



Predicting emotional well-being following traumatic brain injury: A test of mediated and moderated models[☆]

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ABSTRACT

This study examined two models for predicting emotional well-being following traumatic brain injury (TBI), namely the Lazarus and Folkman (1984) mediated model of stress and coping and the stress-buffer hypothesis (Cohen & Edwards, 1988). The mediated model suggests that antecedent variables (i.e., personal and environmental resources) will predict emotional well-being, but their effect will be mediated through cognitive variables, such as appraisal and coping. In contrast, the moderated (buffer) hypothesis suggests that resources will protect individuals from the effects of stress, so will have different relationships with outcome at different levels of perceived stress. Ninety individuals with TBI were recruited from a major hospital in Brisbane, Australia. They and their relatives completed questionnaires at three time intervals: discharge, one month and nine months post-discharge, discharge being in 1998. Hierarchical regression was used to examine the relationships among the proposed predictors, mediators and outcomes. Support was found for some aspects of both models in the short-term. In the long-term, stress-buffer effects were no longer apparent. However, with the exception of family support, the predictors all influenced long-term adjustment through their impact on short-term adjustment. The role of family support as a direct predictor of emotional well-being in the long-term is highlighted. The findings have the potential to enable the identification of “at risk” individuals prior to discharge and can highlight important foci for rehabilitation. Specifically, the study has identified the importance of early psychological intervention to address appraisal and the need to engage families in rehabilitation.

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Traumatic brain injury (TBI) has been associated with significant emotional difficulties, including depression and anxiety (Curran, Ponsford, & Crowe, 2000). However, such difficulties do not occur uniformly across the population, suggesting that the predictors of individual variation in emotional adjustment may reveal important information for rehabilitation. For many years, this variance was attributed to neurological variables, such as the location of lesions, the severity of the injury and the impact of cognitive impairment (see Kendall & Terry, 1996 for a review). Although neurological variables do influence emotional well-being, they cannot account for the variance that is noted in the population.

Research on the potential predictors of emotional well-being has tended to focus on the effect of only one or two variables at any

one time, such as coping or social support (e.g., Anson & Ponsford, 2006). Although this univariate approach has the advantage of simplicity, many of the predictors that have been identified are likely to be subsumed by other variables if subjected to a multivariate analysis. Further, variables that predict emotional well-being at one point in time may not significantly predict adjustment at a subsequent point in time, hence the importance of a multivariate theoretical framework from which to study adjustment in this population.

The theory of stress and coping

One theoretical framework that provides guidance about the non-neurological factors that could be applied to the prediction of adjustment following TBI is the Lazarus and Folkman (1984) theory of stress and coping. The theory provides an opportunity to examine TBI adjustment using a coherent predictive model that can delineate important predictors of adjustment and assist in the identification of those at risk of poor adjustment.

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The theory of stress and coping proposed by Lazarus and Folkman (1984) is a fully mediated model, whereby resources (predictors) influence adjustment through their impact on appraisal and coping (mediators). According to Lazarus and Folkman (1984) an event cannot be considered stressful until it has been defined as such by the individual. Typically, stressful events are those perceived to be extremely threatening (primary appraisal) and unable to be managed successfully (secondary appraisal). Hence, according to Lazarus and Folkman, stress resides in neither the person nor the event, but is a reflection of the person's unique response to each event (Lazarus, 1990; Lazarus, 1993; Lazarus & Folkman, 1984).

The process of appraisal is predicted by a range of personal and environmental resources or demands (such as self-esteem, social support, financial security). Personal resources have been defined as the relatively stable characteristics that enable some individuals to resist the deleterious effects of stress and adjust effortlessly across a range of situations (Menaghan, 1983). In contrast, environmental resources have been defined as the qualities of the social or physical context that assist individuals to manage their lives more effectively (Kessler, Price, & Wortman, 1985). Presumably, access to sufficient resources should encourage individuals to appraise their circumstances as being less stressful—low in perceived threat (primary appraisal) and high in self-efficacy (secondary appraisal).

According to Aldwin and Revenson (1987), coping responses will be implemented when situations are appraised as stressful, whereas low stress situations should not encourage the use of coping (Finney, Mitchell, Cronkite, & Moos, 1984). Lazarus and Folkman suggested that most coping strategies can be classified as either problem-focused or emotion-focused, although coping responses are likely to incorporate both types of strategies (Lazarus, 1993). Problem-focused coping aims to confront the event, either by altering the situation (environment-directed) or by acquiring the necessary information, skills or assistance (self-directed).

In contrast, emotion-focused coping is a palliative response that aims to eliminate or avoid negative emotional reactions to the event (e.g., suppression, wishful thinking, or distraction). Researchers have proposed a third type of coping, namely perception-focused coping (Pearlin & Schooler, 1978), that includes strategies such as positive re-appraisal or seeking meaning. These strategies involve attempts to reduce the threat perceived to be associated with a problem, by redefining the problem or redirecting attention to a different aspect of the problem (Holahan & Moos, 1985).

The stress-buffer hypothesis

Despite the decades that have passed since Lazarus and Folkman (1984) proposed their theory and the volume of research that has been conducted in the intervening period, clarity about the efficacy and mechanisms of coping remain elusive (Folkman & Moskowitz, 2004). Since the establishment of the theory, there has been considerable debate as to whether or not the proposed relationships between resources and well-being are mediated or moderated (see Holmbeck, 1997). Some researchers have suggested that resources may act as buffers, reducing the negative relationship between stress and emotional well-being (Cohen & Edwards, 1988). This buffering hypothesis proposed that resources may protect individuals from the deleterious impact of stress. According to Cohen and Edwards (1988), a stress-buffer is a resource that reduces the individual's susceptibility to stress-related pathology and, is "related to well-being only (or primarily) for persons under stress" (Cohen & Wills, 1985, p. 310). Thus, the effect of resources on well-being will be dependent on the level of stress that is being

experienced. A stress-buffer is likely to be positively associated with well-being under conditions of high perceived stress, but not when stress is low. As described by Frazier, Tix, and Barron (2004), moderated relationships address questions of "when" or "for whom", whereas mediated relationships represent the mechanisms by which a predictor influences an outcome variable. The most common stress-buffer effects have been found in the general population in terms of self-esteem (Cast & Burke, 2002) and social support (Penninx et al., 1997). This evidence suggests that the relationships between the resources and outcome might be more complex than the mediated model.

Method

Research has been limited by a reliance on cross-sectional data. Longitudinal designs are essential as adjustment represents the change in emotional well-being over time rather than only at a single point in time. Longitudinal designs strengthen the ability to draw conclusions about the direction of any relationships, providing the dependent variable is measured at least twice during the study (Aldwin & Revenson, 1987). Thus, a longitudinal design with three time intervals was used, namely discharge (Time 1), one month post-discharge (Time 2) and nine months later (Time 3). Emotional well-being was assessed at each time point. Predictors (self-esteem, financial security, social support, family support and stressors) were assessed at Time 1 whereas the proposed mediators (primary and secondary appraisal and coping strategies) were assessed at Time 2.

Participants

A consecutive sample of individuals with TBI was selected from the inpatient brain injury unit of a major metropolitan hospital in Brisbane, Australia. Participants were tracked over the next 10 years, but this paper reports on the first year following their discharge from hospital in 1998. Ethical clearance was gained for the study from both the Hospital and University Ethics Committees. Participants were excluded from the study if they reported the presence of psychiatric illnesses or a previous neurological condition. Of the 126 eligible individuals, 115 (91%) agreed to participate in the study. However, only 90 completed data at all three intervals. The participants were aged between 16 and 63 years ($M = 29.85$, $SD = 11.14$). Most participants were male (80%), which is representative of the general TBI population. Prior to their injury, the majority was single (70%). Most of the sample had attained a high school education (77%) and the majority had held either semi-skilled or skilled occupations (63%).

The most common cause of TBI was motor vehicle accidents (68%), with falls and assaults each accounting for an additional 16% of the sample. Injury severity was classified using the Glasgow Coma Scale (GCS) score (Jennett & Teasdale, 1981) assigned on hospital admission, ranging between three and fifteen with lower scores indicating more severe injuries. The mean GCS score was 8.18 ($SD = 4.62$), which falls in the moderate to severe range. Severe injuries were sustained by 52% of the sample (GCS below 8). Moderate or mild TBI was sustained by 17% and 31% of the sample respectively. The mean duration of hospitalization was 88 days, although there was considerable variation ($SD = 91.44$). Forty percent of the sample was discharged following initial treatment without any further rehabilitation). For those who did receive inpatient rehabilitation, the mean duration was 35 days ($SD = 59.13$). Outpatient rehabilitation was received by 58% of the sample and community-based rehabilitation was received by 44%. Only 31% obtained additional support from private or community organizations.

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