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Development and Validation of the Goal Content for Exercise Questionnaire

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Self-determination theory (SDT; Deci & Ryan, 2000) proposes that intrinsic, relative to extrinsic, goal content is a critical predictor of the quality of an individual's behavior and psychological well-being. Through three studies, we developed and psychometrically tested a measure of intrinsic and extrinsic goal content in the exercise context: the Goal Content for Exercise Questionnaire (GCEQ). In adults, exploratory ($N = 354$; Study 1) and confirmatory factor analyses ($N = 312$; Study 2) supported a 20-item solution consisting of 5 lower order factors (i.e., social affiliation, health management, skill development, image and social recognition) that could be subsumed within a 2-factor higher order structure (i.e., intrinsic and extrinsic). Evidence for external validity, temporal stability, gender invariance, and internal consistency of the GCEQ was found. An independent sample ($N = 475$; Study 3) provided further support for the lower order structure of the GCEQ and some support for the higher order structure. The GCEQ was supported as a measure of exercise-based goal content, which may help understand how intrinsic and extrinsic goals can motivate exercise behavior.

Keywords: intrinsic and extrinsic goals, self-determination theory, factor analysis

The past 20 years has seen the emergence of a compelling and consistent body of literature documenting the many positive physiological, psychological, and health benefits associated with exercise and physical activity participation (Department of Health, 2004; U.S. Department of Health and Human Services, 1996). Similarly, the World Health Organization (WHO) recognizes the role that physical activity and exercise participation can play in facilitating reductions in noncommunicable diseases such as obesity, diabetes mellitus, cardiovascular disease, hypertension and stroke, and some types of cancer (WHO, 2002). From a public health perspective, such evidence underscores the importance of understanding the motivational factors that encourage individuals to become and remain physically active (Standage & Duda, 2004). To this end, although habitual daily physical activity (e.g., having to walk to a shop) may be largely governed by motivational factors distal to those

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underpinning exercise behavior, motivation toward structured and purposeful exercise is a worthy line of investigation as such actions are underpinned by exercise-related cognitive processes (Edmunds, Ntoumanis, & Duda, 2006).

Within the context of purposeful exercise, individuals may have a number of different goals in mind. For example, some people may follow an exercise regimen to improve their physical health, whereas others may work out to enhance their image or appearance to look good in the eyes of others. One theoretical framework that has received increasing research attention pertaining to the study of the differential effects of divergent goals is self-determination theory (SDT; Deci & Ryan, 2000; Kasser & Ryan, 1993, 1996; Vansteenkiste, Lens, & Deci, 2006). Within this theoretical framework, the kind of goals that one pursues is said to yield implications for one's personal and relational functioning. Specifically, based on the content of goals, a distinction is made between *intrinsic* and *extrinsic* goals. The aim of the present research was to develop and psychometrically test a questionnaire that assesses the intrinsic and extrinsic goals individuals can pursue when exercising. Such a questionnaire, which achieves conceptual clarity from a SDT perspective, is not currently available in the exercise science literature.

Intrinsic Versus Extrinsic Life Goals

The initial work on goal-content within SDT (Kasser & Ryan, 1993, 1996) focused on people's general life goals. Using an intrinsic-versus-extrinsic dichotomy to differentiate aspirational (or goal) contents, Kasser and Ryan (1993, 1996) suggested that the content of one's goals are related to cognitive, affective, and behavioral outcomes owing to their interplay with the satisfaction versus thwarting of three innate psychological needs for autonomy, competence, and relatedness (Deci & Ryan, 2000; Ryan & Deci, 2000). Autonomy pertains to feelings of volition or self-determination when enacting an activity (Deci & Ryan, 1985). Competence refers to feelings of effectance within one's environment, bolstered by the mastery of valued outcomes (Deci & Ryan, 2000; White, 1959). Finally, relatedness reflects feelings of affiliation or connection with others within a given social setting (Baumeister & Leary, 1995).

The goals of self-acceptance, affiliation, community contribution, and health/fitness were postulated to exist in concordance with the human innate growth tendencies proposed within SDT. That is, such goals are hypothesized to satisfy the psychological needs for autonomy, competence, and relatedness (Deci & Ryan, 2000) and are therefore labeled *intrinsic*. In contrast, *extrinsic* life domain goals such as seeking fame, having an appealing appearance, and financial success are more outwardly oriented, externally referenced goals (Williams, Cox, Hedberg, & Deci, 2000) that are contingent on the approval or analysis of others. As such, they are hypothesized to be less or even unsatisfying of basic psychological needs and consequently considered to hinder optimal human development (Deci & Ryan, 2000). In line with these conceptualizations, various studies have provided factor-analytical evidence for the differentiation between intrinsic and extrinsic life goals (e.g., Sheldon & Krieger, 2004; Vansteenkiste, Duriez, Simons, & Soenens, 2006). Further studies have found intrinsic and extrinsic goals to be differentially related to basic need satisfaction (e.g., Vansteenkiste, Neyrinck et al., 2007).

It should be noted that the concepts of intrinsic, relative to extrinsic, goal contents ("what" of behavior) should not be confused with the more often studied SDT-based concepts of autonomous or willing, relative to controlled or pressuring, regulation ("why" of behavior; Deci & Ryan, 2000). Both sets of constructs have been found to be moderately positively related (e.g., Sheldon et al., 2004), although the strength of these correlations (approximately .30) was not such that the construct of intrinsic versus extrinsic goal contents was redundant relative to the earlier introduced concept of autonomous versus controlled regulations, as suggested by some critiques of the goal-content perspective (e.g., Carver & Baird, 1998). Specifically, extrinsic goals have been found to be pursued primarily with a controlled regulation, whereas intrinsic goals are pursued primarily with an autonomous regulation (e.g., Sheldon & Kasser, 1995). These correlations suggest that it is entirely possible that a person exercises to improve his/her health, because their doctor forced them to do so, which represents an instantiation of a controlled regulation of intrinsic goals. Similarly, an extrinsic goal can also be pursued for autonomous reasons, as when a person exercises to look more appealing because he/she highly values being thin. Thus, an important issue that will be addressed in the current study is the examination of the relationship between exercisers' goals (i.e., intrinsic and extrinsic) and behavioral regulations (i.e., autonomous and controlled) for exercising as a means to assess the external validity of the Goal Content for Exercise Questionnaire.

The Correlates of Intrinsic Versus Extrinsic Life Goals

Consistent with their presumed different linkage to basic need satisfaction, initial work couched in intrinsic and extrinsic goal content identified positive associations between intrinsic (self-acceptance, affiliation and community feeling), relative to extrinsic (financial success) aspiration importance and well-being (viz., self-actualization and vitality) and negative associations with anxiety and depression (Kasser & Ryan, 1993). Kasser and Ryan (1996) analyzed one further intrinsic (i.e., physical fitness) and two further extrinsic (i.e., social recognition and appealing image) goals in the life domain. Findings pertaining to intrinsic and extrinsic composite goal variables including these new goals corroborated previous findings in that holding high intrinsic, relative to extrinsic, aspiration importance was associated with significantly greater well-being and significantly less depression and physical symptoms. More recent work shows that the adverse effects of pursuing extrinsic goals at the expense of intrinsic goals also emerge for individuals who reside in a social environment that matches with their extrinsic goal pursuits (Kasser & Ahuvia, 2002; Vansteenkiste, Duriez et al., 2006; but see Sagiv & Schwartz, 2000, for contrasting evidence).

Past work has also shown that the pursuit of extrinsic, relative to intrinsic, life goals not only yields implications for one's personal well-being, but also for one's social functioning, as indexed by less cooperation (Sheldon & McGregor, 2000), more Machiavellianism (McHoskey, 1999) and more intolerance and prejudice (Duriez, Vansteenkiste, Soenens, & De Witte, 2007). In short, prior research on intrinsic, relative to extrinsic life goals indicates that the content of people's goals matters, but similar research in different life-domains is currently lacking. The

present research aimed to begin filling this void by developing a scale that assesses intrinsic and extrinsic exercise goals.

Intrinsic and Extrinsic Exercise Goals

Recent research has provided support for the utility of an intrinsic, relative to extrinsic, goal content approach to understanding variations in an individual's behavioral performance and persistence in exercise settings (for an overview, see Vansteenkiste, Soenens, & Lens, 2007). In this research, goal content was experimentally manipulated. Indeed, intrinsic and extrinsic goals cannot only be differentially pursued by exercisers, they can also be promoted to different degrees by exercise instructors and settings. The type of promoted goals might yield implications for individuals residing within these settings. In line with this, Vansteenkiste, Simons, Lens, Sheldon and Deci (2004) found that framing an exercise activity (learning Tae Bo) in the service of extrinsic goal attainment undermined graded performance test scores and behavioral persistence at the exercise compared with an intrinsic goal framing group. Subsequent work (Vansteenkiste, Simons, Soenens, & Lens, 2004) showed that intrinsic goal framing yielded more beneficial effects compared with a no-goal control group, whereas extrinsic goal framing, in contrast, undermined learning and performance compared with the no-goal control group.

Although researchers have manipulated goal content in exercise settings, it has not been possible to accurately assess individual differences in the goals of exercise participants owing to a lack of a valid and reliable measure aligned with the theoretical tenets of SDT. Existing questionnaires containing items designed to tap exercise *motives* or *reasons* for exercise are abundant in the literature. These include the Reasons for Exercise Inventory (REI; Silberstein, Striegel-Moore, Timko, & Rodin, 1988), the Revised Motives for Physical Activity Measure (MPAM-R; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997) and the Exercise Motivations Inventory (EMI-2; Markland & Ingledew, 1997). Although each contains items that could represent intrinsic and extrinsic goals, these instruments are not directly grounded in the SDT-based conceptualization of intrinsic and extrinsic goal content (Kasser & Ryan, 1993, 1996; Sheldon, Ryan, Deci, & Kasser, 2004). Further, because these instruments were developed before recent theoretical advances in SDT, they fail somewhat to clearly and consistently differentiate between intrinsic and extrinsic goal content and the behavioral regulation of goals underlying the pursuit of particular goal-contents (Sheldon et al., 2004), an issue that is now critical from the SDT perspective (Deci & Ryan, 2000). To illustrate, the EMI-2 contains a scale labeled *health pressures,* which assesses the extent to which exercisers feel pressure to pursue fitness and health. From the SDT perspective, this scale is theoretically ambiguous, as it assesses a pressured or controlled regulation of an intrinsic goal, thus confounding the "what" and "why" of behavior. In addition, all three of the aforementioned instruments tap *enjoyment motives* or *reasons,* which represent intrinsic behavioral regulation. Designing a questionnaire that clearly tapped intrinsic and extrinsic exercise goals without contamination of behavioral regulations was an important aim of the current study.

It is also important to note that although exercising might stand in the service of various other goals, not all goals are said to be either intrinsic or extrinsic in nature. This is because the intrinsic–extrinsic goal content differentiation is not meant to

be exhaustive to encompass all possible goals (Ryan, Huta, & Deci, 2008). For instance, it is difficult to argue a priori whether mood enhancement, which reflects the tendency to exercise to cope with one's daily stress, and the goal of losing weight through exercising, are explicitly intrinsic or extrinsic in nature. Specifically, the goal of weight loss seems ambiguous, as one might want to lose weight through exercising to reduce the health risk associated with being overweight, in which case the exercise-related weight loss would stand in the service of an intrinsic goal, or to improve one's appearance, in which case it would be rather extrinsically oriented. Further, when analyzing goal content at the domain level, certain goals will be more contextually relevant than others. For instance, power (an extrinsic goal) is likely to be salient in the organizational domain (Vansteenkiste, Neyrinck et al., 2007); however, appearance goals may be less so, whereas the opposite is likely to be true for the exercise domain. In addition, goals such as financial success might be relevant to the professional sport domain, but seem irrelevant in the exercise domain. With these issues in mind (and in line with results of item development procedures undertaken), in the present work we aimed to assess three intrinsic and two extrinsic exercise goals: (a) social affiliation, which represents the goal of forming close / meaningful bonds with others through exercise; (b) health management, which taps the exercise goal of health or fitness improvement; (c) skill development, which reflects the goal of skill acquisition or development through exercising; (d) image, which refers to the goal of enhancing one's appearance; and (e) social recognition, which refers to the goal of being noticed and admired by others for one's exercising. Whereas the latter two goals reflect a tendency to exercise to attain external signs of worth, within the first three goals, exercising is more focused on the realization of one's potential and growth.

Present Research

Based on past empirical research (e.g., Kasser & Ryan, 1993, 1996) and aligned with the goal content (or "what" goals individuals aspire to) facet of SDT (cf. Deci & Ryan, 2000), the present research sought to develop a questionnaire to assess exercise goal content. Three studies were carried out to develop, confirm, and test the validity of the Goal Content for Exercise Questionnaire (GCEQ). In Study 1, we developed items and explored the content, factorial composition, and structure of the GCEQ items in relation to intrinsic and extrinsic goal content. Building on the findings of our initial work, in Study 2 we sought to confirm the tenability of lower and higher order measurement models for the GCEQ scale as identified in Study 1. In addition, we sought to test the reliability, aspects of construct validity, and gender invariance of scores derived from the scale. Finally, the purpose of Study 3 was to confirm the GCEQ measurement model in a new sample and examine the temporal stability of the scale scores.

Study 1

The purposes of Study 1 were to (a) develop a pool of items tapping exercise goal content and (b) test their factorial composition via exploratory factor analysis (EFA).

Method

Participants

The total sample (N = 666) comprised 284 males and 382 females ranging in age from 18 to 73 years (M = 34.42, SD = 11.74). The ethnic diversity of the sample was as follows: White (91.1%), Chinese (2.3%), Indian (2.1%), and Other (4.5%). To allow us to test the factorial validity of the GCEQ, two random samples were drawn from the total sample. Specifically, responses provided by 354 participants were used to provide an indication of the factorial composition of the GCEQ items, whereas the responses provided by the remaining 312 participants were used in the confirmatory factor analyses (CFA; Study 2) to confirm the theoretically derived measurement model based on the EFA findings. The sample used in the EFA analysis (N = 354) comprised 147 males and 207 females ranging in age from 18 to 73 years (M = 34.40, SD = 11.64). The ethnic diversity of the sample was White (91.3%), Chinese (2.3%), Indian (2.3%), Other (4.1%).

Procedure

The present study used online questionnaire methodology. Following the approval of a local ethics committee and those of five universities in the southwest of England, postgraduates and university employees were recruited via an invitational e-mail. Following an introduction to the study, participants were invited to participate by accessing the online questionnaires via a URL embedded in the e-mail. Basic information and estimated questionnaire completion time was presented on the first page of the Web site. Participants provided their consent and participation cessation was offered by the invitation to close their Web browser. Consenting participants were presented with a series of Web pages containing questionnaire items.

Measure

Aligned with the "what" facet of SDT, an initial pool of items was formulated using a number of techniques to ensure that the resultant questionnaire was theoretically grounded, relevant, and meaningful. First, a content analysis of existing questionnaires that included items akin to exercise goals (e.g., EMI-2, MPAM-R, and REI) was conducted. Second, a focus group of graduate students who were known exercisers (N = 8) were asked to list "what" exercise goals they pursued (rather than "why" they pursued their goals). This focus group was also asked to provide feedback on the clarity of the items derived from the content analysis. Emergent items were preliminarily screened to ensure their alignment with the goal content rather than the behavioral regulation facet of SDT. Items considered to be ambiguous from a theoretical perspective were retained at this stage for further analysis and/or reworded to improve clarity. These items were then reviewed by three academic experts (whose primary area of research combined SDT, exercise, or sport, and the subject of goal content) who were asked to provide feedback on the clarity of each item in terms of assessing exercise-based goal content. Using this feedback, items were revised and adjusted appropriately. These minor modifications resulted in a reduced item pool, which was more representative of goal content (i.e., had greater

content validity), with the retained items also discriminating the "what" aspect from the "why" aspect of SDT (i.e., enhanced conceptual clarity).

Following item development, 26 items were selected that were purported to represent a range of lower order (health management, skill development, social affiliation, social recognition and image) and higher order (intrinsic and extrinsic) themes of exercise goal content. Participants rated each item responding to the stem "please indicate to what extent these goals are important for you while exercising." Each item was scored on a 7-point Likert-type scale ranging from 1 (*Not at all important*) through 4 (*Moderately important*) to 7 (*Extremely important*).

Results

An EFA was conducted on the 26 raw items to identify underlying factors. The participant-to-item ratio (14:1) was considered as acceptable (Hair, Black, Babin, Anderson, & Tatham, 2006). As past work has shown intrinsic and extrinsic goals to be positively correlated (e.g., Kasser & Ryan, 1996), in the present work we expected a positive association among the GCEQ goal factors. Accordingly, principal axis factoring was employed using direct oblimin rotation.[1] Factor extraction was based on an eigenvalue magnitude of >1.0 and confirmatory examination of the scree plot; such extraction criteria have been previously supported in the statistical literature (Floyd & Widaman, 1995) and have been frequently used within the fields of sport and exercise psychology (Ntoumanis & Vazou, 2005; Wilson, Rogers, Rodgers, & Wild, 2006). With regard to interpreting extracted items, Hair et al. (2006) suggest that items with factor loadings of >.50 can be considered as meaningful. As we were striving to retain a psychometrically sound set of items, this more rigorous criterion for item interpretation was used. In addition, cross-loading items were removed from analysis when the primary loading was >.50 and the secondary loading >.32 (the suggested minimum factor loading required for item meaning; Tabachnick & Fidell, 2007). Further, and consistent with the recommendations of Tabachnick and Fidell (2007), single-item factors were excluded from analysis.

The initial EFA resulted in a solution containing five factors accounting for 62.96% of the variance in the items. Employing the aforementioned criteria in examination of the pattern matrix, we removed two items and performed an additional EFA to obtain a simple factor structure. This solution comprised five factors accounting for 65.57% of the variance of the 24 remaining items (see Table 1). All but four communalities exceeded the recommended .50 level (Hair et al., 2006); however, these four items displayed communalities of >.43. Therefore, these items were retained for further analysis in subsequent studies owing to (a) the exploratory nature of EFA and the purpose of the current study and (b) the small magnitude of the violations.

Analysis of item content suggested that the extracted items could be represented by the hypothesized five factors encapsulating goal content for exercise. Factor 1, *social affiliation,* consisted of six items tapping the goal of forming close / meaningful bonds with others through exercise (e.g., "To form close bonds with others"). Factor 2, *image,* was represented by four items assessing the goal of image or appearance enhancement (e.g., "To improve my appearance"). Factor 3, *health management,* comprised four items tapping the exercise goal of health or fitness

Table 1 Item Means, Standard Deviations, and Factor Loadings Following Exploratory Factor Analysis

GCEQ subscale and item	*M*	*SD*	Factor I	II	III	IV	V
Social Affiliation							
To form close bonds with others	2.26	1.40	**.91**	.01	–.04	–.05	.02
To develop close friendships	2.24	1.51	**.84**	.01	–.09	–.09	.03
To connect with others in a meaningful manner	2.31	1.44	**.73**	.04	–.06	–.07	–.12
To share my spare time with a partner and/or friend	2.95	1.88	**.71**	–.03	.10	.07	–.01
To share my exercise experiences with people that care for me	2.36	1.62	**.70**	–.03	.12	–.03	–.05
To meet others who share my exercise interests	2.77	1.72	**.67**	.01	–.05	–.05	–.21
Image							
To improve the look of my overall body shape	4.98	1.65	.00	**.93**	.03	.05	–.02
To improve my appearance	4.99	1.63	–.03	**.87**	–.00	.02	–.04
To be slim so to look attractive to others	4.58	1.70	–.02	**.75**	–.02	–.06	–.03
To change my appearance by altering a specific area of my body	3.57	1.87	.03	**.67**	.03	–.03	.06
Health Management							
To increase my resistance to illness and disease	5.36	1.43	.11	–.02	**.68**	.01	.08
To increase my energy level	5.64	1.24	–.07	.05	**.65**	–.04	–.14
To improve my overall health	6.13	1.04	.03	.12	**.64**	.07	.06
To improve my endurance, stamina	5.64	1.26	–.15	–.04	**.51**	–.12	–.31

Social Recognition							
To be well thought of by others	2.24	1.38	.02	.00	.02	**–.92**	.02
To gain favorable approval from others	2.09	1.43	.03	.04	.03	**–.90**	.07
To be socially respected by others	2.16	1.39	.04	–.01	–.02	**–.87**	.03
To impress others	2.09	1.33	–.04	.04	–.11	**–.84**	–.11
To gain social recognition from others	2.11	1.40	.09	.03	–.02	**–.80**	.02
So that others recognize me as an exerciser	2.05	1.33	–.03	–.23	.09	**–.79**	.01
Skill Development							
To acquire new exercise skills	3.46	1.86	.05	–.02	.00	.01	**–.90**
To develop my exercise skills	4.03	1.77	.04	.05	.05	.03	**–.78**
To become skilled at a certain exercise or activity	3.91	1.89	.13	–.02	–.10	–.06	**–.74**
To learn and exercise new techniques	3.35	1.75	.09	.00	.09	.03	**–.72**

	Factor				
Factor correlations and internal consistency	**I**	**II**	**III**	**IV**	**V**
I. Social Affiliation	.91				
II. Image	.01	.88			
III. Health Management	.03	.27	.74		
IV. Social Recognition	–.41	–.27	.00	.90	
V. Skill Development	–.46	–.02	–.32	.29	.89

Note. Numbers in bold represent primary factor loadings.

improvement (e.g., "To improve my overall health"). Factor 4, *social recognition,* comprised six items assessing the goal of being noticed and admired by others in an exercise context (e.g., "To be well thought of by others"). Four items comprised the fifth factor, *skill development,* including items assessing the goal of skill acquisition or development (e.g., "To acquire new exercise skills"). It was hypothesized that Factors 1, 3, and 5 represented intrinsic exercise goal content whereas Factors 2 and 4 represented extrinsic exercise goal content. These hypotheses were tested in the next stage of analysis using CFA.

Brief Discussion

The purpose of Study 1 was to develop an initial measure of exercise goal content aligned with the theoretical tenets of SDT. Findings from the EFA supported a five-factor solution, with factors tapping intrinsic (social affiliation, health management, and skill development) and extrinsic (social recognition and image) goals.

Study 2

In Study 2, we sought to use CFA to (a) confirm the findings of the EFA, (b) to further refine the structure of the scale identified in the EFA analysis, and (c) assess an a priori higher order measurement model for the GCEQ. Further, we tested the external validity of the scores from the resultant scale by correlating the intrinsic and extrinsic goal scales with exercisers' autonomous and controlled motivation for exercising (Mullan, Markland, & Ingledew, 1997). Although theoretically distinct constructs, intrinsic and extrinsic goals display a tendency to be pursued for autonomous and controlling regulations, respectively (Sheldon et al., 2004). In line with this reasoning and previous work (Sheldon & Kasser, 1995), it was hypothesized within the exercise context that intrinsic goals would be positively correlated with autonomous motivation, whereas extrinsic goals would be positively correlated with controlled motivation. Finally, we sought to gather further preliminary evidence on the external validity of the GCEQ by examining whether the intrinsic and extrinsic goals for exercise were correlated with satisfaction of needs for autonomy, competence, and relatedness. It was hypothesized that intrinsic goals would display stronger correlations with need satisfaction than extrinsic goals. We also aimed to examine whether responses to the GCEQ items were related to (1) an index of social desirability and (2) whether the resultant GCEQ scale scores would be invariant across gender.

Method

Participants

The sample randomly assigned to the CFA analysis ($N = 312$) comprised 137 males and 175 females ranging in age from 19 to 63 years ($M = 34.44$, $SD = 11.88$). The ethnic diversity of the sample was White (90.7%), Chinese (2.2%), Indian (1.9%), and Other (5.2%).

Measures

Exercise Goal Content. The 26 original GCEQ items were used in the present analysis. Although EFA suggested the removal of two items, we decided to use the original full set of items to examine whether the proposed removal of the two problematic items in EFA would be confirmed in the CFA.

Psychological Need Satisfaction. The Psychological Need Satisfaction in Exercise Scale (PNSE; Wilson et al., 2006) consists of 18 items scored on a 6-point Likert-type scale. In the present sample internal consistency (Cronbach's α) for each subscale were as follows; autonomy $\alpha = .93$, competence $\alpha = .92$, relatedness $\alpha = .94$.

Exercise Behavioral Regulation. Participants' autonomous versus controlled exercise regulations were assessed using the Behavioral Regulations in Exercise Questionnaire (BREQ; Mullan et al., 1997). Previously, this scale has demonstrated good psychometric properties in an adult sample (Mullan et al., 1997). In the present sample, the internal consistency scores were as follows; intrinsic motivation $\alpha = .93$, identified regulation $\alpha = .78$, introjected regulation $\alpha = .79$, external regulation $\alpha = .81$. Autonomous motivation ($\alpha = .90$) was represented by a composite score of the intrinsic motivation and identified regulation subscales whereas controlled motivation ($\alpha = .78$) was represented by a composite score of the introjected regulation and external regulation subscales.

Social Desirability. To assess whether GCEQ responses were subject to socially desirable response styles, the 10-item version of the Marlowe-Crowne Social Desirability Scale (MC2-10; Strahan & Gerbasi, 1972) was employed. This shortened version is recommended for use in scale development research (DeVellis, 1991) and was chosen because it reduces participant burden and the instrument's psychometric properties have been supported in past work (e.g., Strahan & Gerbasi, 1972). On this occasion, the reliability of the MC2-10 was $\alpha = .53$. It is recognized that this alpha coefficient falls short of the conventionally accepted value of >.70 and the results should therefore be interpreted with caution. It is reported that although reliability is somewhat reduced, the MC2-10 is useful when it is desirable to reduce participant burden (Strahan & Gerbasi, 1972).

Data Analysis

To confirm the findings of the EFA, the 26 GCEQ items were analyzed via CFA using AMOS Version 7.0 (Arbuckle, 2006). The proposed measurement model (26 items loading on five first order latent goal factors) was found to be overidentified. In addition to the chi-square statistic (it is suggested that the chi-square test is dependent upon sample size [Marsh, Balla & McDonald, 1988]), assessment of the adequacy of the GCEQ measurement model was supplemented with the examination of three fit indices. Specifically, in line with the recommendations of Hu and Bentler (1999), the comparative fit index (CFI), standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA; including its 90% confidence interval) were employed. Although much debate

surrounds the selection of precise thresholds of fit, especially relevant within the field of theory-based multi–item/factor CFA testing (Markland, 2007; Marsh, Hau, & Wen, 2004), it is commonly accepted that thresholds of >.90, close to (or less than) .08 (Bentler, 1995), and up to .08 (Browne & Cudeck, 1993) for the CFI, SRMR, and RMSEA, respectively, are indicative of acceptable model fit. Excellent fit between the hypothesized model and the data are indicated by thresholds of >.95 for the CFI, and close to (or less than) .08 and .06 for the SRMR and RMSEA, respectively (Hu & Bentler, 1999). In addition, we analyzed modification indices and standardized residuals to screen for mis-specified items. In line with previous work (e.g., Hagger et al., 2007; Motl & Conroy, 2000) items that displayed large standardized residuals (> ± 2.00) were considered for removal. Further data analysis sought to calculate scale descriptives, reliability estimates and examine external validity (via bivariate correlations).

Results

Internal Validity

Examination of Mardia's coefficient (131.80, $p < .001$) indicated that the data departed from multivariate normality. In line with recommendations of Byrne (2001), all subsequent CFAs were conducted using maximum likelihood estimation coupled with bootstrapping procedures. In a recent application of bootstrapping procedures to statistical computer programs, Preacher and Hayes (2004) advanced the use of 1,000 bootstrap samples. Commensurate with this recommendation and aligned with a number of extant empirical studies that have used the bootstrapping approach (e.g., Lutz, Karoly, & Okun, in press; Standage, Duda & Ntoumanis, 2003), in the present work 1,000 bootstrap replication samples were drawn with replacement from the data sets. The bootstrapped samples were equal in size to the original sample. With sample size issues in mind, our ratio of just over five participants per estimated parameter was deemed appropriate based on the recommendations of Bentler and Chou (1987).

Results of the CFA suggested a good fit of the model to the data but indicated room for improvement, $\chi^2(289) = 750.38$, $p < .001$; CFI = .92; SRMR = .06; RMSEA = .07 (90% CI = .07 to .08). Supporting the findings of Study 1, modification indices revealed that the two items removed in the EFA analysis again displayed cross-loadings on multiple factors and were associated with multiple standardized residuals > ± 2.00. These items were removed from further analysis. Excluding these items improved the fit of the model to the data, $\chi^2(242) = 612.95$, $p < .001$; CFI = .93; SRMR = .06; RMSEA = .07 (90% CI = .06 to .08). However, within this model, two items from the social affiliation factor cross-loaded on the skill development factor. Both items were also associated with multiple standardized residuals > ± 2.00 and, as such, were removed from further analysis. In addition, to achieve an equal number of items per factor (to aid computation of a relative intrinsic goal score using latent structural equation modeling) the model was respecified by deleting the two lowest loading items from the social recognition factor (these two items were also associated with multiple standardized residuals > ± 2.00). This respecification resulted in a 20-item, perfectly balanced five-factor model that displayed an excellent fit to the data, $\chi^2(160) = 301.14$, $p < .001$; CFI = .97;

SRMR = .05; RMSEA = .05 (90% CI = .04 to .06). Examination of the modification indices and standardized residuals of this solution revealed no further factorially complex items. Table 2 displays item means, standard deviations, standardized factor loadings, and bootstrap standard errors for this solution.

To assess the existence of a higher order factor structure of goal content, a higher order measurement model was specified. In this model, the five first-order latent goal factors were represented by two higher order latent factors, namely intrinsic (i.e., social affiliation, skill development, health management) and extrinsic goals (i.e., image and social recognition). The fit of the higher order GCEQ measurement model was similar to that of the first-order model and displayed excellent fit to the data, $\chi^2(164) = 355.30$, $p < .001$; CFI = .95; SRMR = .07; RMSEA = .06 (90% CI = .05 to .07). The higher order intrinsic factor displayed factor loadings of .85, .29, and .62 with the social affiliation, health management, and skill development goal factors, respectively. The higher order extrinsic factor displayed factor loadings of .90 and .33 with the social recognition and image goal factors, respectively.

Gender Invariance Analysis

To examine whether the GCEQ scale displayed invariance across gender, a sequential model testing approach was employed via multisample CFA. Specifically, two increasingly constrained models specified to examine the measurement (i.e., item loadings) and structural parameters (i.e., factor variances and covariances) of the GCEQ were tested for equality across male and female samples. Because it is widely accepted that testing the invariance of error variances and covariances is overly restrictive, this line of inquiry was not pursued. Traditionally, invariance testing has relied on the χ^2 test statistic as an indicator of equality across groups. However, as this test is influenced by sample size, the recommendations of Cheung and Rensvold (2002) were adopted. Accordingly, and commensurate with previous work (e.g., Hagger et al., 2007), a change in CFI of $\leq -.01$ between increasingly more constrained models was considered indicative of invariance.

Independent CFA models specified for males, females, and an unconstrained model (i.e., baseline) specified using the total sample displayed excellent fit to the data:

> Males: $\chi^2(160) = 237.77$, $p < .001$; CFI = .96; SRMR = .06; RMSEA = .06 (90% CI = .04 to .08)
>
> Females: $\chi^2(160) = 276.26$, $p < .001$; CFI = .95; SRMR = .06; RMSEA = .07 (90% CI = .05 to .08)
>
> Total (males and females): $\chi^2(320) = 514.04$, $p < .001$; CFI = .95; SRMR = .06; RMSEA = .04 (90% CI = .04 to .05)

In the next step, the factor loadings were constrained to be equal across groups, and this model yielded excellent fit to the data, $\chi^2(335) = 541.87$, $p < .001$; CFI = .95; SRMR = .06; RMSEA = .05 (90% CI = .04 to .05). Although the change in χ^2 was significant, $\Delta\chi^2(15) = 27.83$, $p = .02$, the change in CFI (ΔCFI = .00) supported invariance of the factor loadings across gender. The final model, which additionally constrained the factor variances and covariances to be equal across

Table 2 CFA Factor Loadings, Item Means, Standard Deviation, Standard Error, Squared Multiple Correlation, Factor Correlations and Internal Consistency

				Factor						
	GCEQ subscale and item	*M*	*SD*	I	II	III	IV	V	SE	SMC
	Social Affiliation									
1	To connect with others in a meaningful manner	2.22	1.37	.80					.03	.65
6	To share my exercise experiences with people that care for me	2.21	1.48	.77					.04	.60
11	To develop close friendships	3.45	1.86	.90					.02	.80
16	To form close bonds with others	2.08	1.34	.95					.01	.90
	Image									
2	To improve the look of my overall body shape	5.02	1.69		.87				.03	.76
7	To improve my appearance	4.99	1.60		.87				.03	.76
12	To be slim so to look attractive to others	4.49	1.73		.73				.04	.53
17	To change my appearance by altering a specific area of my body	3.67	1.93		.66				.04	.44
	Health Management									
3	To increase my resistance to illness and disease	5.69	1.31			.56			.06	.32
8	To increase my energy level	5.71	1.32			.77			.05	.60
13	To improve my overall health	5.21	1.53			.68			.06	.47
18	To improve my endurance, stamina	6.12	1.14			.65			.06	.42

	Social Recognition							
4	To be well thought of by others	2.09	1.32		.92		.02	.36
9	To be socially respected by others	2.04	1.31		.87		.02	.73
14	To gain favorable approval from others	1.96	1.22		.84		.03	.49
19	So that others recognize me as an exerciser	2.02	1.40		.83		.03	.59
	Skill Development							
5	To acquire new exercise skills	3.31	1.88			.93	.02	.86
10	To learn and exercise new techniques	3.26	1.74			.87	.02	.76
15	To become skilled at a certain exercise or activity	3.72	1.90			.81	.03	.65
20	To develop my exercise skills	3.89	1.77			.71	.03	.51

		Factor				
	Factor correlations and internal consistency	**I**	**II**	**III**	**IV**	**V**
I.	Social Affiliation	.92				
II.	Image	.17	.86			
III.	Health Management	.21	.39	.75		
IV.	Social Recognition	.60	.29	.09	.92	
V.	Skill Development	.51	.19	.38	.41	.90

Note. Numbers to the left of each item represent the item's position in the GCEQ. $N = 312$. CFA = confirmatory factor analysis, SE = standard error, SMC = squared multiple correlation. Cronbach's alpha coefficients are on the principle diagonal of the factor correlation matrix. All factor loadings are statistically significant ($p < .05$).

gender, maintained an excellent fit to the data, $\chi^2(350) = 561.67$, $p < .001$; CFI = .95; SRMR = .07; RMSEA = .04 (90% CI = .04 to .05). Further, the χ^2 difference was nonsignificant $\Delta\chi^2(15) = 19.81$, $p = .18$, and the change in CFI was ≤ −.01 (ΔCFI = .00). These analyses provide support for factorial invariance by suggesting the factor loadings and factor variances and covariances of the GCEQ measurement model to be invariant across male and female samples.

Descriptives and Internal Consistencies

Examination of mean scores indicated that the most strongly endorsed exercise goal was health management ($M = 5.68$, $SD = 1.01$) followed by image ($M = 4.54$, $SD = 1.46$). Skill development was the next most strongly endorsed goal ($M = 3.54$, $SD = 1.59$) followed by social affiliation ($M = 2.16$, $SD = 1.24$) and social recognition ($M = 2.03$, $SD = 1.18$). This endorsement pattern was identical in rank between males and females; however, males ($M = 4.10$, $SD = 1.43$) rated image goals as significantly less important than did females ($M = 4.89$, $SD = 1.39$), $t(310) = -4.91$, $p < .001$. Each subscale of the GCEQ displayed internal consistency reliability estimates (α) of ≥.75 (see Table 2).

External Validity

Table 3 displays evidence for the external validity of the scores derived from the GCEQ. In these analyses, health management, skill development, and social affiliation goals were averaged to form a composite *intrinsic goal* (α = .87), whereas a composite variable labeled *extrinsic goal* (α = .84) was computed by averaging image and social recognition goals. Owing to the observed correlation between intrinsic and extrinsic composite goal factors ($r = .45$), partial correlations were employed to explore unique relationships of the goal factors, behavioral regulations, and psychological needs.

Table 3 Partial Correlations Between Intrinsic and Extrinsic Goal Contents and Theoretically Related Constructs

	Autonomy		Competence		Relatedness		Autonomous regulation		Controlled regulation	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Variables	**5.15**	**0.93**	**4.32**	**1.08**	**3.06**	**1.46**	**3.03**	**0.78**	**1.09**	**0.71**
Intrinsic goals	.01		.43*		.51*		.48*		.02	
Extrinsic goals	−.02		−.04		.02		−.04		.42*	

Note. Bivariate correlation between intrinsic goals and extrinsic goals, $r = .45$.

*$p < .01$.

The partial correlations between the intrinsic and extrinsic GCEQ factors and autonomous and controlled behavioral regulation composite scores supported our hypotheses. After removing the shared variance with extrinsic goals, in line with thresholds recommended by Cohen (1992), intrinsic goals were moderately positively correlated with autonomous regulation. In a similar vein, after removing the shared variance with intrinsic goals, extrinsic goals were positively correlated with controlled exercise regulations.

Examination of the partial correlations of intrinsic and extrinsic goals and need satisfaction measures showed a positive partial correlation between the intrinsic goal composite and competence need satisfaction that was moderate to large. The correlation between the intrinsic goal composite and relatedness need satisfaction was positive and large. Partial correlations indicated that extrinsic goals did not associate with satisfaction of any of the three needs. Surprisingly, the intrinsic goal composite did not correlate with autonomy need satisfaction.

There was no evidence to suggest that responses to the GCEQ were affected by social desirability, with each GCEQ subscale displaying nonsignificant correlations with the MC2-10 score (social affiliation, $r = .03$, $p = .58$; health management, $r = -.04$, $p = .52$; skill development, $r = -.04$, $p = .45$; social recognition, $r = -.04$, $p = .46$, and image, $r = -.06$, $p = .31$).

Brief Discussion

The factorial validity of the GCEQ was supported using CFA. Specifically, CFA procedures supported the removal of the two items deemed problematic within the EFA analyses of Study 1. Moreover, an excellent fit of the measurement model to the data was obtained following the exclusion of four further items. Twenty items representing five internally consistent goal content factors were retained to form this final solution. Higher order CFA supported previous hypotheses of overarching intrinsic and extrinsic goal factors. Further multisample CFA suggested that the factor loadings, and factor variances and covariances were invariant across gender.

Examination of correlations between goal contents and theoretically related constructs provided evidence for the external validity of the GCEQ scores. Intrinsic goals were found to be more strongly correlated with the satisfaction of needs for competence and relatedness than extrinsic goals. Intrinsic goals were unrelated to autonomy need satisfaction. We return to this issue in the general discussion. Finally, intrinsic and extrinsic goal composite scores tended to correlate more strongly with autonomous and controlling exercise regulations respectively. These results within the exercise context support previous findings pertaining to the distinctiveness of goal content and the behavioral regulation of goals in the general life domain (e.g., Sheldon et al., 2004).

Study 3

The purpose of Study 3 was to examine the GCEQ measurement model with an independent sample to ensure that our model respecifications did not capitalize on chance. Further, we tested the temporal stability of responses to the GCEQ over a 1-month period.

Method

Participants

For Study 3, an independent sample was recruited. After removing 10 outliers based on GCEQ scores (i.e., five univariate outliers displaying standardized scores of ≥ ± 3, and five multivariate outliers displaying Mahalanobis distances ≥ 20.52; cf. Hair et al., 2006), the sample ($N = 475$) comprised 142 males and 333 females ranging in age from 20 to 72 years ($M = 42.62$, $SD = 10.54$). The ethnic diversity of the sample was as follows: White (97.2%) and other (2.8%).

Procedure

Having gained the consent of local government employers located in the southwest of England, employees were invited via e-mail to visit the study Web site and complete the 20-item version of the GCEQ online as identified in Study 2. The same methodological approach used in Studies 1 and 2 was adopted.

Results

Internal Validity

The 20-item GCEQ was tested using CFA procedures as outlined in Study 2. As in Study 2, Mardia's coefficient indicated that the data departed from multivariate normality. The participant to estimated parameter ratio was approximately 10:1, meeting recommended thresholds (Bentler & Chou, 1987). Supporting the findings of Study 2, the fit indices revealed a good fit between the GCEQ measurement model and the data, $\chi^2(160) = 452.65$, $p < .001$; CFI = .94; SRMR = .07; RMSEA = .06 (90% CI = .06 to .07). In addition, the higher order structure approached a satisfactory fit, $\chi^2(164) = 567.96$, $p < .001$; CFI = .92; SRMR = .11; RMSEA = .07 (90% CI = .07 to .08). Examination of modification indices suggested parameter modifications could be made; however, these modifications were not pursued because they lacked theoretical justification. That is, we avoided the temptation to make sample specific modifications as such a decision would have represented a data-driven approach (McDonald & Ho, 2002).

Temporal Stability

An independent sample ($N = 110$) comprising 38 male and 72 female university students, ranging in age from 18 to 24 years ($M = 20.24$, $SD = 1.36$) completed the 20-item GCEQ on two occasions separated by 1 month. Supporting the temporal stability of the GCEQ, intraclass correlations for each subscale were as follows: health management, $r = .79$; social affiliation, $r = .89$; skill development, $r = .80$; social recognition, $r = .85$; image, $r = .89$. Further, the intrinsic and extrinsic goal composite scores displayed intraclass correlations of $r = .83$ and $r = .89$ respectively.

Brief Discussion

Study 3 provided support for the temporal stability of the GCEQ over a 1-month period as well as for the factorial validity of the GCEQ's lower order structure in independent validation samples. With regard to the higher order structure, even though the CFI and RMSEA were indicative of good fit, the SRMR value was marginally higher than Hu and Bentler's (1999) suggested criteria. Even so, researchers have been cautioned against using fit index thresholds as golden rules by which to judge model fit (Marsh et al., 2004). Indeed it is suggested that such model judgments (especially concerning multifactor instruments) should not be made exclusively on the basis of fit index thresholds (Marsh et al., 2004). Instead, Hu and Bentler (1998) have suggested that other contributory factors such as interpretability of parameter estimates and model complexity need be taken into account in addition to overall fit indices. It is also important to avoid adopting a purely data-driven approach that strives for good model fit (Byrne, 2001; Markland, 2007). To this end, modifications to the GCEQ's higher order structure were not pursued in view of (a) the reliability and temporal stability evidenced in Study 3, (b) the excellent higher-order model fit and external validity of the goal composites identified in Study 2, (c) the conceptual and theoretical underpinning used to develop the measurement scale, and (d) that modifications could be sample specific and may result in the premature exclusion of potentially useful items.

General Discussion

The purpose of the present research was to develop and psychometrically evaluate scores from a questionnaire (GCEQ) that captured the importance placed on exercise goals in light of the intrinsic and extrinsic goal content dichotomy highlighted in SDT (Deci & Ryan, 2000; Kasser & Ryan, 1996). In support of our objectives, a systematic series of studies provided empirical support for the reliability and validity of scores on a measure of exercise-based goal content (that is, the "what" rather than the "why" of exercise motivation). Collectively, the findings from the present research suggest that the GCEQ has the potential to further investigations pertaining to individual differences in exercise motivation by providing researchers with a measure of a theoretically important component of SDT (viz., exercise goal content). Researchers should be careful to use the GCEQ as intended; to measure the "what" component of individual's exercise goals, in line with the writings of Deci and Ryan (2000) and their colleagues (e.g., Sheldon et al., 2004).

The factor analyses of Studies 1 and 2 supported a five-factor solution, highlighting exercise goals pertaining to health management, skill development, social affiliation, social recognition and image domains that were invariant across gender. The CFA procedure of Study 2 further suggested that these lower order goals could be appropriately grouped at a higher order level as *intrinsic* (health management, skill development and social affiliation) and *extrinsic* (social recognition and image) goals. Further results supported the internal consistency of all subscales and responses to the GCEQ were shown to be coherently related to theoretically pertinent variables and unrelated to a measure of social desirability.

Given the evidence presented regarding the GCEQ's external validity being in line with theoretical hypotheses, it would seem that goal content as assessed via the GCEQ can be appropriately located in the nomological network underpinning SDT (Deci & Ryan, 2000), which purports that intrinsic goals will facilitate adaptive outcomes via the satisfaction of basic psychological needs. The present results provide support for this hypothesis in that the more *inwardly* focused intrinsic goals were related to greater psychological need satisfaction (in this case competence and relatedness) than the *outwardly* focused extrinsic goals (Williams et al., 2000). The absence of correlation between the intrinsic goal composite factor and autonomy need satisfaction was surprising, although intrinsic goals were found to be positively related to autonomous exercise regulation. One reason for this null finding might be due to the way that the concept of autonomy satisfaction was assessed. The items of the PNSE (Wilson et al., 2006) seem to primarily tap the availability of exercise options from which one can decide. While decisional autonomy (Houlfort, Koestner, Joussemet, Nantel-Vivier, & Lekes, 2002) reflects an important subcomponent of autonomy, it is also critical to assess individuals' phenomenological experience of pressure and tension versus volition and psychological freedom, labeled with the term affective autonomy by Houlfort et al. (2002). Intrinsic goal pursuit might be especially critical for the latter, as the pursuit of intrinsic goals would allow one to freely engage in exercise activity even though one might not always be given the opportunity to decide for oneself which activities to engage in. A similar observation has been made by McDonough and Crocker (2007) who employed the PNSE with a sample of adult dragon boaters. Taken collectively, the findings of the present work and those of McDonough and Crocker suggest that the autonomy items of the PNSE, while purporting to tap the need for autonomy, may more explicitly assess the perception of choice.

Future work exploring the relationship between exercise goal content and exercise-based autonomy need satisfaction may therefore benefit from using more holistic assessments encompassing different aspects of autonomy (see also Reeve, Nix, & Hamm, 2003 for a similar point). Although such advances in measurement may provide clearer results concerning the satisfaction of autonomy, it is important to note that this unexpected finding is also only identified in a single cohort. Thus, sample specific factors in the present data (viz., deviations from normality) may, in part, account for this result.

Further evidence for the external validity of the GCEQ scores was provided through the observation that intrinsic and extrinsic goal contents correlated as hypothesized with autonomous and controlling forms of behavioral regulation. These findings support previous contentions that while being conceptually independent constructs, intrinsic and extrinsic goals tend to be more strongly associated with autonomous and controlling forms of behavioral regulation respectively (Kasser, 2002; Sheldon et al., 2004). In line with previous work in the general life domain which has supported the conceptual distinction between goal content and goal regulation, future work may explore whether goal-contents and behavioral regulations yield independent effects on exercise-related affect, cognitions, and behavior.

In Study 3, we used CFA to test the GCEQ's factorial structure in an independent sample. The lower order structure of the GCEQ was supported and support

for the higher order model was partially provided. Moreover, the final 20-item, five-factor solution displayed good temporal stability.

Even though our findings are promising, we acknowledge that the GCEQ may require further development and validation. With this in mind, future research may involve further examination of SDT-driven exercise goal content assessment to advance the structure of the GCEQ.

Limitations

A number of limitations to our research warrant discussion. Although the five goal factors examined using the GCEQ represent conceptually and theoretically grounded exercise goals, there exist further exercise goals which require conceptual clarification in light of the SDT goal content perspective. For example, the goal of weight loss is a pervasive exercise goal that individuals may hold (Lowry et al., 2000); however, weight loss could be pursued equally to improve one's appearance in the eyes of others or to enhance one's physical health (O'Brien et al., 2007). Future work in this area would do well to further explore the conceptual clarification and differential effects of intrinsic and extrinsic weight loss goal pursuit.

The measure of social desirability employed in Study 2 yielded a low reliability estimate. As measurement error attenuates the relationships among variables, the true associations between social desirability and the goal constructs tapped by the GCEQ could not be reliably explored in the present work. Using valid and reliable measures of social desirability, it would be insightful in future work to test further whether scores derived from the GCEQ are associated with a socially desirable response pattern.

A further limitation is that the populations used in the present analyses displayed prominent ethnic homogeneity, as our samples comprised a majority of White participants. In addition all study populations were biased toward greater proportions of females and were on average middle aged. In addition, the physical activity level of the participants was not assessed and therefore their exercising status is unknown. While acknowledging that the theoretical tenets of SDT are hypothesized to be fairly universal across different subgroups (Deci & Ryan, 2002; Grouzet et al., 2005) future research using the GCEQ would do well to strive to achieve greater participant diversity in terms of exercise level and ethnicity as to test the universal applicability of the scale. With regards to participant's exercise level, we acknowledge that this limits the drawing of conclusions pertaining to the utility of the GCEQ in specific samples of regular exercisers or those that do not currently exercise. At present, the GCEQ seems to be most appropriate for those who are at least contemplating exercise participation (Prochaska, DiClemente, & Norcross, 1992). Following the example of Markland and Ingledew's (1997) work with the EMI-2, future work may look to validate the GCEQ in such samples by exploring the effect of rewording the stem of the GCEQ so that those who do not exercise can speculate as to what their exercise goals might be if they commenced an exercise regimen. Evidently, a scale's validity is inferred through a combination of correlational analysis and theoretical knowledge (in this case regarding the goal content facet of SDT). Although this is a common methodology within scale development research, future work would do well to take the GCEQ beyond the

realms of cross-sectional research and test the value of the goal constructs identified in predicting pertinent exercise-related outcomes (e.g., persistence, enjoyment of exercise and exercise intensity).

Conclusion

In summary, the three studies presented in this article forward the GCEQ as a theoretically based and psychometrically sound tool with which to assess exercise goal content from an SDT perspective. Further research should be pursued to advance understanding of the conceptual, theoretical, and psychometric facets of the GCEQ, but the resultant scale provides researchers with a promising valid and reliable measure that may help further the application of SDT in the exercise domain.

Note

1. At the request of an anonymous reviewer, we performed the EFA employing an equamax rotation. This orthogonal rotation strategy identified a number of factorially complex items, whereas the direct oblimin strategy produced items that loaded cleanly on single factors. Given our hypothesis based on SDT (Deci & Ryan, 2000) and previous research (Kasser & Ryan, 1996) that the goal factors would be correlated, the results from the oblique direct oblimin procedure were reported.

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