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Direct and indirect relationships between disordered eating, sociocultural factors, satisfaction of basic psychological needs and controlled regulation of exercise in university students

Abstract: Objective: The current study aims to investigate, which of the factors are directly and indirectly associated with disordered eating in a non-clinical population of university students in Slovakia.

Methods: 302 university students (52.3% female, M age=21) filled in a questionnaire assessing the perceived pressure to be thin, the internalization of appearance ideals, disordered eating, satisfaction of basic psychological needs and the regulation of exercise. The hypothesized model was tested with a parallel multiple mediation analysis using PROCESS macro.

Results: The pressure to be thin from partner, the internalization of appearance ideals and the controlled regulation of exercise were directly associated with disordered eating. The pressure to be thin from media was indirectly associated with disordered eating through the internalization of appearance ideals. The pressure to be thin from partner and from family as well as satisfaction of the need for competence were indirectly associated with disordered eating through the controlled regulation of exercise.

Conclusions: The results of the current study support the focus of the existing eating disorder interventions at decreasing the internalization of sociocultural appearance ideals. The results suggest the usefulness of incorporating the promotion of autonomous regulation of behaviour, especially with regard to exercising, within the prevention and intervention field.

Key words: *disordered eating; internalization of appearance ideals; pressure to be thin; basic psychological needs; controlled regulation of exercise; self-determination theory.*

From the beginning of their studies, university students face new challenges, such as new requirements for academic performance and self-management, as well as a new social environment. For many students, this may be the first time they live away from their parents and they may often experience loneliness (e. g. Odaci & Kalkan, 2010; Özdemir & Tuncay, 2008) or depressive symptoms (e. g. Steptoe, Ardle, Tsuda, & Tanaka, 2007). Together with the freedom and necessity to manage their daily meals and the option of eating at different day or night times, this may pose a particular challenge to their eating habits. As such, it is important to study the factors that may contribute to the development of disordered eating in university students in order to help plan preventive strategies. This study draws the possible risk and

protective factors of disordered eating from three relevant theories and combines them into a more complex model. This model aims to investigate which of the factors are important in female and male university students in Slovakia and what the relationships are between them.

The sociocultural model (Stice & Agras, 1998; Stice, Nemeroff, & Shaw; 1996) is one of the most tested models in the development of eating disorders (e. g. Austin & Smith, 2008; Fitzsimmons-Craft et al., 2014; Stice, 2001; Vander Wal, Gibbons, & Grazioso, 2008). This model emphasizes the role of sociocultural factors related to the glorification of thinness in society, the perceived pressure to be thin from wider and even closer surroundings of the individual and the internalization of the sociocultural ideal of beauty as a personal goal. These factors may lead to

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disordered eating (Stice & Agras, 1998; Stice et al., 1996). The thin-ideal internalization has been suggested to mediate the relationship between the sociocultural pressure to be thin and eating pathology (Stice et al., 1996; Stice, 1994).

The pressure to be thin comes from different sources which are proposed by the tripartite influence model (Keery, van den Berg, & Thompson, 2004) and quadripartite model (Tylka, 2011). The tripartite influence model suggests that sociocultural pressures from peers, parents and the media predict body dissatisfaction and eating disturbances with the internalization of appearance ideals and appearance comparison as mediators of these relationships. Tylka (2011) has added dating partners as a source of social influence. However, the influence of peers can be further differentiated into the influence of friends, siblings, partner and other peers. Therefore, the current study distinguishes between the pressure from the media, family, friends and romantic partner in the hypothetical model of disordered eating (Figure 1).

For a large proportion of eating disorder patients, exercising excessively takes place during the acute phase of the disorder. Excessive physical activity may be central to the development and maintenance of some eating disorders (Penas-Lledo, Vaz Leal, & Waller, 2002). Mond, Hay, Rodgers and Owen (2006) have investigated, when exercising starts to have negative consequences and can subsequently be referred to as excessive. Their study has shown that exercise is excessive when its postponement is accompanied by intense guilt or when it is undertaken solely to influence weight or shape. In these cases, it is associated with elevated levels of eating disorder symptoms (Mond et al., 2006).

Self-determination theory (Deci & Ryan, 2008; Ryan & Deci, 2000) represents a useful framework in which to study the sociocultural variables associated with disordered eating. In this framework, exercising to control weight or shape can be considered as controlled regulation of exercise. More specifically, if exercising is regulated through guilt, this regulation is considered to be introjected. In the context of self-determination theory, controlled regulation of behaviour is expected to result in negative outcomes while autonomous regulation of behaviour leads to positive outcomes such as increased quality of life and health (Deci & Ryan, 2000).

According to self-determination theory, psychological needs thwarting may lead to compensatory health risk behaviours (Ryan & Deci, 2000). The regulation of exercise to attain an extremely thin figure can be considered as one such compensatory behaviour. It has repeatedly been shown that the fulfilment of basic psychological needs (i.e., autonomy, competence, and relatedness) is negatively associated with disordered eating (Bégin et al., 2018; Frederic & Grow, 1996; Thøgersen-Ntoumani & Ntoumanis, 2007; Thøgersen-Ntoumani, Ntoumanis, & Nikitaras, 2010). Therefore, it is expected that the controlled regulation of exercise would mediate the relationship between basic psychological

needs satisfaction and disordered eating as well as the relationship between the pressure to be thin from different sources and disordered eating in the hypothetical model (Figure 1).

In the current study, it is of interest to examine the factors associated with disordered eating in a non-clinical population. Eating is called disordered, when it does not fulfil its essential role of healthy nutrition, becomes a means of body reshaping and has an adverse effect on the health and functioning of the body (Ferreiro, Seoane, & Senra, 2012; Garber, Boyer, Pollack, Chang, & Shafer, 2008). Disordered eating can be defined as disturbed and unhealthy eating patterns that include purgative practices, bingeing, food restriction and other inadequate methods to control weight. These practices occur less frequently or are less severe than those required to meet the full criteria for the diagnosis of an eating disorder (Pereira & Alvarenga, 2007).

Traditionally, studies investigating eating disorders and body dissatisfaction has been conducted on female samples. However, disordered eating, as well as excessive exercise are no longer exclusively issues for women (e. g. Griffiths, Murray, & Touyz, 2015; Lavender, Brown, & Murray, 2017; O'Dea & Abraham, 2002). It seems, that both, thin-ideal internalization as well as muscularity internalization plays a significant role in the development of disordered eating in men (Klimek, Murray, Brown, Gonzales, & Blashill, 2018). According to longitudinal study of Ferreiro et al. (2012) gender differences in disordered eating first appeared at the age of 13 years, with girls higher on eating disorder symptoms and this difference became more pronounced two years later. In the terms of older age, Linde et al. (2004) found out that women were more likely to engaged in binge eating compared to men in a sample of obese, treatment-seeking individuals. Therefore, the hypothetical model will be adjusted for the variation in disordered eating attributed to gender.

As previous studies investigating disordered eating in the context of all three theories (the sociocultural model, tripartite and quadripartite influence models and self-determination theory) have been limited (e. g. Hricova & Orosova, 2017; Kopp & Zimmer-Gembeck, 2011; Pelletier, Dion, & Levesque, 2004; Zancu, Rodgers, & Enea, 2019) the main aim of the present study is to develop a more complex model of disordered eating based on these approaches. The aim is to investigate which of the factors are directly and indirectly (through the internalization of appearance ideals and the controlled regulation of exercise) associated with disordered eating in university students in Slovakia. It was hypothesised that the pressures to be thin from different sources, the internalization of appearance ideals, the satisfaction of basic psychological needs and the controlled regulation of exercise would be directly associated with disordered eating (H1). It was expected that the associations would be positive except for the association with the satisfaction of basic psychological needs. It was also expected that there would be an indirect association between the pressures to be thin from different

sources and disordered eating parallelly through two mediators: the internalization of appearance ideals and the controlled regulation of exercise (H2). The final hypothesis was that there would be an indirect association between basic psychological needs satisfaction and disordered eating parallelly through two mediators: the internalization of appearance ideals and the controlled regulation of exercise (H3) (Figure 1).

The influence of friends, family, partners and the media are measured by inserting the name of the influence into the statements. The participants were asked how much they agree with these statements on a 5-point scale ranging from 1 (never) to 5 (always). Pressures from different sources were assessed by averaging the scores from the corresponding items. This scale had a Cronbach's alpha of 0.84 (0.81 for women and 0.86 for men).

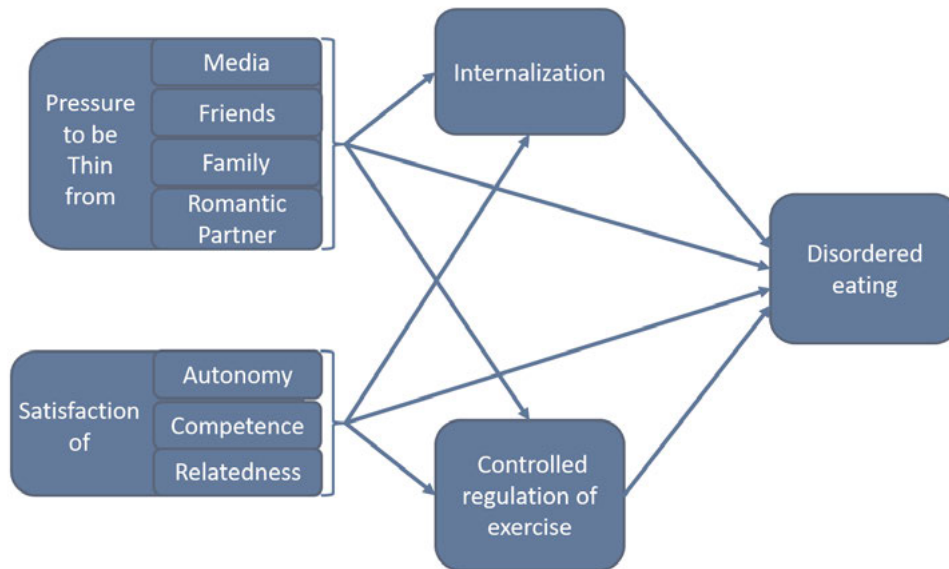


Figure 1 Hypothetical model of disordered eating based on Stice et al. (1996), Stice (1994), Keery et al. (2004), Tylka (2011), Deci and Ryan (1985), Ryan and Deci (2000), Thøgersen-Ntoumani et al. (2010). Internalization; internalization of appearance ideals.

METHODS

Participants and procedure

University students from three universities in two cities in Slovakia were asked to participate in the study face-to-face during regular seminars. Participants studied different subjects (35.8% informatics, 18.2% teaching, 14.6% psychology, 6.6% sports, 0.3% other and 24.5% participants have not filled in their subject). Participation in the study was voluntary and anonymous and informed consent was obtained. The participants received no payment. A convenience sampling method was used and there was a balance of genders in the sample. The total sample size consisted of 302 students (52.3% female). The participants either filled in an electronic (198 participants) or paper (104 participants) version of the questionnaire. The average age of the participants was 21 years old ($SD = 2.15$) and the average BMI was 22.25 ($SD = 3.50$). The study obtained local university ethic committee approval.

Measures

Pressure to be thin. The perceived pressure to be thin from different sources was assessed using The Perceived Sociocultural Pressure Scale (Stice, Ziemba, Margolis, & Flick, 1996). This scale contains 8 statements, e. g. "I've felt pressure from my ___ to lose weight" and "I've noticed a strong message from ___ to have a thin body".

Internalization of appearance ideals. The internalization of appearance ideals was assessed using The Internalization-General subscale of the Sociocultural Attitudes towards Appearance Questionnaire-3 (Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004). This subscale consists of 9 items, e. g. "I would like my body to look like the people who are on TV". Participants are asked how much they agree with these statements on a 5-point scale ranging from 1 (definitely disagree) to 5 (definitely agree). The total score was created by summing all the responses with a higher score reflecting a greater internalization of sociocultural appearance ideals. This scale had a Cronbach's alpha of 0.88 (0.89 for women and 0.87 for men).

Disordered eating. Disordered eating was assessed using The Eating Attitude Test (EAT-26) (Garner, Olmsted, Bohr, & Garfinkel, 1982). It consists of 26 statements, e. g. "I like my stomach to be empty." Participants are asked how much they agree with these statements on a 6-point scale ranging from 1 (never) to 6 (always). A higher score indicates a higher level of disordered eating. The scale had a Cronbach's alpha of 0.86 (0.85 for women and 0.86 for men).

Basic psychological needs satisfaction. The satisfaction of basic psychological needs for autonomy, competence and relatedness was assessed using The Balanced Measure of Psychological Needs (Sheldon & Hilpert, 2012). It consists of 18 statements, e. g. "My choices

expressed my true self" (autonomy) or „I did something stupid that made me feel incompetent“ (competence) or „I felt a sense of contact with people who care for me and whom I care for“ (relatedness). Participants are asked to indicate their agreement with these statements on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The score for each psychological need was computed after recoding the negatively worded items. In the later analyses, these three needs were treated separately and not as a single aggregate as suggested by Sheldon and Hilpert (2012). A higher score indicates higher satisfaction of the need for autonomy, competence and relatedness. The scale had a Cronbach's alpha of 0.83 (0.85 for women and 0.80 for men).

Regulation of exercise. The regulation of exercise was assessed using the Behavioural Regulation in Exercise Questionnaire-2 (Markland & Tobin, 2004). It consists of 19 items, e. g. "I enjoy my exercise sessions" (intrinsic motivation); "I exercise because other people say I should" (external regulation). The participants responded to each item on a 5-point scale ranging from 1 (not true for me) to 5 (very true for me). The subscales referring to non-self-determined forms of exercise regulation (introjected and external regulation) were grouped together to form a global score of controlled regulation. Controlled regulation of exercise had a Cronbach's alpha of 0.80 (0.82 for women and 0.76 for men).

Statistical analyses

The descriptive statistics of the observed variables were done in SPSS 21. The hypothetical model was tested using the Hayes' PROCESS tool (Field, 2013; Hayes, 2018). Two mediators (the internalization of appearance

ideals and the controlled regulation of exercise) were added in a model parallelly and the analysis was conducted for each independent variable set as X variable with the rest of independent variables set as covariates. Gender was added as a covariate as well. This procedure estimated the part of one predictor's effect on disordered eating that is unique to that predictor relative to the other predictors in the model (Hayes, 2018). There were 231 cases included in the analysis. Number of bootstrap samples for percentile bootstrap confidence intervals has been set to 5000.

RESULTS

Preliminary Analysis

The descriptive statistics are presented in Table 1. Only 3% of participants (9 participants) have reached or exceeded the cut-off score of 20 on the Eating Attitude Test. There were no significant gender differences found in disordered eating or the satisfaction of basic psychological needs. Women scored higher on the pressure to be thin from the media and the internalization of appearance ideals. Men scored higher on the controlled regulation of exercise.

H1: Direct associations with disordered eating

Direct associations of all the independent variables with disordered eating were tested as a part of the analysis testing the hypothetical model.

The results revealed that the pressure to be thin from partner ($b=0.905$, $p < .001$), the internalization of appearance ideals ($b=0.121$, $p= .004$) and the controlled regulation of exercise ($b=1.895$, $p < .001$) were directly associated with disordered eating (Table 2).

Table 1. Descriptive statistics

	Total	Women	Men	T-Test		
	Mean (SD)	Mean (SD)	Mean (SD)	t	df	p
Age	21.07 (2.15)	21.35 (1.79)	20.76 (2.46)			
BMI	22.25 (3.50)	21.22 (3.58)	23.34 (3.06)			
Pressure to be thin from friends	2.76 (1.40)	2.81 (1.46)	2.69 (1.31)	0.72	293	0.47
Pressure to be thin from family	2.93 (1.72)	3.15 (1.94)	2.67 (1.38)	2.45	276	0.015
Pressure to be thin from partner	2.75 (1.56)	2.86 (1.69)	2.61 (1.39)	1.39	289.29	0.167
Pressure to be thin from the media	3.93 (2.41)	4.52 (2.53)	3.27 (2.10)	4.63	288.74	<0.001
Internalization	23.28 (8.75)	25.12 (8.66)	21.20 (8.47)	3.83	282	<0.001
Disordered eating	5.60 (5.45)	6.08 (5.81)	5.08 (4.99)	1.53	277	0.126
Autonomy	20.08 (3.81)	19.90 (4.16)	20.31 (3.34)	-0.927	284.13	0.355
Competence	18.56 (3.39)	18.65 (3.60)	18.41 (3.12)	0.629	288.55	0.530
Relatedness	21.21 (3.68)	21.21 (3.92)	21.19 (3.41)	0.036	286	0.972
Controlled regulation	1.96 (0.79)	1.83 (0.79)	2.10 (0.77)	-2.91	280.50	0.004

Means, standard deviations and results of t-tests for the assessed variables. Significant gender differences even after the Bonferroni adjustment are in bold (after the application of the Bonferroni adjustment, the threshold for testing the individual hypotheses was set to 0.005). Internalization; internalization of appearance ideals. Autonomy, competence, relatedness; satisfaction of autonomy, competence, relatedness. Controlled regulation; controlled regulation of exercise.

Table 2 Direct effects of assessed factors on disordered eating

	b	t	p	95% CI
Pressure to be thin from friends	-0.354	-1.086	0.279	[-0.998, 0.289]
Pressure to be thin from family	-0.115	-0.426	0.670	[-0.647, 0.417]
Pressure to be thin from partner	0.905	3.671	<0.001	[0.419, 1.391]
Pressure to be thin from the media	-0.011	-0.070	0.945	[-0.318, 0.296]
Internalization of appearance ideals	0.121	2.946	0.004	[0.040, 0.203]
Satisfaction of autonomy	-0.140	-1.169	0.244	[-0.377, 0.096]
Satisfaction of competence	0.079	0.661	0.510	[-0.157, 0.316]
Satisfaction of relatedness	0.080	0.724	0.470	[-0.138, 0.298]
Controlled regulation of exercise	1.895	3.892	<0.001	[0.935, 2.854]
Gender	-0.470	-0.649	0.517	[-1.897, 0.958]

$R^2=0.233$, $F(10,220)=6.681$, $p < .001$. *CI = confidence interval for b. The presented coefficients are unstandardised.*

H2: Indirect associations with the pressures to be thin from different sources as predictors

The pressure to be thin from each source was set in a model as X variable and the remaining predictors (the pressures from other sources, the satisfaction of basic psychological needs and gender) were set as covariates in a model. The internalization of appearance ideals and the controlled regulation of exercise were set as mediators operating parallelly. The analysis was conducted for each source of pressure.

The pressure to be thin from friends was not found to be significantly indirectly associated with disordered eating.

The pressure to be thin from family was associated with disordered eating indirectly through the controlled regulation of exercise, $b=0.206$, $CI [0.025, 0.404]$.

The pressure to be thin from partner was associated with disordered eating indirectly through the controlled regulation of exercise, $b=0.166$, $CI [0.040, 0.342]$.

The pressure to be thin from media was associated with disordered eating indirectly through the internalization of appearance ideals, $b=0.076$, $CI [0.004, 0.179]$ (Table 3).

H3: Indirect associations with the satisfaction of basic psychological needs as predictors

The satisfaction of each psychological need was set in a model as X variable and the remaining predictors (the pressures to be thin from all the sources, the satisfaction of other basic psychological needs and gender) were set as covariates in a model. The internalization of appearance ideals and the controlled regulation of exercise were set as mediators operating parallelly. The analysis was conducted for each psychological need.

The satisfaction of autonomy was not found to be significantly indirectly associated with disordered eating.

The satisfaction of competence was associated with disordered eating indirectly through the controlled regulation of exercise, $b= -0.063$, $CI [-0.141, -0.002]$.

The satisfaction of relatedness was not found to be significantly indirectly associated with disordered eating (Table 3).

Relations in the complex model are shown in Figure 2 and the direct and indirect effects between the factors are described in Table 2 and 3.

Table 3 Indirect effects on disordered eating in the parallel mediator model through the internalization of appearance ideals and the controlled regulation of exercise

	Through internalization		Through CRE	
	b	95% CI	b	95% CI
Pressure to be thin from friends	0.053	[-0.080, 0.208]	0.163	[-0.015, 0.442]
Pressure to be thin from family	-0.048	[-0.175, 0.060]	0.206	[0.025, 0.404]
Pressure to be thin from partner	0.070	[-0.010, 0.177]	0.166	[0.040, 0.342]
Pressure to be thin from the media	0.076	[0.004, 0.179]	-0.053	[-0.147, 0.033]
Autonomy	-0.041	[-0.105, 0.009]	0.008	[-0.055, 0.078]
Competence	-0.026	[-0.102, 0.024]	-0.063	[-0.141, -0.002]
Relatedness	-0.028	[-0.082, 0.015]	-0.009	[-0.081, 0.053]

CI = confidence interval for b. The presented coefficients are unstandardised. Internalization; internalization of appearance ideals. CRE; controlled regulation of exercise. Autonomy, competence, relatedness; satisfaction of autonomy, competence, relatedness.

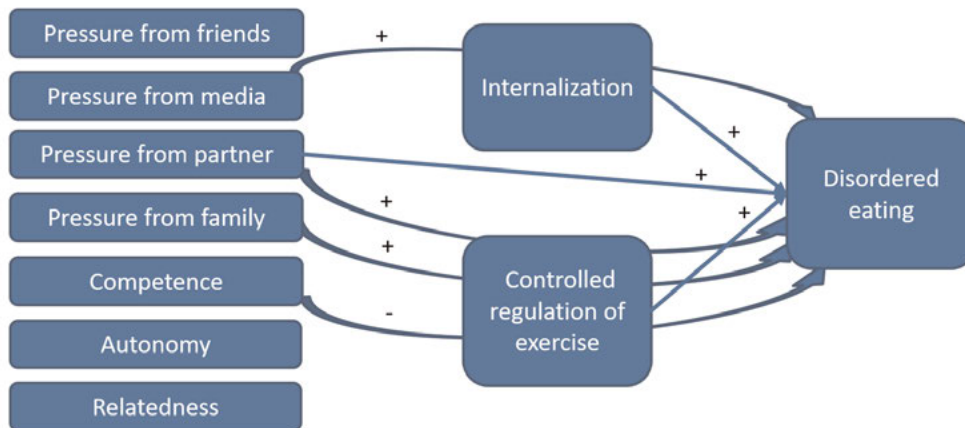


Figure 2 Parallel multiple mediator model of disordered eating in university students. Only significant associations are shown. Direct effects are illustrated by straight lines. Indirect effects are illustrated by curve lines passing through the specific mediator. Pressure from friends, media, partner, family; pressure to be thin from friends, media, partner, family. Competence, autonomy, relatedness; satisfaction of competence, autonomy, relatedness. Internalization; internalization of appearance ideals.

DISCUSSION

The current study aimed to investigate which factors are directly and indirectly associated with disordered eating in university students in Slovakia. The results revealed that the pressure to be thin from partner, the internalization of appearance ideals and the controlled regulation of exercise were significantly directly associated with disordered eating. The pressure to be thin from media was indirectly associated with disordered eating through the internalization of appearance ideals. And finally pressure to be thin from partner and family as well as the satisfaction of competence were indirectly associated with disordered eating through the controlled regulation of exercise. The hypothesised associations were only partially supported (Figure 2).

The preliminary results showed no difference between women and men in disordered eating. Previous studies showed higher disordered eating (e. g. Ata, Ludden, & Lally 2007; MacNeill, Best, & Davis, 2017) and higher binge eating (Linde et al., 2004) in women. Higher internalization of appearance ideals and pressure to be thin from media found in the current study is in line with previous studies (e. g. Knauss, Paxton, & Alsaker, 2007; Lawler & Nixon, 2010).

Current results suggest that the university students perceive the strong message from their romantic partners to conform to socially prescribed body ideal and it may lead directly to disordered eating or indirectly through the introjected and external regulation of exercise. It is in line with the study of Tylka and Calogero (2019) in which perception of partner pressure to be thin was related to higher eating disorder symptoms in women. In their study it was directly as well as indirectly through the internalization of appearance ideals. This indirect path was not confirmed in our study, in our sample of both genders the indirect association was through the controlled regulation of exercise. However, both results indicate that the sociocultural appearance pressures from an intimate

partner may be perceived in a certain way that it may even lead to disordered eating.

In the current study the controlled regulation of exercise was directly associated with disordered eating in university students and moreover it transmitted the impact of other factors on disordered eating. Controlled regulation of exercise included introjected and external regulation of exercise, in contrast with the autonomous regulation. Controlled regulation of exercise operates through the feelings of guilt when not exercising or is related to exercising because of getting the approval from other people. In contrast autonomous regulation is related to enjoyment of exercise sessions or internalization of the value of exercising for its benefits on health. Through the lens of self-determination theory, controlled regulation leads to poorer well-being and poorer health outcomes, among which disordered eating can be included. The current result is in line with the study of Boyd, Abraham and Luscombe (2007) in which feeling like a bad person for not exercising a certain amount significantly distinguished between the eating disorder and non-eating disorder groups. In current results the controlled regulation of exercise transmitted also the impact of pressure to be thin from family, which led to more introjected and external regulation of exercise, which in turn led to more disordered eating.

In the current study internalization of appearance ideals was directly associated with disordered eating as well as mediated the association between the pressure to be thin from media and disordered eating. Both relations were theoretically postulated in the sociocultural model of eating disorders (Stice, 1994; Stice et al., 1996) as well as empirically confirmed (e. g. Halliwell & Harvey, 2006; Stice, Schupak-Neuberg, Shaw, & Stein, 1994; Thompson et al., 2017). In the current results, it was the media as a source of pressure that operates through the internalization of appearance ideals, which seems understandable, since it is the media that convey these messages about the ideals of beauty.

In the current study the satisfaction of competence has been found to be negatively indirectly associated with disordered eating through the controlled regulation of exercise. The less the need for competence was satisfied, the higher the controlled regulation of exercise was, which in turn contributed to more disordered eating reported by participants. It is in line with the theoretical background of self-determination theory, which proposed that when the basic psychological needs are thwarted, it may lead to the development of need substitutes and compensatory motives (Deci & Ryan, 2000). Controlled regulation of exercise with the aim to pursue the ideal body could serve as one of such compensatory behaviours. Moreover, it is postulated, that thwarting of basic psychological needs leads to increase in controlled regulation of behaviour, which is associated with poorer well-being and less effective functioning (Deci & Ryan, 2000). Indeed, empirical results showed that psychological need thwarting is associated with maladaptive outcomes such as disordered eating (Bartholomew, Ntoumanis, Ryan, Bosch, & Thogersen-Ntoumani, 2011; Boone, Vansteenkiste, Soenens, van der Kaap-Deeder, & Verstuyf, 2014). The current results highlight the importance of the need for competence in relation to disordered eating in university students. In previous studies, it was the satisfaction of autonomy that seemed to be important in this context (e. g. Frederic & Grow, 1996; Thogersen-Ntoumani & Ntoumanis, 2007; Thogersen-Ntoumani, Ntoumanis, & Nikitaras, 2010) as well as the satisfaction of competence (Brichacek, Neill, & Murray, 2018; Foreich, Vartanian, Zawadzki, Grisham, & Touyz, 2017).

With regard to implications to designing prevention and intervention programs, current results support the focus of interventions on challenging the sociocultural appearance ideals. Indeed, such programs using cognitive dissonance has consistently showed effect in reducing disordered eating symptoms (e. g. Greif, Becker, & Hildebrandt, 2015; Linville et al., 2015; McMillan, Stice, & Rohde, 2011). In addition, the current results suggest the usefulness of promoting the students' self-determination and supporting the autonomous regulation of behaviour, especially with regard to exercising.

One of the limitations of this study is its cross-sectional design which was used to model the process of developing disordered eating. The obtained results need to be tested in prospective studies in the future.

The generalizability of the results is limited by the convenience sampling method and the composition of the sample in that it was made up of exclusively university students. The extent to which findings from this sample generalize to other populations is not clear. Regarding the generalization of results to the entire population of students in Slovakia, the sample included two most represented groups of study fields in Slovakia (social sciences and technical sciences), but the sample is slightly younger than the average according to the government report (Ministerstvo školstva, vedy, výskumu a športu Slovenskej republiky, 2020). In addition, the convenience

sampling method could have led to the under-representation of certain groups of students.

The questionnaire which was used to measure the pressure to be thin from different sources only contains two questions measuring the influence of each source. Although the measures showed good internal consistency, the construct validity of the used measures was not examined. Thus, the results need to be elucidated in more detail in the future.

CONCLUSION

The internalization of appearance ideals as well as appearance pressures from the social environment played a significant role in relation to disordered eating in university students. The controlled regulation of exercise seemed to be especially important, while it was related directly to disordered eating, but moreover transmitted the impact of other factors on disordered eating. In designing interventions focused on disordered eating in both genders, it seems to be useful the challenging of the importance of pursuit of appearance ideals presented in the media and promoting students' autonomous regulation of behaviour. In addition, also specific motivation toward exercise should be addressed in prevention.

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DECLARATION OF INTEREST STATEMENT

The authors have no conflicts of interest to report.

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