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VALIDATION OF A GERMAN VERSION OF THE SPORT MOTIVATION SCALE (SMS28) AND MOTIVATION ANALYSIS IN COMPETITIVE MOUNTAIN RUNNERS[1, 2]

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Summary.—This study validated a German version of the Sport Motivation Scale (SMS28) and investigated the sex-specific and age-related differences in motivation of competitive mountain runners. Translation and cross-cultural adaptation of the SMS28 was based on translation and back-translation methodology. Acceptable validity of the German version of the SMS28 was indicated by the high correlations (.81 to .98) of scores on the seven subscales for the English and German versions completed by 15 subjects. Motivation analysis was performed with 127 competitive male and female mountain runners. The seven subscales of the German version showed good internal consistency (Cronbach's coefficient alphas .70 to .85). Findings on motivation of competitive mountain runners were a decline across age groups of Intrinsic motivation toward accomplishment for both sexes and an age-related decline of External regulation only for females. These motivational changes might well be associated with the observed diminishing numbers of older participants in mountain running competitions.

Competitions in mountain running have become popular in recent years. Annually, hundreds of regional and international competitions are held in the Alps. For example, more than 1,000 runners participated in the World Masters Athletic Championships in Mountain Running in 2007 held in Austria (Burtscher, Förster, & Burtscher, 2008). There, the largest numbers of male and female participants were recorded for the age group between 45 and 49 years. However, after this age numbers of participants diminished steeply up to the age between 65 and 69 years, i.e., for males by 73% and for females by 82%. Another finding was that the endurance was extraordinarily higher for mountain runners up to the age of 70+ years than for untrained peers (Burtscher, *et al*., 2008). This is important to recognize because large cohort studies have demonstrated a strong association between endurance or fitness and survival (Paffenbarger, Hyde,

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Wing, & Hsieh, 1986; Blair, Kohl, Paffenbarger, Clark, Cooper, & Gibbons, 1989; Myers, Prakash, Froelicher, Do, Partington, & Atwood, 2002) and because mountain running is an easy and safe sport without need for high-tech equipment, provided the availability of training opportunities in a hilly terrain. Thus, the prevention of the observed decline in participation of older persons would be important. Motivation is one of the critical cognitive variables in exercise adoption and maintenance (Buckworth, Lee, Regan, Schneider, & DiClemente, 2007). A growing body of research has examined the role of motivation in adoption and maintenance of physical activity (Cardinal, 1998; Lee, Nigg, DiClemente, & Courneya, 2001; Buckworth & Wallace, 2002).

Self-determination theory has been successful in explaining motivational aspects of sports (Hagger & Chatzisarantis, 2008; Pelletier, Vallerand, & Sarrazin, 2007). According to this theory, highly self-determined types of motivation, like intrinisic motivation, are associated with favorable outcomes like greater persistence, interest, and satisfaction with physical activity. Intrinsically motivated behaviors occur in interesting activities and do not depend on separable consequences like material rewards, praise, or external constraints, so these behaviors are self-determined. Such behaviors will only be maintained as long as the needs for autonomy and competence—which are innate needs of all humans according to self-determination theory—are satisfied, as necessary for experience of interest and intrinsic motivation (Deci & Ryan, 2000; Hagger & Chatzisarantis, 2008). In contrast, extrinsically motivated behaviors are performed not for their own sake but for separate consequences like awards, money, or praise. In competitive sports, extrinsic forms of motivation may represent important maintenance aspects of motivational factors. It is well documented that youth exposed to extrinsic goals have lower performance and participation rates in adulthood, perhaps due to burnout (Raedeke, 1997; Julio, Takito, Mazzei, Miarka, Sterkowicz, & Franchini, in press). Dodd and Spinks (1995) found that extrinsic motivation for male participation in masters' sports increased significantly from middle (46 to 59 years) to later (60 to 90 years) adulthood. However, little information is available on motivational aspects of female master athletes, and no study has considered mountain runners. Especially extrinsic motivation is hypothesized to differ for male and female competitive mountain runners, the more pronounced age-related changes being noted for females. Therefore, the present goal was investigating age-related differences in motivation between both sexes of competitive mountain runners.

Method

The Sport Motivation Scale

The Sport Motivation Scale (SMS28; Pelletier, Fortier, Vallerand, Tu-

son, Brier, & Blais, 1995) was used for motivation analysis. The SMS28 assesses motivation for engaging in sports activities and was thus considered to be adequate for assessment of motivation of competitive mountain runners. It has successfully been used in many studies dealing with motivational aspects in competitive and noncompetitive sports, and has already been translated into several languages (Doganis, 2000; Núñez, Martín-Albo, Navarro, & González, 2006). It assesses seven types of motivation: (a–c) intrinsic motivation toward knowledge, accomplishment and stimulation, as well as (d–f) identified, introjected, and external regulations, and (g) amotivation. It contains 28 items (four items for each of the seven subscales) assessed on a 7-point scale (see the Appendix, pp. 819-820). Pelletier, *et al*.'s descriptions (1995) of the subscales are as follows. Intrinsic motivation toward knowledge is observed if an activity is performed for the pleasure or satisfaction of learning or understanding something. Intrinsic motivation toward accomplishment or task orientation is defined as engaging in an activity for the pleasure or satisfaction of accomplishing or creating something. Intrinsic motivation toward stimulation occurs when an activity is performed to obtain stimulating experiences. Identified regulation represents the type of extrinsic motivation wherein a specific behavior is important and so performed out of choice; no actual external factors are necessary. Although such behavior is internally regulated and self-determined, it is still performed for extrinsic reasons. In introjected regulation, former external factors of motivation have been internalized. Their actual presence, as in identification, is no longer necessary to initiate behavior; internal pressures like guilt or anxiety take over its effects. External regulation refers to behavior that is controlled by external factors. Amotivation is defined as the lack of intrinsic and extrinsic motivation. No contingencies between actions and outcomes are perceived.

Translation and Cross-cultural Adaptation

Given the sample characteristics, most participants were expected to prefer a questionnaire in the German language. Since no German version of the SMS28 was available, translation of the English version was performed. After obtaining permission from Luc G. Pelletier, the SMS28 questionnaire was translated as suggested by Vallerand, Pelletier, Blais, Brière, Senécal, and Vallières (1992). *Step 1:* The initial translation from English to German (forward translation) was performed by two independent bilingual translators. *Step 2*: The resulting two German versions were discussed and synthesized by the translators and individuals familiar with the SMS28 (translating committee). *Step 3:* The resulting German version and the original English version were then presented to four individuals with excellent knowledge of English and German languages who independently examined the German version with regard to equivalence

and comprehensibility. Based on their comments, the translating committee proposed a final German version of the SMS28. *Step 4*: Fifteen nonprofessional athletes (10 men, 5 women) with good knowledge of the English and German languages were asked to complete the German version of the SMS28 and also the original English version (Pelletier, *et al*., 1995). *Step 5*: Back-translation was performed by two English native speakers fluent in German. The back-translation was checked against the original version and was judged to have retained perfectly its overall theme and meaning.

Motivation Analysis in Competitive Mountain Runners

After adaptation of the German version of the SMS28, three organizers of international mountain running competitions in Austria agreed to send both German and English versions of the SMS28 in a survey including questions on runners' characteristics, and a cover letter to available lists of competition participants. A total of 300 to 320 participants were contacted by e-mail, and 130 completed questionnaires were finally returned. Three of these questionnaires were rejected because no age was indicated. Twelve answered in English and 115 in German. Thus, a total of 115 questionnaires was available for validation of the German version of the SMS28 and 127 for analyses of motivational aspects of competitive male and female mountain runners. In addition to the SMS28, study participants completed questions on characteristics like age, sex, stature, body weight, mountain running experience (for how many years), yearly participation in mountain running competitions, weekly volume of running training, and the respective percentage of high intensity training (at or above the anaerobic threshold).

Statistical Analysis

The validation of the German version included the assessment of internal consistency reliability of subscales using Cronbach´s coefficient alpha (Cronbach, 1951) and intercorrelations of subscale scores. Analyses of covariance (ANCOVAs), with sex as a fixed factor and age as a covariate, were performed to assess sex-specific and age-related differences on the seven subscales of the SMS28.

Main effects of age and sex and the interaction effect of sex and age were estimated. When significant interaction effects were detected, regression analyses were then applied to assess age-dependent slope differences between the two sexes. To assess effect size, Cohen's *d* was calculated for differences between two means and partial eta squared (η^2_p) for ANCOVA. A p value $< .05$ was considered to indicate statistical significance.

Results

Validation of the German Version of the SMS28

Correlations of the scores of the seven subscales for the English and

TABLE 1

MEANS AND STANDARD DEVIATIONS AND CORRELATIONS BETWEEN ENGLISH AND GERMAN VERSIONS FOR SCORES ON SUBSCALES OF SMS28 COMPLETED BY PARTICIPANTS ($N = 15$)

Subscale	English		German		Correlation	
	M	*SD*	*M*	*SD*	*r*	95%*CI*
Intrinsic motivation toward knowledge	3.5	1.3	3.6	1.5	.98	.94, .99
Intrinsic motivation toward accomplishment	4.3	1.1	4.4	1.1	.90	.72, .97
Intrinsic motivation toward stimulation	4.9	1.1	4.8	1.1	.81	.51, .93
Identified regulation	3.6	0.9	3.7	1.0	.87	.65, .96
Introjected regulation	5.7	1.2	5.8	0.9	.86	.62, .95
External regulation	2.7	1.1	2.6	1.0	.94	.83, .98
Amotivation	1.6	0.8	1.6	0.8	.97	.91, .99

German versions of the SMS28 ranged from .81 to .98 (Table 1), both versions completed by the same 15 participants (Step 4 in the Method section). The seven subscales of the German version (see the Appendix, pp. 819-820) showed good internal consistency as Cronbach´s coefficients alpha ranged from .70 to .80. For the 115 mountain runners who completed the German version of the SMS28, the seven subscales showed good internal consistency as Cronbach´s coefficients alpha ranged from .70 to .85.

Motivation Analysis in Competitive Mountain Runners

Questionnaires on motivation analysis were completed by 101 men and 26 women competitive mountain runners; 115 responded in German and 12 in English. The proportion of sexes (20.5% women) was similar to that of finishers in the World Masters Athletic Championships in Mountain Running 2007 (18.3% women; Burtscher, *et al*., 2008). Characteristics of the study participants are shown in Table 2. Women mountain runners were on the average somewhat younger, shorter, and of lower body weight and Body Mass Index than male runners. There were no sex differences with regard to mountain running experience, the frequency of the annual participation in mountain running competitions, and the weekly

TABLE 2

CHARACTERISTICS OF COMPETITIVE MALE ($n = 101$) AND FEMALE ($n = 26$) MOUNTAIN RUNNERS

Variable	Men		Women		Comparison		
	M	*SD*	*M*	*SD*	*t*	*p*	Cohen's *d*
Age, yr.	44.9	9.8	40.3	12.1	2.03	.04	0.42
Height, cm	177.9	6.1	166.1	4.8	9.15	< .001	2.15
Weight, kg	70.1	8.1	55.0	4.8	9.09	< .001	2.27
BMI, kg/m^2	22.1	1.8	20.0	1.4	5.53	< .001	1.30
Mountain running experience, yr.	10.4	8.5	8.2	8.9	1.16	.25	0.24
Competitions/yr.	10.6	9.0	8.4	7.7	1.14	.27	0.26
Running training, hr./wk.	7.0	2.6	7.3	3.8	−0.47	.64	−0.09
High intensity training, %	22.4	19.6	30.0	21.5	−1.73	.09	−0.37

TABLE 3

MEANS AND STANDARD DEVIATIONS OF SMS28 SUBSCALES IN COMPETITIVE MEN AND WOMEN MOUNTAIN RUNNERS AND EFFECTS OF SEX AND AGE

Subscale	Men ($n = 101$)		Women ($n = 26$)		Age Effect			Sex Effect			Interaction Age × Sex		
	M	*SD*	*M*	*SD*	*F*	*p*	η^2	*F*	*p*	η^2	*F*	*p*	η^2
Intrinsic motivation toward knowledge	3.8	1.3	3.7	1.4	0.91	.34	.007	0.19	.66	.002	0.60	.55	.010
Intrinsic motivation toward accomplishment	4.3	1.3	3.8	1.5	4.17	.04	.033	0.38	.54	.003	2.24	.11	.035
Intrinsic motivation toward stimulation	5.0	1.1	5.1	1.1	2.79	.10	.022	0.02	.89	.000	1.51	.22	.024
Identified regulation	4.0	1.1	3.6	1.3	0.07	.79	.001	1.64	.20	.013	0.94	.39	.015
Introjected regulation	5.3	1.1	5.7	1.1	0.80	.37	.006	1.72	.19	.014	0.89	.41	.014
External regulation	2.9	1.2	2.2	1.2	5.04	.03	.039	9.86	.002	.074	7.53	.001	.108
Amotivation	1.5	0.6	1.5	0.9	0.00	.99	.000	0.00	.95	.000	0.01	.99	.000

hours of running training. Women runners tended to train more intensely than the men. The results of a variance analysis on the seven subscales are shown in Table 3. Significant effects of age were found on the subscales Intrinsic motivation toward accomplishment and External regulation. Both types of motivation declined across age groups. However, a sex-specific difference was observed only on External regulation. Using a sex-specific regression of age on External regulation, a significant decline of extrinsic motivation was evident only for women runners (Fig. 1).

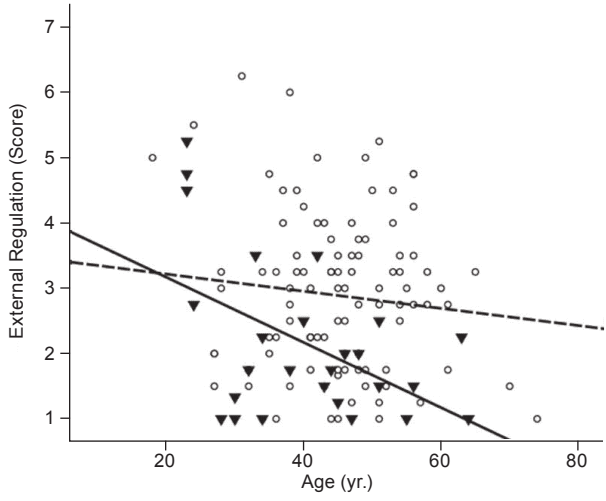

FIG. 1. Regressions of age on the subscale External Regulation (men ○, women ▼). For men, $R^2 = .01$ (ns) and for women $R^2 = .25$ ($p < .01$; External Regulation = $4.167 - .04 \cdot$ Age).

DISCUSSION

The goal was to adapt a German version of the SMS28 and to investigate age-related differences in motivation between both sexes of competitive mountain runners. An age-related decline of intrinsic motivation was observed in both sexes and an age-related decline of extrinsic motivation only for women mountain runners.

Based on the applied translation and back-translation methodology, the relatively high correlations of scores of the subscales between the English and German versions of the SMS28, and the good internal consistency of the subscales of the German version, acceptable validity of the German version of the SMS28 can be assumed.

The main findings of the motivation analysis in competitive mountain runners were an age-related decline on Intrinsic motivation toward

accomplishment for men and women and an age-related decline on External regulation for women. Intrinsic motivation is undoubtedly essential for persistent participation in exercise in general and for participation in competitions as well. However, prior studies on athletes who focus too much on winning, but lose, have reported such athletes are especially at risk for losing intrinsic motivation (Vallerand & Reid, 1984; McAuley & Tammen, 1989). On the other hand, Vansteenkiste and Deci (2003) demonstrated that the motivation of losers could be maintained when they received noncontrolling positive feedback on competence.

In nearly all theoretical models, perceived athletic competence is considered to be an important correlate of intrinsic motivation (e.g., Vallerand & Reid, 1984; Lintunen, Valkonen, Leskinen, & Biddle, 1999; Chatzisarantis, Hagger, Biddle, Smith, & Wank, 2003). Perceived athletic competence may be dampened as participants' ages increase, especially in mountain runners who directly experience their performance decline in comparison with younger competitors due to typical mass starts for all age groups. Additionally, decline in this type of intrinsic motivation for older age groups might be associated with an effect described by Wilcox and Storandt (1996), who reported increased awareness of physical limitations at older ages. The decreasing numbers of participants in mountain running competitions with older age groups of both sexes (Burtscher, *et al*., 2008) may well be associated with the lower mean scores on Intrinsic motivation toward accomplishment, as in the present study.

Extrinsic motivation may be crucial in competitive sports. Recently, De Pero, Amici, Benvenuti, Minganti, Caprinica, and Pesce (2009) concluded that extrinsic motivation may be a key motivational factor for older athletes, although no sex difference was detected. In contrast, the present findings revealed that External regulation decreased across age groups only for women mountain runners. This might explain the noticeably fewer women participants in mountain running competitions (Burtscher, *et al*., 2008). The importance of persistent extrinsic motivation may be supported by the chance of winning which has been reported as positively related to participation. For example, Medic, Starkes, and Young (2007) showed that both the probability of setting a record and the likelihood of participating in the national championships increased if Masters' athletes were in the first year of the age cohort and decreased if they were in the third, fourth, or fifth year of a 5-yr. age category. Given the fewer women participants, these age categories in mountain running sometimes comprise 10 yr. or more, so fewer rewards may be provided for women mountain runners (personal observations of the authors). Such facts may contribute to the loss of women entrants. Avoiding such sex differences in regulations

could counter the observed decline in women mountain runners. Physiologically, the postmenopausal change in estrogen might contribute to an explanation for the more predominant decline in extrinsic motivation of elderly women mountain runners. Such changes lead to abnormalities in the dopaminergic system, which is considered to be an important factor in extrinsic motivation (Craig, Cutter, Wickham, van Amelsvoort, Rymer, Whitehead, & Murphy, 2004). Possibly unexpected incentives could affect that system and thereby elicit extrinsically motivated behavior (Kaplan & Oudeyer, 2007). If reduced estrogen in postmenopausal women disrupts dopaminergic systems, e.g., making them less responsive to extrinsic incentives, this physiological change might be one reason why elderly women are generally less interested in competitions as extrinsic motives like prizes and recognition are perceived as less attractive. Of course, other age-related reasons like depressive disorders or musculoskeletal diseases cannot be excluded.

Since most of the literature has focused on children and young adults (e.g., Hagger, Chatzisarantis, & Biddle, 2001; Standage Duda, & Ntoumanis, 2005; Standage, Duda, & Ntoumanis, 2006), studies of sex-specific motivation among senior athletes considering specific types of sports are urgently needed. The present study provides a small but important contribution to the little information now available on the motives and motivational determinants for sport and competition participation of older athletes for both sexes.

Limitations

Changes in the original scale have been proposed (Mallett, Kawabata, Newcombe, Otero-Forero, & Jackson, 2006). However, as the SMS28 has already successfully been used in many studies and translated into several languages (Doganis, 2000; Núñez, *et al.*, 2006), here the older version of the scale was translated. The present sample was small, especially concerning women, but the population of older women mountain runners is small, as noted above. Given these athletes represent a relatively exclusive group who were studied for the first time, the data can provide a valuable base for subsequent studies. Finally, this was a cross-sectional survey with all associated weaknesses, e.g., such studies do not permit distinction between cause and effect, provide no information about individual change, and they do not allow separation of aging effects (intra-individual changes over time) from cohort effects (differences between groups of individuals who share some temporal experience). Robust longitudinal studies are needed to confirm relations inferred from the findings.

REFERENCES

Blair, S. N., Kohl, H. W., Paffenbarger, R. S., Clark, D. G., Cooper, K. H., & Gibbons, L. W. (1989) Physical fitness and all-cause mortality: a prospective study of healthy men and women. *Journal of the American Medical Association*, 262, 2395-2401.

Buckworth, J., Lee, R. E., Regan, G., Schneider, L. K., & DiClemente, C. C. (2007) Decomposing intrinsic and extrinsic motivation for exercise: application to stages of motivational readiness. *Psychology of Sport and Exercise*, 8, 441-461.

Buckworth, J., & Wallace, L. S. (2002) Costs and consequences of sedentary living: new battleground for an old enemy. *President´s Council on Physical Fitness and Sports: Research Digest*, 3, 1-7.

Burtscher, M., Förster, H., & Burtscher, J. (2008) Superior endurance performance in aging mountain runners. *Gerontology*, 54, 268-271.

Cardinal, B. J. (1998) Interaction between stage of exercise and relapse. *Journal of Human Movement Studies*, 34, 175-185.

Chatzisarantis, N., Hagger, M., Biddle, S., Smith, B., & Wank, C. K. (2003) A meta-analysis of perceived locus of causality in exercise, sport, and physical education contexts. *Journal of Sport & Exercise Psychology*, 25, 284-306.

Craig, M. C., Cutter, W. J., Wickham, H., van Amelsvoort, T. A., Rymer, J., Whitehead, M., & Murphy, D. G. (2004) Effect of long-term estrogen therapy on dopaminergic responsivity in post-menopausal women: a preliminary study. *Psychoneuroendocrinology*, 29, 1309-1316.

Cronbach, L. J. (1951) Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297-334.

Deci, E. L., & Ryan, R. M. (2000) The "what" and "why" of goal pursuits: human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227-268.

De Pero, R., Amici, S., Benvenuti, C., Minganti, C., Caprinica, L., & Pesce, C. (2009) Motivation for sport participation in older Italian athletes: the role of age, gender, and competition level. *Sport Science for Health*, 5, 61-69.

Dodd, J. R., & Spinks, W. R. (1995) Motivations to engage in masters sport. *ANZALS Leisure Research Series*, 2, 61-75.

Doganis, G. (2000) Development of a Greek version of the Sport Motivation Scale. *Perceptual and Motor Skills*, 90, 505-512.

Hagger, M. S., & Chatzisarantis, N. (2008) Self-determination theory and the psychology of exercise. *International Review of Sport and Exercise Psychology*, 1, 79-103.

Hagger, M. S., Chatzisarantis, N., & Biddle, S. J. (2001) The influence of self-efficacy and past behaviour on the physical activity intentions of young people. *Journal of Sports Sciences*, 19, 711-725.

Julio, U. F., Takito, M. Y., Mazzei, L., Miarka, B., Sterkowicz, S., & Franchini, E. (in press) Tracking 10-year competitive winning performance of Judo athletes across age groups. *Perceptual and Motor Skills*.

Kaplan, F., & Oudeyer, P. Y. (2007) In search of the neural circuits of intrinsic motivation. *Frontiers in Neuroscience*, 1, 225-236.

Knechtle, B., Knechtle, P., & Rosemann, T. (2010) Race performance in male mountain ultra-marathoners: anthropometry or training? *Perceptual and Motor Skills*, 110, 721-735.

Lee, R. E., Nigg, C. R., DiClemente, C. C., & Courneya, K. (2001) Validating motivational readiness for exercise behavior with adolescents. *Research Quarterly for Exercise and Sport*, 72, 401-410.

Lintunen, A., Valkonen, E., Leskinen, E., & Biddle, S. J. H. (1999) Predicting physical activity intentions using a goal perspectives approach: a study of Finnish youth. *Scandinavian Journal of Medicine and Science in Sports*, 9, 344-352.

Mallett, C., Kawabata, M., Newcombe, P., Otero-Forero, A., & Jackson, S. (2006) Sport Motivation Scale–6 (SMS–6): a revised six-factor sport motivation scale. *Psychology of Sport and Exercise*, 8, 600-614.

McAuley, E., & Tammen, V. V. (1989) The effects of subjective and objective competitive outcomes on intrinsic motivation. *Journal of Sport & Exercise Psychology*, 11, 84-93.

Medic, N., Starkes, J. L., & Young, B. W. (2007) Examining relative age effects on performance achievement and participation rates in Masters athletes. *Journal of Sports Sciences*, 25, 1377-1384.

Myers, J., Prakash, M., Froelicher, V. F., Do, D., Partington, S., & Atwood, J. E. (2002) Exercise capacity and mortality in men referred for exercise testing. *New England Journal of Medicine*, 346, 793-801.

Núñez, J. L., Martín-Albo, J., Navarro, J. G., & González, V. M. (2006) Preliminary validation of a Spanish version of the Sport Motivation Scale. *Perceptual and Motor Skills*, 102, 919-930.

Paffenbarger, R. S., Hyde, R. T., Wing, A. L., & Hsieh, C. C. (1986) Physical activity, all-cause mortality, and longevity of college alumni. *New England Journal of Medicine*, 314, 606-613.

Pelletier, L. G., Fortier, M. S., Vallerand, R. J., Tuson, K., Brier, N. M., & Blais, N. M. (1995) Toward a new measure of intrinsic motivation, extrinsic motivation and amotivation in sports: the Sport Motivation Scale (SMS). *Journal of Sport & Exercise Psychology*, 17, 35-53.

Pelletier, L. G., Vallerand, R. J., & Sarrazin, P. (2007) The revised six-factor Sport Motivation Scale (Mallett, Kawabata, Newcombe, Otero-Forero, & Jackson, 2007): something old, something new, and something borrowed. *Psychology of Sports and Exercise*, 8, 615-621.

Raedeke, T. D. (1997) Is athlete burnout more than just stress? A sport commitment perspective. *Journal of Sport & Exercise Psychology*, 19, 396-417.

Standage, M., Duda, J. L., & Ntoumanis, N. (2005) A test of self-determination theory in school physical education. *The British Journal of Educational Psychology*, 75, 411-433.

Standage, M., Duda, J. L., & Ntoumanis, N. (2006) Students' motivational processes and their relationship to teacher ratings in school physical education: a self-determination theory approach. *Research Quarterly for Exercise and Sport*, 77, 100-110.

Vallerand, R. J., Pelletier, L. G., Blais M. R., Brière, N. M., Senécal, C., & Vallières E. F. (1992) The Academic Motivation Scale: a measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement*, 52, 1003-1017.

Vallerand, R. J., & Reid, G. (1984) On the causal effects of perceived competence on intrinsic motivation: a test of cognitive evaluation theory. *Journal of Sport and Exercise Psychology*, 6, 94-102.

Vansteenkiste, M., & Deci, E. L. (2003) Competitively contingent rewards and intrinsic motivation: can losers remain motivated? *Motivation and Emotion*, 27, 273-299.

Wilcox, S., & Storandt, M. (1996) Relations among age, exercise, and psychological variables in a community sample of women. *Health Psychology*, 15, 110-113.

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APPENDIX

The German Version of the Sport Motivation Scale (SMS28)

Permission for the use and the translation of the SMS28 was obtained from Luc G. Pelletier, Die Sport Motivations Skala (SMS28) Warum üben Sie Ihre Sportart aus?

Pelletier, L. G., Fortier, M. S., Vallerand, R. J., Tuson, K. M., Brière, N. M., & Blais, M. R. (1995) Toward a new measure of intrinsic motivation, extrinsic motivation, and amotivation in sports: the Sport Motivation Scale (SMS). *Journal of Sport & Exercise Psychology*, 17, 35-53.

Trifft überhaupt nicht zu	Trifft schwach zu		Trifft mäßig zu	Trifft stark zu		Trifft exakt zu
1	2	3	4	5	6	7

Warum üben Sie Ihre Sportart aus?	1	2	3	4	5	6	7
1. Weil ich ein gutes Gefühl während aufregender Erfahrungen verspüre.							
2. Wegen des guten Gefühls, mehr über den Sport zu wissen, den ich ausübe.							
3. Früher hatte ich gute Gründe Sport zu treiben, aber heute frage ich mich, ob ich weitermachen soll.							
4. Weil ich mich beim Entdecken neuer (Trainings-) Techniken gut fühle.							
5. Es kommt mir so vor, als wäre ich nicht mehr fähig, in diesem Sport erfolgreich zu sein.							
6. Weil mir dadurch Ansehen von Menschen, die ich kenne, entgegengebracht wird.							
7. Weil es meiner Meinung nach eine der besten Möglichkeiten ist, Leute zu treffen.							
8. Weil ich große Genugtuung verspüre, wenn ich bestimmte schwierige (Trainings-) Techniken meistere.							
9. Weil es absolut notwendig ist Sport zu treiben, wenn man in Form bleiben will.							
10. Wegen des Ansehens, ein/e Athlet/In zu sein.							
11. Weil es eine gute Möglichkeiten ist, um andere Aspekte meiner Persönlichkeit weiterzuentwickeln.							
12. Weil ich ein gutes Gefühl verspüre, wenn ich an der Verbesserung eigener Schwachstellen arbeite .							
13. Wegen der Aufregung, die ich fühle, wenn ich mich mit einer Aktivität richtig intensiv befasse.							
14. Weil ich Sport treiben muss, um mich wohl zu fühlen.							
15. Wegen der Genugtuung, die ich erfahre, wenn ich meine Fähigkeiten perfektioniere.							
16. Weil die Menschen in meiner Umgebung finden, dass es wichtig ist, fit zu sein.							

(continued on next page)

Warum üben Sie Ihre Sportart aus?	1	2	3	4	5	6	7
17. Weil es eine gute Möglichkeit ist, viele Dinge zu lernen, die mir auch in anderen Lebensbereichen nützlich sein können.							
18. Weil ich intensive Gefühle verspüre, wenn ich einen Sport ausübe, den ich mag.							
19. Ich glaube nicht mehr wirklich, dass mein Platz im Sport ist.							
20. Weil ich ein gutes Gefühl verspüre, wenn ich gewisse schwierige Bewegungen ausführe.							
21. Weil ich mich schlecht fühle, wenn ich mir nicht die Zeit dafür nehme.							
22. Um anderen zu zeigen, wie gut ich in meinem Sport bin.							
23. Weil ich ein gutes Gefühl verspüre, wenn ich (Trainings-) Techniken erlerne, die ich nie zuvor probiert habe.							
24. Weil es eine der besten Möglichkeiten ist, Beziehungen mit meinen Freunden aufrecht zu erhalten.							
25. Weil ich das Gefühl mag, in eine Aktivität komplett vertieft zu sein.							
26. Weil ich regelmäßig Sport treiben muss.							
27. Weil ich ein gutes Gefühl verspüre, wenn ich neue Leistungs-Strategien entdecke.							
28. Oft kommt es mir vor, als könnte ich meine selbst gesteckten Ziele nicht erreichen.							