

# Triangulation of self-report and investigator-rated coping indices as predictors of psychological stress: A longitudinal investigation among public utility workers

Louise Lemyre and Jennifer E.C. Lee\*  
*School of Psychology, University of Ottawa, Ontario, Canada*

Received 24 June 2005

Accepted 15 July 2005

**Abstract.** The aims of the present study were to: (a) determine if self-reported coping is consistent with conceptually-equivalent investigator-rated coping indices; (b) establish which types of coping are associated with psychological stress; and (c) establish whether using investigator-rated in addition to self-report coping indices to predict stress outcomes is beneficial in a real life context of worker's stressors. To fulfil these aims, a longitudinal investigation was conducted among 40 Canadian workers from the public utility sector. Results from semi-structured interviews about their worst current stressors revealed main effects for some coping types as assessed with investigator-rated indices, whereas no main effects were observed with self-report coping indices. Still, self-report and investigator-rated coping indices together significantly predicted follow-up stress. Psychological stress was most strongly predicted by investigator-rated behavioural approach. While self-report cognitive approach predicted lower psychological stress, investigator-rated cognitive approach predicted greater stress. Findings underline the importance of using both types of coping indices to predict outcome.

**Keywords:** Coping, psychological stress, multi-source measurement, Life Events and Difficulties Schedule, longitudinal investigation, public utility workers

## 1. Introduction

Over the past three decades, numerous studies have revealed an association between stressful events and negative outcomes such as anxiety, depression, psychological distress, or somatic complaints [49,51]. In an effort to explain such an association, researchers have devoted a great deal of effort to the identification and study of factors explaining the link between stressful events and health and well-being outcomes. In the wake

of rising concerns over occupational stress, the workplace has been a popular context in which to study stress and coping processes [2,4,32]. Still, issues remain regarding coping measurement approaches used within this context. In the majority of studies, measurement is limited to the use of self-report scales. While these represent a practical and economical approach to assess coping, valuable information may be overlooked about contextual aspects of coping of which respondents may be less aware. In an attempt to reconcile this issue, a primary goal of the present study was to investigate the validity of using investigator-rated in addition to self-report indices as an alternative measurement approach to predict outcome in a real life context of worker's stressors.

---

\* Address for correspondence: J.E.C. Lee, Institute of Population Health, 1 Stewart Street, Room 312, Ottawa, ON, Canada K1N 6N5. Tel.: +1 613 562 5800 Ext. 2031; Fax: +1 613 562 5380; E-mail: jlee007@uottawa.ca.

### *1.1. Coping*

The study of coping is now considered central to stress theory. Decades of research have shown that it plays a larger role in determining outcome than the frequency and severity of stressful events [17,53]. The concept of coping can be traced to Freudian theory, whereby it was conceptualized as an unconscious defence mechanism against unpleasant ideas or feelings [24]. In more recent years, the concept has been broadened to include more conscious and deliberate responses to stressful events. According to Lazarus and Folkman [26], coping represents any cognitive or behavioural effort made to master, tolerate or reduce the impact of stressful situations. While a wide variety of labels have been used to describe different types of coping, the dual-axis model proposed by Moos and Schaefer [38] has proven to be most useful. The first dimension in the model relates to whether the coping action draws attention toward the stressful situation (approach) or away from it (avoidance). The second dimension in the model represents the modality of the coping action (whether it is behavioural or cognitive). Thus, four distinct types of coping can be distinguished: behavioural approach, cognitive approach, behavioural avoidance, and cognitive avoidance.

Despite being the object of extensive investigations, the link between stressful life events, coping, and subsequent positive adaptation remains equivocal. Generally, coping has been considered adaptive so long as it involves approaching the stressful situation, while coping through avoidance of the stressful situation has been viewed as a source of psychological or physical symptoms [44,45]. Yet, in a significant number of studies, approaching the problem has been linked to unchanged or even increased psychological symptoms [49]. For instance, Bolger [6] found that problem-focused coping was associated with increases in anxiety in a sample of medical students undertaking the Medical College Admissions Test. Moreover, Stanton and colleagues [45] found that coping through emotional processing of the situation led to higher levels of distress over time. In an attempt to account for such inconsistencies, conceptual, theoretical, and measurement issues have been raised.

### *1.2. Issues in coping research*

At the conceptual level, inconsistent coping typologies have been suggested as responsible for equivocal findings. For instance, Folkman and Lazarus [22]

originally conceptualized two distinct types of coping: problem-focused, where efforts are made to change the stressful situation, and emotion-focused, where efforts are made to resolve feelings towards the stressful situation. Their measure, Ways of Coping Checklist [22], was for a long time among the most widely used instrument until subsequent analyses demonstrated that both problem- and emotion-focused coping could be further broken down into other coping behaviours [1,52]. Thus, low scale reliability and unstable factor structure of this instrument has led to multiple coping typologies and, hence, a lack of clarity in findings. Similar challenges remain for other coping measures [40].

At the theoretical level, failure to consider the specificity of coping effectiveness has been reasoned to explain inconsistent findings. Specifically, Compas and Forsythe [15] proposed that coping effectiveness depended on whether there was a good fit between the type of coping used and the controllability of the stressful situation. In support of this hypothesis, they found that problem-focused coping correlated with lower levels of distress when used in situations deemed as controllable and higher levels of distress when used in situations deemed as uncontrollable [15]. More recently, researchers have suggested that the goodness of fit hypothesis be abandoned for a simpler account of coping effects on psychological stress, the main argument being that few studies have been able to demonstrate the dependence of the relationship between coping and adjustment on levels of event controllability [16,21,34].

More germane to the current study and a fundamental issue, shortcomings inherent to the use of self-report coping measures have been proposed to account for the observed inconsistencies in coping research. Self-report measures are often criticized for assuming that people can accurately report their coping behaviours. As commented by Kessler, Price, and Wortman [25], the question of whether coping efforts are deliberate or conscious remains greatly debated. While people may be aware of what they are doing to change a stressful situation, they are less likely to be aware of aspects of the situation they are avoiding [7]. Thus, self-report coping measures run the risk of reflecting coping awareness rather than providing a complete picture of coping behaviour. The influence of coping on adjustment becomes even more difficult to determine since it is unclear whether the coping behaviours that are reported are leading to psychological symptoms or whether they reflect biased coping awareness due to pre-existing psychopathology. Finally, an additional problem involves the potential of self-report coping measures to convey

the notion of effectiveness. Many scales begin by asking respondents to identify a current or past stressful situation and indicate ways that they used to cope with it. However, interpretation of the term “cope” may lead respondents to favour particular coping items more than others. Respondents might therefore limit their reports of coping to behaviours that have been effective in dealing with situations they have experienced in the past [40]. Alternatively, they may limit their reports of coping to behaviours that they perceive as being adaptive.

### *1.3. Investigator-rated coping measures*

In an effort to overcome limits associated with self-report measures, some researchers have opted to use an investigator-rated approach. Investigator-rated measures were first used and developed in response to the controversy surrounding the use of self-report checklists in investigations of stressful events and hassles. One example is Brown and Harris’s Life Events and Difficulties Schedule (LEDS; 1978). The LEDS was developed to identify factual and contextual elements of stressful events experienced by depressed patients in order to minimize the possibility that high stress appraisals reflect psychopathology. The method typically involves conducting semi-structured interviews during which respondents are asked about past and current stressful situations.

Research using both the LEDS and a self-report life events checklist has suggested that many significant events may be missed or misconstrued by self-report methods [19]. In one study, it was also found that both measures differentially predicted treatment outcome [36]: while the LEDS was significantly associated with treatment outcome, the self-report measure was not. Clearly, findings such as these have emphasized the need for multi-source measurement in research on stress [44].

In light of the fact that self-reported coping might also reflect psychopathology [7], a LEDS Coping Schedule (LEDS-CS) was developed to be used in conjunction with the LEDS. The approach has been used to gather detailed qualitative information about coping behaviours to which self-report measures are not sensitive [40]. However, evaluations of its use in conjunction with self-report measures have been sparse. The fact that this measure has less commonly been applied likely relates to practical issues: as a trade-off to gathering qualitatively rich data, interviews require an average length of one to two hours so that obtaining data

from large samples is not feasible. Moreover, using the LEDS-CS requires extensive training. Consequently, it has primarily been used in clinical settings, where coping with severe life events was examined in relation to the onset of mental illness. Yet, it seems likely that the stressful events that people typically face and cope with would lead to the experience of psychological stress more often than mental illness. Few researchers, if any, have used the LEDS-CS to investigate coping in relation to psychological stress.

### *1.4. Psychological stress*

Although psychological stress does not imply clinical status, it can have an important impact on health over time [18,43]. Indeed, stress has been recognized as one of the most serious occupational health hazards of our time [2,4,32]. As more people spend a large portion of their lives at the workplace, many of the stressful events experienced are related to the work environment. Reports have shown that up to 75% of the people who consult psychiatrists were experiencing problems that could be traced to the workplace [32]. Moreover, it seems reasonable to assume that stressful events experienced at work can aggravate appraisals of stressful events in other life domains or, conversely, that stressful events in other life domains can aggravate appraisals of those in the workplace.

### *1.5. Study objectives*

To date, multi-source measurement studies on stress have been limited to an examination of life stressors primarily among clinical populations [19,36]. Thus, the overarching goal of the present study was to evaluate the validity of using both investigator-rated and self-report indices to assess coping among a non-clinical sample of public utility workers. A first objective was to examine the concordance between self-report and investigator-rated indices of behavioural approach, behavioural avoidance, cognitive approach, and cognitive avoidance coping. Second, the initial and long-term role of each coping type as predictors of psychological stress was investigated, where it was expected that behavioural and cognitive approach coping would be associated with lower stress and that behavioural and cognitive avoidance coping would be associated with higher stress. In anticipation that the inclusion of investigator-rated coping indices would significantly improve the prediction of psychological stress, a final objective was to determine the degree to which using multi-source measurement is beneficial to predict initial and long-term psychological stress.

## 2. Method

### 2.1. Participants

Forty-two Canadian public utility workers were selected for face to face interviews from a larger sample used in a two-wave questionnaire-based study on occupational stress [31]. Participants were selected among those who had indicated they would agree to be interviewed during the second wave. A stratified sampling procedure was used to select this sub-sample ensuring a similar profile as the full sample in terms of gender and employment type. Data collected from the interviews of two participants could not be used due to missing information. The final sample consisted of forty workers (27 men and 13 women). Participants were all French-speaking and were aged an average of 43 years ( $SD = 7.18$ ). Thirty-five occupied permanent positions and 4 held contractual positions. Ten of the workers held managerial or professional positions, 20 were skilled workers, trade workers, or technicians and 10 were office personnel.

### 2.2. Measures

*Psychological stress.* Psychological stress was measured using the abridged Psychological Stress Measure [27,28,30]. The PSM-9 is available in French or English and has been validated in both forms. It contains 9 items designed to measure the subjective experience of stress within a non-pathological population. Items consist of statements that reflect somatic, behavioural, and cognitive-affective indices of stress. Using an 8-point Likert-type scale (1 = not at all, 8 = extremely), respondents rate the degree to which they have recently experienced each symptom. Numerous studies have shown that the PSM-9 is psychometrically sound, producing reliabilities as high as 0.89 [29]. In the current study, the PSM-9 yielded an internal consistency of .92 in the initial phase (with item-total correlations ranging from 0.52 to 0.83) and of 0.85 in the follow-up phase (with item-total correlations ranging from 0.25 to 0.78).

*Worst current stressor.* Worst current stressors were identified by directly asking respondents to name the single worst stressor they were currently experiencing, to give a brief description of it, and to report whether they anticipated it would persist. In addition to being convenient and economical, this technique has generated excellent concordance with interview-based methods for important stressors [50] and is more consistent

with Lazarus and Folkman's [26] conceptualization of stress than typical life events checklists. In the current study, self-reported worst stressors were concordant with investigator-rated assessments in all cases.

*Self-reported coping.* Items used as self-report coping indices were from Savoie's abridged version of the COPE questionnaire (1999). Developed by Carver, Scheier, and Weintraub [13], the original COPE is a 53 item self-report paper and pencil inventory comprising of subscales for 14 theoretically defined coping types: active coping, planning, suppression of competing activities, restraint coping, seeking social support for instrumental reasons, focusing on and venting emotions, behavioural disengagement, mental disengagement, positive reinterpretation and growth, denial, acceptance, turning to religion, and alcohol-drug disengagement. The abridged COPE retained items reflecting Moos and Schaefer's [38] dual-axis model of coping. Based on the literature and the psychometric properties of the scales, Savoie [40] selected the active coping, planning, behavioural disengagement, and denial subscales to conceptually represent behavioural approach, cognitive approach, behavioural avoidance, and cognitive avoidance. These items were translated in French by three independent researchers, and back-translated [9] into English by another two independent researchers. Test-retest correlations did not differ between data obtained from French and English scales in respondents matched in terms of age, marital status, education, and income. The reliabilities of both scales also fell within a close range.

In the current study, one item was selected from each of the four translated subscales on the basis of factor loadings and test-retest reliabilities observed in Savoie's research [40] to represent behavioural approach (I concentrate my efforts in doing something about it – French translation), behavioural avoidance (I reduce the amount of effort I'm putting into solving the problem – French translation), cognitive approach (I think hard about what steps to take – French translation), and cognitive avoidance (I pretend that it has not really happened – French translation). Respondents rated each coping statement on a 4-point scale (1 = I do not do this at all – French translation, 4 = I do this a lot – French translation) in relation to the stressful event or situation they identified as their worst current stressor.

*Life Events and Difficulties Schedule.* The LEDS [10] was used as an investigator-rated measure to assess contextual and factual elements of each self-reported worst current stressor, as well as to identify other pos-

sible stressors. Administration of the LEDS involves a three stage process. The first stage consists of a semi-structured interview in which the investigator gathers detailed information on all stressful events and difficulties experienced in the last 12 months through a series of probe questions. Probe questions are designed to gather unbiased factual information on stressors in broadly defined life domains such as work, family and friend relations, health, finances, housing, reproduction, and legal matters. These serve to highlight the circumstances surrounding the event or difficulty. The interviews are recorded so that these may be rated in a second stage.

In the second stage, interviews are rated by a panel of judges consisting of the interviewer and two trained raters. In order to minimize rating biases to response styles, the level of severity associated with each stressful event or difficulty is rated by the panel based on the context in which these occur. Ratings of severity are made for each identified event or difficulty using a reference guide consisting of previously defined rating criteria and an event dictionary which includes over 1000 examples of stressful events and their corresponding severity ratings [10]. Severity is rated using a 4-point scale (1 = marked, 2a = high moderate, 2b = low moderate, 3 = some, and 4 = little/none). Finally, discrepancies in ratings among panel members are discussed in a third stage until a consensus rating is determined.

In addition to allowing for an unbiased assessment of the elements surrounding stressors, studies have shown that the LEDS is a psychometrically sound tool. Inter-rater reliabilities as high as 0.92 have been revealed with respect to the identification of severe events and 0.79 for events overall [10]. For the current sample, these were 0.97 and 0.95 in initial and follow-up phases, respectively. In addition to high inter-rater reliabilities, inter-spousal agreements of 0.77 for the identification of currently experienced events and 0.63 for the identification of anticipated future events have been observed [50]. Moreover, a fall-off rate of reported events of 3% per month was obtained over a period of one year in contrast to a fall off rate close to five times greater (15% to 20%) typical of most life events checklists [11].

*LEDS Coping Schedule.* The LEDS-CS [7] was used for investigator-rated coping indices. Designed to be used in conjunction with the LEDS, it assesses seven types of coping: practical preparation, problem tackling, downplaying, pessimism, inferred denial, self-blame, and felt helplessness. Respondents are probed

with regards to their behavioural, emotional, and cognitive coping efforts towards each life event and difficulty identified during the interview. In a second stage, a panel of judges rates the amount that each type of coping was employed using a 4 point scale (1 = marked use, 2 = moderate use, 3 = some use, and 4 = little/no use) on the basis of pre-established guidelines and case examples from dictionaries. Finally, a consensus rating is determined by the panel in the third stage.

Problem tackling, practical preparation, felt helplessness, and inferred denial scales were used in the present study to reflect investigator-rated indices of behavioural approach, cognitive approach, behavioural avoidance, and cognitive avoidance, respectively. In the present sample, excellent inter-rater reliabilities were observed for these four scales: 0.94 in phase 1 and 1.0 in phase 2 for behavioural approach, 0.99 in phase 1 and 1.0 in phase 2 for behavioural avoidance, 1.0 in both phases for cognitive approach, and 0.99 in both phases for cognitive avoidance.

### 2.3. Procedure

Data were collected in three phases. Given that respondents were French-speaking, all questionnaires and interviews were completed in French. In the first phase, questionnaires were provided to workers. Measures included the PSM-9, items relating to the worst current stressor, the four items selected from the COPE to be answered in the context of the worst current stressor, and some items requesting demographic information. Workers were asked and encouraged to fill out the questionnaire during their regular work hours with no time constraints imposed.

The second phase of data collection took place six months later. Workers completed the PSM-9. Again, workers were encouraged to do so during their regular work hours and were not constrained by time.

Life Events and Difficulties Schedule (LEDS) interviews were administered in the third phase of data collection six months following the second phase of data collection. Interviews began with a series of questions targeting in-depth demographic information. Following this, information was gathered on the initial and follow-up severity of and coping responses towards worst current stressors reported in the initial phase in addition to any other stressor identified through probes during the interview. Only worst current stressors identified as the most severe in both self-reports and LEDS interviews were considered in the current analyses. The

presentation order of probe questions was kept constant across respondents.

*Analyses.* Data analyses involved multiple steps. First, preliminary analyses were conducted to screen the data for violation of basic assumptions inherent to analyses. Second, Pearson's  $r$  coefficients were computed between the four self-report and four investigator-rated coping indices to establish the level of concordance between them (Objective 1).

To examine the initial and long-term role of each type of coping as predictors of psychological stress (Objective 2), two multivariate analyses of variance (MANOVAs) were conducted to examine the main effects of high and low use of each coping type on initial and follow-up psychological stress. Finally, to determine if the use of investigator-rated coping would significantly improve the prediction of psychological stress over and above that obtained with self-report coping indices (Objective 3), sequential linear multiple regressions were performed with self-report coping indices entered in the first step and investigator-rated coping indices entered in the second step as predictors of psychological stress.

### 3. Results

#### 3.1. Preliminary analyses

Data were screened for accuracy of data entry, normality and missing values. No univariate or multivariate outliers were identified. A few missing values were found; however, these were extremely rare and none were on more than 5% of the cases. Consequently, mean substitution was used to replace missing values. All variables were found to be normally distributed with the exception of investigator-rated behavioural avoidance, which was markedly negatively skewed. It was therefore decided to exclude this variable from all analyses. No statistically significant differences in psychological stress were observed by gender with  $t(8) = 20.85$ ,  $p = 1.0$  for phase 1 and  $t(38) = 33.52$ ,  $p = 0.52$  for phase 2, type of employment with  $F(5, 34) = 1.99$ ,  $p = 0.11$  for phase 1 and  $F(5, 34) = 1.96$ ,  $p = 0.11$  for phase 2, and age with  $r = -0.12$ ,  $p = 0.45$  for phase 1 and  $r = 0.16$ ,  $p = 0.32$  for phase 2. It was therefore considered acceptable to perform analyses on data from the full sample rather than by subgroups.

Table 1  
Identified Worst Current Stressors

Order	Stressor	Frequency	%
1	Job Security	8	20.0
2	Marital/Familial Problems	7	17.5
3	Work Overload	5	12.5
4	Lack of Recognition at Work	3	7.5
5	Finance	3	7.5
6	Interpersonal Relations at Work	2	5.0
7	Work Family Spill-Over	2	5.0
8	Change of Residence	2	5.0
9	Role Change at Work	1	2.5
10	Loss of Motivation to Work	1	2.5
11	Low Decisional Control at Work	1	2.5
12	Work in General	1	2.5
13	Physical Health Problems	1	2.5
14	Illness of Close Friend/Relative	1	2.5
15	Child(ren)'s Behavioural Problems	1	2.5
16	Home Renovation	1	2.5

#### 3.2. Descriptive analyses

All stressors identified as worst current stressors are listed in Table 1. Fifty-five percent of these were work-related, 25% were related to family or interpersonal relationships, 8% were financial, 8% were related to the home, and 5% were related to health. Eighty-three percent of workers believed their stressor would persist.

#### 3.3. Concordance between self-report and investigator-rated indices

Pearson's  $r$  correlations were examined between self-report coping indices and their conceptually-equivalent LEDS-CS investigator-rated indices. All correlations are presented in Table 2. No significant correlations were found between self-report coping indices and their corresponding investigator-rated indices (with the lowest  $p$  value of 0.40 for cognitive avoidance). However, results did reveal significant positive relationships between self-report cognitive approach and investigator-rated cognitive avoidance in addition to between self-report behavioural avoidance and investigator-rated cognitive approach. Keeping in mind that higher LEDS-CS scores reflect lower use of coping, these results indicate that workers who reported engaging in more cognitive approach engaged in less investigator-rated cognitive avoidance and workers who reported engaging in more behavioural avoidance engaged in less investigator-rated cognitive approach.

#### 3.4. Coping effectiveness

Multivariate analyses of variance (MANOVAs) were performed in order to test main effects of each type of

Table 2  
Pearson's Correlation Matrix for Initial Self-report and Investigator-rated Coping Indices ( $N = 40$ )

	S-BAP	S-BAV	S-CAP	S-CAV	I-BAP	I-CAP	I-CAV
S-BAP	1.0						
S-BAV	-0.19	1.0					
S-CAP	0.62***	-0.20	1.0				
S-CAV	-0.23	0.34*	-0.26	1.0			
I-BAP	-0.01	0.29	-0.05	0.21	1.0		
I-CAP	-0.13	0.46**	-0.09	0.20	0.57***	1.0	
I-CAV	0.24	-0.05	0.46**	-0.14	0.25	0.21	1.0

Note. S- = self-report index, I- = investigator-rated index, BAP = behavioural approach, BAV = behavioural avoidance, CAP = cognitive approach, CAV = cognitive avoidance.

Because self-report and investigator-rated indices have opposite scales, a negative correlation reflects agreement.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

Table 3  
Psychological Stress Measure Means and Standard Deviations by High and Low Self-report and Investigator-rated Coping

Type of Coping		Assessment Period	
		Initial	Follow-up
<i>Self-report Scales</i>			
Behavioural Approach	Low ( $n = 25$ )	39.20 (11.75)	40.79 (11.88)
	High ( $n = 15$ )	31.73 (15.73)	33.27 (11.21)
Behavioural Avoidance	Low ( $n = 27$ )	38.67 (13.69)	37.55 (12.10)
	High ( $n = 13$ )	31.69 (12.91)	38.83 (12.44)
Cognitive Approach	Low ( $n = 25$ )	38.52 (10.67)	42.03 (11.80)
	High ( $n = 15$ )	32.87 (17.45)	31.20 (9.40)
Cognitive Avoidance	Low ( $n = 29$ )	36.17 (13.03)	37.10 (10.73)
	High ( $n = 11$ )	37.00 (15.94)	40.25 (15.40)
<i>Investigator-rated Scales</i>			
Behavioural Approach*	Low ( $n = 13$ )	40.62 (12.69)	43.60 (12.07)
	High ( $n = 27$ )	34.37 (13.90)	35.26 (11.30)
Behavioural Avoidance <sup>a</sup>	Low ( $n = 38$ )	36.63 (13.85)	38.39 (11.80)
	High ( $n = 2$ )	32.00 (12.73)	30.00 (19.80)
Cognitive Approach	Low ( $n = 24$ )	34.75 (12.76)	37.03 (11.35)
	High ( $n = 16$ )	38.88 (15.05)	39.38 (13.32)
Cognitive Avoidance	Low ( $n = 31$ )	36.35 (12.83)	37.61 (10.84)
	High ( $n = 9$ )	36.56 (17.20)	39.21 (16.33)

Note. <sup>a</sup>Investigator-rated behavioural avoidance was not included in analyses due to a markedly non-normal distribution.

\* $p < 0.05$  in MANOVA.

coping on psychological stress and, ultimately, to identify adaptive coping behaviours. Analyses were conducted separately for investigator-rated and self-report indices. High and low behavioural approach, cognitive approach, behavioural avoidance, and cognitive avoidance groups were formed according to initial levels of use. For investigator-rated indices, LEDS ratings of 3 and 4 were combined to make up low use groups and LEDS ratings of 1 and 2 were combined to make up high use groups. For self-report indices, ratings of 1 and 2 were combined to make up low use groups, and ratings of 3 and 4 were combined to make up high use groups.

A  $2 \times 2 \times 2 \times 2$  between subjects MANOVA was performed with self-reported behavioural approach

(high versus low), cognitive approach (high versus low), behavioural avoidance (high versus low), and cognitive avoidance (high versus low) as independent variables. Dependent variables were initial and follow-up psychological stress as assessed using the PSM-9. No significant results were revealed in this analysis (with the lowest observed  $p$  value of 0.23 for cognitive approach).

A  $2 \times 2 \times 2$  between subjects MANOVA was then performed with investigator-rated behavioural approach (high versus low), cognitive approach (high versus low), and cognitive avoidance (high versus low) as independent variables. Again, dependent variables were initial and follow-up PSM-9 scores. A Wilk's criterion of 0.78 was observed, indicating that

Table 4

Results of Sequential Regression with Self-report and Investigator-rated Indices of Coping as Predictors of Follow-up Psychological Stress

Variable	$\beta$	$t$	$p$	Total $R^2$
<i>Step 1</i>				
S-Behavioural Approach	-0.27	-1.41	0.17	
S-Cognitive Approach	-0.26	-1.36	0.18	
S-Behavioural Avoidance	0.02	0.11	0.91	
S-Cognitive Avoidance	-0.07	-0.41	0.69	
			0.06	0.23
<i>Step 2</i>				
S-Behavioural Approach	-0.30	-1.79	0.08	
S-Cognitive Approach	-0.43	-2.32	0.03	
S-Behavioural Avoidance	0.01	0.04	0.97	
S-Cognitive Avoidance	0.01	0.04	0.97	
I-Behavioural Approach	0.37	2.27	0.03	
I-Cognitive Approach	-0.42	-2.44	0.02	
I-Cognitive Avoidance	0.39	2.47	0.02	
			0.01	0.47

Note. S- = self-report index, I- = investigator-rated index.  
 $\Delta R^2 = 0.24$  for Step 2 ( $p = 0.01$ ).

psychological stress significantly differed as a function of investigator-rated behavioural approach coping,  $F(2, 32) = 4.43$ ,  $p = 0.02$ . Univariate analyses revealed that initial psychological stress was significantly lower in high compared to low behavioural approach copers,  $F(1, 33) = 4.54$ ,  $p = 0.04$ . Most markedly, follow-up psychological stress was also lower in high compared to low behavioural approach copers,  $F(1, 33) = 8.10$ ,  $p = 0.01$ .

### 3.5. Sequential multiple regressions

Sequential linear regressions were run to determine if the addition of investigator-rated indices of coping (i.e., behavioural approach, cognitive approach, and cognitive avoidance) improved statistical prediction of psychological stress during initial and follow-up phases beyond that afforded by self-report coping indices (i.e., behavioural approach, cognitive approach, behavioural avoidance, and cognitive avoidance). Table 4 displays the standardized regression coefficients, the  $t$  values, and the  $R^2$  after each step of this analysis.

With initial psychological stress as the dependent variable, the final analysis did not reach significance. It should be noted, however, that initial self-report coping indices marginally predicted initial psychological stress after step 1 with  $R^2 = 0.23$ ,  $F(4, 35) = 2.55$ ,  $p = 0.06$ . In contrast, initial self-report and investigator-rated coping indices significantly predicted follow-up psychological stress with an  $R^2$  of 0.47,  $F(7, 32) = 4.04$ ,  $p = 0.01$ . Thus, the coping indices together accounted for 47% of the variance in psychological

stress during follow-up. Interestingly, inclusion of initial self-report coping indices in step 1 marginally predicted follow-up psychological stress,  $R^2 = 0.23$ ,  $F(4, 35) = 2.54$ ,  $p = 0.06$ . After step 2, change in  $R^2$  was 0.24,  $\Delta F(3, 32) = 4.91$ ,  $p = 0.01$ .

## 4. Discussion

The objectives of the current study were to a) examine the concordance between self-report and investigator-rated coping indices, b) determine the main effects of the 4 coping types as assessed through both self-report and investigator-rated indices on psychological stress, and c) establish whether researchers may indeed benefit from the use of investigator-rated in addition to self-report coping indices to predict psychological stress.

Consistent with the many reports that recognize occupational stress as a growing problem in Canada [4, 20,33], over half of the worst stressors identified were related to the workplace. Of these, the majority involved job insecurity. Indeed, researchers have noted the link between the major organizational changes witnessed in the past decades within the workforce (e.g., organizational restructuring, formation of mergers, and workforce reductions) and perceptions of job insecurity [39]. In turn, job insecurity has been associated with detrimental consequences such as job dissatisfaction, absenteeism, and psychosomatic complaints [12, 37,46]. In many cases, organizational changes have entailed significant increases in workload. According to Siegrist's Effort-Reward Imbalance Model [41,42], high workload can be particularly detrimental to health if not appropriately rewarded whether it be through adequate salary, respect and support, or security/career opportunities. The fact that both work overload and lack of recognition were often identified as stressors in the current study highlights the importance of accommodating reward systems with the changing workforce.

With respect to coping, not only were self-report indices not concordant with conceptually-equivalent investigator-rated indices, findings also pointed to the latter as better predictors of outcome. Investigator-rated behavioural approach was the only coping index that yielded a significant main effect on initial and follow-up psychological stress, with high behavioural approach copers displaying significantly less psychological stress than low behavioural approach copers. The fact that no main effects were revealed with other coping types is somewhat surprising given that previ-

ous studies have frequently shown that all forms of coping can influence stress outcomes, even during stressful situations themselves [6,14,47].

The absence of significant main effects with self-report coping indices may have related to the use of one item rather than entire subscales to assess each type of coping. While doing so was a quick and convenient way to shorten questionnaire length, the items that were selected might not have captured all aspects of the types of coping they were reflecting. Alternatively, a floor effect may have been responsible for the fact that neither investigator-rated nor self-report avoidance-type coping yielded significant main effects on psychological stress. For instance, over 75% of the ratings were between 3 and 4 (some – little/no use) for investigator-rated cognitive avoidance, and there were no ratings of 1 (marked use). As Compas and Forsythe [15] have highlighted, people tend to use different types of coping simultaneously to deal with a problem. Further, the effectiveness of any one type of coping may be influenced by the other types of coping being used. Thus, avoidant-type coping might not have been related to stress outcomes because this sample of workers used very little of it relative to approach-type coping.

Sequential linear regression analyses showed only self-report coping indices to be marginally associated with initial psychological stress, suggesting that self-perceptions of coping may be important in the early stages of stressful situations. In contrast, both types of coping indices significantly predicted follow-up psychological stress, with investigator-rated indices accounting for a significant portion of variance above and beyond differences related to self-report indices. While only self-report cognitive approach negatively predicted stress, all investigator-rated indices were significant predictors of stress: investigator-rated behavioural approach and cognitive avoidance were associated with lower stress. Interestingly, investigator-rated cognitive approach predicted higher psychological stress in contrast to its self-report equivalent.

Although the above finding was not expected, it is in line with prior research. For instance, Mattlin, Wethington, and Kessler [35] found that positive reappraisal – a form of cognitive approach – was associated with increased distress when used in low-threat or practical situations. The researchers attributed this finding to having successfully separated cognitive from behavioural aspects of coping in their measure. It is noteworthy that coping was assessed with an investigator-rated approach similar to the LEDCS in their study. Thus, the present contrasting findings across both types

of cognitive approach indices may also have resulted from the successful distinction between cognitive and behavioural aspects of coping in investigator-rated but not in self-report indices. A confounding of cognitive and behavioural aspects of coping among respondents might further account for why self-report coping indices were unrelated to psychological stress.

The overall picture painted by the current results is that coping involves a great deal more than can be captured by self-reports. An ongoing debate in stress and coping research is whether coping may also include aspects of which individuals are unaware [48]. If coping is construed as such, it would then seem reasonable to suggest that investigator-rated coping indices differed from self-reports because the former were sensitive to these aspects. Although it is arguable whether investigator-rated indices are truly objective, the fact that they were based on observations from external sources might have significantly increased their potential to reflect coping behaviours beyond awareness. Nevertheless, the use of self-report coping indices should not be discounted as the present results do suggest that they may be better predictors of psychological stress in the earlier stages of stressful situations. What is more, it has been shown that even coping *perceptions* can be an important determinant of stress outcome [3]. Thus, the present findings suggest that both indices are necessary components in order to achieve a complete picture of coping and its impact on psychological stress over time.

At a practical level, the present findings on worst current stressors demonstrate quite clearly the value of effective stress-prevention programs in the workplace. In an effort to ameliorate problems associated with work stress, several organizations have implemented stress-prevention programs centering on improving coping skills through training [5]. Clearly, the role played by coping measurement in the planning, implementation, and evaluation of these programs can be critical, whether it be used to identify adaptive coping behaviours, identify those in need of the programs, or evaluate the effectiveness of coping skills training. To date, program evaluations have relied almost exclusively on self-report coping measures. While these represent an inexpensive and convenient approach to assess coping, the present findings suggest that the additional use of investigator-rated indices may be valuable by informing the design of stress-prevention programs with a more complete picture of coping and its impact on psychological stress over time.

Before concluding, a few limitations must be addressed. First, only initial types of coping were con-

sidered in the analyses. Workers may have engaged in a different pattern of coping behaviours during the second stage of data collection that may have influenced psychological stress at that time. A brief examination of the data revealed that follow-up coping, as assessed through investigator-rated indices was very similar to initial coping. It was therefore deemed reasonable to limit the analyses to an investigation of initial coping on psychological stress without accounting for follow-up coping. Moreover, controlling for any additional variable (whether it involves follow-up coping, stressor severity, or stressor type) would have greatly compromised the experimental power of each analysis since the present sample comprised of only 40 respondents. As aforementioned, proper investigator-based assessment requires lengthy face-to-face semi-structured interviews that are later transcribed and submitted to panel rating. Although sample size is sacrificed, the result is qualitatively richer, better contextualized data as compared to what would be obtained with self-report methodology alone. It also remains to be noted that a sample of 40 is considered remarkable for work of this nature. Ultimately, the fact that initial coping efforts towards worst current stressors predicted psychological stress at a later time is noteworthy even if controlling for additional variables was limited by sample size. This finding further points to the need for longitudinal analyses in coping research.

A second potential limitation which may have contributed the lack of concordance between self-report and investigator-rated indices relates to the fact that LEDS interviews were based on retrospective accounts of the stressors 1 year after their occurrence. Therefore, reports of stressors and coping may have been subject to memory biases. It should be noted, however, that the semi-structured probe questions used in the LEDS were designed to deal with such issues since the tool was specifically developed to gather retrospective information. Also, recall accuracy using the approach has been validated: information gathered through LEDS interviews has been found to be consistent with information provided by family members [8]. While it was not possible to administer the LEDS during actual experience of the worst reported stressor in the current study, it might nevertheless have been beneficial to conduct the interviews closer to the initial phase when stressors were appraised as significant.

A final limitation relates to the fact that the conceptual equivalence of both types of coping indices was based on face value rather than empirical evidence. This may also have contributed to the observed discrep-

ancies between self-report and investigator-rated coping indices. Although both types of indices were not designed to measure precisely the same constructs, it was believed that each tapped onto equivalent ends of Approach/Avoid and Behavioural/Cognitive axes. This issue may nevertheless be resolved in future research with the design and empirical testing of interview-based scales that more closely resemble validated self-report scales. Clearly, the development of such an instrument would allow for much advancement in stress and coping research involving multi-source measurement.

In sum, the present findings suggest that exclusive reliance on self-report coping indices may be at the heart of equivocal findings in the stress and coping literature. Hence, their sole use may be problematic if the intention is to obtain a more complete index of coping to better plan, implement, and evaluate stress-prevention programs. Albeit, the generalizability of the present results may have been limited by a small sample as well as issues inherent to self-report methodology. Results should nevertheless be considered encouraging and will hopefully lead to greater incorporation of multi-source measurement in research on stress and coping within the workplace. Clearly, the cost of investigator-rated indices in terms of training and time is outweighed by the benefits that they pose to the work setting, where the need and the proper resources exist.

### Acknowledgements

Funding for this research project was granted by the Social Sciences and Humanities Research Council of Canada. The authors would like to thank Yaniv Ben-Zimra, Ph.D. for his contribution to the project as well as Louise Legault, Ph.D. for her critical insight on the paper.

### References

- [1] C.M. Aldwin and T.A. Revenson, Does coping help? A re-examination of the relation between coping and mental health, *Journal of Personality and Social Psychology* **53** (1987), 337–348.
- [2] V.V. Baba, M. Jamal and L. Tourigny, Work and mental health: A decade in Canadian research, *Canadian Psychology* **39** (1998), 94–107.
- [3] Y. Bar-Tal and A. Spitzer, Coping use versus effectiveness as moderating the stress-strain relationship, *Journal of Community & Applied Social Psychology* **4** (1994), 91–100.
- [4] T.A. Beehr, S.M. Jex, B.A. Stacy and M.A. Murray, Work stressors and coworker support as predictors of individual strain and job performance, *Journal of Organizational Behavior* **21** (2000), 391–405.

- [5] M.H.J. Bekker, A. Nijssen and G. Hens, Stress prevention training: Sex differences in types of stressors, coping, and training effects, *Stress and Health* **17** (2001), 207–218.
- [6] N. Bolger, Coping as a personality process: A prospective study, *Journal of Personality and Social Psychology* **59** (1990), 525–537.
- [7] A. Bifulco and C.W. Brown, Cognitive coping responses to crises and onset of depression, *Social Psychiatry and Psychiatric Epidemiology* **31** (1996), 163–172.
- [8] C. Biron, M. Truchon and L. Lemyre, *Investigator and respondent evaluations of stressors: Psychometrical considerations*, Unpublished manuscript, Université Laval, Québec, 1992.
- [9] B.A. Bracken and A. Barona, State of the art procedure for translating, validating, and using psychoeducational tests in cross-cultural assessment, *School of Psychology International* **12** (1991), 119–132.
- [10] G.W. Brown and T.O. Harris, *The Bedford College Life Events and Difficulty Schedule: Directory of Contextual Threat Ratings of Events*, London: Bedford College, University of London, 1978.
- [11] G.W. Brown and T.O. Harris, Disease, distress, and depression. *Journal of Affective Disorders* **4** (1982), 1–8.
- [12] R.J. Burke, Job insecurity in recent business school graduates: Antecedents and consequences, *International Journal of Stress Management* **5** (1998), 113–119.
- [13] C.S. Carver, M.F. Scheier and J.K. Weintraub, Assessing coping strategies: A theoretically based approach, *Journal of Personality and Social Psychology* **56** (1989), 267–283.
- [14] C.S. Carver, C. Pozo, S.D. Harris, V. Noriega, M.F. Scheier, D.S. Robinson, A.S. Ketcham, F.L. Moffat and K.C. Clark, How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer, *Journal of Personality and Social Psychology* **65** (1993), 375–390.
- [15] C.J. Compas and B.E. Forsythe, Interaction of cognitive appraisals of stressful events and coping: Testing the goodness of fit hypothesis, *Cognitive Therapy and Research* **11** (1987), 473–485.
- [16] V.J. Conway and D.J. Terry, Appraised controllability as a moderator of the effectiveness of different coping strategies: A test of the goodness of fit hypothesis, *Australian Journal of Psychology* **44** (1992), 1–7.
- [17] A.L. Day and H.A. Livingstone, Chronic and acute stressors among military personnel: Do coping styles buffer their negative impact on health? *Journal of Occupational Health Psychology* **6** (2001), 348–360.
- [18] B.S. Dohrenwend and B.P. Dohrenwend, *Stressful Life Events and Their Contexts*, New York: Neale Watson Academic, 1981.
- [19] S. Duggal, S. Malkoff-Schwartz, B. Birmaher, B.P. Anderson, M.K. Matty, P.R. Houck, M. Bailey-Orr, D.E. Williamson and E. Frank, Assessment of life stress in adolescents: Self-report versus interview methods, *Journal of the American Academy of Child & Adolescent Psychiatry* **39** (2000), 445–452.
- [20] L. Duxbury and C. Higgins, *Work-Life Conflict in Canadians in the New Millennium: A Status Report*, Ottawa, ON: Health Canada, 2003.
- [21] N.S. Endler, R.L. Speer, J.M. Johnson and G.M. Flett, Controllability, coping, efficacy, and distress, *European Journal of Personality* **14** (2000), 245–264.
- [22] S. Folkman and R.S. Lazarus, An analysis of coping in a middle-aged community sample, *Journal of Health and Social Behavior* **21** (1980), 219–239.
- [23] S. Folkman, R.S. Lazarus, R.J. Gruen and A. DeLongis, Appraisal, coping, health status, and psychological symptoms, *Journal of Personality and Social Psychology* **50** (1986), 922–1003.
- [24] S. Freud, *New Introductory Lectures on Psychoanalysis*, New York: Norton, 1933.
- [25] R.C. Kessler, R.H. Price and C.B. Wortman, Social factors in psychopathology: Stress, social support, and coping processes, *Annual Review of Psychology* **36** (1985), 531–572.
- [26] R.S. Lazarus and S. Folkman, *Stress, Appraisal, and Coping*, New York: Springer Publishing Company, 1984.
- [27] L. Lemyre, *Stress psychologique et appréhension cognitive*, Unpublished doctoral dissertation, Université Laval, Québec, 1987.
- [28] L. Lemyre and R. Tessier, Mesure de Stress Psychologique (MSP): Se sentir stressée, *Canadian Journal of Behavioural Science* **20** (1988), 302–321.
- [29] L. Lemyre and R. Tessier, La mesure de stress psychologique en recherche de première ligne, *Canadian Family Physician* **49** (2003), 1166–1168.
- [30] L. Lemyre, R. Tessier and L. Fillion, *Psychological Stress Measure (PSM): A translation*, Québec, PQ: Université Laval, 1991.
- [31] L. Lemyre and Y. Benzimra, Les efforts de recouvrement suite à la tempête de verglas: État de stress psychologique chez les travailleur-es après la crise, *Santé Mentale au Québec* **25** (2000), 186–209.
- [32] L. Levi, Occupational stress: Spice of life or kiss of death? *American Psychologist* **45** (1990), 1142–1145.
- [33] M.R. Manning, C.R. Jackson and M.R. Fusilier, Occupational stress and health care use, *Journal of Occupational Health Psychology* **1** (1996), 100–109.
- [34] C.N. Masel, D.J. Terry and M. Gribble, The effects of coping on adjustment: Re-examining the goodness of fit model of coping effectiveness, *Anxiety, Stress, and Coping* **9** (1996), 279–300.
- [35] J.A. Mattlin, E. Wethington and R.C. Kessler, Situational determinants of coping and coping effectiveness, *Journal of Health and Social Behavior* **31** (1990), 103–122.
- [36] J.R. McQuaid, S.M. Monroe, J.E. Roberts, D.J. Kupfer and E. Frank, A comparison of two life stress assessment approaches: Prospective prediction of treatment outcome in recurrent depression, *Journal of Abnormal Psychology* **109** (2000), 787–791.
- [37] G.B. Mohr, The changing significance of different stressors after the announcement of bankruptcy: A longitudinal investigation with special emphasis on job insecurity, *Journal of Organizational Behavior* **21** (2000), 337–359.
- [38] R.H. Moos and J.A. Schaefer, Coping resources and processes: Current concepts and measures, in: *Handbook of Stress: Theoretical and Clinical Aspects* L. Goldberger and S. Brenitz, 2nd ed., New York: Maxwell Macmillan International, 1993.
- [39] T.M. Probst, Wedded to the job: Moderating effects of job involvement on the consequences of job insecurity, *Journal of Occupational Health Psychology* **5** (2000), 63–73.
- [40] J.A. Savoie, *Contextual and subjective indices of coping strategies in breast cancer screening: A longitudinal investigation*, Unpublished doctoral dissertation, University of Ottawa, Ottawa, 1999.
- [41] J. Siegrist, Adverse health effects of high-effort/low-reward conditions, *Journal of Occupational Health Psychology* **1** (1996), 27–41.
- [42] J. Siegrist, Adverse health effects of effort-reward imbalance at work: Theory, empirical support, and implications for prevention, in: *Theories of Organizational Stress*, C.L. Cooper, ed.,

- Oxford, England: Oxford University Press, 1998, pp. 190–204.
- [43] M. Soderstrom, C. Dolbier, J. Leifermann and M. Steinhardt, The relationship of hardiness, coping strategies, and perceived stress to symptoms of illness, *Journal of Behavioral Medicine* **23** (2000), 311–328.
- [44] M.R. Somerfield and R.R. McCrae, Stress and coping research: Methodological challenges, theoretical advances, and clinical applications, *American Psychologist* **55** (2000), 620–625.
- [45] A.L. Stanton, S. Danoff-Burg, C.L. Cameron, M. Bishop, C.A. Collings, S.B. Kirk and L.A. Sworowski, Emotionally expressive coping predicts psychological and physical adjustment to breast cancer, *Journal of Consulting and Clinical Psychology* **68** (2000), 875–882.
- [46] M. Sverke, J. Hellgren and K. Näswall, No security: A meta-analysis and review of job insecurity and its consequences, *Journal of Occupational Health Psychology* **7** (2002), 242–264.
- [47] L. Sweet, J.A. Savoie and L. Lemyre, Appraisals, coping, and stress in breast cancer screening: A longitudinal investigation of causal structure, *Canadian Journal of Behavioural Science* **31** (1999), 240–253.
- [48] H. Tennen, G. Affleck, S. Armeli and M.A. Carney, A daily process approach to coping: Linking theory, research, and practice, *American Psychologist* **55** (2000), 626–636.
- [49] O.A. Thoits, Stress, coping, and social support processes: Where are we? What next? *Journal of Health and Social Behavior, Extra Issue* (1995), 53–79.
- [50] M. Truchon and L. Lemyre, Les événements anticipés comme stressseurs, *Santé Mentale au Québec* **20** (1995), 77–98.
- [51] T.B. Vanltallie, Stress: A risk factor for serious illness, *Metabolism* **51** (2002), 40–45.
- [52] P.P. Vitaliano, J. Russo, J.E. Carr, R.D. Maiuro and J. Becker, The ways of coping checklist: Revision and psychometric properties, *Multivariate Behavioral Research* **20** (1995), 3–26.
- [53] M. Zeidner and D. Saklofske, Adaptive and maladaptive coping, in: *Handbook of Coping: Theory, Research, and Applications*, M. Zeidner and N.S. Endler, eds, New York: Wiley, 1996.