e., habitually monitoring one's physical appearance) that results from self-objectification. Self-objectification refers to placing more value on the body's aesthetic qualities than internal experiences such as sensation, ability, and function (Fredrickson & Roberts, 1997). Habitually monitoring one's physical appearance as a result of self-objectification may prevent women from experiencing the internally derived joy and satisfaction of moving one's

body and instead focus on how their body looks when they exercise or how exercise might change their appearance. Fredrickson and Roberts (1997) also suggested that the habitual monitoring of physical appearance can interfere with peak motivational states such as flow (i.e., complete absorption in a challenging task), which is closely linked to intrinsic motivation (Csikszentmihalyi, Abuhamdeh, & Nakamura, 2014). Body surveillance has been found to relate positively to external reasons for exercise engagement such as changing one's outward appearance (Homan & Tylka, 2014; Prichard & Tiggemann, 2008), but its relationship with intrinsic motivation has not been tested.

Conversely, positive body image may enhance intrinsic motivation for physical activity. Positive body image is internally focused, characterized by gratitude, respect, acceptance, and love for the body regardless of its physical appearance (Tylka & Wood-Barcalow, 2015b). Positive body image has been linked to greater exercise frequency when appearance motives for exercise are low (Homan & Tylka, 2014), and intrinsic motivation may play a critical role in this relationship. Body appreciation, the hallmark of positive body image, includes accepting, holding favorable opinions toward, and respecting the body by taking care of its needs and engaging in healthy behaviors (Avalos, Tylka, & Wood-Barcalow, 2005; Tylka & Wood-Barcalow, 2015b). This internal perspective of the body suggests that higher body appreciation may help facilitate physical activity motivation that is derived from the inherent rewards of physical activity (i.e., intrinsic motivation). Body appreciation is positively linked to internal (i.e., health and enjoyment) reasons to exercise (Tylka & Homan, 2015); however, its relationship to intrinsic motivation as conceptualized by SDT remains to be examined.

The quickly expanding literature on positive body image points to the need to identify key supports for increasing positive body image and not solely decreasing negative body image. Self-compassion represents a strategy that one can apply on their own and has demonstrated robust relationships with both positive body image and intrinsic motivation (e.g., Magnus, Kowalski, & McHugh, 2010; Wasylkiw, MacKinnon, & MacLellan, 2012). Self-compassion involves giving care, compassion, and understanding to the self in times of perceived failure, pain, or suffering (Neff, 2003). It is linked to lower body surveillance and greater body appreciation among community and college women (Braun, Park, & Gorin, 2016; Wasylkiw et al., 2012). Being able to provide the self with comfort and care when experiencing negative body-related thoughts or emotions may help women resist body surveillance and build body appreciation (Kelly, Miller, & Stephen, 2016). Similarly, interventions have shown that extending more kindness to the self and less self-judgment helps women accept and appreciate their bodies (Albertson, Neff, & Dill-Shackleford, 2015).

The relationship between self-compassion and intrinsic motivation for physical activity may be due to a shared inclination to be authentic to the self and one's well-being rather than focusing on achieving an outcome such as external approval or appearing physically fit (Thøgersen-Ntoumani & Ntoumanis, 2006). Indeed, in a sample of women who regularly exercise, self-compassion was positively related to intrinsic motivation for physical activity (Magnus et al., 2010). In another study, self-compassion not only predicted intrinsic motivation for physical activity, but also reengagement in exercise after an exercise setback (Semenchuk, Strachan, & Fortier, 2018). Whereas research supports that self-compassion relates to body image variables and intrinsic motivation for physical activity (see also Neff, 2016), what is missing is an understanding of how these variables fit together. Conceptual and empirical evidence suggests that self-compassion may support intrinsic motivation for physical activity through a positive connection with the body (i.e., lower body surveillance and higher body appreciation)—indeed, a positive connection with the body is consistent with engaging in self-care (Tylka & Wood-Barcalow, 2015b). We propose that body surveillance and body appreciation may mediate the relationship between self-compassion and intrinsic motivation for physical activity. To our knowledge, this hypothesis has yet to be explored.

Yoga represents a context with the potential to support self-compassion and body appreciation while reducing body surveillance (Cook-Cottone & Douglass, 2017). Indeed, in a sample of young adults, self-reported yoga practice was associated with positive changes in body satisfaction over a 5-year period (Neumark-Sztainer, MacLehose, Watts, Pacanowski, & Eisenberg, 2018). When interviewed, many young adults who practiced yoga revealed that yoga helped them accept, appreciate, and gain confidence in their current body and what it is capable of accomplishing (Neumark-Sztainer, Watts, & Rydell, 2018). Young adult women in a yoga intervention experienced improved body appreciation, body connectedness, body satisfaction, and positive affect compared to a control group (Halliwell, Dawson, & Burkey, 2019). In addition, evidence shows that body surveillance declines over 8 or 12 weeks while participating regularly in yoga (Cox, Ullrich-French, Howe, & Cole, 2017; Cox, Ullrich-French, Cole, & D'Hondt-Taylor, 2016). Finally, a common focus in yoga classes is on paying attention to one's experience as one moves through the poses and extending kindness to the self when encountering mental or physical challenges (i.e., self-compassion). Empirical evidence links yoga participation to gains in self-compassion (Braun, Park, & Conboy, 2012; Gard et al., 2012). However, not everyone may benefit from increased positive body image and decreased body surveillance as a result of taking yoga, as some individuals note that yoga prompted body comparison and negative self-talk for them (Neumark-Sztainer, MacLehose et al., 2018; Neumark-Sztainer, Watts et al., 2018). This potential for variability in how individuals are impacted by yoga participation provides an opportune context to examine the relationships among change in self-compassion, body appreciation, body surveillance, and intrinsic motivation for physical activity.

1.1. The present study

The first purpose of the current study was to test the mediating roles of body surveillance and body appreciation in the relationship between self-compassion and intrinsic motivation for physical activity cross-sectionally in a sample of college women (see Fig. 1). We hypothesized that self-compassion would be negatively linked to body surveillance and positively related to body appreciation. Further, we expected body surveillance and body appreciation to be negatively and positively associated with intrinsic motivation for physical activity, respectively. Finally, we hypothesized that body surveillance and appreciation would mediate the relationship between self-compassion and intrinsic motivation for physical activity.

The second purpose of this study was to test the relationships among the rates of change in the variables in the hypothesized model within the context of 16-week naturally occurring yoga[1] courses at Washington State University. We did not test the effects of a specific yoga intervention. Given the potential for yoga to support positive body image and self-compassion in many, but not all, individuals (Neumark-Sztainer, MacLehose et al., 2018), the naturally occurring yoga context provides an ideal opportunity to capture natural variations in individual participants' growth trajectories of self-compassion, body appreciation, and body surveillance. This design allowed us to build on the cross-sectional data by (a)

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[1] Yoga classes that are taught by instructors who bring their own teaching philosophy into their classes, not as part of a yoga intervention.
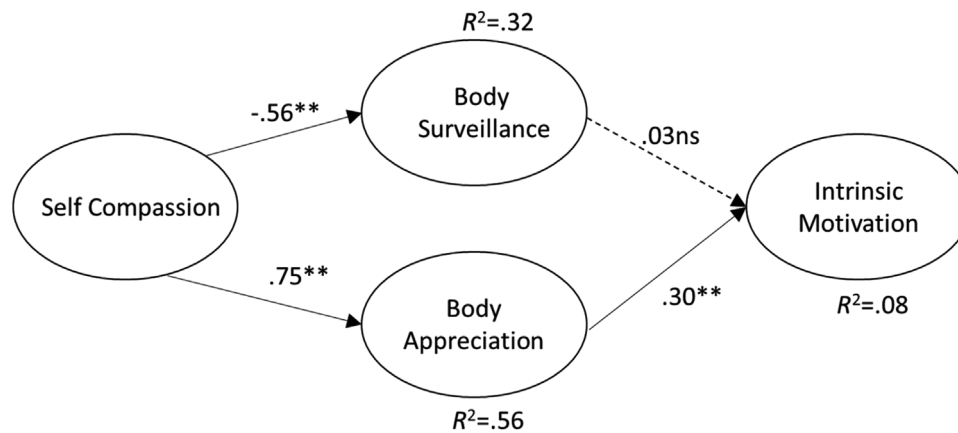
Fig. 1. Cross-Sectional SEM model testing hypothesized relationships in Sample 1 (N = 269). Path estimates are standardized. Observed indicators are not shown. **p < .01.

testing for changes in study variables across the duration of a 16-week university yoga course, (b) obtaining multiple assessments of these variables over a 16-week period to test the relationships among the rate of change in study variables using latent growth curve analysis, and (c) examining whether the cross-sectional relationships are replicated with prospective data.

We hypothesized that self-compassion and body appreciation would increase and that body surveillance would decrease linearly across the 16 weeks. We also expected that the rate of change in self-compassion would negatively predict the rate of change in body surveillance and positively predict the rate of change in body appreciation. Further, we expected that rates of change in body surveillance and body appreciation would negatively and positively predict the rate of change in intrinsic motivation, respectively. Finally, we expected that the rates of change in body surveillance and body appreciation would mediate the relationship between the rates of change in self-compassion and intrinsic motivation for physical activity.

2. Method

2.1. Participants and procedures

All study procedures were approved by the IRB at Washington State University. Both samples were taken from larger studies, and only college women were included due to their heightened risk for body surveillance and body image concerns (Calogero, 2009) as well as lower body appreciation (Tylka & Wood-Barcalow, 2015a) compared to college men. For the first sample, an online survey was distributed by email to students in large courses across a range of disciplines at Washington State University. Participants were told that the purpose of the study was to examine physical self-perceptions, emotions, and physical activity motivation and behavior. They were not compensated. The female participants (N = 269; M_{age} = 19.96, SD = 1.94) identified as White (76%), Black (4%), Asian (6%), Hispanic/Latino (8%), American Indian (1%), or multi-racial/other (5%).

The second sample was recruited from students taking an existing for-credit yoga course at Washington State University. Students were told that the purpose of the study was to investigate the effects of yoga on outcomes such as physical activity behaviors and the way you feel about your physical self. Data were collected over a 2-year period (i.e., four semesters) to achieve the target sample size. Students in the course met twice a week for 75 min over a 16-week period with one week off for a student holiday (e.g., spring break). There were 25–30 students in each class, although not all chose to participate in filling out the questionnaires. Students in

these classes completed the study measures on the first day of class (Week 1), at the midpoint of the course (Week 8), and during the last class period (Week 16). The female students (N = 323) had an age range of 18–40 years (M_{age} = 20.31, SD = 2.12, 97.5% were under 25 years). The majority of the sample identified as White (78.9%); the remaining identified as Black (1.9%), Native Hawaiian or Pacific Islander (0.3%), American Indian (0.3%), Asian (5.3%), more than one race (8.7%), and "other" (2.8%); six did not respond. Most (98.5%) were undergraduate students and five were graduate students.

Both yoga teachers taught from an all-levels perspective by providing options for students to make the yoga poses more or less challenging. Classes typically began with 5–10 min of centering (e.g., breath work) followed by moving through different yoga poses and concluding with relaxation (e.g., savasana) and/or meditation for 5–10 min. The first yoga instructor (taught 12 class sections) has numerous certifications from YogaFit, and the second yoga instructor (taught four class sections) is a 200RYT in the Power/Vinyasa yoga tradition. There was no specified curriculum or intervention as the aim was to observe existing yoga classes that would be expected to allow for more variability. When asked about their teaching philosophy, both instructors stated that they focused on the basic body awareness and letting go of judgment, expectations, and competition. They also strived to provide a path for students to honor their body, mind, and spirit. There were no mirrors present in the yoga setting.

2.2. Measures

2.2.1. Self-compassion

For both samples, self-compassion was assessed using Neff's (2003) 26-item Self-Compassion Scale (SCS). Participants respond to how often they experience a particular response to pain and suffering using a 5-point Likert-type scale ranging from 1 (almost never) to 5 (almost always). Sample items include "I try to be loving towards myself when I'm feeling emotional pain," and "When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people." We calculated both a total score (negative dimensions were reverse scored and dimension scores were then averaged), where higher scores reflect greater self-compassion, and subscale average scores where higher scores represent greater levels of each dimension (items not reverse scored). Evidence supports total and subscale score reliability and validity with college samples (Neff, 2016; Neff, Whittaker, & Karl, 2017). In the present study, Cronbach's alphas ranged from .81 to .90 for self-compassion subscales and .92–.94 for the total SCS across both samples.

Table 1
Means and Standard Deviations for Study Variables in Samples 1 and 2.

Study Variables	Potential Ranges	Sample 1 M (SD)	Sample 2 Week 1 M(SD)	N	Sample 2 Week 8 M(SD)	N	Sample 2 Week 16 M(SD)	N
Body Surveillance	1–7	4.54 (1.10)	4.51 (1.04)	312	3.95 (1.12)	233	3.72 (1.03)	222
Body Appreciation	1–5	3.43 (0.80)	3.58 (0.69)	320	3.77 (0.73)	241	3.91 (0.70)	230
Self-Compassion	1–5	3.14 (0.62)	3.13 (0.69)	310	3.28 (0.70)	235	3.36 (0.69)	223
Intrinsic Motivation	0–4	2.76 (1.02)	2.84 (0.96)	318	3.01 (0.87)	240	3.06 (0.87)	225

Note. Sample 1 *N* = 269. Sample size varied for Sample 2 due to missing data at different time points.

2.2.2. Body surveillance

The Body Surveillance subscale of the Objectified Body Consciousness Scale (McKinley & Hyde, 1996) was used to assess body surveillance in both samples. Participants completed the subscale by indicating their agreement with eight statements regarding the degree to which they think about their appearance from an observer's perspective (e.g., "During the day, I think about how I look many times;" "I often worry about whether the clothes I am wearing make me look good"). Items are rated along a 7-point Likert scale that ranges from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher scores indicate higher body surveillance. Studies using the subscale have provided evidence for internal consistency and construct validity in adolescent girls (Slater & Tiggemann, 2002) and adult women (McKinley & Hyde, 1996). In the present study, Cronbach's alphas were .81 and .82–.88 (across all time points) in Sample 1 and Sample 2, respectively.

2.2.3. Body appreciation

In order to assess participants' acceptance of and appreciation for their body, the Body Appreciation Scale (BAS; Avalos et al., 2005) was used in Samples 1 and 2. Items (e.g., "I respect my body," "I take a positive attitude towards my body") are rated along a 5-point Likert-type scale ranging from 1 (*never*) to 5 (*always*). Participants completed the 13 items, which were averaged, and higher scores indicate higher body appreciation. Studies supported the scale's unidimensionality and the internal consistency, construct validity, and 3-week stability of its scores in college women (Avalos et al., 2005). In the present study, Cronbach's alphas were .94 for Sample 1 and .92–.94 (across all time points) for Sample 2.

2.2.4. Intrinsic motivation for physical activity

Intrinsic motivation for exercise was assessed in Samples 1 and 2 using the Intrinsic Motivation subscale from the Behavioral Regulation for Exercise Questionnaire– 2 (Markland & Tobin, 2004). The subscale consists of four items: "I enjoy my exercise sessions," "I find exercise a pleasurable activity," "I exercise because it's fun," and "I get pleasure and satisfaction from participating in exercise." Items are rated along a 5-point Likert-type scale ranging from 0 (*not true for me*) to 4 (*very true for me*). Higher scores represent greater intrinsic motivation for exercise. Studies using the subscale have provided evidence for internal consistency, factor structure, and construct validity (e.g., relationships with physical activity behavior) in adult samples (Markland & Tobin, 2004) and college students (Abundo, Sidman, Milroy, Orsini, & Fiala, 2014; Wilson, Rodgers, Fraser, & Murray, 2004). In the present study, Cronbach's alphas were .93 for Sample 1 and .91–.93 (across all time points) for Sample 2.

2.3. Data analyses

Data were first screened for normality of study variables. Scale reliabilities and descriptive statistics were calculated followed by bivariate correlations among study variables. Structural models using maximum likelihood estimation with robust standard errors (MLR) were examined to test the relationships in the proposed models using MPlus version 7.3 (Muthén & Muthén, 1998–2012).

For Sample 1, a measurement model was specified first. The six subscales of the SCS served as observed indicators of the self-compassion latent variable, as supported in recent research (Neff et al., 2017). The respective errors among the positive and negative SCS subscale scores were allowed to correlate. The residual error correlations were considered due to method effects of positive and negatively worded self-compassion items, respectively. The four items of the Intrinsic Motivation subscale served as indicators for the intrinsic motivation latent variable. The 13 items from the BAS were randomly assigned to three parcels, which represented the body appreciation latent variable. The eight items from the Body Surveillance subscale were randomly assigned to three parcels, which represented the body surveillance latent variable. Then, structural equation modeling (SEM) was used to test the hypothesized structural model.

For Sample 2, first latent growth curve (LGC) models (Bollen & Curran, 2005) were estimated separately for self-compassion, body surveillance, body appreciation, and intrinsic motivation. The Week 1, Week 8, and Week 16 observed mean scores for each variable were used to estimate the intercept and slope for each LGC. Next, a structural model was tested in which the slopes of body surveillance and body appreciation mediated the relationship between the slopes of self-compassion and intrinsic motivation. About 1.5% of data were missing at Week 1, 25–26% at Week 8, and 29% at Week 16. This was due to class absences when participants were unavailable to complete the surveys or nonparticipation. Missing data were addressed in MLR by estimating model parameters using all available data (FIML), which produces a robust strategy for handling missing data (Enders & Bandalos, 2001). We also tested semester, class section, and teacher as covariates in the model and all were nonsignificant and dropped from the main analysis.

Hypotheses were evaluated by examining path coefficients and a variety of model fit indices. These included the comparative fit index (CFI), the standardized root-mean-square residual (SRMR), the root-mean-square error of approximation (RMSEA), and the Tucker-Lewis index (TLI). Values around .95 and higher for CFI and TLI, around .08 and lower for SRMR, and around .06 and lower for RMSEA indicate good model fit to the data (Hu & Bentler, 1999). In order to evaluate the indirect relationships in the mediation models, we examined the significance of the total indirect effects and the specific indirect paths through body surveillance and body appreciation. We also examined the 95% confidence intervals. The number of cases for each sample exceeded the 5–10 participants-to-parameter ratio needed to confidently examine a model (Bentler, 1990) and the *N* > 200 criterion specified for complex models which have internally consistent and highly inter-related indicators (Weston & Gore, 2006).

3. Results

3.1. Descriptive statistics

Skewness and kurtosis values for all study variables fell within an acceptable range for both Samples 1 and 2. Means and standard deviations of the study variables for both samples are displayed in Table 1. For Sample 1, participants reported moderate intrin-
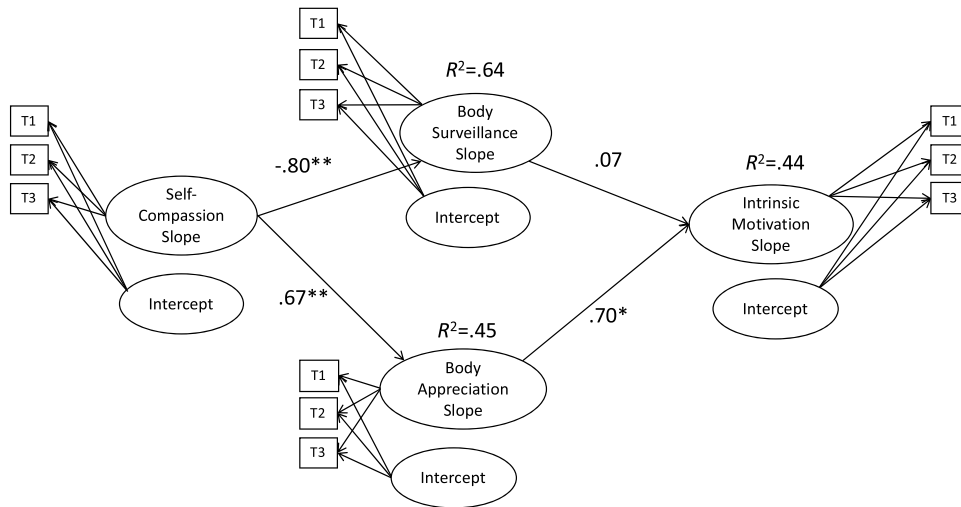
Fig. 2. Latent growth curve model testing hypothesized relationships in Sample 2 during a 16 week yoga course (N = 323). T1 = Week 1; T2 = Week 8; T3 = Week 16. Path estimates are standardized. $^*p$ < .05; $^{**}p$ < .01.

sic motivation for physical activity and body appreciation, body surveillance, and self-compassion. For Sample 2, body appreciation, body surveillance, and self-compassion each hovered around the mid-points of their scales across the three time points. Intrinsic motivation was above the midpoint of the scale at each time point. There were no significant differences between the levels of variables in Sample 1 and in Sample 2 at Week 1. Bivariate correlations showed positive relationships between body appreciation and intrinsic motivation for both samples across all time points (rs = .28–.35, ps < .001). Although intrinsic motivation and self-compassion were significantly related for Sample 2 (rs = .15–.23, ps < .05), the relationship between these two variables was non-significant (r = .11, p = .08) in Sample 1. Finally, body surveillance related negatively to all other variables in both samples at all time points (rs = −.17 − −.63, ps < .05).

3.2. Main analyses Sample 1

The measurement model was a good fit to the data, $\chi^2(92)$ = 170.45, p < .001, RMSEA = .06, SRMR = .05, CFI = .97, TLI = .96. All observed indicators loaded significantly (p < .001) on respective latent constructs. The full SEM model testing the hypothesized relationships using MLR (see Fig. 1) provided a good fit to the data, $\chi^2(93)$ = 172.19, p < .001, RMSEA = .06, SRMR = .05, CFI = .97, TLI = .96. All hypothesized paths were significant, except for the path from body surveillance to intrinsic motivation. The total indirect effect of self-compassion to intrinsic motivation was positive (β = .21) and significant (p < .001), but only the indirect path through body appreciation was significant (β = .22, p < .001, 95% confidence interval .10–.35). The 95% confidence interval for the total and the specific significant indirect path did not cross zero. The explained variance in body surveillance (32%), body appreciation (56%), and intrinsic motivation (8%) was moderate, strong, and minimal, respectively (cf. Ferguson, 2009).

3.3. Main analyses Sample 2

The results of the LGCs indicated significant (ps < .05) positive change in self-compassion, body appreciation, and intrinsic motivation and significant negative change in body surveillance over the 16 weeks. In addition, the variance of the slopes was significant (ps < .01) for all variables except for intrinsic motivation. Fit statistics indicated that the LGCs all fit the data well with the exception of high RMSEA for body surveillance and intrinsic moti-

Table 2
Individual Latent Growth Curve Model Fit Indices and Slope Values.

Model	CFI	SRMR	RMSEA	Slope	Variance of Slope
Self-compassion	.996	.017	.056	.426***	.069***
Body surveillance	.943	.037	.198	−.938***	.168***
Body appreciation	.994	.081	.070	.636***	.055**
Intrinsic motivation	.988	.022	.101	.435*	.049

Note. $^*p$ < .05, $^{**}p$ < .01, $^{***}p$ < .001. The value for slope is from standardized estimates.

vation. This likely reflects the difficulty of estimating a LGC with only three time points. Table 2 includes slope estimates and fit indices for each of the four LGC models. The main structural model (see Fig. 2) also fit the data very well, $\chi^2(48)$ = 141.54, p < .001, RMSEA = .08, SRMR = .05, CFI = .95, TLI = .93. All paths were positive and significant (ps < .05), except for the path from the slope of body surveillance to the slope of intrinsic motivation. The total standardized indirect effect from self-compassion to intrinsic motivation was positive (β = .41) but not significant (p = .12). Only the indirect path from self-compassion through body appreciation to intrinsic motivation approached significance (β = .47, p = .06) and the 95% confidence interval did cross zero (β = −.03–.96). Based on Ferguson's (2009) guidelines on effect size, the explained variance in body surveillance (64%), body appreciation (45%), and intrinsic motivation (44%) was considered moderate to strong.

4. Discussion

Based on the growing evidence for the benefits of self-compassion, low body surveillance, and positive body image (Magnus et al., 2010; Semenchuk et al., 2018; Tylka & Homan, 2015), the current study examined the mediating roles of body surveillance and body appreciation in the relationship between self-compassion and intrinsic motivation for physical activity. Collectively, the cross-sectional and prospective mediation models provided partial support for hypothesized relationships, emphasizing that treating the self with kindness and appreciating the different aspects of one's body create conditions that cultivate intrinsic motivation for physical activity. In addition, average increases in self-compassion, body appreciation, and intrinsic motivation, and declines in body surveillance were observed in the women participating in university yoga classes.

Specifically, results revealed that body appreciation mediated the relationship between self-compassion and intrinsic motivation

for physical activity in the cross-sectional model. Although mediation was not supported in the prospective model, increases in self-compassion predicted increases in body appreciation, which then predicted increases in intrinsic motivation. Increases in self-compassion also predicted decreases in body surveillance in the prospective model. All hypothesized model paths were significant and in the expected directions, except for the relationship between body surveillance and intrinsic motivation both cross-sectionally and prospectively. Although there has been evidence of the relationships of lower body surveillance and higher body appreciation to greater internal reasons for exercise (Tylka & Homan, 2015), this was the first study to our knowledge to link these body image variables to the intrinsic regulation of physical activity behavior as defined within SDT. Past research on body image and physical activity using a SDT lens has primarily focused on the role of negative body image variables (e.g., shame, guilt, anxiety) and their link to more controlling physical activity motivation (Brunet & Sabiston, 2009; Gillison, Standage, & Skevington, 2006; Hurst et al., 2017). It is telling that a lower emphasis on one's physical appearance did not relate to intrinsic motivation, but that an appreciation for one's body more holistically did. Negative body image may be more relevant to the prediction of controlling motivation whereas positive body image may be more closely linked to autonomous forms of motivation. The current shift in the body image literature to focusing on the unique role of positive body image indicators may open new doorways to understanding not only how to reduce controlling forms of physical activity motivation, but how to fuel the most autonomous of motivation regulations: intrinsic motivation. In particular, the recent focus on appreciation for the functionality of the body (Alleva, Tylka, & Kroon Van Diest, 2017; Tylka & Wood-Barcalow, 2015b) is in better conceptual alignment with key sources of intrinsic motivation, as it is an internally rather than externally motivated process (Tylka & Wood-Barcalow, 2015b).

The latent growth curve analyses demonstrated normative improvements in self-compassion, body image, and intrinsic motivation for physical activity during participation in a 16-week yoga course. These findings provide indirect evidence that there are specific processes within the context of naturally occurring yoga that supports these positive psychological variables. The improvements in body image and self-compassion are consistent with past yoga studies (e.g., Cox et al., 2017; Gard et al., 2012; Impett, Daubenmier, & Hirschman, 2006); however, the significant shift in intrinsic motivation for physical activity provides new information about the potential benefits of yoga participation. Importantly, variability in the slopes of self-compassion, body surveillance, and body appreciation indicate that not everyone changes at the same rate. Rigorous intervention designs are needed to begin identifying the key ingredients or processes (e.g., focusing on body function over appearance) that occur during yoga participation to explain improvements in self-compassion, body image, and intrinsic motivation for physical activity.

Given the adaptive role of self-compassion in predicting reductions in body surveillance and increases in body appreciation, applying the specific aspects of self-compassion to the body may be an effective strategy for supporting positive body image both within and outside of yoga settings. For example, in a randomized controlled trial, women were assigned to a 3-week self-compassion meditation intervention or a waitlist control group (Albertson et al., 2015). The women in the intervention group experienced significant improvements in body image including reductions in body shame and increases in body appreciation that were maintained three months later. Notably, the self-compassion meditation that they were instructed to do daily was general and did not target feelings about the body specifically. One direction for future research is to test the efficacy of self-compassion interventions that are more specifically targeted to suffering related to the body. Weaving

in the self-compassion components of mindfulness, self-kindness, and common humanity throughout a yoga class may be particularly effective at reducing body surveillance and supporting body appreciation while participants are actively engaged in moving their bodies. For example, students may be reminded throughout the class to accept (i.e., mindfulness) and be kind to oneself when facing certain challenges such as pain during the yoga class.

The important role of body appreciation in supporting increases in intrinsic motivation for physical activity opens up new possibilities for supporting the internalization of physical activity motivation. Strategies could include emphasizing appreciation for all that one's body does for them and the various functions it performs. This could be accomplished through the instruction provided by a yoga teacher. Recent intervention studies have shown that when women undergo training (e.g., through writing) to show them how to focus on and appreciate the functions of their bodies, they experience gains in body appreciation and reduced body surveillance (Alleva, Martijn, Van Breukelen, Jansen, & Karos, 2015, 2018). In one study, women who completed a body functionality assignment had higher functionality satisfaction and body appreciation when exposed to thin-ideal images, compared to controls (Alleva, Veldhuis, & Martijn, 2016). In the future, researchers could consider comparing the effectiveness of shifting one's focus away from appearance and towards functionality within or outside of a physical activity setting to determine if one approach is more effective.

In the last decade, research on positive body image has risen greatly and with it a greater focus on defining and measuring specific indicators such as body appreciation (Avalos et al., 2005; Tylka & Wood-Barcalow, 2015a), functionality appreciation (Alleva et al., 2017), and mindful self-care (Cook-Cottone & Guyker, 2018). Through this research, we have growing evidence of the salutary role that positive body image, and body appreciation in particular, plays in multiple indicators of well-being and healthy behaviors. These include lower disordered eating symptoms (Tylka & Wood-Barcalow, 2015a), higher intuitive eating (Avalos & Tylka, 2006), better sexual functioning (Satinsky, Reece, Dennis, Sanders, & Bardzell, 2012) and now, more intrinsic motivation for physical activity. Collectively, these findings support the need for more comprehensive models of positive body image and health behaviors. This will be an important area of development moving forward.

Key limitations of the current studies include using observational study designs, only examining the experiences of women, and using college samples. We cannot, based on the study design, conclude that greater body appreciation causes changes in intrinsic motivation for physical activity nor that yoga caused changes in self-compassion and body image. Rigorously controlled intervention studies and other experimental designs are needed to investigate the causal nature of these relationships. In addition, research is needed to examine if these relationships are comparable for men. In a similar study, Tylka and Homan (2015) discovered significant gender differences in the relationships among body functionality, functional reasons for exercise, body appreciation, and intuitive eating. Understanding the differences between men and women may illuminate how best to meet their needs in a physical activity setting. We also used the original BAS rather than the updated version. Although the two versions are strongly related, the BAS-2 may be a better representation of the body appreciation construct (Tylka & Wood-Barcalow, 2015a). Finally, participants in the yoga course (Sample 2) represent a self-selection bias into the yoga context, and both samples were relatively young and largely represented undergraduate students. Investigating these relationships in older populations or those who pose greater risk for negative body image or external regulation of physical activity behavior will be an important avenue for future work.

4.1. Conclusion

Negative body image variables such as body surveillance are associated with a range of negative health behaviors related to eating and physical activity among young adult women. It is therefore imperative to understand how cultivating positive body image may effectively fuel healthy outcomes such as intrinsic motivation for physical activity. This study's findings suggest that when women offer themselves more compassion, they may be better equipped to appreciate the various attributes of their body and refrain from habitually monitoring their appearance. Furthermore, body appreciation was a significant predictor of intrinsic motivation to be physically active. Although this study aimed to replicate the tests of these relationships across two samples and utilized both cross-sectional and prospective data within a yoga context, there is still more work to be done. Moving forward, we must continue to investigate the most effective strategies for helping women develop self-compassion skills as they relate to their body as well as fostering a positive view of their body that is characterized by an appreciation for its various aspects.

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