Athletic Identity, Sport Participation, and Psychological Adjustment in People With Spinal Cord Injury

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This study examined interrelationships among athletic identity, sport participation, and psychological adjustment in a sample of people with spinal cord injury (SCI). Participants (N = 1,034) completed measures of athletic identity, life satisfaction, anxiety, depression, and demographic and sport participation variables. Current amount of weekly sport participation was positively related to athletic identity when statistically controlling for age, gender, and pre-SCI amount of weekly sport participation. Being able to practice one’s favorite sport after SCI was associated with higher levels of athletic identity and better psychological adjustment. Team sport participants reported experiencing better psychological adjustment than individual sport participants did. The findings suggest that social factors are important in the link between sport participation and psychological adjustment in people with SCI.

Among the many potential psychological effects of involvement in sport is enhanced development of a sense of self. By committing to and investing in freely chosen physical activities, people make a statement to themselves and others about who they are (Kleiber & Kirshnit, 1991). Through participation in sport, some individuals may come to define themselves, at least in part, as athletes. Athletic identity—the extent to which one identifies with the athlete role (Brewer, Van Raalte, & Linder, 1993)—is the sport-specific portion of a multidimensional self-concept (Marsh, 2008), in which self-identification is manifested across multiple roles (e.g., work/school, family, religion). In keeping with their self-images, people high in athletic identity tend to show greater sport involvement and participate at higher levels of competition than those low in athletic identity (Brewer et al., 1993). For some individuals who highly identify with the athlete role, experiencing events that threaten performance of that role, such as illness, injury, and deselection (i.e., getting “cut” from a sport team) may negatively affect personal identity (Sparkes, 1998).
Consistent with several models positing that threats to the self (i.e., events that jeopardize performance of self-defining roles or diminish evaluations of oneself) precipitate depression (Dance & Kuiper, 1987; Oatley & Bolton, 1985; Pyszczynski & Greenberg, 1987), positive associations have been documented between athletic identity and psychological distress following both sport injury (Brewer, 1993; Manuel et al., 2002) and sport career termination (Hinitz, 1988; Shachar, Brewer, Cornelius, & Petitpas, 2004). Athletic identity is also related to various demographic and psychological factors. For example, men tend to have higher athletic identity than women do, and athletic identity has been found to be inversely related to age and positively associated with level of sport involvement (Brewer et al., 1993). Beginning with a pair of studies exploring measurement issues (Martin, Eklund, & Mushett, 1997; Martin, Mushett, & Eklund, 1994), athletic identity has been examined in a series of investigations of persons with disabilities. Positive correlations have been documented between athletic identity and competitiveness in a sample of female athletes with various disabilities (Martin, Adams-Mushett, & Smith, 1995), perceived competence in a sample of children with visual impairments (Shapiro, 2003), and quality of life in a sample of athletes with cerebral palsy (Groff, Lundberg, & Zabriskie, 2009). An inverse relationship between athletic identity and social physique anxiety in a sample of female athletes with various disabilities was reported by Martin (1999). Further, Groff and Zabriskie (2006) found that the degree of identification with the athlete role of elite Alpine skiers with disabilities was comparable to that of skiers without disabilities at similar levels of competition. In a study of 678 people with spinal cord injury (SCI), Tasiemski, Kennedy, Gardner, and Blaikley (2004) found that people with SCI, even those involved in competitive sport, reported lower levels of athletic identity than the normative values for athletic identity among athletes without disabilities and athletes with disabilities other than SCI. As documented in research on athletes without disabilities (Brewer et al., 1993), athletic identity was greater among males than among females and increased with level of sport involvement and amount of weekly sport participation. Athletic identity was not, however, significantly correlated with life satisfaction, anxiety, and depression (Tasiemski et al., 2004).

The lower level of athletic identity in people with SCI in comparison with people with other types of disabilities could be caused by the magnitude of the disability and its potential influence on sport involvement. In particular, SCI that results in disruption of neural transmission can have considerable physical and emotional consequences for an individual’s life. Paralysis, altered sensation, or weakness in the parts of the body innervated by areas below the injured region commonly occurs. In addition to a loss of sensation, muscle functioning, and movement, individuals with SCI experience many other changes that may affect bowel and bladder, presence of pain, gastrointestinal function, swallowing ability, blood pressure, temperature regulation, and breathing ability. Numerous secondary complications may arise from SCI, including deep vein thrombosis, heterotopic ossification, pressure ulcers, and spasticity (Eng & Miller, 2008). Previous research has indicated that more than 20% of people with SCI experience depressive disorders (Woolrich, Kennedy, & Tasiemski, 2006). Depression in patients with SCI has been shown to be associated with increased duration of hospital stays and fewer functional improvements in rehabilitation (Malec & Neimeyer, 1983). Cumulatively, these physical and emotional effects may contribute to a decrease in both sport involvement (Kirkby, Cull, & Foreman,
1996; Schönherr, Groothoff, Mulder, & Eisma, 2005; Tasiemski, Bergström, Savic, & Gardner, 2000; Tasiemski, Kennedy, Gardner, & Taylor, 2005) and, by consequence, athletic identity. It is unclear, however, whether athletic identity after SCI is influenced more by preinjury or postinjury sport involvement. Athletic identity is fairly stable over time, but does tend to decrease after events that threaten sport participation (Brewer, Cornelius, Stephan, & Van Raalte, 2010; Brewer, Selby, Linder, & Petipas, 1999; Grove, Fish, & Eklund, 2004). Accordingly, people with SCI, who are unable to engage in sporting pursuits after their injury, might decrease their athletic identity to a greater extent than people with SCI, who are able to participate in sport after their injury. Such a decline in athletic identity would also be consonant with a self-presentational perspective, holding that people distance themselves from roles they cannot perform well in an attempt to avoid making a bad impression on others (Major & Schmader, 1998; Schmader, Major, & Gramzow, 2001).

Among people with SCI who participate in sport after sustaining their injuries, some choose to play team sports and some choose to play individual sports. It is a legitimate practical concern as to whether psychological factors associated with sport participation after SCI vary as a function of the type of sport. Research with intercollegiate athletes suggests that participating in a team sport is related to stronger identification with the athlete role than participating in an individual sport (Mignano, Brewer, Winter, & Van Raalte, 2006), but the relationship between type of sport participation and athletic identity has not been examined in people with SCI. Muraki, Tsunawake, Hiramatsu, and Yamasaki (2000) reported no differences in anxiety and depression as a function of type of sport participation (i.e., team versus individual) among people with SCI. In contrast, participation in a sport activity course where teamwork is a salient component following SCI is associated with an increase in life satisfaction and a decrease in anxiety (Kennedy, Taylor, & Hindson, 2006). Similarly, involvement in social leisure, which presumably is more salient in team sports than in individual sports, is positively correlated with quality of life among people with SCI (Lee & McCormick, 2006).

The primary purpose of the current study was to extend the research of Tasiemski et al. (2004) on the role of athletic identity in the psychological adjustment of people with SCI. In keeping with a dynamic view of the self-concept (Cantor, Markus, Niedenthal, & Nurius, 1986; James, 1910; Markus & Kunda, 1986), in which people’s self-perceptions are malleable and subject to change over time as a reflection of their life experiences, it would be expected that athletic identity would be more strongly associated with postinjury sport participation than with preinjury sport participation. Because not being able to play one’s favorite sport following SCI presumably constitutes a greater threat to athletic identity than sustaining a SCI alone, it was predicted that individuals unable to play their favorite sport would have lower levels of life satisfaction and higher levels of depression and anxiety than those able to play their favorite sport. A secondary purpose of the current research was to examine the practical question of whether people participating in team sports following SCI differ from those participating in individual sports following SCI on athletic identity, life satisfaction, anxiety, and depression. Based on the findings of Muraki et al. (2000), Kennedy et al. (2006), and Lee and McCormick (2006), it was hypothesized that team-sport participants would have higher levels of life satisfaction and lower levels of anxiety and depression than individual-sport participants following SCI.
Method

Participants
Prospective participants were identified via the Foundation of Active Rehabilitation in Poland (equivalent of spinal injuries association in other countries), which holds the biggest national database regarding people with SCI. Inclusion criteria for the study were having an SCI at level C5 or below (SCI above the C5 level doesn’t allow participation in sport due to limited functional abilities, i.e., four-limb paralysis), using a manual wheelchair for all daily activities, being between 18 and 50 years of age at the time of injury, injured at least one year before the study, admitted to a rehabilitation center within six months of injury, and a resident of Poland. A total of 1,743 people who satisfied the inclusion criteria were mailed a letter of explanation, a booklet containing the study questionnaires (i.e., demographic characteristics, injury characteristics, recreational activities, sport participation, the measures of athletic identity, life satisfaction, anxiety, depression), and a postage-paid return envelope. Those people with tetraplegia who were not able to fill in the questionnaires themselves were allowed to have assistance from their relatives or personal caregivers. A reminder packet was sent to potential participants who had not returned their questionnaire booklet within six weeks. Altogether, 1,034 completed questionnaires were received after one reminder, yielding a response rate of 59%. The response rate is satisfactory for a postal survey, although the lack of data from 41% of people initially selected for participation in this study does not allow for generalizability of the results to the population of people with SCI in Poland. The respondents were 173 women and 861 men ranging in age from 19 to 68 ($M = 35.93$, $SD = 10.03$) took part in this study. The mean age at the time of injury was 26.16 ($SD = 8.04$) years, with 519 participants reporting paraplegia and 515 participants reporting tetraplegia. The mean number of years postinjury was 9.78 years ($SD = 7.09$). The demographic characteristics of participants in this study are comparable to international data for populations of people with SCI (see Table 1). Approximately three-fourths of the participants reported being totally independent (i.e., did not require any help from others in daily activities; $n = 294$, 28%) or partially independent (on average required 4.16 hr of help from others in each 24 hr period; $n = 491$, 48%). The most common causes of injury were traffic accidents ($n = 407$, 39%) and falls ($n = 296$, 29%). Most participants reported they were single ($n = 557$, 54%), with smaller portions of the sample indicating they were married or living with a partner ($n = 375$, 36%), divorced or separated ($n = 89$, 9%), or widowed ($n = 13$, 1%). The majority of participants ($n = 657$, 64%) stated they lived in cities; the remainder reported living in villages. With respect to residential wheelchair accommodation, approximately two-thirds of the participants reported they lived in housing that was fully adapted ($n = 253$, 24%) or partially accessible ($n = 442$, 43%). Most participants ($n = 776$, 75%) indicated they had obtained at least a secondary school education. In terms of occupation, 41% ($n = 419$) of participants noted they were unemployed, with other participants reporting that they were students ($n = 59$, 6%), homemakers/parents ($n = 41$, 4%), workers in full-time employment ($n = 189$, 18%), or workers in part-time employment ($n = 82$, 8%). Information on ethnicity and race was not collected as, according to the Demographic Yearbook of Poland, 96% of inhabitants in Poland declare Polish nationality (Central Statistical Office, 2009).
An expanded version of the questionnaire developed by Tasiemski et al. (2004) was used to obtain information on demographic characteristics (e.g., age, gender, marital status, level of education, employment status, housing situation, residential location), injury characteristics (e.g., injury cause, injury level, wheelchair use, amount of assistance required), recreational activities before and after injury, and sport participation. Among the aspects of sport participation assessed were (a) hours of sport participation per week before and after injury (the response options were 0 [scored 1], < 1 [scored 2], 1–2 [scored 3], 3–5 [scored 4], and 6+ [scored 5]); (b) sport discipline practiced before and after injury; (c) opportunities to practice one’s favorite sport after injury (“yes,” “no—due to my disability,” and “no—due to lack of opportunity” were the response options); (d) reasons for sport participation after injury; (e) barriers to sport participation after injury; (f) best sport results after injury; and (g) years of sport participation after injury. Involvement in nonsport recreational activities before and after SCI were assessed with items on which respondents were asked to indicate which of the following activities applied to them: (a) socializing/meeting people, (b) traveling, (c) watching TV, (d) reading, (e) listening to music, (f) going to concerts/cinemas/theaters, (g) Internet/computer games, (h) playing cards/chess, and (i) others. The number of activities indicated were summed separately for pre- and post-SCI. The original demographic and sport participation questionnaire was developed for a pilot study assessing sport, recreation, and work involvement following SCI (Tasiemski et al., 2000). As a result of that project, the initial questionnaire was reviewed and amended according to findings of a pilot study and then pretested on 12 outpatients with SCI. Those involved in the pretest provided feedback on the questionnaire design and assisted in the detection of typographical errors, ambiguity, and/or omissions. The pilot study confirmed the accuracy of one major change within this measure (i.e., assessment of sport participation after SCI). The original categories of sport participation described as “frequency of sport participation per week” (5–7 times, 2–4 times, once, none) were changed into “hours of sport participation per week” to allow for more precise assessment of this variable. The extended version of the questionnaire has been used in investigations related to sport participation in people with SCI (Tasiemski et al., 2004, 2005). The measurement of sport participation

<table>
<thead>
<tr>
<th>Study Author, Year (Country)</th>
<th>Gender*</th>
<th>SCI level*</th>
<th>Age**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women</td>
<td>Men</td>
<td>Paraplegia</td>
</tr>
<tr>
<td>Martin Ginis et al., 2010 (Canada)</td>
<td>23.6</td>
<td>76.4</td>
<td>62.3</td>
</tr>
<tr>
<td>Tasiemski et al., 2005 (UK)</td>
<td>19.0</td>
<td>81.0</td>
<td>65.2</td>
</tr>
<tr>
<td>Richards et al., 1999 (USA)</td>
<td>21.0</td>
<td>79.0</td>
<td>52.0</td>
</tr>
<tr>
<td>Westgren &amp; Levi, 1998 (Sweden)</td>
<td>18.5</td>
<td>81.5</td>
<td>61.2</td>
</tr>
<tr>
<td>Post, van Dijk et al., 1998 (Holland)</td>
<td>24.6</td>
<td>75.4</td>
<td>57.9</td>
</tr>
<tr>
<td>Present study (Poland)</td>
<td>16.7</td>
<td>83.3</td>
<td>49.8</td>
</tr>
</tbody>
</table>

* Percent, ** Mean

### Measures

An expanded version of the questionnaire developed by Tasiemski et al. (2004) was used to obtain information on demographic characteristics (e.g., age, gender, marital status, level of education, employment status, housing situation, residential location), injury characteristics (e.g., injury cause, injury level, wheelchair use, amount of assistance required), recreational activities before and after injury, and sport participation. Among the aspects of sport participation assessed were (a) hours of sport participation per week before and after injury (the response options were 0 [scored 1], < 1 [scored 2], 1–2 [scored 3], 3–5 [scored 4], and 6+ [scored 5]); (b) sport discipline practiced before and after injury; (c) opportunities to practice one’s favorite sport after injury (“yes,” “no—due to my disability,” and “no—due to lack of opportunity” were the response options); (d) reasons for sport participation after injury; (e) barriers to sport participation after injury; (f) best sport results after injury; and (g) years of sport participation after injury. Involvement in nonsport recreational activities before and after SCI were assessed with items on which respondents were asked to indicate which of the following activities applied to them: (a) socializing/meeting people, (b) traveling, (c) watching TV, (d) reading, (e) listening to music, (f) going to concerts/cinemas/theaters, (g) Internet/computer games, (h) playing cards/chess, and (i) others. The number of activities indicated were summed separately for pre- and post-SCI. The original demographic and sport participation questionnaire was developed for a pilot study assessing sport, recreation, and work involvement following SCI (Tasiemski et al., 2000). As a result of that project, the initial questionnaire was reviewed and amended according to findings of a pilot study and then pretested on 12 outpatients with SCI. Those involved in the pretest provided feedback on the questionnaire design and assisted in the detection of typographical errors, ambiguity, and/or omissions. The pilot study confirmed the accuracy of one major change within this measure (i.e., assessment of sport participation after SCI). The original categories of sport participation described as “frequency of sport participation per week” (5–7 times, 2–4 times, once, none) were changed into “hours of sport participation per week” to allow for more precise assessment of this variable. The extended version of the questionnaire has been used in investigations related to sport participation in people with SCI (Tasiemski et al., 2004, 2005). The measurement of sport participation...
among people with disabilities based on “hours of sport participation per week” has also been supported by other research (Schönherr et al., 2005).

The Athletic Identity Measurement Scale (AIMS; Brewer & Cornelius, 2001) was used to assess athletic identity. The AIMS, which was designed as a measure of the athletic portion of a multidimensional self-concept (Marsh, 2008), features seven items pertaining to affective, behavioral, and cognitive aspects of identification with the athlete role. Respondents rate the extent to which they agree with each of the items on a scale from 1 (strongly disagree) to 7 (strongly agree). Examples of items are “I have many goals related to sport” and “I feel bad about myself when I do poorly in sport.” Individual items scores are summed to create a total athletic identity score, with higher scores corresponding to stronger, more exclusive identification with the athlete role. The AIMS was developed with able-bodied people (Brewer et al., 1993) but has been used extensively in studies of persons with disabilities (e.g., Groff et al., 2009; Martin, Eklund et al., 1997; Martin, Mushett et al., 1994; Tasiemski et al., 2004). Support for the convergent validity (positive associations with similar constructs such as perceived importance of sport competence and sport-related competitiveness), discriminant validity (nonsignificant associations with dissimilar constructs such as self-esteem and the tendency to respond in a socially desirable manner), factorial validity, test-retest reliability ($r = 0.89$ over a 14-day period), and internal consistency ($\alpha = 0.81$ to 0.93) of the AIMS has been obtained (Brewer & Cornelius, 2001; Brewer et al., 1993), and the AIMS has been shown to be unidimensional and internally consistent ($\alpha = 0.87$) among people with SCI (Tasiemski et al., 2004).

Life satisfaction was assessed with the nine-item Life Satisfaction Questionnaire (LiSat-9; Fugl-Meyer, Bränholm, & Fugl-Meyer, 1991), which consists of nine items pertaining to satisfaction with life as a whole and in the specific domains of self-care, leisure, vocation, finances, sexuality, partner relationship, family, and social contact. LiSat-9 items, which are rated on a Likert scale from 1 (very dissatisfying) to 6 (very satisfying), include “My vocational situation is . . .” and “My sexual life is . . .” Individual item scores are summed to create a total life satisfaction score. Convergent evidence of the validity of the LiSat-9 as a measure of life satisfaction based on relations to other variables (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999) was obtained in a study where each of the LiSat-9 items were positively associated with one or more other factors conceptually related to life satisfaction, such as employment situation, perceived health, subjective performance ability, and having a partner (Melin, Fugl-Meyer, & Fugl-Meyer, 2003). Although developed for able-bodied persons, the reliability and utility of the LiSat-9 in SCI populations has been demonstrated in several previous studies (Post, de Witte, van Asbeck, van Dijk, & Schrijvers, 1998; Schönherr et al., 2005; Songhual et al., 2009; Tasiemski et al., 2004, 2005). Several of the items of LiSat-9 have been found to show acceptable test–retest reliability, specificity, and sensitivity (Bränholm, Lundmark, Fugl-Meyer, & Fugl-Meyer, 1991). Further, Tasiemski (2007) provided evidence in support of the internal consistency of the LiSat-9 ($\alpha = 0.82$ for the 8 domain-specific items). Anxiety and depression were assessed with the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983). The HADS consists of fourteen items, with seven items corresponding to anxiety (HADS-A) and seven items corresponding to depression (HADS-D). Responses are given on a scale from 1
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(not at all) to 4 (very often indeed). The items pertaining to each dimension are summed to create separate indices of anxiety and depression. Examples of anxiety items are “Worrying thoughts go through my mind” and “I get sudden feelings of panic.” Examples of depression items are “I feel as if I am slowed down” and “I have lost interest in my appearance.” In support of the concurrent validity of the instrument, Bjelland, Dahl, Tangen Haug, and Neckelmann (2002) reported correlations ranging from 0.49 to 0.83 between the two HADS subscales and other measures of anxiety and depression, thereby providing convergent evidence of the instrument’s validity based on relations to other variables (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999). The HADS has demonstrated convergent validity across populations with physical health problems, including myocardial infarction (Roberts, Bonnici, Mackinnon, & Worcester, 2001), stroke (Aben, Verhey, Lousberg, Lodder, & Honig, 2002), SCI (Woolrich et al., 2006), breast cancer (Johnston, Pollard, & Hennessy, 2000), and renal disease (Martin, Tweed, & Metcalfe, 2004). It has also been validated among adult and older adult psychiatric populations (Dagnan, Chadwick, & Trower, 2000; Flint & Rifat, 2002) and nonclinical populations from various countries (Mykletun, Stordal, & Dahl, 2001; Quintana et al., 2003). Concurrent validity has been evaluated mainly using the Beck Depression Inventory (Beck, Steer, & Brown, 1996) and the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970); Bjelland et al. (2002) presented support for the internal consistency of both the HADS-A (α = 0.68 to 0.93) and the HADS-D (α = 0.68 to 0.93). Test–retest reliability has also been demonstrated to be good (r = 0.85; Quintana et al., 2003). The HADS was designed to assess anxiety and depression in nonpsychiatric populations (Herrmann, 1997). It has been widely used for research purposes in clinical settings where mood disorders can co-occur with physical pathology (Barczak et al., 1988) but has also been widely used in previous investigations of mood disorders in persons with SCI (Hancock, Craig, Dickson, Chang, & Martin, 1993; Kennedy & Rogers, 2000; Songhuai et al., 2009; Tasiemski et al., 2004, 2005; Woolrich et al., 2006).

Procedure

Approval to conduct this study was obtained from the European Commission (EC) research ethics committee, as this project was completed within the EC Individual Marie-Curie Reintegration Grant. All the measures used in the study were translated from English to Polish by two sworn translators through the back translation method. In addition, professionals in rehabilitation medicine were consulted to ensure accuracy in the use of specific medical terms. Next, a pilot study was undertaken involving six people with SCI to ensure that all the measures and particular questions were clear for study participants. The survey was then administered as described in the Participants section herein. All statistical analyses were performed using SPSS 14.0.

Statistical Analysis

Preliminary Analyses. Medians, means, standard deviations, skewness, and Cronbach’s alpha were calculated for athletic identity, life satisfaction, and depression. To examine patterns of missing data, a series of t tests was performed in which the age, number of years postinjury, level of injury, and scores of participants
on the scales used to measure the athletic identity, life satisfaction, anxiety, and depression of participants with missing data on the psychological variables were compared with those of participants without missing data on of the psychological variables. A chi-square analysis was conducted to compare the distributions of men and women across the subsamples of participants with and without missing data. Intercorrelations among athletic identity, life satisfaction, anxiety, and depression were also computed. To determine whether the robust finding that sport participation decreases after SCI, a t test comparing the amount of sport participation engaged in per week by participants before and after SCI was performed.

**Main Analyses.** Each of the main analyses was preceded by tests in which assumptions underlying the respective analysis were examined. To test the hypothesis that athletic identity would be more strongly associated with postinjury sport participation than with preinjury sport participation, a hierarchical regression analysis (Table 2) was conducted in which athletic identity scores served as the criterion variable. Age and gender (dummy-coded) were entered on the first step, followed by pre-SCI amount of physical activity participation and involvement in post-SCI nonsport recreational activities. Current amount of sport participation per week were entered on the second, third, and fourth steps, respectively. The hierarchical regression analysis provided an opportunity to highlight the unique, incremental variance in athletic identity accounted for by the predictor variables.

To test the hypothesis that individuals unable to play their favorite sport would have lower levels of life satisfaction and higher levels of anxiety and depression than those able to play their favorite sport, a multivariate analysis of covariance (MANCOVA) was conducted in which the athletic identity, life satisfaction, anxiety, and depression scores of participants who reported that they were not able to practice their favorite sport after SCI due to disability were compared with those of participants who reported that they were not able to practice their favorite sport due

### Table 2  Hierarchical Multiple Regression Analysis Predicting Athletic Identity From Pre-SCI Sport Involvement, Post-SCI Nonsport Recreational Activities, and Post-SCI Sport Involvement

<table>
<thead>
<tr>
<th>Predictor</th>
<th>ΔR²</th>
<th>R²</th>
<th>β</th>
<th>F</th>
<th>F Change</th>
</tr>
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<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td>0.03</td>
<td></td>
<td>10.35**</td>
<td>10.35**</td>
</tr>
<tr>
<td>Age</td>
<td>0.04</td>
<td>0.03</td>
<td>−.09*</td>
<td></td>
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</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>−.14*</td>
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<tr>
<td>Step 2</td>
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<tr>
<td>Pre-SCI sport hours per week</td>
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<td>0.06</td>
<td>0.18*</td>
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<tr>
<td>Step 3</td>
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<td>14.90**</td>
<td>13.02**</td>
</tr>
<tr>
<td>Post-SCI nonsport recreational activities</td>
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<td>0.13**</td>
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<tr>
<td>Step 4</td>
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<td>0.26</td>
<td></td>
<td>203.78**</td>
<td>55.78**</td>
</tr>
<tr>
<td>Post-SCI sport hours per week</td>
<td>0.19</td>
<td>0.26</td>
<td>0.45*</td>
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</tbody>
</table>

*Note.* n = 784; *p < .05; **p < .005
to lack of opportunity. This MANCOVA was conducted to ensure that the responses of participants who gave different reasons for not being able to play their favorite sport were homogeneous and could therefore be combined. Because Box’s test of equality of covariance matrices was statistically significant ($p = 0.002$) and Levene’s test of equality of error variances was statistically significant for depression ($p = 0.002$) in the MANCOVA with post-SCI team versus individual sport involvement, the Pillai’s Trace statistic was used in this analysis. Wilks’s $\Lambda$ was used in the MANCOVA with pre-SCI team versus individual sport involvement because Box’s test of equality of covariance matrices was not statistically significant ($p = 0.93$), and Levene’s test of equality of error variances was not statistically significant for all four dependent variables (all $p$s > 0.14; Mertler & Vannatta, 2005). In a follow-up MANCOVA, the two groups of participants who noted that they were unable to play their favorite sport after SCI were aggregated. Participants reporting that they were able to practice their favorite sport after SCI were compared with those reporting that they were not able to do so due to disability or lack of opportunity on athletic identity, life satisfaction, anxiety, and depression. Post-SCI involvement in nonsport recreational activities served as a covariate in both MANCOVAs, as this variable is moderately related to life satisfaction, anxiety, and depression in persons with SCI (Martin Ginis, Jetha, Mack, & Hetz, 2010).

A MANCOVA was also performed to explore differences in athletic identity, anxiety, and depression as a function of current sport participation in team versus individual sports. A parallel MANCOVA was conducted using pre-SCI team versus individual sport involvement as the grouping variable in light of the previously documented differences between pre- and post-SCI sport involvement patterns (Kirkby et al., 1996; Schönherr et al., 2005; Tasiemski et al., 2000, 2005). A second purpose of the parallel MANCOVA was to rule out the possibility that any differences obtained in the first MANCOVA were due simply to a predisposition toward playing team or individual sports. Post-SCI involvement in nonsport recreational activities served as a covariate in both MANCOVAs.

## Results

### Preliminary Analysis

Medians, means, standard deviations, and skewness values for athletic identity, life satisfaction, anxiety, and depression are displayed in Table 3. Cronbach’s alpha reliability coefficients for the scales used to assess the four primary psychological constructs in this study were acceptable for athletic identity ($\alpha = 0.90$), life satisfaction ($\alpha = 0.85$), anxiety ($\alpha = 0.84$), and depression ($\alpha = 0.79$). No significant differences were found (all $p$s > 0.37) in the series of $t$ tests that was performed in which the age, number of years postinjury, level of injury, and scores on the scales used to measure the athletic identity, life satisfaction, anxiety, and depression of participants with missing data on the psychological variables ($n = 189$–$419$) were compared with those of participants without missing data on the psychological variables ($n = 615$). The chi-square analysis for gender and missing data was also not statistically significant. Intercorrelations among athletic identity, life satisfaction, anxiety, and depression are presented in Table 3. Athletic identity scores were positively correlated with life satisfaction scores and negatively correlated with
both anxiety and depression scores. A similar pattern was found for life satisfaction scores, whereas the opposite pattern of correlations was found for anxiety and depression, which were positively correlated with each other but negatively associated with both athletic identity and life satisfaction. The magnitude of the correlations involving athletic identity was small, but the magnitude of the correlations among the psychological adjustment indices was large (Cohen, 1992). Participants reported engaging in significantly more sport participation before sustaining SCI \( (M = 3.38, SD = 1.44) \) than they did after the occurrence of their SCI \( (M = 2.79, SD = 1.56) \), \( t(1000) = 9.91, p < .001, \) Cohen’s \( d = 0.39 \). Approximately 79% of study participants reported involvement in physical recreational activities before SCI (53% in sport), and approximately 64% of participants indicated that they were engaged in physical recreational activities (38% in sport) at the time of the study.

### Main Analyses

**Association Between Sport Participation and Athletic Identity.** No violations of the assumptions of linearity, normality, and absence of multicollinearity were evident. In the first step of the regression analysis, both age \( (\beta = -.09, p < .005) \) and gender \( (\beta = -.14, p < .001) \) were significant predictors of athletic identity, \( R^2 = 0.03, F(2, 781) = 10.35, p < .001 \). Younger and male participants tended to have higher athletic identity scores than their older and female counterparts. Inclusion of pre-SCI amount of sport participation per week \( (\beta = 0.18, p < .001) \) in the second step of the analysis produced a significant increment in explained variance, \( \Delta R^2 = .03, F(1, 780) = 24.56, p < .001 \). Inclusion of post-SCI participation in non-sport activities \( (\beta = 0.13, p < .001) \) in the third step of the analysis also produced a significant increment in explained variance, \( \Delta R^2 = 0.02, F(1, 779) = 13.02, p < .001 \). When statistically controlling for the other variables in the equation, adding current amount of sport participation per week \( (\beta = 0.45, p < .001) \) to the model accounted for a significant proportion of variance in athletic identity scores, \( \Delta R^2 = 0.19, F(1, 778) = 203.72, p < .001 \). The overall regression equation was statistically significant, \( R^2 = 0.26, F(5, 778) = 55.78, p < .001 \).

**Effects of not Being Able to Practice a Favorite Sport.** The MANCOVA comparing participants who indicated they were not able to practice their favorite sport after SCI due to disability \( (n = 305) \) with those who claimed they could not practice their favorite sport due to lack of opportunity \( (n = 145) \) on athletic identity, life

### Table 3 Descriptive Statistics and Intercorrelations for Athletic Identity, Life Satisfaction, Anxiety, and Depression

<table>
<thead>
<tr>
<th>Variable (score range)</th>
<th>Median</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 AIMS (7–49)</td>
<td>18</td>
<td>20.56</td>
<td>11.68</td>
<td>.63</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 LiSat-9 (9–54)</td>
<td>33</td>
<td>32.05</td>
<td>8.79</td>
<td>-.10</td>
<td>.15**</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 HADS-A (7–28)</td>
<td>7</td>
<td>14.22</td>
<td>4.14</td>
<td>.40</td>
<td>-.09*</td>
<td>-.50**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>4 HADS-D (7–28)</td>
<td>5</td>
<td>13.18</td>
<td>3.95</td>
<td>.58</td>
<td>-.14**</td>
<td>-.56**</td>
<td>.64**</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Note. N = 669–1004; *p < .05; **p < .005*
satisfaction, anxiety, and depression yielded a nonsignificant omnibus multivariate effect, $F(4, 444) = 1.02$, Wilks’s $\Lambda = 0.99$, $p = 0.32$. Consequently, the two groups of participants who noted they were unable to play their favorite sport after SCI were aggregated in the MANOVA that was conducted to compare participants reporting that they were able to practice their favorite sport after SCI ($n = 179$) with those reporting they were not able to do so due to disability or lack of opportunity ($n = 450$) on athletic identity, life satisfaction, anxiety, and depression. The omnibus multivariate effect was statistically significant, $F(4, 623) = 14.34$, Wilks’s $\Lambda = 0.92$, $p < .001$. Inspection of the univariate tests revealed that compared with participants who indicated they were prevented from being involved in their favorite sport after sustaining their SCI, participants who noted they were still able to practice their favorite sport after incurring their SCI had significantly higher athletic identity scores, $F(1, 626) = 13.53$, $p < .001$, partial $\eta^2 = 0.02$, and life satisfaction scores, $F(1, 626) = 42.64$, $p < .001$, partial $\eta^2 = 0.06$, and significantly lower depression scores, $F(1, 626) = 12.40$, $p < .001$, partial $\eta^2 = 0.02$.

**Comparison Between Team and Individual Sport Participants.** In the MANCOVA that was conducted to compare participants reporting current involvement in team sports ($n = 153$) with those reporting current involvement in individual sports ($n = 454$) on athletic identity, life satisfaction, anxiety, and depression, the omnibus multivariate effect was statistically significant, $F(4, 423) = 5.45$, Pillai’s Trace = 0.05, $p < .001$. Inspection of the univariate tests revealed that athletes indicating involvement in team sports had significantly higher life satisfaction scores, $F(1, 426) = 7.06$, $p < .01$, partial $\eta^2 = 0.02$; and significantly lower anxiety scores, $F(1, 426) = 18.88$, $p < .005$, partial $\eta^2 = 0.04$; and depression scores, $F(1, 426) = 4.99$, $p < .05$, partial $\eta^2 = 0.01$. The comparable MANCOVA that was performed using pre-SCI team sport versus individual sport involvement as the grouping variable yielded a nonsignificant omnibus multivariate effect, $F(4, 558) = 0.63$, Wilks’s $\Lambda = 1.00$, $p = 0.64$.

**Discussion**

The results of this study replicate several previous findings for people with SCI but also provide new important findings. As with the research of Tasiemski et al. (2004), athletic identity levels were higher among men than among women and tended to increase with the amount of self-reported involvement in sport. These findings have been obtained consistently for people without SCI as well (Brewer & Cornelius, 2001). Moreover, the 7-item version of the AIMS demonstrated adequate internal consistency and the values for athletic identity, life satisfaction, anxiety, and depression were comparable with those reported by Tasiemski et al. (2004). The common finding that people report engaging in sport activities to a greater extent before SCI than after SCI (Kirkby et al., 1996; Schönherr et al., 2005; Tasiemski et al., 2000, 2005) was duplicated in the current study. Finally, in line with research on people without SCI (Brewer et al., 1993), age was inversely related to athletic identity. It is important to note that the effect sizes for age and gender were small (Cohen, 1992).

The finding that current amount of sport participation accounted for 20% of the variance in athletic identity over and above age, gender, pre-SCI amount of sport
participation, post-SCI involvement in nonsport recreational activities (whereas pre-SCI amount of sport participation accounted for just 3% of the variance in athletic identity when controlling for age and gender) extends the work of Tasiemski et al. (2004). This result, which suggests that current sport involvement is more important than pre-SCI sport involvement in determining athletic identity, is consonant with the view that the self is malleable and subject to situational influences (Cantor et al., 1986; James, 1910; Markus & Kunda, 1986). Although many participants likely made downward adjustments to their athletic identities after sustaining their SCI, some participants may have actually increased their identification with the athlete role if they became more involved in sport after sustaining their SCI. Although bolstered by the finding that 246 participants reported greater involvement in sport after their SCI than before their SCI, this notion is speculative, and further inquiry is needed in which retrospective assessments of pre-SCI athletic identity are taken. In such inquiry, it would be expected that participants reporting greater sport involvement post-SCI than pre-SCI would report experiencing concomitant increases in athletic identity over the same time period. Increased sport participation and athletic identity could conceivably yield improvements in physical and psychological functioning after SCI.

Consistent with theoretical perspectives positing a key role to threats to self-identity in the onset of psychological distress (Dance & Kuiper, 1987; Oatley & Bolton, 1985; Pyszczynski & Greenberg, 1987) and a body of research indicating that injuries that prevent people from engaging in sport involvement are associated with elevations in psychological distress (for a review, see Brewer, 2007), participants in the current study who reported that they were unable to participate in their favorite sport after SCI had lower levels of life satisfaction and higher levels of anxiety and depression than those who stated that they were able to maintain involvement in their favorite sport after SCI. Although the effect sizes were small (Cohen, 1992), these findings are noteworthy in light of the length of time that had elapsed between the occurrence of the SCI and the administration of the research instruments ($M = 9.78$, $SD = 7.09$ years). This suggests that the emotional disturbance tied to being prevented from participating in a preferred sport activity is not a transient phenomenon in people with SCI. Emotional disturbance generally wanes over the first two months postinjury in athletes without SCI (Brewer, 2007), perhaps because the prospects of recovery and a return to sport increase over time.

The lower levels of psychological adjustment observed in this study for participants who were unable to play their favorite sport cannot be attributed solely to SCI-related restrictions in sport involvement. It is possible, for example, that being unable to participate in a preferred sport activity is a proxy for reduced functional capabilities in general after SCI. Such an explanation, however, is less tenable for the lower athletic identity scores associated with not playing one’s favorite sport. In this situation, the tendency for sport participants without SCI to decrease their athletic identity after experiencing serious physical injuries (Brewer et al., 2010) and other events that threaten sport participation (Brewer et al., 1999; Grove et al., 2004) may be relevant. More specifically, participants in the current study whose SCI precluded involvement in a preferred sport activity may have initiated a self-protective coping mechanism in which they distanced themselves from the disappointment of not being able to play their favorite sport by reducing their identification with the athlete role, thereby reducing the psychological
impact of the SCI-related sport restrictions. This possibility notwithstanding, the findings pertaining to the ability to play one’s favorite sport are qualified by the small effect sizes (Cohen, 1992) and by research indicating that physical activity is associated with more favorable values for a variety of indicators of psychological status after SCI, including life satisfaction (Lannem, Sorensen, Froslie, & Hjeltnes, 2009; Tasiemski et al., 2005), anxiety (Gioia et al., 2006; Muraki et al., 2000), and depression (Gioia et al., 2006; Muraki et al., 2000).

As hypothesized, the comparison between participants involved in team sports with those involved in individual sports yielded significant results similar to those obtained in previous research. As with the female intercollegiate athletes (without SCI) in the study conducted by Mignano et al. (2006), team sport participants had higher levels of athletic identity than individual sport participants. A potential explanation for this finding is that playing a team sport entails frequent contact with other people (e.g., teammates, coaches) who reaffirm one’s identity as an athlete. Social factors may also have contributed to the enhanced psychological adjustment (i.e., higher life satisfaction and lower anxiety and depression) reported by participants involved in team sports. As in the research of Kennedy et al. (2006) and Lee and McCormick (2006), the teamwork and “social leisure” inherent in team sport participation may have performed a supportive function that resulted in enhanced well-being. For both team- and individual-sport participants, the physical activity associated with sport participation may have enhanced psychological adjustment relative to nonsport participants through stress reduction (Latimer, Martin Ginis, Hicks, & McCartney, 2004). It should be noted that the effect sizes in these analyses were small (Cohen, 1992) and that further research is needed to explicate the relationship between type of sport involvement (i.e., team versus individual sports) and psychological adjustment to SCI. For example, studies that examine the context of sport involvement (e.g., the team versus individual sport issue) in specialized, segregated, and integrated settings could make important contributions to the inclusion debate.

Overall, the large sample size of the current study enabled the detection of theoretically-meaningful relationships involving athletic identity, sport participation, and psychological adjustment in persons with SCI. In particular, the findings highlight the dual and potentially pivotal role of sport participation in the process of adjusting to SCI. In one respect, the results suggest that SCI is associated with a loss of aspects of physical functioning that can compromise involvement in sport activities, which, for some individuals, can have an adverse impact on self-identity and psychological adjustment. In another respect, however, the results indicate that individuals with SCI who do participate in sport activities may experience a bolstered athletic identity and enhanced psychological adjustment. Thus, sport involvement is a fertile domain for the exploration of psychological processes in association with SCI.

**Limitations of the Study**

Several limitations of the current study should be acknowledged. First, the data were obtained exclusively through self-report, which is subject to bias, distortion, and forgetting. Psychometric properties of the expanded version of the questionnaire developed by Tasiemski have not been determined. It is, however, a simple questionnaire developed to collect descriptive information related to sports activity in people with SCI. Assuring participants of the anonymity and confidentiality of
the data may have reduced the potential for biased and distorted responses, but the accuracy of the retrospective reports of pre-SCI sport behavior may have been compromised by the amount of time elapsed between the occurrence of the behavior and completion of the questionnaire requesting recall of such behavior. Self-report can be augmented by additional forms of measurement (e.g., archival evidence of past sport behavior, behavioral observations of psychological adjustment) in future investigations. Second, due to the cross-sectional nature of the data, no causal inferences can be made regarding the relationships documented in this report. Experimental manipulations of sport activity variables can be attempted in subsequent research to identify possible causal relationships between sport involvement and the psychological factors assessed in this study. Third, the generalizability of the current findings is limited by the fact that data were collected in a single country. The large sample size and broad-based sampling strategy do, however, help to ensure that the results are applicable to people with SCI in Poland. Moreover, the similarity of the present results to those of Tasiemski et al. (2004) suggests that the findings transcend national borders. Fourth, the study is limited by the imbalanced group sample sizes in the MANOVAs that were conducted.

Recommendations for Future Research

To address the limitations and unanswered questions of the current study, there are several potentially fruitful directions for future research. First, retrospective assessments of pre-SCI athletic identity should be made to allow for an examination of changes in identification with the athlete role after SCI and the extent to which those changes are associated with post-SCI psychological adjustment. Second, self-report of key constructs should be augmented by additional forms of measurement (e.g., archival evidence of past sport behavior, behavioral observations of psychological adjustment) in future investigations. Third, experimental manipulations of sport activity variables can be attempted in subsequent research to identify possible causal relationships between sport involvement and the psychological factors assessed in this study. For example, people with SCI can be randomly assigned to various levels or types of sport involvement and the effects of this manipulation on athletic identity, life satisfaction, anxiety, and depression can be measured.

Practical Implications

The results of the current study speak to the potential importance of sport participation in psychological adjustment following SCI. Should the present findings be replicated and extended experimentally, practitioners can develop, implement, and evaluate physical activity interventions to enhance the overall well-being and quality of life of persons with SCI. Steering individuals toward team sports may prove especially beneficial in facilitating psychological adjustment. In light of the limitations of the study, however, the practical implications should be considered tentative and subject to further investigation.

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