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Do exerciser weight status and perceived motivation predict instructors' motivation and beliefs about the exerciser? A test of motivation contagion effects

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ABSTRACT

We examined how fitness professionals' perceptions of a hypothetical exerciser's motivation and weight status impacted the professionals' motivation to instruct, perceived effectiveness of different interpersonal behaviors toward the exerciser, and beliefs about the exerciser's efficacy to overcome barriers to exercise. Results of a 2 (autonomous vs. controlled exerciser motivation) x 2 (normal weight vs. overweight exerciser) between-subjects experimental design showed that fitness professionals ($N = 134$) were more autonomously motivated to instruct, perceived autonomy-supportive behaviors as more effective, and had stronger beliefs regarding the exerciser's efficacy when the exerciser was portrayed as having autonomous motivation, compared to controlled motivation. Fitness professionals reported higher levels of controlled motivation to instruct and perceived controlling behaviors as more effective when presented with the overweight exerciser, compared to the normal weight exerciser. Our findings suggest that perceptions of exercisers' motivation and body weight can influence fitness professionals' interactions with and beliefs about their clients.

1. Introduction

An individual's body weight can have a profound impact on others' behaviors toward and beliefs about that individual; for instance, overweight and obese individuals report experiencing weight-based discrimination, stigmatization, and unjust treatment from educators, employers, and health-care professionals, including fitness professionals (Puhl & Heuer, 2009). These weight-stigmatizing attitudes within the exercise context may negatively affect the quality of service fitness professionals provide, such as their interpersonal styles of communication. These styles used by individuals in position of authority or expertise are also influenced by their perceptions of the motivation of the individuals they interact with (Ntoumanis, Quested, Reeve, & Cheon, 2018). For instance, exercisers' intrinsic reasons for engaging in exercise (e.g., enjoyment) can positively impact fitness professionals' beliefs about the exerciser and result in the use of a supportive communication style by the instructor (Ng, Thøgersen-Ntoumani, & Ntoumanis, 2012). Our goal in the current study was to explore whether fitness professionals' motivation to instruct, perceptions of effective communication style, and beliefs about the client's efficacy to overcome barriers to exercise participation were influenced by perceptions of their clients' motivation to exercise and body weight.

Our study was grounded in self-determination theory (SDT; Deci & Ryan, 1985; Ntoumanis et al., 2018) as this theory is concerned, amongst other things, with how significant others' communication style can facilitate or impede human motivation. Interpersonal styles within SDT are typically characterized as being either *autonomy-supportive* or *controlling behaviors* (Deci & Ryan, 1985), although more recently the broader terms 'need-supportive' and 'need-thwarting' have been, respectively, used as such behaviors encompass the support or thwarting of multiple needs (Ryan & Deci, 2017). For example, fitness professionals who engage in autonomy-supportive behaviors offer meaningful choices, provide rationales for task engagement, promote opportunities to make volitional choices, and acknowledge clients' feelings. Conversely, fitness professionals who exhibit controlling behaviors use coercion, criticism, punishment, and task-contingent rewards to

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manipulate how their clients feel, think, and behave (Edmunds, Ntoumanis, & Duda, 2007). Researchers drawing from SDT have shown that autonomy-supportive behaviors are associated with physical activity participation (Kinnafick, Thogersen-Ntoumani, Duda, & Taylor, 2014), positive mental health outcomes (e.g., Rouse, Ntoumanis, Duda, Jolly, & Williams, 2011), and autonomous motivation toward physical activity (e.g., Moustaka, Vlachopoulos, Kabitsis, & Theodorakis, 2012; Ntoumanis, Thøgersen-Ntoumani, Quested, & Hancox, 2017). While fewer studies have focused on outcomes of controlling behaviors in physical activity domains, existing research has shown that controlling behaviors increase controlled motivation and decrease psychological need satisfaction (e.g., Moustaka et al., 2012; Ng, Ntoumanis, Thøgersen-Ntoumani, Stott, & Hindle, 2013).

According to Ryan and Deci (2017), an individual's motivation toward an activity can be distinguished in terms of the degree to which it represents autonomous or controlled reasons for behavioral engagement. Individuals who are autonomously motivated perform activities out of inherent interest, enjoyment, and satisfaction (*intrinsic motivation*), or because the activities are congruent with their values and beliefs (*integrated regulation*), or because the activities offer personally valued outcomes (*identified regulation*). In contrast, individuals with controlled motivation engage in activities to avoid inner conflict or to attain contingent self-worth (*introjected regulation*), or as a result of external pressures, punishments, or rewards (*external regulation*). A plethora of researchers have documented positive relations between autonomous forms of motivation and exercise persistence (Teixeira, Carraca, Markland, Silva, & Ryan, 2012) and efficacy to overcome exercise barriers (Thøgersen-Ntoumani & Ntoumanis, 2006). In contrast, controlled motivation has been associated with reduced exercise participation (e.g., Ingledew & Markland, 2008) and symptoms of exercise dependence (Edmunds, Ntoumanis, & Duda, 2006).

1.1. Motivation contagion

Stemming from SDT, motivation contagion is a term used to describe how perceptions of others' motivation regulation toward an activity can positively or negatively influence the perceiver's own motivation regulation toward the same activity (Wild & Enzle, 2002). Perceptions of others' motivation may influence one's interpersonal style, especially in dyadic hierarchical relationships (e.g., fitness professional/client, teacher/student; Ntoumanis et al., 2018). Researchers testing motivation contagion in educational settings have shown that teachers exhibited autonomy-supportive behaviors when they perceived their students as more intrinsically motivated, and controlling behaviors when they perceived their students as less intrinsically motivated (i.e., controlled motivation; Taylor & Ntoumanis, 2007; Taylor, Ntoumanis, & Standage, 2008).

Few studies have tested the motivation contagion hypothesis in the exercise setting (Ng et al., 2012; Scarapicchia, Sabiston, Andersen, & Bengoechea, 2013). Ng et al. examined motivation contagion between trainee fitness professionals and a hypothesized obese client. Exercise science students were presented with a fictitious obese individual (target exerciser) displaying various motivation regulations (autonomous, controlled, or neutral) toward exercise adoption. Preliminary results showed no between-group differences regarding beliefs about weight loss and biases against obese individuals. However, a motivation-related bias was found. Specifically, students who were presented with the autonomously motivated exerciser had lower ratings of external regulation to instruct the exerciser, and greater beliefs that the exerciser would be able to overcome barriers to exercise. Furthermore, when presented with an autonomously motivated male (vs. female) exerciser, students perceived autonomy supportive behaviors (vs. controlling behaviors) as being more effective for motivating the exerciser, and invested more effort in identifying factors that would create the most effective training program for the exerciser.

While Ng et al. (2012) study was the first to examine the effects of motivation contagion on exercise instruction, there were limitations to their study. First, they did not control for social desirability and participants' dispositional tendencies for being autonomy-supportive vs. controlling. These variables are important to consider because self-report measures that assess personal attitudes and behaviors are prone to socially desirable response bias (Reynolds, 1982). It is likely that autonomous motivation to instruct and autonomy-supportive communication style might be prone to social desirability responding, given the adaptive nature of these constructs (i.e., internally endorsed reasons for action and interaction with others). The potential role of social desirability has been indicated in previous studies in the SDT literature, although the findings have been inconsistent (e.g., Roth, Assor, Kanat-Maymon, & Kaplan, 2007, found significant correlations between social desirability and student reports of motivation but not with teacher reports of motivation). Further, individuals differ in their dispositional tendencies to be autonomy-supportive or controlling when engaging with others, which can potentially influence ratings of perceived effectiveness of interpersonal behaviors (Deci, Connell, & Ryan, 1989), for instance those with higher disposition toward autonomy support might rate autonomy supportive strategies as more effective. Second, only a small proportion (10.98%) of the exercise science students in the Ng et al. study had professional experiences as fitness instructors. It is possible that the strength of motivation contagion effect may vary depending on the observer's experience with instructing (exercise science student vs. qualified fitness professional). Third, participants in the Ng et al.'s study were shown obese exercisers only (with different motivation regulations). Without a normal-weight comparison, it is difficult to determine whether the hypothetical exerciser's motivation or weight status influenced the instructors' ratings of their motivation to instruct, effectiveness of interpersonal behaviors, and beliefs about the efficacy of the exerciser to overcome barriers.

1.2. Weight bias

Ng et al. (2012) focused on obese exercisers because such individuals often feel stigmatized and experience weight-biased discrimination in various domains, including health care settings (Puhl & Heuer, 2009). Health-care trainees and providers from various specialty areas have reported several negative attitudes toward overweight and obese people. For example, exercise science students endorsed attitudes that overweight people are lazy, physically unattractive, buy too much junk food, and could lose weight if they really wanted to do (Chambliss, Finley, & Blair, 2004). Additionally, physicians have characterized overweight and obese patients as weak-willed, sloppy, and lazy (Foster et al., 2003). Within healthcare settings, researchers have shown that negative stereotypes of overweight and obese patients influence providers' quality of care (Phelan et al., 2015). Phelan et al.'s review on weight bias and stigma showed that providers' communication is less patient-centered (i.e., openness to patients' needs, beliefs, values, and preferences) with obese patients. A review of this body of research suggests that an individual's perceived weight status (normal weight vs. overweight) can impact others' behaviors toward and beliefs about that individual.

1.3. The current study

We examined whether a hypothetical exerciser's motivation (autonomous, controlled) and weight status (normal weight, overweight) influenced, independently and in interaction with each

other, qualified fitness professionals': (a) motivation to instruct the exerciser, (b) perceived effectiveness of autonomy-supportive and controlling behaviors toward that exerciser, and (c) perceptions of the client's efficacy to overcome barriers to exercise. Our hypotheses, based on work by Ng et al. (2012) on motivation contagion effects, and Phelan et al. (2015) and Puhl and Heuer (2009) on weight bias, were:

H1. Instructors would report higher levels of autonomous (vs. controlled) motivation to instruct when the exerciser was portrayed as having autonomous (vs. controlled) motivation (H1a), and as normal weight (vs. overweight; H1b).

H2. If an interaction between motivation and weight status occurred, instructors would report the highest levels of autonomous motivation to instruct when presented with a normal weight exerciser who had autonomous motivation (H2a), and the highest levels of controlled motivation to instruct when presented with the overweight exerciser with controlled motivation (H2b).

H3. Instructors would report autonomy-supportive (vs. controlling) behaviors as more effective when the target exerciser was portrayed as having autonomous (vs. controlled) motivation (H3a), and as normal weight (vs. overweight; H3b).

H4. If an interaction between motivation and weight status occurred, instructors would report the autonomy-supportive behaviors as being the most effective when presented with a normal weight exerciser who had autonomous motivation (H4a), and would report the controlling behaviors as being the most effective when presented with the overweight exerciser with controlled motivation (H4b).

H5. Instructors would have stronger beliefs regarding the exerciser's efficacy when the exerciser was portrayed as having autonomous motivation (vs. controlled; H5a), and normal weight (vs. overweight; H5b).

H6. If an interaction between motivation and weight status occurred, instructors would perceive the normal weight exerciser with autonomous motivation as being the most capable of overcoming barriers to exercise.

2. Method

2.1. Participants

A total of 134 qualified fitness professionals (74 males, 58 females, 2 did not disclose their gender), herein referred to as *instructors,* participated in our study. Power calculations were carried out using the G*Power software (Faul, Erdfelder, Buchner, & Lang, 2009) and the 'ANCOVA-fixed effects, main effects and interactions' option. Using an estimate of medium effect size (f = .25) based on findings from Ng et al. (2012), α = .05, beta = .80, with four groups and two covariates, the estimated sample size was 128. It should be noted, however, that interactions are more difficult to be detected because they often have small effect sizes (Aiken & West, 1991). For a small effect size (f = .10), a sample of 787 participants would be needed. Thus, the current study is not likely to produce significant interactions and, if they do materialize, they should be treated cautiously.

Instructors were between the ages of 20 and 61 years (M_{age} = 28.43 years, SD = 5.95), and most had 2–5 years of experience as a fitness professional (64.90%). Instructors held various levels of fitness certifications, with the majority being a fitness/group instructor and/or personal trainer (76%). Approximately 86% of the participants identified as White Australians.

2.2. Measures

2.2.1. Social desirability

Social desirability was assessed using the 13-item short-form version of the Marlowe-Crowne Social Desirability Scale (Reynolds, 1982). An example statement is: "No matter who I'm talking to, I am always a good listener." Instructors rated whether each statement was true or false for them personally. Scores on this questionnaire have been shown to have high reliability coefficients and concurrent validity (i.e., strong correlations with the full scale; Reynolds, 1982).

2.2.2. Interpersonal orientation

Instructors' dispositional tendency to be being autonomy-supportive or controlling when engaging with others was assessed using the Problems at Work (PAW) questionnaire (Deci et al., 1989). This inventory comprises eight different scenarios (vignettes) depicting problem situations that are typical for managers when working with subordinates. Each scenario is accompanied by four responses that portray different ways a manager could deal with the problem. The four responses range from highly autonomy-supportive behaviors to highly controlling behaviors. The highly autonomy-supportive responses involve the manager listening to the subordinates' opinions, recognizing their feelings, and allowing them to find their own solutions to problems, whereas the highly controlling responses involve the manager directing the subordinates' behaviors and using rewards and threats. Each response is scored on a 7-point Likert-type scale. Responses are summed across all eight scenarios. An overall score is then calculated by weighting (-2 for highly controlling, -1 for moderately controlling, 1 for moderately autonomy-supportive, and 2 for highly autonomy-supportive) and combining the sum of the four responses. Higher scores depict more autonomy-supportive behaviors. Deci et al. (1989) reported evidence of validity (via factor analysis) and high internal and test-retest reliability estimates over a 4-month period.

2.2.3. Perceived motivation of exercisers

The Behavioral Regulations in Exercise Questionnaire (BREQ; Mullan, Markland, & Ingledew, 1997) is a 15-item self-report inventory that assesses external regulation, introjected regulation, identified regulation, and intrinsic motivation. Mullan et al. provided evidence of adequate reliability and strong concurrent and discriminant validity via confirmatory factor analysis. In the current study, the scores on the BREQ was used as a manipulation check to ensure that participants correctly identified the target exerciser's type of motivation (autonomous or controlled). We did not use any items for integrated regulation because this factor assesses reasons for exercise that are not readily detected by others (e.g., exercise being part of one's identity). Participants were asked to rate their perceptions of the target exerciser's reasons to begin exercising at the gym (e.g., "Because other people probably said he should exercise," "Because he would probably enjoy his exercise session"). In order to reduce the length of the entire questionnaire package, only two items from each subscale were used, taken from Ng et al. (2012). Items were rated on a 5-point Likert-type scale anchored at 1 (*not very likely*) and 5 (*very likely*). Intrinsic motivation and identified regulation scores were combined to represent autonomous motivation, and introjected regulation and external regulation scores were combined to represent controlled motivation. Ng et al. reported high internal reliability estimates for these scores. We did not assess amotivation because we were interested in contrasting the two broad facets of motivation (as opposed to the absence of it) when referring to the reasons why the hypothetical exerciser decided to join the exercise class.

2.2.4. Motivation to instruct

Instructors' motivation to instruct the target exerciser was assessed using the Situational Motivation Scale (SIMS; Guay, Vallerand, & Blanchard, 2000) and the Multidimensional Work Motivation Scale (MWMS; Gagné et al., 2015). Both the SIMS and MWMS have been shown to produce valid and reliable scores. As per Ng et al. (2012), the intrinsic motivation (four items) and identified regulation (four items) subscales of the SIMS were used assess autonomous motivation. The SIMS does not have an introjected regulation subscale and for this reason we used the introjected regulation (four items) subscale of the MWMS, as well as the external regulation (four items) subscale of the SIMS to measure controlled motivation. Items from both questionnaires were slightly modified in the current study to examine instructors' motivation to instruct the target exerciser (e.g., "I would feel proud of myself to instruct exercisers like him"). The modifications were necessary because the SIMS refers to situational motivation without specifying a specific activity, and the MWMS refers to motivation for work. All items were rated on a 7-point Likert-type scale ranging from 1 (*does not correspond at all*) to 7 (*corresponds exactly*). Ng et al. and Gagné et al. reported high internal reliability estimates for the different motivation regulations subscales.

2.2.5. Interpersonal behaviors

Eight items from the Health Care Climate Questionnaire (HCCQ; Williams, Grow, Freedman, Ryan, & Deci, 1996) were used to assess autonomy-supportive behaviors, and eight items from the Controlling Coach Behaviors Scale (CCBS; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2010) were used to assess controlling behaviors. Both the HCCQ and CCBS have been shown to have good reliability and factorial validity. The original scales are phrased so that they capture perceptions of autonomy supportive and controlling behaviors, as perceived by the recipients of those behaviors. We had to modify those items and their stem so that they capture the extent to which fitness instructors believed that these behaviors would be effective in motivating the client exerciser. Thus, items from both scales were modified to assess instructors' perceived effectiveness of autonomy-supportive (e.g., "Encourage him to ask questions") and controlling (e.g., "Promise to reward him if he came back to the gym for the next session") behaviors for the target exerciser. All items were rated on a 7-point Likert scale anchored at 1 (*strongly disagree*) and 7 (*strongly agree*). Ng et al. (2012) reported adequate Cronbach alphas for the same 16 items of perceived effectiveness of autonomy supportive and controlling behaviors.

2.2.6. Perceived barrier efficacy of exerciser

The Self-Efficacy for Exercise Behavior Scale (Sallis, Pinski, Grossman, Patterson, & Nader, 1988) is an 8-item self-report inventory designed to assess individuals' self-efficacy to engage in exercise. Sallis et al. reported evidence for internal reliability, construct, and criterion-related validity. In the current study, the scale was modified, as per Ng et al. (2012), to assess instructors' perceptions of the target exerciser's ability to overcome barriers related to exercise (e.g., "Stick to his exercise program after a long, tiring day at work"). Items were rated on a 5-point Likert-type scale ranging from 1 (*not very likely*) to 5 (*very likely*). The modified Self-Efficacy Exercise Behavior Scale scores have shown high reliability estimates in previous research (Ng et al., 2012).

2.3. Procedures and design

Ethical approval for this study was obtained from the ethics review committee at Curtin University, Australia. Fitness instructors were recruited using face-to-face and online recruitment methods (e.g., Facebook, email), in return for entry into a cash prize draw. This study used a 2 (exercisers motivation: autonomous, controlled) × 2 (exerciser weight: average weight, overweight) between-subjects experimental design. Data collection was carried out online using the Qualtrics online survey software. When clicking on the survey link, all instructors were presented with a photograph of a hypothetical new client of theirs, a Caucasian, middle-aged male dressed in exercise attire. The same image was used across all conditions; however, it was digitally manipulated via an image software to reflect the different weight conditions (normal weight vs. overweight). The participants had as much or little time as they wanted to view the photo online. Having the same actor enabled us to control for perceived facial attractiveness of the exerciser across conditions. Each image was paired with statements reflecting the exerciser's motivation to begin exercising. Statements were designed to induce perceptions that the exerciser was either autonomous (e.g., "it's important for me to lead a healthy lifestyle") or controlled (e.g., "my partner, children, and doctor have been nagging me to start exercising") in their motivation to begin exercising. Participants then proceeded to complete the questionnaire. We did not comment on the client's weight in the scenarios. We wanted the participants to take a look at the photo and make their own inferences regarding the weight of the client.

2.4. Data analysis

Data were screened for missing values, outliers, and normality. Our hypotheses for motivation to instruct, instructor interpersonal behaviors, and perceived barrier efficacy of the exerciser were tested using ANCOVAs. False discovery rate correction was used to address issues of multiple comparisons and possible Type 1 error. The false discovery rate procedure has been noted as an effective alternative to the stringent Bonferroni correction for multiple comparisons (e.g., Glickman, Rao, & Schultz, 2014). The latter is too conservative and can significantly reduce power (Hochberg, 1988); in contrast, the false discovery rate procedure controls the expected proportion of false-positives based on the obtained p-values in an experiment, and thus, retains power (e.g., Verhoeven, Simosen, & McIntyre, 2005). The procedure creates a distribution of ascending p-values found significant in a study and then uses an index (based on the relative position of each p-value in the distribution and an alpha threshold, normally $p = .05$) to determine a new threshold for significance. In the current study, the false discovery rate procedure was conducted in SPSS 24.0. A threshold of 5% false discovery rate was used for statistical significance. Consequently, the adjusted p-value, given the distribution of p-values and number of comparisons in our study, that corresponds to a 5% false discovery rate was $p = .031$. In interpreting the effect sizes below (partial η^2), Cohen (1969); see also Richardson, 2011, regarding the confusion between η^2 and partial η^2) guidelines of .01 (small), 0.06 (medium) and .14 (large) could be useful.

For reasons explained earlier, social desirability served as covariate in the analysis assessing instructors' motivation to instruct, while both social desirability and instructors' interpersonal orientation served as covariates in the analysis assessing instructors' perceived effectiveness of autonomy-supportive and controlling behaviors.

3. Results

3.1. Preliminary analyses

Given that the amount of missing values was marginal (less than 1%), missing values were not replaced. The missing values were missing at random; Little's MCAR $\chi^2(556) = 552.66$, $p = .532$. There were no missing values for the scale scores that were employed

Table 1
Descriptive Statistics and Coefficient Omegas of Measured Variables by Motivation and Weight Condition.

Variable	Possible Range	Autonomous Condition		Controlled Condition		Entire Sample	
		Normal Weight (n = 32) M (SD)	Overweight (n = 33) M (SD)	Normal Weight (n = 34) M (SD)	Overweight (n = 35) M (SD)	ω	M (SD)
Social desirability	0–13	8.72 (2.25)	7.36 (3.27)	7.47 (2.93)	8.00 (2.93)	.72	7.88 (2.89)
Interpersonal orientation	−17–81	39.53 (18.02)	34.70 (18.24)	37.85 (21.78)	29.60 (19.68)	.74	35.32 (19.67)
Perceived motivation of exerciser							
Autonomous	1–5	3.71 (0.83)	3.75 (0.84)	2.64 (0.79)	2.66 (0.83)	.81	3.18 (0.97)
Controlled	1–5	2.58 (0.89)	2.66 (0.90)	3.52 (0.98)	3.51 (0.96)	.87	3.08 (1.02)
Motivation to instruct							
Autonomous motivation to instruct	1–7	5.93 (0.97)	5.49 (0.88)	5.37 (0.75)	5.11 (0.87)	.86	5.46 (0.91)
Controlled motivation to instruct	1–7	2.70 (0.80)	3.19 (0.78)	3.43 (0.81)	3.68 (0.84)	.86	3.26 (0.87)
Effectiveness of interpersonal behaviors							
Autonomous	1–7	5.48 (1.02)	5.38 (0.91)	4.98 (1.00)	4.79 (0.95)	.82	5.15 (1.00)
Controlled	1–7	1.93 (0.81)	2.56 (1.05)	2.76 (1.04)	3.19 (0.94)	.77	2.63 (1.06)
Perceived barrier efficacy of exerciser	1–5	4.11 (0.55)	3.89 (0.56)	3.43 (0.78)	3.23 (0.62)	.88	3.65 (0.72)

in the main analyses. Skewness and kurtosis values were used to assess normality and met Kline (2005) recommendations for univariate normality (i.e., skewness values less than |3| and kurtosis values less than |10|). No significant multivariate outliers were detected, as assessed by boxplots and Mahalanobis distance at the critical $\chi^2(df = 7) = 24.32$, $p = .001$. Descriptive statistics and omega coefficients (omega total; see MacNeish, in press) for all measured variables are presented in Table 1. Pearson correlations between constructs and skewness and kurtosis values are presented in Table 2.

Preliminary analyses using a factorial 2 × 2 ANOVA showed no significant differences in age and years of experience between the groups ($p > .05$). Furthermore, as a manipulation check, 2 × 2 ANOVAs were conducted to determine whether the participants correctly identified the exerciser's motivation (autonomous motivation vs. controlled motivation). There were significant main effects and large effect sizes for both perceived autonomous motivation, $F(1, 130) = 57.89$, $p < .001$, partial $\eta^2 = .31$, and perceived controlled motivation, $F(1, 130) = 30.77$, $p < .001$, partial $\eta^2 = .19$. Perceptions of autonomous motivation were higher for the exerciser portrayed as having autonomous motivation ($M = 3.73$) than the exerciser portrayed as having controlled motivation ($M = 2.65$). Similarly, perceptions of controlled motivation were higher for the exerciser portrayed as having controlled motivation ($M = 3.51$), compared to the exerciser portrayed as having autonomous motivation ($M = 2.62$). These results suggest that the scenarios were successful in inducing different perceptions of the exerciser' motivation.

3.2. *Motivation to instruct*

To test H1 and H2, that is, whether instructors' autonomous and controlled motivation to instruct would be influenced by the exerciser's perceived motivation for exercise and/or weight status, we carried out two ANCOVAs (see Table 1 for means and standard deviations).

3.2.1. *Autonomous motivation*

A 2×2 ANCOVA was conducted with instructors' autonomous motivation to instruct as the dependent variable; social desirability served as the covariate. The effect for social desirability was significant and small to moderate in size, $F(1, 129) = 6.32$, $p = .013$, $\eta_p^2 = .05$, indicating that social desirability was predictive of ratings of instructors' autonomous motivation to instruct. There was no significant interaction, $F(1, 129) = 0.03$, $p = .858$, $\eta_p^2 = .00$, but the main effect for motivation condition was significant and moderate in size, $F(1, 129) = 9.52$, $p = .002$, $\eta_p^2 = .07$. Specifically, instructors reported higher ratings of autonomous motivation to instruct when the exerciser was portrayed as having autonomous motivation, compared to controlled motivation. For weight condition, the main effect was also significant but small, $F(1, 129) = 4.75$, $p = .031$, $\eta_p^2 = .04$. Specifically, instructors reported higher ratings of autonomous motivation to instruct when presented with the normal weight exerciser as opposed to overweight exerciser.

3.2.2. *Controlled motivation*

A 2 × 2 ANCOVA was conducted with instructors' controlled motivation to instruct as the dependent variable; social desirability served as the covariate. The effect for social desirability was significant and moderate in size, $F(1, 129) = 14.87$, $p < .001$, $\eta_p^2 = .10$, indicating that social desirability was predictive of instructors' controlled motivation to instruct. There was no significant interaction, $F(1, 129) = 0.07$, $p = .791$, $\eta_p^2 = .00$, but the main effects for motivation condition was significant and moderate to large in size, $F(1, 129) = 19.07$, $p < .001$, $\eta_p^2 = .13$. Specifically, instructors reported higher ratings of controlled motivation to instruct when the exer-

Table 2
Skewness (S), Kurtosis (K), and Pearson Correlations Amongst Variables.

	S	K	1.	2.	3.	4.	5.	6.	7.
1. Social desirability	−0.10	−0.71	–						
2. Interpersonal orientation	−0.23	0.21	.30*	–					
3. Autonomous motivation to instruct	−0.83	1.02	.24*	.35**	–				
4. Controlled motivation to instruct	0.54	0.39	−.33**	−.39**	−.35**	–			
5. Effectiveness of autonomous behaviors	−0.50	0.15	.29**	.31**	.11	−.30**	–		
6. Effectiveness of controlled behaviors	0.16	−0.92	−.29**	−.49**	−.33**	.40**	−.28**	–	
7. Perceived barrier efficacy of exerciser	−0.44	0.79	.00	.20*	.21*	−.17*	.17	−.21*	–

Note. *p < .05, **p < .01.

ciser was portrayed as having controlled motivation, compared to autonomous motivation. For weight condition, the main effect was also significant and small to moderate in size, $F(1, 129) = 6.21$, $p = .014$, $\eta_p^2 = .05$. Specifically, instructors reported higher ratings of controlled motivation to instruct when presented with the overweight exerciser as opposed to normal weight exerciser.

3.3. Interpersonal style

To test H3 and H4, that is, whether instructors' ratings of the effectiveness of autonomy-supportive and controlling behaviors would be influenced by the exerciser's perceived motivation for exercise and/or weight status, we carried out two ANCOVAs (see Table 1 for means and standard deviations).

3.3.1. Autonomy-supportive behaviors

A 2 × 2 ANCOVA was conducted with instructors' effectiveness ratings of autonomy-supportive behaviors as the dependent variable; social desirability and interpersonal orientation served as the covariates. The effects for social desirability, $F(1, 128) = 6.36$, $p = .013$, $\eta_p^2 = .05$, and interpersonal style, $F(1, 128) = 6.54$, $p = .012$, $\eta_p^2 = .05$, were significant and small to moderate in size, indicating that both variables were predictive of instructors' perceived effectiveness ratings of autonomy-supportive behaviors. No interaction effect was found, $F(1, 128) = 0.36$, $p = .551$, $\eta_p^2 = .00$. The main effect for motivation condition was significant and moderate in size, $F(1, 128) = 9.30$, $p = .003$, $\eta_p^2 = .07$, whereas the main effect for weight condition was not significant, $F(1, 128) = 0.07$, $p = .800$, $\eta_p^2 = .00$. With regard to the motivation condition differences, ratings of effectiveness of autonomy-supportive behaviors were higher for the exerciser with autonomous motivation compared to the exerciser with controlled motivation.

3.3.2. Controlling behaviors

A 2 × 2 ANCOVA was conducted with instructors' effectiveness ratings of controlling behaviour as the dependent variable; social desirability and interpersonal orientation served as the covariates. The effect for social desirability was not significant, $F(1, 128) = 3.26$, $p = .073$, $\eta_p^2 = .03$, whereas the effect for interpersonal style was significant and large, $F(1, 128) = 29.06$, $p < .001$, $\eta_p^2 = .19$. These findings suggest that interpersonal style was predictive of perceived effectiveness ratings of controlling behaviors. No interaction effect was found, $F(1, 128) = 0.36$, $p = .551$, $\eta_p^2 = .00$, but the main effects for motivation condition was significant and moderate to large in size, $F(1, 128) = 19.17$, $p < .001$, $\eta_p^2 = .13$. Specifically, ratings of effectiveness of controlling behaviors were higher for the exerciser with controlled motivation than the exerciser with autonomous motivation. The main effect for weight condition was also significant but small to moderate in size, $F(1, 128) = 5.93$, $p = .016$, $\eta_p^2 = .04$. Specifically, controlling behaviors were rated more effective for the overweight exerciser than the normal weight exerciser.

3.4. Perceived barrier efficacy of exerciser

To test H5 and H6, that is, whether instructors' perceptions of the barrier efficacy of the exerciser would be influenced by the exerciser's perceived motivation for exercise and/or weight status, we carried out a 2 × 2 ANCOVA; social desirability served as the covariate (see Table 1 for means and standard deviations). The effect for social desirability was not significant, $F(1, 129) = 0.17$, $p = .861$, $\eta_p^2 = .00$. There was no significant interaction, $F(1, 129) = 0.01$, $p = .910$, $\eta_p^2 = .00$, and no significant main effect for weight condition, $F(1, 129) = 3.74$, $p = .055$, $\eta_p^2 = .03$. The main effect for motivation condition was significant and large, $F(1, 129) = 37.15$, $p < .001$, $\eta_p^2 = .22$. Specifically, instructors believed the exerciser portrayed as having autonomous motivation would be more efficacious to overcome barriers compared to the exerciser portrayed as having controlled motivation.

4. Discussion

The aim of the current study was to examine how perceptions of a new hypothetical client's motivation regulation (autonomous vs. controlled) for exercise and weight status (normal vs. overweight) affected instructors' motivation to instruct that client (controlling for social desirability), the perceived effectiveness of interpersonal behaviors (autonomy-supportive, controlling) toward that client, and instructors' beliefs about the client's efficacy to overcome barriers to exercise. In all analyses, we controlled for social desirability; when predicting perceived effectiveness of interpersonal behaviors, we also controlled for instructors' interpersonal orientation. Our hypotheses were generally supported as far as the main effects were concerned, but not in terms of interaction effects. Specifically, instructors reported higher autonomous (vs. controlled) motivation to instruct, rated autonomy supportive (vs. controlling) behaviors as more effective, and perceived greater client efficacy to overcome barriers, when presented with an exercise who was described as having autonomous (vs. controlled) motivation to exercise. Further, when the client was of normal weight (vs. overweight), instructors reported more autonomous (vs. controlled) motivation to instruct and perceived controlling behaviors to be less effective in instructing the client; there were no differences in terms of the effectiveness of autonomy supportive strategies or perceived client efficacy. Overall, for the significant findings, effect sizes were of medium to large size and were greater for motivation condition than for weight status.

As predicted, instructors reported higher levels of autonomous (controlled) motivation to instruct when presented with the exerciser portrayed as having autonomous (controlled) motivation (H1a). Instructors also reported higher levels of autonomous (controlled) motivation to instruct when presented with the normal weight (overweight) exerciser (H1b). As predicted, instructors reported autonomy-supportive (controlling) behaviors as more effective when presented with the exerciser portrayed as having autonomous (controlled) motivation (H3a). Partial support for H3b was found. While instructors reported controlling behaviors

as more effective when presented with the overweight exerciser compared to the normal weight exerciser, no differences in effectiveness ratings of autonomy-supportive behaviors were found between the normal weight and overweight exerciser. Regarding instructors' efficacy beliefs about the exerciser, results supported our prediction that instructors would believe the exerciser with autonomous motivation as more efficacious to overcome barriers compared to the exerciser portrayed as having controlled motivation (H5a). Our hypothesis that instructors would perceive the normal weight exerciser, compared to the overweight exerciser, as more capable of overcoming barriers to exercise (H5b) was not supported.

Our finding that instructors' motivation to instruct and interpersonal behaviors were influenced by their perceptions of the exercisers' motivation is consistent with the work of Ng et al. (2012), and supports the tenets of motivation contagion. Wild and Enzle (2002) postulate that observers are receptive to interpersonal and social cues that provide information about an actor's motivation for task engagement. Our findings demonstrate that exercisers who are perceived as being externally motivated to exercise may generate expectations and inferences that result in instructors feeling more controlled motivated to instruct and exhibiting more controlling behaviors during instruction. These generated expectations and inferences may also contribute to instructors feeling apprehensive about an exerciser's ability to overcome barriers to exercise. However, as is well-established in the SDT literature (Ryan & Deci, 2017), controlled motivation for behavioral enactment and a controlling style of communication are motivationally detrimental (e.g., less effort, empathy). If a client is indeed controlled in their motivation to join a new exercise program, instructors' maladaptive motivation, behaviors toward and beliefs about the client could have detrimental effects on that client's exercise participation and adherence.

As expected, instructors had higher levels of autonomous motivation to instruct the normal weight exerciser (vs. the overweight exerciser), more controlled motivation to instruct the overweight exerciser (vs. the normal weight exerciser), and believed controlling behaviors were most effective for the overweight exerciser (vs. normal weight exerciser). These findings are consistent with previous research documenting health professionals' negative attitudes and differing behaviors toward overweight and obese people, compared to average-weight people (Puhl & Heuer, 2009). Weight-stigmatizing attitudes within the exercise context can negatively affect the quality of service instructors provide (e.g., interpersonal behaviors, effort, planning), and can subsequently deter overweight clients' exercise adherence and quality of life. There is also potential that these negative attitudes may cause (or reinforce) overweight people to experience self-stigma and internalize weight-biased attitudes, potentially yielding a "why try" effect (Corrigan, Larson, & Rüsch, 2009). According to the "why try" effect, devaluation that results from self-stigma leads to diminished motivation and self-efficacy toward a particular goal. In fact, researchers have shown negative correlations between internalization of weight-biased attitudes and exercise motivation and self-efficacy (Pearl, Puhl, & Dovidio, 2015), providing evidence that the "why try" effect exists within an exercise context.

Some of our predictions were not supported. Results showed that effectiveness ratings of autonomy-supportive behaviors did not differ between the normal weight and overweight exerciser (H3b). Because autonomy-supportive behaviors encompass a range of positive attributes, it is unlikely that these behaviours would be perceived by the instructors as ineffective (i.e., rated low) for exercisers who are overweight. Rather, instructors might believe that using a combination of both autonomy-supportive and controlling behaviors would be effective for overweight clients, and that autonomy-supportive behaviours would be primarily effective for normal weight clients. Furthermore, instructors' efficacy beliefs did not differ between the normal weight and overweight exerciser (H5b). This nonsignificant finding may be due to the fact that the hypothetical target exerciser had already committed to a new exercise program, as opposed to someone contemplating exercise engagement. Future researchers might consider replicating our study with hypothetical exercisers varying not only in weight but also in readiness to begin exercising (e.g., stages of change).

The nonsignificant interactions for motivation to instruct (H2), interpersonal behaviors (H4), and instructors' efficacy beliefs of the exerciser (H6) suggest that the effects of the exerciser's motivation and weight status may be additive rather than synergistic. From an applied perspective this means that targeting each variable (exerciser's perceived motivation or weight status) may be likely to have an independent impact on the dependent variables, irrespective of whether the other variable is targeted or not. This perspective, however, rests on the assumption that the interactions examined were moderate or larger in size. However, interactions tend to have small effect sizes and, as such, require much larger samples than ours to determine statistical significance. Thus, we encourage researchers to examine whether these interactions would be significant with a larger sample size powered to detect small interaction effects before any firm conclusions are made.

Assuming that the examined interactions are indeed nonsignificant within larger samples powered to detect small interaction effects, it is also possible that instructors may perceive the overweight participant as invariably controlled in their exercise motivation and the normal weight participant as invariably autonomous in their exercise motivation. Another potential explanation for possible nonsignificant interactions from appropriately powered samples can be drawn from findings of previous studies which have shown that people's belief in weight controllability influences their perceptions of overweight/obese individuals; people are more favorable toward overweight/obese individuals when they believe that these individuals' weight is due to genetics or medical conditions (uncontrollable) vs. lack of effort or low willpower (controllable; e.g., Tanneberger & Ciupitu-Plath, 2018; Weiner, Perry, & Magnusson, 1988). Hence, future research might consider including another condition wherein weight controllability beliefs are manipulated in a three-way interaction: exerciser motivation × weight status × weight controllability beliefs. Based on such research, one could expect for example that instructors may have more autonomous motivation to instruct, rate autonomy-supportive strategies as more effective, and have higher perceived efficacy for the exerciser to overcome barriers, when overweight clients are described as self-determined in their motivation to exercise and their weight is attributed to uncontrollable factors (e.g., genetics) vs. when described as controlled in their exercise motivation and their weight is attributed to controllable factors (e.g., low willpower). However, the sample size requirements to obtain sufficient power to test a three-way interaction are even greater than those for a two-way interaction and, as such, place a large burden on the researchers. With this in mind, researchers may wish to consider alternate research strategies, such as multi-site, collaborative endeavors.

There are several limitations to our work. The use of hypothetical exercisers is a limitation that could be addressed in future studies by using confederates. Instructors could be given a profile of the confederate prior to interacting with them. This profile could include information about the confederate's current (or previous) weight and their reasons for exercising (autonomous or controlled). Next, instructors could be asked to instruct the confederate through a shortened workout. Motivation contagion effects could then be assessed via observation ratings of the instructors' interpersonal behaviors. Furthermore, we did not control for instructors' current weight. Researches have shown that the

magnitude of anti-fat attitude is lower among heavier individuals than among learner individuals (Schwartz, Vartanian, Nosek, & Brownell, 2006).

Several other future research directions exist. It would be interesting to explore the effect of a further weight status (i.e., *formerly* overweight or obese) on instructors' motivation to instruct, interpersonal behaviour, and efficacy beliefs. A driving reason people want to lose weight is to eliminate weight-biased stigma (e.g., Fardouly & Vartanian, 2012). However, some researchers have shown weight-based stigma resurfaces when a normal weight individual's former heavier weight is disclosed (Latner, Ebneter, & O'Brien, 2012). Mattingly, Stambush, and Hill (2009) claim that "in the eyes of others, knowing that an individual was at one time fat will lead him/her to always be treated like a fat person" (p. 139). Previous reports have shown that individuals who have successfully lost weight are viewed more negatively than their normal weight or even overweight counterparts (e.g., Levy & Pilver, 2012). Also, knowledge of weight-loss method has also been shown to influence perceptions; for instance, individuals who lost weight through bariatric survey were rated more negatively than individuals who lost weight through diet and exercise (Fardouly & Vartanian, 2012; Mattingly et al., 2009). Thus, future researchers could also explore how information about methods of weight-loss (or beliefs whether exercise is an effective means of weight loss) influence instructors' behaviors toward and beliefs about formerly overweight or obese exercisers. Another interesting research question is to investigate the effects of instructors' weight status (normal weight, overweight, formerly overweight), on exercisers' motivation to be instructed and efficacy beliefs about the instructor. We did not measure instructors' weight status, but it could be a potential moderator variable; within the healthcare literature, patients seeking care from non-obese physicians have reported greater confidence in physicians' ability to counsel and treat illness than patients seeking care from obese physicians (Hash, Munna, Vogel, & Bason, 2003).

Our study provides important conceptual and practical additions to the motivation contagion and weight bias literatures. This is the first study to test the motivation contagion effects with professional fitness instructors. The findings regarding the influence of a hypothesized client's motivation on the instructors' motivation to instruct, interpersonal communication style, and perceived efficacy beliefs are more consistent than those reported by Ng et al. (2012) with exercise science undergraduate students; Ng et al. found no differences between conditions with regard to autonomous motivation to instruct or controlling instructional style (when instructing a male exerciser). With regard to the role of perceived weight status, our findings make a substantial and unique contribution to the motivation and weight bias literatures, as no previous studies have looked at these effects with either professional or trainee exercise instructors.

While instructors are responsible for helping clients make positive, long lasting changes to their lifestyles, they are (just like the rest of society) sensitive to interpersonal cues that hold information regarding exercisers' motivation, and are exposed to western cultural biases about obesity and associated weight stigma. It is therefore imperative that fitness professionals are made aware of the potential positive or negative impact their inferences (implicit or explicit) about their clients have on their personal behaviors toward and beliefs about the client. Preliminary research findings indicate that brief educational films targeting weight bias significantly improved healthcare professionals' explicit attitudes toward obese individuals (Swift et al., 2013). Other examples of interventions to reduce weight bias include attribution re-training, evoking sympathy through perspective taking, role-playing, and self-reflection (for a review, see Alberga et al., 2017). Efforts to combat weight bias and raise awareness about the effects of motivation contagion and weight-bias discrimination could help improve fitness professionals' quality of service, and potentially their clients' motivation and exercise adherence.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.

Alberga, A. S. B., Pickering, J., Hayden, K. A., Ball, G. D. C., Edwards, A., Jelinski, S., . . . & Russell-Mayhew, S. (2017). Weight bias reduction in health professionals: A systematic review. *Clinical Obesity*, *6*, 175–188. http://dx.doi.org/10.1111/cob.12147

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., & Thøgersen-Ntoumani, C. (2010). Psychological need thwarting in the sport context: Assessing the darker side of athletic experiences. *Journal of Sport and Exercise Psychology*, *33*, 75–102. http://dx.doi.org/10.1123/jsep.33.1.75

Chambliss, H., Finley, C. E., & Blair, S. (2004). Attitudes toward obese individuals among exercise science students. *Medicine and Science in Sports and Exercise*, *36*, 468–474. http://dx.doi.org/10.1249/01.MSS.0000117115.94062.E4

Cohen, J. (1969). *Statistical power analysis for the behavioral sciences*. New York, NY: Academic Press.

Corrigan, P. W., Larson, J. E., & Rüsch, N. (2009). Self-stigma and the "why try" effect: Impact on life goals and evidence-based practices. *World Psychiatry*, *8*, 75–81. http://dx.doi.org/10.1002/j.2051-5545.2009.tb00218.x

Deci, E. L., Connell, J. P., & Ryan, R. M. (1989). Self-determination in a work organization. *Journal of Applied Psychology*, *74*, 580–590. http://dx.doi.org/10.1037/0021-9010.74.4.580

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum Press.

Edmunds, J., Ntoumanis, N., & Duda, J. L. (2006). Examining exercise dependence symptomatology from a self-determination perspective. *Journal of Health Psychology*, *11*, 887–903. http://dx.doi.org/10.1177/1359105306069091

Edmunds, J., Ntoumanis, N., & Duda, J. L. (2007). Perceived autonomy support and psychological need satisfaction as key psychological constructs in the exercise domain. In M. Hagger & N. L. D. Chatzisarantis (Eds.), *Self-determination in exercise and sport*. Champaign, IL: Human Kinetics, pp. 35–51.

Fardouly, J., & Vartanian, L. R. (2012). Changes in weight bias following weight loss: The impact of weight-loss method. *International Journal of Obesity*, *36*, 314–319. http://dx.doi.org/10.1038/ijo.2011.26

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical G*Power analyses using G*G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*, 1149–1160. http://dx.doi.org/10.3758/BRM.41.4.1149

Foster, G. F., Wadden, T. A., Makris, A. P., Davidson, D., Swain Sanderson, R., Allison, D. B., . . . & Kessler, A. (2003). Primary care physicians' attitudes about obesity and its treatment. *Obesity Research*, *11*, 1168–1177. http://dx.doi.org/10.1038/oby.2003.161

Gagné, M., Forest, J., Vansteenkiste, M., Crevier-Braud, L., Van den Broeck, A., Aspeli, A. K., . . . & Westbye, K. (2015). The Multidimensional Work Motivation Scale: Validation evidence in seven languages and nine countries. *European Journal of Work and Organizational Psychology*, *24*, 178–196. http://dx.doi.org/10.1080/1359432x.2013.877892

Glickman, M. E., Rao, S. R., & Schultz, M. R. (2014). False discovery rate control is a recommended alternative to Bonferroni-type adjustments in health studies. *Journal of Clinical Epidemiology*, *67*, 850–857. http://dx.doi.org/10.1016/j.jclinepi.2014.03.012

Guay, F., Vallerand, R. J., & Blanchard, C. (2000). On the assessment of situational intrinsic and extrinsic motivation: The Situational Motivation Scale (SIMS). *Motivation and Emotion*, *24*, 175–213. http://dx.doi.org/10.1023/A:1005614228250

Hash, R. B., Munna, R. K., Vogel, R. L., & Bason, J. J. (2003). Does physician weight affect perception of health advice? *Preventive Medicine*, *36*, 41–44. http://dx.doi.org/10.1006/pmed.2002.1124

Hochberg, Y. (1988). A sharper Bonferroni procedure for multiple tests of significance. *Biometrika*, *75*, 800–803.

Ingledew, D. K., & Markland, D. (2008). The role of motives in exerciser participation. *Psychology and Health*, *23*, 807–828. http://dx.doi.org/10.1080/08870440701405704

Kinnafick, F. E., Thogersen-Ntoumani, C., Duda, J. L., & Taylor, I. (2014). Sources of autonomy support, subjective vitality and physical activity behaviour associated with participation in a lunchtime walking intervention for physically inactive adults. *Psychology of Sport and Exercise*, *15*, 190–197. http://dx.doi.org/10.1016/j.psychsport.2013.10.009

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York, NY: Guilford Press.

Latner, J. D., Ebneter, D. S., & O'Brien, K. S. (2012). Residual obesity stigma: An experimental investigation of bias against obese and lean targets differing in weight-loss history. *Behavior and Psychology*, *20*, 2035–2038. http://dx.doi.org/10.1038/oby.2012.55

Levy, B. R., & Pilver, C. E. (2012). Residual stigma: Psychological distress among the formerly overweight. *Social Science and Medicine*, *75*, 297–299. http://dx.doi.org/10.1016/j.socscimed.2012.03.007

Mattingly, B. A., Stambush, M. A., & Hill, A. E. (2009). Shedding the pounds but not the stigma: Negative attributions as a function of a target's method of weight

loss. *Journal of Applied Biobehavioral Research*, *14*, 128–144. http://dx.doi.org/10.1111/j.1751-9861.2009.00045.x
McNeish, D. Thanks coefficient alpha, we'll take it from here. Psychological Methods, https://doi.org/10.1037/met0000144 (in press).
Moustaka, F. C., Vlachopoulos, S. P., Kabitsis, C., & Theodorakis, Y. (2012). Effects of an autonomy-supportive exercise instructing style on exercise motivation, psychological well-being, and exercise attendance in middle-age women. *Journal of Physical Activity and Health*, *9*, 138–150.
Mullan, E., Markland, D., & Ingledew, D. K. (1997). A graded conceptualisation of self- determination in the regulation of exercise behaviour: Development of a measure using confirmatory factor analytic procedures. *Personality and Individual Differences*, *23*, 745–752. http://dx.doi.org/10.1016/S0191-8869(97)00107-4
Ng, J. Y., Ntoumanis, N., Thøgersen-Ntoumani, C., Stott, K., & Hindle, L. (2013). Predicting psychological needs and well-being of individuals engaging in weight management: The role of important others. *Applied Psychology: Health and Well-Being*, *5*, 291–310. http://dx.doi.org/10.1111/aphw.12011
Ng, J. Y., Thøgersen-Ntoumani, C., & Ntoumanis, N. (2012). Motivation contagion when instructing obese individuals: A test in exercise settings. *Journal of Sport and Exercise Psychology*, *34*, 525–538. http://dx.doi.org/10.1123/jsep.34.4.525
Ntoumanis, N., Quested, E., Reeve, J., & Cheon, S. H. (2018). Need supportive communication: Implications for motivation in sport, exercise, and physical activity. In B. Jackson, J. A. Dimmock & J. Compton (Eds.), *Persuasion and communication in sport, exercise, and physical activity*. Abingdon, UK: Routledge, pp. 155–169.
Ntoumanis, N., Thøgersen-Ntoumani, C., Quested, E., & Hancox, J. (2017). The effects of training group exercise class instructors to adopt a motivationally adaptive communication style. *Scandinavian Journal of Medicine and Science in Sport*, *27*, 1026–1034. http://dx.doi.org/10.1111/sms.12713F
Pearl, R. L., Puhl, R. M., & Dovidio, J. F. (2015). Differential effects of weight bias experiences and internalization on exercise among women with overweight and obesity. *Journal of Health Psychology*, *20*, 1626–1632. http://dx.doi.org/10.1177/1359105313520338
Phelan, S. M., Burgess, D. J., Yeazel, M. W., Hellerstedt, W. L., Griffin, J. M., & van Ryn, M. (2015). Impact of weight bias and stigma on quality of care and outcomes for patients with obesity. *Obesity Reviews*, *16*, 319–326. http://dx.doi.org/10.1111/obr.12266
Puhl, R. M., & Heuer, C. A. (2009). The stigma of obesity: A review and update. *Obesity*, *17*, 941–964. http://dx.doi.org/10.1038/oby.2008.636
Reynolds, W. M. (1982). Development of reliable and valid forms of the Marlowe-Crowne Social Desirability Scale. *Journal of Clinical Psychology*, *38*, 119–125. http://dx.doi.org/10.1002/1097-4679(198201
Richardson, J. T. E. (2011). Eta squared and partial eta squared as measures of effect size in educational research. *Educational Research Review*, *6*, 135–147. http://dx.doi.org/10.1016/j.edurev.2010.12.001
Roth, G., Assor, A., Kanat-Maymon, Y., & Kaplan, H. (2007). Autonomous motivation for teaching: How self-determined teaching may lead to self-determined learning. *Journal of Educational Psychology*, *99*, 761–774. http://dx.doi.org/10.1037/0022-0663.99.4.761
Rouse, P. C., Ntoumanis, N., Duda, J. L., Jolly, K., & Williams, G. C. (2011). In the beginning: Role of autonomy support on the motivation, mental health and intentions of participants entering an exercise referral scheme. *Psychology & Health*, *26*, 729–749. http://dx.doi.org/10.1080/08870446.2010.492454
Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York, NY: Guilford Press.
Sallis, J. F., Pinski, R. B., Grossman, R. M., Patterson, T. L., & Nader, P. R. (1988). The development of Self-Efficacy Scales for health related diet and exercise behaviors. *Health Education Research*, *3*, 283–292. http://dx.doi.org/10.1093/her/3.3.283
Scarapicchia, T. M., Sabiston, C. M., Andersen, R. E., & Bengoechea, E. G. (2013). The motivational effects of social contagion on exercise participation in young female adults. *Journal of Sport and Exercise Psychology*, *35*, 563–575. http://dx.doi.org/10.1123/jsep.35.6.563
Schwartz, M. B., Vartanian, L. R., Nosek, B. A., & Brownell, K. D. (2006). The influence of one's own body weight on implicit and explicit anti-fat bias. *Obesity*, *14*, 440–447. http://dx.doi.org/10.1038/oby.2006.58
Swift, J. A., Tischler, V., Markham, S., Gunning, I., Glazebrook, C., Beer, C., . . . & Puhl, R. (2013). Are anti-stigma films a useful strategy for reducing weight bias among trainee healthcare professionals? Results of a pilot randomized control trial. *Obesity Facts*, *6*, 91–102. http://dx.doi.org/10.1159/000348714
Tanneberger, A., & Ciupitu-Plath, C. (2018). Nurses' weight bias in caring for obese patients: Do weight controllability beliefs influence the provision of care to obese patients? *Clinical Nursing Research*, *27*, 412–432. http://dx.doi.org/10.1177/1054773816687443
Taylor, I. M., & Ntoumanis, N. (2007). Teacher motivational strategies and student self-determination in physical education. *Journal of Educational Psychology*, *99*, 747–760. http://dx.doi.org/10.1037/0022-0663.99.4.747
Taylor, I. M., Ntoumanis, N., & Standage, M. (2008). A self-determination theory approach to understanding the antecedents of teachers' motivational strategies in physical education. *Journal of Sport & Exercise Psychology*, *30*, 75–94. http://dx.doi.org/10.1123/jsep.30.1.75
Teixeira, P. J., Carraca, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, *9*, 78. http://dx.doi.org/10.1186/1479-5868-9-78
Thøgersen-Ntoumani, C., & Ntoumanis, N. (2006). The role of self-determined motivation in the understanding of exercise-related behaviours, cognitions and physical self-evaluations. *Journal of Sport Sciences*, *24*, 393–404. http://dx.doi.org/10.1080/02640410500131670
Verhoeven, K. J. F., Simosen, K. L., & McIntyre, L. M. (2005). Implementing false discovery rate control: Increasing your power. *Oikos*, *108*, 643–647. http://dx.doi.org/10.1111/j.0030-1299.2005.13727.x
Weiner, B., Perry, R. P., & Magnusson, J. (1988). An attributional analysis of reactions to stigmas. *Journal of Personality and Social Psychology*, *55*, 738–748. http://dx.doi.org/10.1037/0022-3514.55.5.738
Wild, T. C., & Enzle, M. E. (2002). Social contagion of motivational orientations. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research*. Rochester, NY: University of Rochester Press, pp. 141–157.
Williams, G. C., Grow, V. M., Freedman, Z. R., Ryan, R. M., & Deci, E. L. (1996). Motivational predictors of weight loss and weight-loss maintenance. *Journal of Personality and Social Psychology*, *70*, 115–126. http://dx.doi.org/10.1037/0022-3514.70.1.115