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Behavioral Regulation and Dispositional Flow in Exercise among American College Students relative to Stages of Change and Gender

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Abstract. Objective: The purpose of this study was to examine behavioral regulations and dispositional flow in exercise among university students in terms of gender and stage of change. **Participants:** Data were collected from American college students ($n = 257$; $M_{\text{age}} = 23.02 \pm 4.05$) in Spring 2013. **Methods:** Behavioral regulations and dispositional flow in exercise were assessed, along with stage of change. **Results:** Exercisers in the maintenance stage of change displayed significantly more self-determined motivation to exercise and a greater tendency to experience flow than those in preparation and action stages. Significant correlations were observed among behavioral regulations and flow state. Nonsignificant differences were observed for gender on behavioral regulations and dispositional flow in exercise. **Conclusions:** The results suggest that promotion of self-determined motivation and dispositional flow in exercisers may improve the quality of their experiences, as well as to foster their exercise behavior.

Keywords: Exercise motivation, dispositional flow, self-determination theory, college students

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3 Engagement in exercise is widely known to have physical and psychological health benefits,
4 yet the majority of people still remain largely inactive.¹ Young adults have not been an
5 exception in exhibiting this undesirable pattern of physical activity.² Studies on US college
6 students' physical activity have typically revealed levels below those required to produce
7 health and fitness benefits.^{3,4} Understanding the motivational and emotional factors that
8 influence participation in physical activity in this population can be beneficial for health
9 promotion efforts.⁵

10 Exercise-related behavioral regulations influence the regular physical activity behaviors of
11 individuals.⁶ A conceptual framework frequently used in this area is self-determination theory
12 (SDT).⁷ SDT is comprised of several subtheories including cognitive evaluation theory,
13 organismic integration theory, causality orientations theory, goal content theory, and basic
14 needs theory. Organismic integration theory has been widely used in studies of exercise and
15 physical activity because of the multidimensional conceptualization of motivation and
16 because it explains how autonomy supportive environments can facilitate autonomous
17 engagement in an activity through the process of internalization and integration of behavioral
18 enactments into one's sense of self.⁸ Six types of motivational regulations (i.e., intrinsic,
19 integrated, identified, introjected, external, amotivation) varying in degree of self-
20 determination underlying the behavioral engagement are characterized in the theory.
21 *Amotivated* exercisers lack all intention to exercise or exercise without intent (i.e., they may
22 "go through the motions") while individuals who are intrinsically motivated to exercise freely
23 engage in physical activity for enjoyment and satisfaction. Extrinsic motivational regulations
24 span the continuum between amotivation and intrinsic motivation. These include external,
25 introjected, identified and integrated regulations. Exercisers who engage a physical activity

1 for external rewards or to avoid punishment are *externally regulated*. *Introjected regulation*
2 underlies behavior for those feeling compelled to take in physical activity to avoid aversive
3 feeling states (e.g., guilt over skipping a workout) or to experience ego-affirming states (e.g.,
4 pride in fitness). The behavior of exercisers who participate in activity for benefits of
5 exercise, and assign personal importance to engagement of regular physical activity, is said to
6 be governed by *identified regulations*. Finally, *integrated regulations* relate to engaging in
7 the activity because it is integrated with the individual's sense of self, goals and values.
8 *Intrinsic, integrated and identified regulations* are considered to be more self-determined,
9 while *introjected and external regulation* are considered non-self-determined forms of
10 motivation.⁹

11 Overall, self-determined motivation has been consistently associated with exercise
12 adoption and maintenance;¹⁰ whereas external regulation and amotivation have consistently
13 been found to be unrelated to, or negatively associated with exercise adoption and
14 maintenance.¹¹ The association between introjected regulation and exercise has been found to
15 be equivocal; with both positive and inverse relationships being reported across different
16 studies.^{12,13}

17 In his theory of flow (FT), Csikszentmihalyi¹⁴ suggests that behavior is performed and
18 maintained because there are clear goals, feedback on performance is easily self-assessed,
19 and one's skill level is sufficient to meet the challenge of the physical activity. It may be easy
20 to experience flow in exercise setting, because it usually includes a balance between
21 challenge and competence, clear goals, and immediate feedback on performance. FT has been
22 used to explain individuals' pleasurable engagement in sports and leisure activities. Flow is
23 an experiential state that causes individuals to engage in the activities as an end in itself rather
24 than for some contingency external to the activity.¹⁰ Researchers have shown that individuals
25 are more likely to experience flow in engagements that are autonomously undertaken than in

1 engagements that are less self-determined in nature.^{15,16} It seems apparent, therefore, that
2 more self-determined involvement in exercise resulting in flow may be an important factor in
3 exercise adherence.

4 In understanding motivational and flow related determinants of exercise behavior, it is
5 important to note that the process of initiation and eventual adherence to exercise have been
6 conceptualized as being multi-dimensional and dynamic in nature.¹⁷ That is, it is assumed
7 that individuals move through a series of stages of change in their adoption of exercise
8 behaviors in moving from living a sedentary lifestyle to regularly maintaining a physically
9 active lifestyle.¹⁸ Dishman¹⁹ highlighted the utility and potential contributions of stage
10 conceptualizations of exercise behaviors, and several researchers^{20,21} have identified the
11 transtheoretical model (TTM) as a particularly useful stage conceptualization on that account.
12 More self-determined regulation of exercise behavior (e.g., identified regulation) has been
13 associated with exercise in higher TTM stages^{22,23} but few studies have examined both
14 motivational regulation and dispositional flow in different stages of exercise behavior
15 change.^{15,16}

16 Gender differences were also examined in this research because female students tend
17 to engage in lower levels of physical activity than male students.²⁴ Men's and women's
18 exercise have typically been described as resulting from similar behavioral regulation
19 patterns^{25,26} although puzzling differences have occasionally been reported. For example,
20 when compared with men, women have been variously reported to exercise for more
21 controlled reasons¹⁰ or, alternatively, more autonomously regulated reasons.²⁷ With regard to
22 dispositional flow, gender differences in exercise settings have not been previously
23 examined, and only considered to a limited degree in sport settings where women scored
24 lower than men in one study²⁸ while no meaningful differences were reported in another.²⁹
25 Rising rates of unhealthy behavior and declining fitness levels have increased interest in

1 understanding motivations that underly these trends. Accordingly, examination of behavioral
2 regulations and dispositional flow across stages of change in exercise behavior is important
3 for improving understanding for health programming.

4 Knowledge is also advanced by this study because the flow experience in exercise has not
5 yet to be well-studied in exercise psychology. Therefore, the aim of the present study was to
6 examine differences in dispositional flow and exercise regulations varying in self-
7 determination with regard to stage of change for exercise and gender in college students.
8 Based on the theoretical propositions of SDT^{10,11}, FT¹⁵, TTM²², and extant research, we
9 hypothesised that: (1) self-determined exercise motivation (i.e. intrinsic and identified
10 regulation) would be higher in later stages of change; (2) external and introjected regulation
11 and in particular amotivation would be higher in earlier stages of change; (3) dispositional
12 flow would be higher in later stages of change; (4) high intrinsic and identified regulation
13 would be positively associated with dispositional flow; (5) low external and introjected
14 regulation and amotivation would be negatively associated with dispositional flow; and
15 finally, (6) male students would report higher intrinsic and identified regulation and tendency
16 to experience flow than female students.

17 **METHODS**

18 **Population and Sampling**

19 Data were collected from 251 college students (104 males, 147 females) from a large
20 university in the Southeastern United States. These volunteer exercisers were aged between
21 19-35 years ($n_{\text{male}}=104$; $M_{\text{age}}=23.57\pm 4.18$ and $n_{\text{female}}= 147$; $M_{\text{age}}=22.76\pm 3.96$) and 67.7%
22 (170) self-identified as being white. These exercisers reported engaging in a wide variety of
23 physical activities with 16 activity types being identified by more than a single respondent.
24 The three most commonly reported included running ($n = 76$), weight-lifting ($n = 66$),
25 cardiovascular exercise ($n = 77$). The participants reported exercising more than 2 times

1 weekly in exercise sessions generally ranging from 46 to 90 minutes. Students completed the
2 questionnaires with regard to their involvement in their chosen exercise activities of their
3 choice.

4 **Instrument**

5 *Behavioral Regulations in Exercise.* The Behavioral Regulations in Exercise
6 Questionnaire-2 (BREQ-2)³⁰ is a 19-item instrument containing five subscales measuring
7 varying degrees of self-determination in exercise regulations (i.e., external, introjected,
8 identified, intrinsic regulations, amotivation).³¹ Following the statement “Why do you
9 exercise?”, participants are asked to respond to each item on a 5-point scale anchored by 0
10 *not at all true for me* and 4 *very true for me*. Data obtained with the BREQ-2 from exercise
11 participants in various settings and age groups in previous investigations have been found to
12 valid and reliable.^{23,31}

13 *Dispositional Flow in Exercise Scale.* Dispositional Flow in Exercise Scale (DFS-2)³² is
14 comprised of 36 items and is used for assessing individual’s tendency to experience flow in
15 sport and exercise. In this investigation, participants were asked to think about how often they
16 typically experience the characteristic described in each item during their exercise workouts
17 and to respond on a 5-point Likert scale ranging from 1 *Never*, to 5 *Always*. There are nine
18 subscales including challenge-skill balance, merging of action and awareness, clear goals,
19 unambiguous feedback, total concentration, sense of control, loss of self-consciousness,
20 transformation of time and autotelic experience. The total of all item responses represents the
21 global score for flow disposition with higher scores indicating a greater tendency to
22 experience flow during exercise workouts. Confirmatory factor analyses of data obtained
23 with the DFS-2 has demonstrated acceptable fit (i.e., NNFI > .90, CFI > .94, RMSEA < .05)
24 for the global factor model of dispositional flow based on nine first-order factors.³²

1 Multivariate analysis of variance (MANOVA), Independent samples t-tests and Pearson
 2 Product Moment Correlations. Box's M tests and Levene's tests were used to check that the
 3 assumptions of equality of variances and covariances of the dependent variables had been
 4 met. MANOVA follow-up tests, where appropriate, were conducted using ANOVA and
 5 Tukey's post hoc tests. The descriptive approach involved frequencies and percentages.
 6 Statistical significance was accepted at the $p < .05$ level of probability for all analyses. The
 7 effect sizes were estimated with partial eta square and Cohen's d values.³⁵

8

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RESULTS

10 Means and standard deviation of exercise motivation and dispositional flow in exercisers
 11 by stage of exercise behaviour change are shown in Table 1. Frequency analysis showed that
 12 14 participants were at the preparation stage of exercise behavior change, 38 were at the
 13 action stage and 199 at the maintenance stage. The internal consistency coefficient for
 14 BREQ-2 subscales for this sample ranged between 0.48 and 0.83 (Table 1). The amotivation
 15 ($\alpha = .48$) and identified regulation ($\alpha = .66$) subscales exhibited relatively low reliability
 16 value although the identified regulation alpha is arguably tolerable for exploratory research.³⁴
 17 Further examination of the data revealed low variability in item responses for the amotivation
 18 subscale (i.e., most participants reported "0" or "1" on the four amotivation items as is
 19 evident in the very low subscale total sample mean and standard deviation, $M = 4.62 \pm 1.32$).
 20 Alpha values are attenuated when variation in response is low and a low alpha in those
 21 instances is not inherently indicative of an internal consistency problem.³⁶ Furthermore,
 22 Cronbach's alpha coefficients for DFS-2 subscales for this sample ranged between .76 and
 23 .89 (Table 1).

24

-----INSERT TABLE 1 ABOUT HERE-----

25

A significant multivariate effect for stage of change in exercise was observed in a

1 MANOVA with BREQ-2 subscales as the dependent variables, Wilk's $\lambda = 0.80$, $F_{(10, 488)} =$
 2 5.69 , $p < 0.001$, $\eta_p^2 = 0.104$). As detailed in Table 1, follow up univariate analyses of
 3 variance indicated significant stage of change effects with moderate to large η_p^2 effect sizes³⁵
 4 (i.e., 0.064 to 0.164) on all variables except external regulation ($\eta_p^2 = 0.012$) where a small
 5 nonsignificant effect size was observed. Tukey's post hoc tests indicated that participants in
 6 the preparation stage reported lower *intrinsic*, *identified* and *introjected regulation* scores
 7 than participants in the action and maintenance stages. Participants in the preparation stage
 8 reported higher *amotivation* scores than those in the action and maintenance stages. These
 9 findings provided support for the first hypothesis and partial support for the second
 10 hypothesis.

11 A significant multivariate effect for stage of change in exercise was also observed in a
 12 MANOVA with the DFS-2 subscales as the dependent variables, Wilk's $\lambda = 0.86$, $F_{(18, 480)} =$
 13 2.17 , $p < 0.05$, $\eta_p^2 = 0.075$. Also as detailed in Table 1, follow up univariate analyses of
 14 variance revealed significant omnibus effects with small to medium effect sizes³⁵ for three of
 15 the subscales including *clear goals* ($\eta_p^2 = 0.030$), *total concentration on the task at hand* (η_p^2
 16 $= 0.043$), and *autotelic experience* ($\eta_p^2 = 0.080$). Trivial-to-small nonsignificant stage of
 17 change effect sizes³⁵ (i.e., $\eta_p^2 < 0.02$ as reported in Table 1) were observed relative to all other
 18 DFS-2 subscales. Tukey's post hoc tests indicated that participants in the preparation stage
 19 reported lower *clear goals* scores than participants in the maintenance stage. Participants in
 20 the preparation stage reported lower *total concentration on the task at hand* scores than those
 21 in the maintenance stage. And also participants in the preparation stage reported lower
 22 *autotelic experience* scores than those in the action and maintenance stage. These findings
 23 partially supported for the third hypothesis.

24 -----INSERT TABLE 2 ABOUT HERE-----

25 Pearson correlations between each of the BREQ and DFS-2 subscales and findings are

1 presented in Table 2. The significant correlation coefficients between the behavioral
2 regulations and dispositional flow subscales variables ranged from small ($r = .12$) to large (r
3 $= .66$) in absolute magnitude.³⁵ Intrinsic regulation was significantly and positively associated
4 with all subscales of dispositional flow. Identified regulation was significantly and positively
5 associated with all DFS-2 subscales except for loss of self-consciousness to which it was
6 unrelated. Contrary to our hypotheses, introjected regulation had significant, albeit modest,
7 positive relationships with clear goals, unambiguous feedback, autotelic experience.
8 Significant but weak negative associations were observed between external regulation and
9 dispositional flow subscales (i.e., clear goals, unambiguous feedback, sense of control, loss of
10 self-consciousness, autotelic experience). A similar pattern of negative associations was
11 observed between amotivation and challenge-skill balance, clear goals and autotelic
12 experience (Table 2). These findings supported the fourth hypothesis and partially supported
13 the fifth hypothesis.

14 -----INSERT TABLE 3 ABOUT HERE-----

15 Small Cohen's d effect sizes³⁶ and nonsignificant independent samples t-test results were
16 observed in gender comparisons of all BREQ-2 and DFS-2 subscales (see Table 3). These
17 findings did not provide support for the sixth hypothesis (all $p > .05$).

18

19

COMMENT

20 The purpose of the present study was to examine the exercise behavioral regulations and
21 dispositional flow among college students with regard to stage of change in exercise and
22 gender. Another aim of the investigation was to investigate relationships among behavioral
23 regulations and dispositional flow in exercise. Self-determined motivation and the
24 dispositional flow dimensions of clear goals, total concentration and autotelic experience
25 were observed to be higher in later stages of change of exercise in this study. We also

1 observed dispositional flow variables to be significantly and positively associated with self-
2 determined motivation. Finally, nonsignificant differences were found in the behavioral
3 regulations and dispositional flow of college students with respect to gender.

4 More specifically, we found that exercisers in the action and maintenance stages reported
5 more self-determined motivation (intrinsic, identified regulation) and introjected regulation
6 than those in the preparation stage. These findings are partially consistent with our original
7 hypothesis and with the SDT contention that free choice behaviors can be predicted by more
8 autonomous motives. The results of the present study are in line with those reported by
9 previous research.^{34,37} It is interesting that introjected regulation was also observed to be
10 higher in action and maintenance stages. The higher mean introjected regulation scores
11 observed in these more advanced stages of behavior change was unexpected on a theoretical
12 basis because introjected regulation is a controlling type of motivation that is often associated
13 with incompatible psychological behavior.¹⁰ Nonetheless, a number of studies have
14 previously reported introjected regulation to be associated with more frequent exercise
15 participation.^{6,31}

16 In the context of the present study, the positive association between introjected regulation
17 and exercise behavior may be explained by the internalization processes postulated in
18 organismic integration theory. Specifically, introjected regulation involves the internalization
19 of external controls, which are then applied through self-imposed pressures with the intent of
20 avoid guilt or to sustain self-esteem.³¹ Accordingly, controlled motivation can be internalized
21 and converted into autonomous motivation, if supportive conditions are in place.¹³ The
22 participants may experience changes in beliefs or evaluations towards an attitude object, or
23 they may be influenced by the social outcomes of adopting a change in behavior.

24 External regulation and amotivation levels were found to be lower for participants in the
25 exercise maintenance stage, compared to the other stages. External regulation generally

1 decreases across stages, being higher in the preparation stages than in the maintenance
2 stage,^{28,38,39} although no stages of change differences in external regulation have been
3 observed in some studies.²³ Lower levels of amotivation were also expected in later stages of
4 behaviour change because a systematic review of literature revealed no evidence of a positive
5 association between motivation and exercise behavior¹⁰, and because individuals in the earlier
6 stages of exercise behavioural change tend to focus on the negative aspects of exercising and
7 fail to recognize the benefits.⁴⁰ It is unsurprising, therefore, that the active exercisers taking
8 part in this investigation reported very low levels of amotivation relative to exercise. Overall,
9 the results of this study largely supported our hypotheses, which postulated that compared
10 with controlling and amotivated regulations, autonomous motivation would be higher in more
11 advanced exercise stages of change. Moreover, these results are mostly in line with both the
12 tenets of SDT and its subtheory of organismic integration theory, as well as with extant
13 empirical findings in this area.^{26,41}

14 With regard to dispositional flow, participants in the preparation stage of change reported
15 scores that were lower on subscales relating to clear goals, total concentration on the task and
16 autotelic experience than participants in the maintenance stage. There has been little research
17 to examine patterns of change in the forms of optimal experiential states occurring in
18 exercise behavior but our findings are consistent with what was observed in previous reports.
19 Ersoz⁴² reported higher scores in most subscales of DFS-2 in the action and maintenance
20 stages than in the preparation stage while Mannell, Kaczynski and Aronson⁴³ found that
21 adolescents participating more frequently in physically active leisure were more likely to
22 experience flow in their physical activity engagement than youth who were less physically
23 active.

24 The other purpose of this study was to examine relationships between behavioral
25 regulations and dispositional flow in exercise. Dispositional flow may relate to individuals'

1 behavioral regulations from the framework of SDT. We found that dispositional flow was
2 related significantly and positively with intrinsic, identified and introjected regulations and
3 related negatively with external regulation and amotivation. These results suggest that self-
4 determined motivated exercisers may experience more positive states and enjoy their exercise
5 sessions to a greater degree.

6 Studies of physical activity behavior have revealed that intrinsic motivation is positively
7 associated with flow.^{7,18} Jackson¹⁷ claimed that flow could lead to high enjoyment in physical
8 activity. Deci and Ryan⁷ also suggested that when people are highly interested in what they
9 are doing, flow is likely to occur more often. Jackson and Roberts⁴⁴, as well as, Kowal and
10 Fortier¹⁶ have presented evidence indicating that intrinsic motivation and self-determined
11 behavior are positively associated with the experience of flow. The flow dimension of
12 autotelic experience, defined as an intrinsically rewarding experience, showed the strongest
13 relationship with intrinsic motivation to experience stimulation.⁴⁵ In present study, there was
14 a strong positive relationship between intrinsic regulation and autotelic experience. Jackson
15 and Csikszentmihalyi⁴⁶ found that autotelic experience is the flow dimension most closely
16 aligned to intrinsic motivation. Similarly, some sport studies have indicated that self-
17 determined motivation has a positive relationship with the disposition to experience flow.^{16,28}

18 On the other hand, studies have tended to be consistent in showing negative associations
19 between external behavioral regulations and flow^{42,47} although Mannell, Zuzanek, and
20 Larson⁴³ have reported that the highest experience of flow in leisure activities in their studies
21 occurred among extrinsically motivated individuals freely choosing to participate. As observed
22 in our study, Stavrou⁴⁷ and Kowal and Fortier¹⁶ found amotivation to be negatively related
23 with flow experience. Stavrou⁴⁷ even claimed that amotivated states prevent or disturb flow.
24 Martin and Cutler⁴⁸, however, did not observe any significant correlations on this account.

25 Studies in the area suggest that there are differences in the exercise motives reported by

1 women and men. Some researchers reported that females were motivated to exercise with
2 autonomous regulations and males were more externally regulated and amotivated.^{38,41}
3 Mullan and Markland²⁶ observed women to have lower levels of self-determined motivation
4 than males in exercise settings. Daley and Duda⁴⁹ also found that males had lower
5 amotivation and higher identified and intrinsic regulations than females in physical activity
6 engagement.

7 In this investigation, exercisers appeared to have similar dispositions to experience flow
8 regardless of gender. Previous studies examining differences in dispositional flow of
9 exercisers with respect to gender are limited. Ersoz⁴² has conducted one of the few studies of
10 dispositional flow with regard to gender in young exercisers. On average, she observed
11 higher scores for males than females on the subscales relating to challenge-skill balance,
12 action-awareness merging, clear goals, unambiguous feedback, total concentration on the task
13 at hand, sense of control, autotelic experience. Most other researchers have investigated
14 dispositional flow among athletes relative to their sport involvements.^{28,50} Murcia et al.²⁸
15 suggested that men had higher scores in dispositional flow than women. No significant
16 gender differences were found in dispositional flow, which supported previous research
17 findings.^{50,51} It appears that male and female athletes experience flow in sports in similar
18 ways.

19 **Limitations**

20 The study was limited to university students who took part in preparation, action or
21 maintenance stages of exercise involvement. This study was also limited in that it used only
22 quantitative methods to examine reasons for participating in exercise. Quantitative methods
23 of data collection are limited by the inability to obtain additional information from further
24 inquiry with participants for clarification.⁵¹ Although stages of change have been used as a
25 behavioral measure of exercise participation in many previous studies, it has the same

1 limitations as other self-report measures. Another limitation can be found in the unequal
2 sample size distribution across the stages of change which may have implications for the
3 generalizability of study findings. Moreover, the results are limited by the absence of BREQ-
4 2 measurement of integrated regulation which means that motivational regulation relative to
5 personal values and identity-relevant commitments of the exercisers participating in this
6 study were not assessed. It would be interesting to examine the relationship between different
7 psychological characteristics of exercisers (exercise motivation and dispositional flow) and
8 exercise behavior using more objective measures of the latter.

9 **Conclusion**

10 In conclusion, the findings have demonstrated that college students are more self-determined
11 in the regulation of their exercise behavior in the latter stages of change. We also found that
12 introjected regulation was positively related to adaptive behavioral outcomes. Conversely,
13 students extrinsically motivated to exercise, or who have a higher degree in amotivation,
14 were in the early stages of change. Additionally, individuals adhering to a regular exercise
15 program have higher scores in clear goals, total concentration on the task at hand, and
16 autotelic experience dimensions of dispositional flow. However, as expected, the behavioral
17 regulations of exercisers were related to their dispositional tendencies to experience flow in
18 this study. Self-determined (autonomous) behavioral regulations may facilitate the flow
19 experiences while controlling behavioral regulations and amotivation may inhibit this
20 experience. It is reasonable to conclude that the promotion of self-determined motivation and
21 flow experience in exercise contexts may serve to foster exercise behavior among college
22 students. The accumulation of knowledge on this account should be helpful for practitioners
23 working in college health and wellness services or recreation centers in understanding college
24 students' underlying participation motivation so as to identify their motivational needs and
25 understand their feelings in exercise and participation in physical activity. Additionally,

1 evidence suggests that acute and chronic exercise can improve cognitive and executive
2 function⁵² so the promotion of exercise behavior in college students may also provide
3 benefits in their academic efforts.

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