REVIEW

Social support and the physical activity behaviours of people with a brain injury

S. DRIVER

University of North Texas, Denton, TX, USA

(Received 24 September 2004; accepted 20 April 2005)

Abstract

Primary objective: To examine the influence of social support on the physical activity behaviours of individual’s with a traumatic brain injury.
Main outcomes and results: The paper defines social support as a multi-dimensional construct and reviews relevant literature describing how the type and source of social support changes post-brain injury. These findings are then applied to a physical activity domain with the use of a conceptual framework. Discussion finally focuses on research applications and appropriate measures of social support within a physical activity environment.

Conclusions: This paper will provide physical activity programmers with an understanding of how social support influences physical activity participation, a conceptual framework to guide programming and appropriate measures of social support for research purposes.

Keywords: Social, support, physical, activity, brain, injury

Introduction

Throughout life, individuals are exposed to a variety of different social influences, which include ‘real or imagined pressure to change one's behaviour, attitudes or beliefs’ ([1], p 195). Social influences can be positive or negative and occur when an individual's personal and social realms interact [2, 3]. For example, an individual’s behaviours or feelings may be influenced by the shared belief system of a culture [4], a particular group [5], a specific leader [2] or by the social support received [3]. Due to the important link empirical research has established between social support, behaviour and health [6], it is viewed alongside stress and coping as one of the three most important constructs in mental health research [7]. Consequently, this paper will examine the role of social support on the motivation of people with a brain injury to be physically active. First, the paper will define social support as well as detailing research studies that highlight its impact on behaviour. Secondly, attention will centre on changes in support after a brain injury and the potential influence this will have on an individual's physical activity behaviour. Thirdly, a theoretical framework for how support influences behaviour will be covered. Finally, discussion will focus on measures of social support and their applicability to people with a brain injury.

Defining social support

Social support is a multi-dimensional construct consisting of source and type of support and it is characterized by an exchange of resources between individuals [8, 9]. Research has identified three primary sources of social support including family members, friends and health professionals [10, 11]. Each source has been shown to provide a different form of social influence depending on the situation. Various theoretical models of social support also exist, each containing different types of support [12–16]. However, there is considerable overlap
between each conceptual framework allowing social support to be operationalized into four main types including tangible (e.g. physical or financial assistance), emotional (e.g. feel cared for), esteem (e.g. increase sense of competence) and informational (e.g. advice) [17].

While extensive research has been completed examining these positive dimensions of social support [10], studies have also indicated the existence of unsupportive types of behaviour (negative influence). These include impatience, criticism, insensitivity [18], compromise, obligation and over-protectiveness [19, 20]. These negative influences have been shown to have a detrimental effect on feelings, beliefs and behaviours [10, 19].

Empirical research has not always shown each type (e.g. emotional vs esteem) or source (e.g. parent vs friend) of social support to be significantly related to desirable behavioural outcomes, such as increased motivation or exercise adherence [21]. For example, in a review of older adult physical activity research findings indicated that only 42 of the 85 social support characteristics measured were related to positive outcomes [21]. However, it is important to note that, of the 29 studies included within the review, only five found no significant relationship between any of the social support variables and the behavioural outcome. Consequently, 24 studies reported that at least one social support variable was significantly related to a desirable outcome. This result is explained by the fact that different types and sources of social support are most important at different times and this will vary between individuals [10, 22]. Basically, this suggests that help is situation-specific [23]. Research highlighting the relationship between type and source of social support and behavioural outcomes will now be discussed.

Within the general population, research has demonstrated a positive link between informational, esteem and emotional support when coping with pregnancy, bereavement or depression [8]. Research from a physical activity context has shown that individuals who receive emotional support are more motivated to be physically active [24, 25], recover successfully from athletic injury [26], adhere to an exercise programme [27, 28] and have greater satisfaction with life [29]. Research specific to people with a brain injury suggests that people who perceive greater levels of emotional support have a greater quality of life [30] and are more motivated to successfully cope with the disability [31].

Differences in the source of social support have also been shown. For example, in a meta-analysis of 87 research studies examining the influence of social support on exercise behaviour, researchers found moderate-to-large effect sizes (ES = 0.50–0.80) for different sources of social support on exercise behaviour [32]. Links were found between family and significant other support (e.g. physician, colleagues) and attitude towards exercise, as well as family support and exercise adherence. This finding is reinforced by results from a review of the social support and physical activity research in older adults [21], which found that family members (spouses and children), friends (peers) and health professionals (instructors, physicians) were the primary sources of social support. Overall, findings indicate that sources and type of social support can influence an individual’s motivation to complete a particular behaviour (e.g. physical activity). Due to the significant link between social support and positive behavioural outcomes, the type and sources of social support available to people with a brain injury will now be discussed.

Social support after a brain injury

Social support is critical to the success of the rehabilitation programme [31], due to the central role it plays in ensuring individuals are able to ‘buffer’ the stress caused by the physical, cognitive and psychosocial impairments of the disability [33, 34]. Social support provides individuals with a greater number of resources and supports to successful deal with stressful situations, as well as increasing an individual’s motivation to complete specific behaviours (e.g. attending rehabilitation classes, exercising). Therefore, social support plays an integral role in the overall rehabilitation of an individual with a brain injury.

However, despite the importance of social support in the rehabilitation process, research indicates that individuals with a brain injury do not receive adequate support. For example, numerous studies have shown a decrease in social network size and support post-injury [34–36]. Lower social support has also been linked to lower self-esteem and life satisfaction [37], decreased likelihood of returning to work [38], quality of life [30] and unsuccessful rehabilitation (e.g. occupational and vocational programs) [39]. It is also important to recognize that each of these negative social outcomes (e.g. increased isolation, inability to work) exacerbates the social isolation of an individual as he or she will have less opportunity to interact with others or pursue leisure activities. This negative spiral is accentuated by the fact that an individual’s sources of social support also decrease post-injury.

Research has shown there to be a developmental change in family and friend support after a brain injury [34]. According to Armstrong [40], family support begins with an immediate response to the acute stress of the injury to a family member that is
‘creative and crisis-oriented’. This occurs within the first 6 months of the injury and involves family members mobilizing resources (e.g. time, money, housing), providing high social support and being willing to adjust to meet the new challenges presented by the injury (e.g. work part time). The next developmental phase (e.g. >6 months) is characterized by families reacting differently to the prolonged stress of acting as a caregiver, which occurs on a continuum from ‘adaptive to maladaptive’ responses. During this period, family members either continue to offer social support or they become unsupportive (e.g. withdraw social support, over-protect). During this maladaptive period, research has shown families to experience increased stress [41], burden [42], depression and decreased overall family functioning [43]. These problems impair the family member’s ability to offer social support [44].

During this maladaptive period, individuals also experience negative influences, such as over-protection [40]. Over-protection by the spouse has been studied extensively in cardiac rehabilitation patients with results indicating that over-protection undermines an individual’s belief in their ability to exercise frequently and adhere to the programme [19, 20, 45]. Clearly, the type of influence a family member is providing for an individual (e.g. social support vs over-protection) will impact an individual’s ability to successfully initiate or maintain a behaviour, such as exercise.

Support from friends follows a different developmental pattern post-injury, as there is a gradual decline over time. This decline occurs when friends realize that the disability is chronic or they are asked to help care for the individual [40]. Furthermore, due to personality differences and speech impediments caused by the brain injury friends often find it difficult to ‘relate’ and converse with individuals who have essentially become different people, thus friendships dissolve [31, 44]. Longitudinal studies reinforce these suggestions as research has shown that social support from friends significantly decreases from 6 months to 2 years post-injury [34, 47]. This decrease in support from friends also has negative implications for family members, as they are placed under greater pressure to care for the individual [43].

In summary, following a brain injury there are changes in the type and source of social support. Individuals often lose friends and become dependent on family members for emotional and instrumental support [48, 49]. Consequently, there is a decrease in perceived quality of life as individuals become increasingly depressed and isolated [50, 51]. These findings have implications regarding the physical activity behaviours of people with a brain injury.

For example, people who are exposed to negative influences (e.g. over-protection) or experience a lack of social support to be physically active will not be motivated to participate. Consequently, individuals will not gain from the physical [52] or psychosocial benefits that accompany physical activity involvement [53]. Due to the important link between social support and motivation the discussion will now focus on examining the theoretical relationship between these two constructs. Specifically, Harter’s [54] mediational model of global self-worth will be used as the theoretical framework.

Theoretical framework: how social support influences motivation

According to Harter’s [54] mediational model of global self-worth, an individual’s motivation within a specific domain (e.g. academic, social, physical) is affected by his or her perceived competence, social support, self-worth and affect (see Figure 1). Self-worth plays a central role as it mediates the relationship between the antecedents (e.g. perceived competence, social support) and outcomes (affect, motivation) within the model. Thus, social support and perceived competence are independent variables and global self-worth, affect and motivation are the dependent variables.

Although the model was originally developed in the academic domain, the model has been adapted for use in a sport context [55, 56], whereby the global measures of each construct were contextualized to the physical activity domain. For example, social support is assessed specific to physical activity participation (‘Friends encourage me to exercise’), global self-worth becomes physical self-worth (‘I am strong’) and affect and motivation are physical activity specific [57]. Consequently, this paper will focus on physical activity specific social support, self-worth, affect and motivation. Each construct within the model will now be discussed.

Physical self-worth (or self-esteem) is considered a relatively stable judgement of the overall self [58] and can be characterized by evaluative statements such as ‘I am good at sports’. According to the model, an individual’s feelings of physical self-worth are influenced by their perceived competence, which is

![Figure 1. Harter’s mediational model of global self-worth.](image)
a more specific judgement of ability (e.g. ‘I am good at lifting weights’) or appearance (e.g. ‘I like the shape of my body’). Appearance or body image constructs are particularly relevant to people with a brain injury due to the changes in physical functioning or appearance that can occur post-injury.

Affect is a multi-dimensional construct that is used to describe how a person feels [59]. Feelings can be positive (excitement, happiness) or negative (anger, despair) and will also vary by level of activation (fatigue vs energized). Motivation refers to an individual’s level of determination, drive or desire to approach (or avoid) a particular behaviour [3]. The interaction between the constructs within the model will now be discussed in relation to the physical activity behaviour of an individual with a brain injury.

After his brain injury, Mike was left with different physical (e.g. spasticity, balance) and cognitive (e.g. memory, attention) disabilities. Consequently, he returned home to live with his family, as he could not continue to live independently. His parents immediately began to over-protect Mike because they did not want him to hurt himself again. Physical activity was not encouraged and Mike’s parents told him, ‘We don’t want you to go to the gym anymore because you don’t have the strength or balance to lift the weights. We don’t want you to hurt yourself again’. This lack of positive support had a negative influence on Mike’s self-worth as he did not think that he could be physically active. Mike then began to develop negative affective feelings about exercising (e.g. anxiety, fear, despair), which ultimately decreased his motivation to participate. However, had Mike’s parents offered him encouragement and support such as ‘You should start working out again because it will improve your strength. I’ll give you a ride to the gym’, then his self-worth would have increased. As a result of the support Mike would have developed positive feelings about exercise (excitement, enjoyment), increasing his motivation to be physically active.

It is important to note, however, that, due to the variability in cognitive, functional and neurobehavioural aspects of brain injury, individuals may interpret social support differently. For example, an individual with dense sided left-hemispatial neglect, hemiparesis, anosognosia and memory problems may not be able to recollect previously successful experiences. This situation would result in the individual having constant feelings of low self-worth. Thus, it is critical to recognize that not all gestures of social support will be interpreted as positive by individuals with brain injuries and that the interpretation of social support will vary by individual, family system or minute-to-minute affective fluctuations.

However, as the example with Mike demonstrates, physical self-worth mediates the effect of perceived social support on emotional experience (affect) and resultant motivation. This relationship has been tested extensively within the academic and social domains [54, 55]. Key findings include a strong additive relationship between social support and global self-worth, suggesting that, when perceived social support increases, there is a subsequent increase in global self-worth. However, currently only one study has tested the model within a physical activity context [56]. Smith [56] investigated the relationship among perceptions of peer acceptance and friendship, physical self-worth, affect and motivational orientation. Participants included 418 middle school students who ranged in age from 12–15 years old (M 13.73, SD 0.64). Results support the model as perceptions of peer acceptance and close friendship were positively related to physical self-worth, which in turn predicted positive affect towards physical activity. Positive affect then predicted an individual’s motivation to be physically active.

Findings highlight several important points. First, results demonstrate that an individual’s physical self-worth is dependent upon the perceived social support received. In turn, an individual’s affect is shaped by her physical self-worth with motivation being dependent upon her affect. Secondly, results again highlight the important relationship between social support and motivation. By providing continued support and increasing physical self-worth, sources of support are able to help an individual avoid a negative spiral in health impairing behaviours [27]. Thus, different types of support act together to provide motivation-based support, which impacts an individuals physical self-worth, affect and motivation.

If the relationship between social support and physical activity motivation is to be further enhanced then it is imperative that researchers use appropriate measures of support. Questionnaires must be valid and reliable as well as suitable to capture the specific component of social support desired (e.g. type vs source) [10]. Therefore, discussion will now concentrate on different measures of social support specific to physical activity research.

Measuring social support

A variety of measures of social support exist within the coping and stress literature, which assess either size of social network, source or type of support. In a review of support measures, researchers identified 27 different questionnaires [60]. However, currently only two measures exist that are specific to physical activity research. These include the social support for
exercise scale [61] and the social influences scale [10]. The social provisions scale [8] has also been frequently used in physical activity research, despite the fact it was originally designed to understand the influence of social support and adaptation to stress [27, 29]. Consequently, as these three measures were either developed specifically for a physical activity context or have been modified and adopted extensively, each will be discussed in relation to their applicability to people with a brain injury.

The social support for exercise habits scale [61] was created to assess the influence of family and friend support on exercise behaviour. Structured interviews were initially conducted to identify how family and friends had been supportive or unsupportive of their exercise behaviours. From these results, a battery of 29 items was created including questions such as how often a family member or friend has offered to exercise with them, given them reminders to exercise or discussed exercise with them. Preliminary questionnaires were then administered to 171 undergraduate students with responses being scored on a likert scale with scores ranging from 1 (none) to 5 (very often). An exploratory factor analysis was then completed, which identified one sub-scale for friend support, labelled ‘exercising together’ and two sub-scales for family support, labelled ‘participation and involvement’ and ‘punishment’. As a result, a 15-item questionnaire was developed which included positive (13-items) and negative (2-items) components of social support. Results also indicate significant test–re-test reliabilities between sub-scales ranging from 0.55–0.86 and moderate-to-high α-coefficients (r = 0.61–0.91). These results suggest that the sub-scales are stable enough to use on different occasions and that the items are suitable measures of each sub-scale. The construct validity of the measure was not confirmed as none of the sub-scales correlated significantly with the social support questionnaire (SSQ) [62]. However, the SSQ [62] was designed to understand the impact of social support on stress. As the measures were not correlated, this indicates that they are measuring support behaviours specific to a context (e.g. dealing with stress vs exercise behaviours), rather than a general construct of support. This emphasizes the need for measures that are created to assess domain-specific types of support [61].

There are several weaknesses with the SSQ [61] including a lack of distinct sub-scales that assess emotional, esteem, informational and tangible support. The researchers may have identified other salient factors of support from the original analyses had an eigenvalue of 1.0, rather than 2.0, been used to identify the relevant factors. Consequently, the measure may not be assessing all dimensions of social support as some potential sub-scales may have been left out due to the high eigenvalue used. Assessing the multi-dimensionality of social support is essential as it permits practitioners to identify which type of support is most effective when creating an intervention [28]. Also, the negative influence sub-scale (punishment) only consisted of two items, which were not related to inhibitive or over-protective influences. It is important that these negative influences are assessed in people with a brain injury due to the potential for their occurrence (e.g. over-protection). Consequently, while the measure is specific to exercise behaviour it may not be sensitive enough to capture all the dimensions of support relevant to people with a brain injury.

The social provisions scale (SPS) [8] was based on six theoretical provisions of social support [12]. The questions were based on each theoretical provision of support, resulting in the creation of six sub-scales. A confirmatory factor analysis was completed on 1792 responses to the instrument revealing six distinct factors each representing one of the theoretical provisions [12]. The sub-scales included attachment, social integration, reassurance of worth, reliable alliance, opportunity for nurturance and guidance. Four questions (two positively worded and two negatively worded) were associated with each sub-scale and individuals responded on a rating scale from 1 (strongly agree) to 4 (strongly agree). An example of a positive question is ‘There are people who depend on me for help’, whereas a negative question is ‘No one needs me to care for them’. Scores range between 4 (lack of support) to 16 (high support) for each sub-scale. The scores from each sub-scale can also be summed to create an overall score of social support. However, this score should be interpreted with caution as a total score ignores the multi-dimensional nature of social support. Results indicate a very good fit of the data to the model (χ² (246) = 1824.92, p = 0.875), supporting the construct validity of the measure. Alpha-coefficients for the original SPS ranged between 0.65–0.76, indicating an adequate internal consistency. However, studies specific to physical activity, which involved changing the wording of the SPS items to reflect social provisions available in a physical activity context, reported high α-coefficients ranging between 0.83–0.90 [27, 29]. Results from the original validation also indicated high inter-correlations between each of the sub-scales (r = 0.55–0.99), suggesting the presence of a general social support factor that underlies each of the different sub-scales. The discriminant (convergent) validity was also confirmed as the SPS correlated significantly with other measures of social support including the social support questionnaire (r = 0.352, p < 0.001) [62] and index of socially
supportive behaviours \((r = 0.400, \ p < 0.001)\) [63]. This result was expected as the SPS was correlated with other measures of stress-related social support.

However, there are several weaknesses with the SPS as a suitable measure for people with a brain injury. For example, despite each sub-scale consisting of two negatively worded questions the SPS only measures social support or an absence of support. For example, scores for the attachment sub-scale range between high support to no support rather than measuring negative influences such as over-protection, inhibitive behaviours or criticism. Consequently, the researcher cannot determine the impact of negative social influences on physical activity behaviour. However, it is recommended that if investigators are to fully understand the impact of social influences then the inter-play between positive and negative types must be considered [10, 64]. This allows practitioners to design interventions that enhance supportive interactions and decrease negative influences. Consequently, the SPS may not be an appropriate or encompassing measure of social influence for people with a brain injury who may be exposed to various negative influences.

The final measure is the social influence scale (SIS) [10], which is a multi-dimensional measure of social support designed for use with older adults within a physical activity context. The scale assesses both positive and negative types and sources of support. Development of the scale began with structured interviews, whereby 41 participants were asked to identify sources of support as well as what type of support sources were offered. After completing a componential analysis of each transcript and cross-checking components with other social support measures, a total of 23 components of positive influence and 19 components of negative influence emerged. Results also revealed three sources of social support including family, friends and health professionals. A dimensional analysis was then completed on these components, which resulted in the creation of three positive and three negative themes. Positive themes included companionship (e.g. emotional), informational and esteem support and negative themes included inhibitive (e.g. told you to avoid participation), justifying (e.g. you do not need to exercise) and criticizing behaviour (e.g. low skill level). Consequently, a questionnaire was created that consisted of six sub-scales and 27 questions with scores recorded on a likert scale ranging from 0 (never) to 4 (very often). A confirmatory factor analysis revealed a good fit of the data for family \((\chi^2 (318) = 305.87, \ p > 0.05)\), friends \((\chi^2 (318) = 289.56, \ p > 0.05)\) and experts \((\chi^2 (318) = 328.81, \ p > 0.05)\), emphasizing the construct validity of the measure. The multi-dimensionality of the measure was also confirmed by the near zero correlations between the positive and negative sub-scales \((r = 0.03–0.05)\), emphasizing the fact that there is a distinct difference between positive and negative support. This finding reinforces the notion that positive support and negative influences are different constructs, which should be measured independently [21]. The test–re-test reliability was also confirmed by the significant correlations between measurements taken 2 weeks apart \((r = 0.50–0.91)\). The high \(\alpha\)-coefficients indicated that all of the items within each sub-scale were correlated \((\alpha = 0.71–0.91)\), suggesting that items are measuring the same factor (sub-scale). Normative values for the 479 older adults involved in the original validation revealed that (1) companionship was greatest from friends, (2) esteem from family and friends, (3) inhibitive behaviour from experts, (4), justifying behaviour from family and (5) criticizing behaviour from friends. Interestingly, results indicate that, when experts gave negative influences, there was a greater detrimental impact on physical activity behaviour. Overall, the SIS appears to be the most suitable measure of social influence for people with a brain injury, despite the fact that the SIS was originally developed for older adults. Benefits include the multi-dimensionality of the SIS as it assesses types (positive and negative components) and sources (family, friend, health professional) of social influence pertinent to people with a brain injury. Also, numerous researchers and specialists have indicated a similarity between people with disabilities and older adults, largely because disabling conditions increase with age (e.g. decreased strength, functional capacity) [22, 64, 65].

Despite the apparent applicability of the SIS, it is important that several steps are taken to ensure its suitability as a measure of social influences for people with a brain injury. Assessing different components of an instrument’s validity (e.g. content, criterion, construct, discriminant) is an important step to take when researchers use measures, like the SIS, with individuals who are dissimilar (e.g. people with a brain injury) from the population that the measure was originally designed (e.g. older adults) [66]. Specifically, the content validity of the SIS should be assessed, which involves sharing the instrument with a panel of experts who will evaluate its content and applicability to people with a brain injury [66]. The procedure involves the experts critiquing the instrument for wording, relevance and accuracy as a measure of social support for people with a brain injury. It is recommended that the experts be from different fields (e.g. brain injury specialists, adapted physical activity professionals) so that different perspectives are obtained. Changes proposed by the experts are then made to
the original measure to ensure that it is specific to people with a brain injury. Subsequently, a pilot study should be conducted whereby the instrument is given to 50 people with a brain injury. Once again, individuals assess the instructions and wording to ensure they are clear and understandable. Based upon the findings from the pilot study, the instruments are again modified. From the results of the pilot study, the researcher can also assess the reliability of the SIS by computing alpha-coefficients. High internal consistency (e.g. values $\alpha > 0.70$) will indicate that the items for each sub-scale are correlated, suggesting that items are all measuring the same variable [67]. Thus, high $\alpha$-coefficients indicate that the sub-scale and instrument are reliable measures of the variable [68]. If alpha-coefficients of less than 0.60 are recorded, then results from items should be interpreted with caution or even dropped from the measure [67]. The test–re-test reliability of the measure can also be assessed by administering the SIS to the same 50 people 1-week later. Scores from weeks 1 and 2 can then be correlated to determine the stability of the measure and ensure that results did not occur by chance [69]. By completing these steps, researchers are increasing the likelihood of developing measures that are reliable and valid and that allow for results to be generalized to the wider population [66].

**Conclusion**

In conclusion, research indicates that social influences are an important variable in predicting an individuals overall health as a consistent link has been shown between increased social support and positive health influences [27, 31]. Harter's [54] mediational model of global self-worth can be used to explain this relationship, as the model predicts that increased support will enhance an individual's physical self-worth, enjoyment (affect) and motivation to participate. Due to the important health benefits that can accompany physical activity participation, especially for people with a brain injury [52], it is important that understanding of the different social influences on physical activity motivation is enhanced. Consequently, research using suitable measures of social support is required to ensure that this phenomenon is better understood.

**References**