Stressful Life-Events and Fatigue in a Nonclinical Sample

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Abstract: There is a lack of systematic examination of the relationship between different stressor features and fatigue. Thus, we examined which features of stressors (e.g. frequency, duration, severity, valence, type) were most strongly related to fatigue levels. Eighty-nine participants completed a short fatigue questionnaire and a comprehensive stress interview. High fatigue levels were found to be most strongly related to the number of acute interpersonal stressors and chronic difficulty stressors (<6 months duration) and psychological distress, but no other stressor measure. Thus, acute and chronic stressor frequency counts might be the best measures used in future studies assessing the relationship between stressors and fatigue.

Key Words: Fatigue, stressful life-events, interpersonal stressors, psychological distress.

(*J Nerv Ment Dis* 2009;197: 707–710)

Fatigue is defined as a pervasive sense of tiredness or lack of energy that is not related exclusively to exertion. Fatigue severity may range from mild and brief states to severe and enduring clinical states that are characterized by fatigue, pain, and neurocognitive symptoms (Loblay et al., 2002). Fatigue is common in nonclinical populations such as community samples (LaChapelle and Finlayson, 1998; Loge et al., 1998), healthy working adults, (Åkerstedt et al., 2004; Bültmann et al., 2002) and university students (Brown and Schutte, 2006; Thorsteinsson and Brown, 2009). For example, Loge et al. (1998) report that in a large community sample, 22% of participants reported substantial fatigue, with 11% fulfilling criteria for chronic fatigue caseness.

We assessed fatigue in a nonclinical (i.e. university student) sample in this study. Our earlier research suggests that these samples include participants with nonclinical fatigue (i.e. related to stress/distress and poor sleep quality) and possible clinical fatigue (i.e. related to stress and physical illness symptoms) (Liffman et al., 2009; Thorsteinsson and Brown, 2009). Thus, such studies may permit an increased focus on early fatigue experiences, which may or may not progress to a later diagnosed fatigue disorder.

The literature suggests that there is a degree of overlap in the probable causal antecedents of these different fatigue experiences. Some authors suggest that certain cognitions, psychological states, and behaviors may interact with physical factors to determine how an individual experiences the fatigue; but possible underlying physiologic and psychosocial causal pathways leading to fatigue have rarely been advanced (Sharpe and Wilks, 2002) and need to be examined more comprehensively. Increased clarity on this matter may facilitate a better understanding of the complex processes involved in fatigue causation in healthy adults.

Stressors (e.g. stressful life-events [SLE], work stress) have consistently been identified as cross-sectional or longitudinal predictors of fatigue in nonclinical (Åkerstedt et al., 2002; Åkerstedt et al., 2004; Van der Ploeg and Kleber, 2003) and clinical samples (e.g. chronic fatigue syndrome and multiple sclerosis patients) (Hatcher and House, 2003). Some studies indicate that particular aspects of work (e.g. hectic, high demands, dissatisfaction with organizational support) are related to higher fatigue levels in healthy working adults (Åkerstedt et al., 2004; Van der Ploeg and Kleber, 2003).

Stressor frequency is reported to be related to worse fatigue in chronic fatigue syndrome patients (Hatcher and House, 2003) and a failure to recover from acute infectious mononucleosis (a common cause of fatigue) (Buchwald et al., 2000). In addition, catastrophic stressors (e.g. hurricane, terrorist attack) are reportedly related to fatigue, but the results appear contradictory (Heim et al., 2004; Lutgendorf et al., 1995). However, much of the literature has focused on clinical fatigue and so there is little available research to help guide studies on healthy adults. Moreover, no studies have systematically compared which features of these stressors (e.g. duration, frequency, severity, valence, type) are most strongly related to fatigue. Such an evaluation may indicate which stressor measure(s) are best employed in future studies examining the stressor-fatigue relationship.

Much of the stress-fatigue literature has employed outdated checklist approaches to assess stressors (e.g. Holmes and Rahe, 1967) or used subjective stressor measures (e.g. perceived stress) that are likely to be biased inasmuch as they tend to incorporate an individual's assessment of stress and psychological distress (Brown and Harris, 1978). In addition, few approaches currently permit the systematic comparison of different stressor measures other than the Bedford College Life Events and Difficulties Schedule (LEDS). In this study, we used the LEDS to generate semi-structured interview data and blinded objective ratings of stressor exposure, rather than evaluating individuals' subjective impressions of the stress (Brown and Harris, 1989).

A range of stressor measures were compared using the LEDS: stressor frequency, duration (i.e. acute, chronic), severity (i.e. number of highly emotionally-threatening or goal-frustrating events), valence (i.e. positive, negative), and type (e.g. interpersonal, work stressors). Thus, in accordance with the limited available literature it was expected that: total stressor frequency count (i.e. acute events and chronic difficulties) and number of work stressors would be most strongly related to fatigue, in this nonclinical sample.

METHOD

Participants

This study was conducted with full human research ethics committee approval. Participants were recruited via an advertisement placed on an online forum for young and mature-aged first-year university students enrolled at an Australian university. Students received course credit for their participation, but had a large variety of studies to choose from. They were eligible to participate in the study if they were over 18 years of age. They were excluded if they reported prior inpatient treatment of a psychiatric disorder; since recent distressing symptoms were expected to obscure the primary focus of the stress interview.

A total of 112 adults were approached regarding participation but only 91 completed the interview and returned the questionnaire

(response rate, 81.3%). Of the 21 nonresponders, 6 completed the interview but not the questionnaire. Two respondents were excluded due to a prior psychiatric hospital admission, leaving a total of 89 participants. Sixty-nine women and 20 men, ranging in age from 19 to 73 years ($M = 33.56$, $SD = 12.26$) participated in the study. Most (72.7%) were mature-aged (i.e. 25 years or older) and married or in a de facto relationship (48.3%), but 32 (35.9%) had never married, 11 (12.4%) were widowed, divorced, or separated and 3 (3.4%) described their relationship as 'other.' Thirty (33.7%) participants reported they were currently raising children at home; and 14 were raising one or more children under 5 years. Most worked full-(32.1%, 36) or part-time (18.1%, 21) and the remainder were full-time students (23.2%, 26), unemployed, retired, or completing home duties (6).

Procedure

Participants were provided with printed details of the study, informed of their right to withdraw at any time, asked to sign the consent form, provide contact details, and complete a short questionnaire asking about demographics and their recent experience of fatigue. They were asked to complete the questionnaire immediately or take it home and return it by reply-paid post. The stress interview (LEDS, 1 hour) was administered either face-to-face or via telephone to assess the presence and severity of SLE. Both assessments were completed within a 4-week period.

Measures

Fatigue was assessed using the Fatigue Impact Scale (FIS; Fisk and Doble, 2002), a 40-item scale examining an individual's perception of their functional limitations caused by fatigue over the past month. FIS subscales reflect the perceived impact of fatigue on cognitive, physical, and social functioning; only total fatigue score was used in this study. Participants were asked to rate items on the extent to which fatigue had caused problems for them, from 0 (no problem), to 4 (extreme problem), with high FIS scores indicating more severe fatigue. Internal consistency for the scale is high with a Cronbach alpha of 0.98 (Fisk et al., 1994). The FIS has previously been used to evaluate fatigue in healthy adults (LaChapelle and Finlayson, 1998; Naschitz et al., 2004).

The presence and severity of stressors over the past 12 months was assessed using the LEDS. This semistructured interview systematically probes for the occurrences of SLE and difficulties in a comprehensive fashion. It relies on objective (i.e. trained rater) assessments of stressor exposure rather than individuals' subjective impression of the stress. A detailed library of stressors, contexts and ratings is available to assist raters with the rating process. Detailed information about SLE and the context in which they occurred was collected by a trained interviewer. Short written 'vignettes' were then generated which described each stressor and social context in detail (Brown and Harris, 1989).

Each stressor was categorized as either an acute event (i.e. <6 months duration) or chronic difficulty (CD) (i.e. >6 months); these were assessed separately and were not confounded in their measurement. Stressors were also categorized as: illness (self), anxiety/depression (self), illness (other), death, role/interaction, crises/news, work, finance/legal, housing, marital, or miscellaneous. Stressor valence was rated for each stressor, categorized as either: neutral, negative, or positive.

Objective rating scales were used to assess the degree of inherent stressfulness in each stressor, from 1 (severe) to 4 (non-threatening), judged on 2 dimensions: personal emotional threat (ET; i.e. likely impact of events on anxiety and depression); and goal frustration (GF; i.e. likely impact of events in frustrating personal goals and causing frustration/anger) (Brown and Harris, 1989). GF is reported to be related to psychosomatic conditions such as

ischemic heart disease (Ellard et al., 1990; Tennant et al., 1994), whereas ET stressors can predict fatigue in multiple sclerosis patients (Brown et al., 2009). Interrater reliabilities for ratings of 100 events and 100 CDs made by the rater and a well-known rater are high ($M = 0.92$) (Brown et al., 2009). Thus, for each stressor, 6 stressor measures were determined: total frequency count, duration (acute, chronic), type, severity (ET and GF) and valence, separately for acute events and CDs.

Statistical Analyses

SPSS was used for all analysis. Missing FIS item responses for 2 participants were substituted using the mean total fatigue score (Tabachnick and Fidell, 2007).

RESULTS

Mean fatigue score was relatively low ($M = 50.17$, $SD = 31.52$, range: 0–134), but scores showed good variability with 17% of participants reporting moderate to severe fatigue (i.e. scores >80) and the remainder reporting mild to moderate fatigue, similar to values reported in community samples (Brown and Schutte, 2006; Thorsteinsson and Brown, 2009).

None of the demographics (i.e. sex, marital status, education level, employment status, children under 5 years) were correlated with fatigue levels except age (years), indicating that fatigue was present more often in younger participants, Table 1.

A total of 1367 stressful situations were reported: 1159 acute events (84.8%) and 208 CDs (15.2%); with a mean of 13.0 events and 2.3 CDs. Slightly more acute negative events (58.3%, 676) were reported than positive events (483); and all CDs were negative. Most CDs persisted for more than 1 year (72%, 149), but some persisted for 6 to 12 months. Most CDs had terminated in the prior 12 months (92%, 192), with the remainder current at interview.

Type of stress-interview (i.e. face-to-face versus telephone) was uncorrelated with fatigue ($r = 0.014$, $p = 0.899$, $N = 89$) and total number of acute events ($r = -0.024$, $p = 0.822$, $N = 89$) indicating that highly stressed and fatigued individuals were not more likely to request a telephone interview than other study participants.

Most acute events (99%) and CDs (97%) were mild to moderate in severity, with the remainder rated as high to severe on ET and/or GF. Role-interaction stressors were the most frequently reported acute event, followed by work and illness (other) stressors; whereas CDs were mostly illness (other) or role-interaction stressors, Table 2.

In the analysis of acute events, psychological distress (i.e. anxiety/depression) and more role-interaction stressors were found to be related to higher fatigue levels, accounting for 9% of the variance in total fatigue score, Table 3. In the analysis of CDs, total frequency count was found to be related to higher fatigue levels ($r = 0.21$, $p = 0.023$, $N = 89$).

TABLE 1. Correlation Matrix of the Key Variables

Variable	1	2	3	4	5
Age	—	—	—	—	—
Gender	−0.01	—	—	—	—
CD stressor frequency	0.24*	0.03	—	—	—
Anxiety/Depression disorder	−0.01	0.04	−0.14	—	—
Role-Interaction stressors	0.20	0.07	0.42**	−0.04	—
Fatigue	−0.27*	−0.03	0.21*	0.18	0.27*

*$p < 0.05$ (2-tailed).
**$p < 0.01$ (2-tailed).

TABLE 2. Numbers and (Percentages) of Acute Event and Chronic Difficulty Stressor Types

Variable	Acute Events	Chronic Difficulties
Illness (self)	72 (6.21)	19 (9.13)
Anxiety/Depression	7 (0.63)	4 (1.92)
Illness (other)	172 (14.84)	118 (57.63)
Death	50 (4.31)	1 (0.05)
Role/Interaction	345 (29.76)	32 (15.38)
Crisis/News	74 (6.38)	1 (0.05)
Employment	265 (22.86)	9 (4.3)
Financial/Legal	21 (1.81)	10 (4.81)
Housing	41 (3.54)	5 (2.4)
Marital	42 (3.62)	9 (4.33)
Miscellaneous	70 (6.04)	0

TABLE 3. Standard Multiple Regression for the Predictors Anxiety and Depression Disorder and Role-Interaction Stressors and the Outcome Subjective Fatigue

Variable	B	SE B	β	r	sr
Anxiety/Depression disorder	22.74	11.86	0.195	0.18	0.20
Role-Interaction stressors	4.14	1.54	0.274	0.27	0.27

Fit for model adjusted $r^2 = 0.09$, $F_{2,86} = 5.25$, $p < .008$. The semi-partial (sr) correlation given is reported as Part correlation in SPSS. The r given is for the zero-order correlation.

DISCUSSION

This is the first systematic comparison of different stressor measures in relation to subjective fatigue. Of the 6 stressor measures, number of acute interpersonal (i.e. role-interaction) stressors was most strongly related to high fatigue levels. Interpersonal stressors include common events such as: friends or family members getting engaged, married, separated, divorced, starting school or university, leaving home or sitting important exams, or making new friends or losing contact with old friends (Brown and Harris, 1989).

Work stressors were also common in this study but they were not found to be related to fatigue, which is inconsistent with other studies reporting cross-sectional and longitudinal associations between work stressors and fatigue in healthy working adults (Åkerstedt et al., 2002; Åkerstedt et al., 2004). Such discrepancies are likely due to the work-stressor focus of the Åkerstedt team, whereas this study examined a broader range of stressor features including stressor type which might have 'diluted' the putative effects of work-stressors on fatigue. Total number of CDs (i.e. stressors >6 months duration) was also related to worse fatigue in this study, especially role-interaction and illness (other) stressors.

No other stressor measure was found to be related to fatigue in this study including: acute stressor frequency count, other stressor types (e.g. illness, housing), stressor severity (i.e. number of high ET or GF events) or stressor valence (i.e. positive or negative). Some studies have previously reported associations between stressor frequency, (Buchwald et al., 2000; Hatcher and House, 2003) severity, (Heim et al., 2004) and fatigue, but no studies have systematically compared these different stressor measures in the same study.

Finally, self-reported psychological distress (i.e. anxiety, depression), operationalized as a type of illness-stressor, was found to be related to fatigue. It is perhaps not surprising that this less than optimal distress measure was related to fatigue since a robust association has previously been reported between psychological distress and fatigue in clinical and nonclinical fatigue samples in the literature (Clark and Watson, 1991; Ruggiero, 2003).

Limitations

These results should be interpreted with caution given several obvious study-related limitations. First, the sample size was relatively small, thus potentially increasing the Type II error rate. However, Bonferroni-type adjustments were not made in Table 1 for these multiple comparisons, since a power analysis indicated the sample size was adequate assuming a medium effect size ($f^2 = 0.20$) and using multiple regression analysis. Second, the LEDS was a time-consuming approach to assess stressors, with the interview and rating procedures taking in excess of 2 hours for each participant. Thus, the LEDS can generate rich stressor data, but it does so at the cost of sample size.

Third, relatively low mean levels of fatigue were reported in this study using a questionnaire rather than a clinical interview; although approximately 20% of the sample reported moderate to severe fatigue, similar to, or higher than levels previously reported in community and university student samples (Brown and Schutte, 2006; Thorsteinsson and Brown, 2009). Fourth, the sample was predominantly female thus potentially introducing a gender bias in the study, but there were no statistically significant associations between gender and key variables (e.g. stressors, fatigue). Fifth, 2 participants were excluded from the study because of a prior inpatient psychiatric admission. The participants were highly distressed and unable to shift their focus away from their symptoms to focus on the stress interview. Finally, the findings were only cross-sectional in nature; therefore, precluding any causal inferences being made, although the findings may help build theoretical models that can then be used to guide the design of longitudinal studies (Maxwell and Cole, 2007).

CONCLUSION

More short-acting interpersonal stressors and longer-acting chronic difficulties and the presence of psychological distress (i.e. anxiety, depression) were related to higher fatigue levels in this study, especially the number of interpersonal stressors. No other stressor measure (e.g. severity, valence, duration, type) was found to be related to fatigue. These results suggest that acute and chronic stressor frequency counts, especially interpersonal stressors, might be best used in future studies assessing the stressor-fatigue relationship.

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