

Loneliness in the Workplace: Construct Definition and Scale Development

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This paper describes the conceptual development and validation of a scale to measure loneliness in the workplace. Despite extensive literature on loneliness and the measurement of the phenomenon, the issue of assessing worker loneliness is not well researched. A 16-item self-report loneliness scale was developed for intended use in the workplace. Two separate studies were conducted to examine the reliability and validity of the scale. For each study participants were recruited by email and completed the scale via a website published on the internet. The first study included 514 employees, while the second study included 363 employees, each representing various occupational groups. Exploratory factor analysis using oblique rotation generated two factors representing emotional deprivation at work and social companionship at work. On a subsequent sample, confirmatory factor analysis confirmed the two-factor structure by demonstrating a significantly better fit than a single-factor structure. The results indicate the scale has good internal consistency and test-retest reliability. Preliminary evidence for convergent and discriminant validity is also provided.

The fostering of healthy interpersonal relationships is an integral part of any workplace and in many cases provides companionship for individuals who may not find it elsewhere. However, for some employees merely being in a social environment is not sufficient to conquer feelings of social deprivation and loneliness. Despite the pervasiveness of loneliness in society (Ernst & Cacioppo, 1998) the experience of loneliness in the workplace has generated little conceptual discussion and empirical substantiation. Broadly speaking, loneliness reflects a breakdown in social interaction and the quality of interpersonal relationships. Studying work-related loneliness may therefore give us insight into communication or interpersonal problems in the workplace, and signal the manifestation of a negative organisational climate. However, to

enable further enquiry into work-related loneliness, it is first necessary to develop a measurement platform from which future research and interventions can be developed. This paper discusses the notion of worker loneliness and reports on the development of a scale to measure the degree of loneliness experienced by employees.

Defining Workplace Loneliness

It is generally agreed by researchers that loneliness is a psychological state that results from deficiencies in a person's social relationships, either qualitatively or quantitatively (Peplau & Perlman, 1982). Loneliness is often perceived as a selfish pursuit that is driven by interpersonal incompetence or social inhibition. While it is often the case that lonely people shy away from social opportunities (Marangoni

& Ickes, 1989), research shows that loneliness has little relationship with self-focus (Green & Wildermuth, 1993) or with actual social contact (Jones, 1981). For example, research by Jones (1981) indicates that college students who are lonely have just as much social contact with others as do students who do not report being lonely. Moreover, loneliness tends to be more intense and painful when the individual feels lonely in a social environment, rather than feeling lonely as a result of being alone (Sermat, 1980).

One of the issues with attempting to define work-related loneliness for wide application is that there is a large variation in what makes individuals feel lonely, and the way they potentially perceive relationship deficiencies in the workplace. Moreover, because of the complexity of loneliness, its everyday usage is often confused with other related terms, such as aloneness, isolation, solitude, and lack of social support. There are subtle but important differences between these terms, particularly in the workplace. In general, aloneness, isolation, and solitude tend to refer to the objective characteristics of a social environment, whereas loneliness is based on an individual's perception. Loneliness is often referred to, and confused with, a lack of social support. However, it is generally agreed that a lack of social support refers to deficiencies in quantifiable social assistance or resources from others, whereas loneliness is more subjective, referring to the perception one has of

their social deficits (Perlman & Peplau, 1984). Therefore, while the experience of unwelcome aloneness, isolation, and a lack of social support may lead to an increase in feelings of loneliness, the terms are conceptually distinct. However, it is difficult to interpret reports of loneliness in the workplace when no obvious social deficiency is apparent. Arguably therefore, social deficiencies in the workplace arise less from quantitative factors (lack of social support or working alone), and more from characteristics which impede or stifle the desired quality of interpersonal relationships. It would therefore follow that being qualitatively dissatisfied with one's relationships at work is more closely related to loneliness than is the amount of contact with fellow co-workers or clients. This proposition integrates well with research on childhood loneliness, suggesting the presence of just one close friend can mitigate feelings of loneliness (e.g. Parker & Asher, 1993). As such, loneliness at work can manifest itself as the distress caused by the perceived lack of good quality interpersonal relationships in a work environment. Recognising that loneliness is not synonymous with actual social contact, this paper argues that the negative discrepancy between actual and desired relationships at work, and the inability to rectify this imbalance, can engender feelings of loneliness.

Previous Empirical Studies on Workplace Loneliness

To date, and to the authors' knowledge, only a small number of published empirical studies have specifically examined the nature of loneliness in the workplace. Research carried out by Gumbert and Boyd (1984) suggests that small business owners frequently feel lonely, a problem which the authors attribute to a general lack of colleagues with whom to share experiences, explore ideas and commiserate. However, Gumbert and Boyd's (1984) study suffers from several methodological issues. Firstly, work related-*loneliness* was not defined nor was it quantifiably assessed. Rather, it was gauged using open-ended, unstructured questions which ranged from defining loneliness as isolation or aloneness, through to the term meaning the 'loneliness of

command'. Moreover, the data do not provide standardised comparison amongst the respondents, inhibiting generalisations drawn from the study. Secondly, the authors did not study a comparison group of employees who were not self-employed, therefore it is not possible to determine if small business owners' levels of loneliness are in fact different to other employees. In subsequent research Bell, Roloff, Van Camp and Karol (1990) found no support for the authors' claim that individuals who are self-employed are more likely to be lonely than those employed by others.

In remedying methodological limitations of prior research, Reinking and Bell (1991) conducted a field study to examine how one's career situation interacts with his or her communication competence to then influence loneliness. Loneliness was assessed using the 20-item UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980). Similar to previous findings (Bell, *et al*, 1990; Page & Cole, 1991), Reinking and Bell (1991) found that loneliness was associated with those respondents in lower level positions, even when communication competence was controlled for. In explanation, the authors argue that success and achievement in the workplace may be more important for many people than closeness to others. Moreover, an individual may not see a deficit in personal relationships when achievement at work fulfils primary personal goals.

In other related research, Chadsey-Rusch, DeStefano, O'Reilly, Gonzalez and Collet-Klingenberg (1992) studied loneliness among workers with mental retardation employed by integrated and sheltered workshops. The results suggest that loneliness and social dissatisfaction were not pervasive feelings for individuals with mild or moderate mental retardation. However, their conclusions were limited by the fact that no comparative data was available on the loneliness of workers without mental retardation. A further study carried out by Steinburg, Sullivan, and Montoya (1999) looked at the experience of loneliness and social isolation in the workplace using a small sample of deaf adults. The

authors suggested that because of social integration difficulties, deaf workers may experience poor psychological well-being in the workplace. Their qualitative study found that for some participants communication barriers in the workplace did engender feelings of loneliness and negatively affected their work performance. Both studies used loneliness scales designed specifically for the respondent group.

Measuring Loneliness

In order to empirically study loneliness in the workplace it is first necessary to have some way of accurately measuring it. Previous researchers (e.g. Cubitt & Burt, 2002; Dussault & Thibodeau, 1997) have modified the existing UCLA Loneliness Scale to suit the work environment by placing 'at work' as a precursor to each item. However, on analysis several of the items are inappropriate when placed in the context of the workplace (e.g. "How often do you feel that you are no longer close to anyone?"). Others (Bell *et al*, 1990; Reinking & Bell, 1991) have used general questions to measure feelings of loneliness and assumed that participants would respond to the items in relation to their work environment. According to Russell (1982) scales developed for specific constructs have the potential advantage of more accurately identifying certain variations in the experience of loneliness, which may be particularly useful in helping lonely individuals. As such, measuring general loneliness in workplace settings using existing loneliness scales can produce ambiguous results, in that it is not clear what aspects of loneliness or relationship deficiencies are specifically being measured and in what context the loneliness feelings are being assessed. This ambiguity may misguide future research or intervention processes.

Over the past three decades, several measures have been developed to assess various aspects of loneliness. Some of these scales measure loneliness unidimensionally, capturing the concept in a single global measure (e.g. de Jong-Gierveld, 1985; Russell, Peplau & Ferguson, 1978; Russell, 1996). This unitary conceptualisation of loneliness implies that being lonely is undifferentiated in nature, and is experienced in the same way by all

lonely people (Allen & Oshagan, 1995). Loneliness has traditionally been seen in this light, both conceptually and in measurement. However, global measures of loneliness typically fail to take into consideration the contextual factors of where the lonely feelings stem from. It is therefore difficult to conclude if the individual is in fact lonely at work, or whether the loneliness stems from other facets of life. Furthermore, factor analyses of unidimensional scales, such as the UCLA Loneliness Scale, reveal that in most situations the scales are not measuring a unitary construct, with several studies consistently identifying a two-factor model (e.g. Knight, Chisholm, Marsh & Godfrey, 1988).

Theorists such as Rook (1988) argue that loneliness is a multidimensional construct and therefore should be measured using a multidimensional instrument. Multidimensional loneliness scales (e.g. DiTommaso & Spinner, 1992; Schmidt & Sermat, 1983; Vincenzi & Grabosky, 1987) assume that loneliness can result from several different personal or social situations, can be experienced in many different ways, and need not affect all areas of one's functioning (Solano & Koester, 1989). Further, multidimensional conceptualisations describe loneliness as a multifaceted phenomenon with various manifestations, such as intimate loneliness, feeling isolated from a group of others, or feeling estranged or marginalised from the surrounding culture (McWhirter, 1990).

Weiss (1973), one of the first proponents of a multidimensionality perspective on loneliness conceptualised loneliness as either emotional or social in nature. Social loneliness, Weiss (1973) claimed, is the perception of inadequate social networks, whereas emotional loneliness stems from the absence of a close intimate relationship. The underpinnings of Weiss' theory imply that various types of relationships create different social provisions. Weiss suggested six social provisions: attachment, social integration, reliable alliance, guidance, reassurance of worth, and opportunity for nurturance. According to Weiss (1973), loneliness is a response to the absence of a particular social provision,

with emotional loneliness reflecting a qualitative absence of attachment, whereas social loneliness stems from more quantifiable social deficiencies. Several studies (e.g. Rubenstein & Shaver, 1982; Russell, Cutrona, Rose & Yurko, 1984; DiTommaso & Spinner, 1997) support the notion that emotional and social loneliness are distinct states with different precursors, that is, lack of attachment predicted emotional loneliness, whereas lack of social reassurance predicted social loneliness.

Development of the Loneliness at Work Scale

Based on our conceptualisation of loneliness at work, we generated a list of 90 potential items to measure the construct. In accordance with scale development principles (Kline, 2000) the notion of face and construct validity were built into the development process from the outset. The items were generated from theoretical and empirical literature, as reviewed above, which collectively influenced the development of the pool of items. In developing the items for the current scale, previously developed loneliness scales were also reviewed, such as the UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980; Russell, 1996), state vs. trait loneliness scales (Gerson & Perlman, 1979; Shaver, Furnham & Buhrmester 1985), the Loneliness Rating Scale (Scalise, Ginter & Gerstein, 1984), the Rasch-Type Loneliness Scale (de Jong-Gierveld & Kamphuis, 1985), the Differential Loneliness Scale (Schmidt & Sermat, 1983), emotional and social loneliness scales (Cramer & Barry, 1999; DiTommaso & Spinner, 1993; Russell, Cutrona, Rose & Yurko, 1984; Vincenzi & Grabosky, 1987), the Children's Loneliness Scale (Asher, Hymel & Renshaw, 1984), Rokach and Brock's (1997) multidimensional scale of loneliness, and Hays and DiMatteo's (1987) short-form measure of loneliness.

As a general rule, a 90-item instrument is too long for use in applied research and can affect response bias by creating respondent fatigue (Anastasi, 1976). Therefore, to begin the winnowing process the items were subjected to review by two academics and four lay reviewers (two solicitors,

a school principal, and a nurse). The reviewers were asked to make critical comments on the scale items, identify any items considered ambiguous and make general comments regarding the scale items. All reviewers indicated that the scale was too lengthy, with item redundancy in places. The items were scrutinised in accordance with previously reviewed theoretical and empirical literature for conceptual fidelity. From this conceptual review, the scale was reduced to 60 items.

The 60 items were piloted using a convenience sample of first year psychology students in a university laboratory class (N = 273). The students were asked to think about their current job or a previous job when responding to the set of items. Each item was rated on a 7-point Likert scale ranging from strongly disagree (1) to strongly agree (7). The results were subjected to exploratory factor analyses. Three clusters emerged during the analysis revealing conceptually meaningless groupings. From further analysis it appeared the set of items suffered from measurement polarity, in that two of the factors represented positively worded items, while the remaining factor represented negatively worded items. This could suggest acquiescence amongst the respondents, with the factors simply measuring a response set (Caught, Shadur & Rodwell, 2000). Alternatively, the factors could have been affected by the sample from which they were obtained (Kline, 1994). Given that students may have a substantially different interpretation of their interpersonal relationships at work compared to permanent employees, recruiting a student sample may have had some bearing on the factorial inadequacies of the scale.

The 60-item scale was also administered to 12 office workers and partners in a small legal practice to gauge their perceptions of the content of the scale. The excessive length of the scale was noted by most of the respondents. Consequently, the items were revisited in relation to the theoretical underpinnings of loneliness in the workplace. Discussions were also held with academics and colleagues about the nature of loneliness, and the items were scrutinised for conceptual

fidelity and clarity. The item review also highlighted the need within the scale to differentiate between those individuals who are desirous of social and emotional companionship and are unable to achieve it, and those who willingly choose to refrain from social engagement.

Based on the item review, 44 of the statements were systematically removed. The criteria for exclusion included items that demonstrated low levels of variance, were ambiguous, redundant or non-discriminatory, were poorly conceptualised, or were more representative of variables related to, but distinct from, loneliness such as aloneness, social competence, shyness, social support or negative affectivity. Because loneliness is a cognitive construct rather than behavioural in nature, the revised items were also developed to better reflect its cognitive characteristics (i.e. the use of the words "I feel" when referring to the social environment). No reference to loneliness was made either within the scale or when introducing the research to participants, as it can produce socially constructed gender effects (Borys & Perlman, 1985) and respondents may be discouraged from participating due to loneliness being seen as a social failure (Hancock, 1986). Disguising what is being measured is not unusual in loneliness measures as it helps lessen the impact of social desirability (Russell, 1982).

The items were randomly ordered and balanced to produce eight positively and eight negatively worded items. The key word from each item was assessed to ensure the negatively worded items were not merely antonyms of the positively worded items. This process was used to reduce item polarity witnessed in the pilot testing of the scale. To verify face validity the revised items were distributed to a group of 19 employees from a large insurance corporation. From this pilot, minor grammatical changes were made to two of the items.

STUDY ONE: Exploratory Factor Analysis

The purpose of the first study was to determine the factor structure and reliability of the loneliness at work scale (LAWS).

Method

Sample

A total of 537 responses were received, of which 514 were usable. The majority of participants were women ($N = 356$), were married or in a recognised de facto relationship ($N = 327$), and were from New Zealand ($N = 427$). The average age of the participants was 39.8 years ($SD = 11.6$) with a range of 19-65 years. Those in the study had diverse occupations, with the majority coming from science or research ($N = 109$), management ($N = 99$), academia ($N = 95$), or clerical positions ($N = 55$). The use of a varied data set, representing a reasonable range of occupations from both public and private sectors helped reduce the possibility of industry sector or organisational bias.

Procedure

The scale was administered over the internet to ensure a wide cross section of workers was surveyed. Two organisational psychology and human resources list-servers were employed to recruit participants via email, with subscriber numbers of 417 and 123 respectively at the time of distribution. Recipients of the email were invited to forward the invitation to fellow employees to generate a larger pool of respondents. Although collecting data over the internet limits the sample to typically white-collar tertiary educated workers (Wilson, 2000), the scale was designed with an office environment in mind and the internet was therefore considered an acceptable medium for gathering data. Respondents who chose to participate in the test-retest study were emailed four weeks after the first data collection period was completed, and were requested to return to the internet site to submit the questionnaire.

Study One Results

Descriptive Statistics

The mean loneliness score for the sample was 40.38 ($SD = 17.09$) with a range of 16 to 107. Higher scores indicated higher levels of loneliness at work. The mean score for men was 42.0 ($SD = 16.67$) and 39.55 ($SD = 17.33$) for women, a difference that was not statistically different, $t(509) = 1.53$, $p = 0.13$. Within the sample, the mean, median (36.0), and mode (32.0) were fairly similar, suggesting that the distribution of scores was reasonably normal. However, relatively few respondents received high scores resulting in a positive skew (skewness = 1.25, $p < .05$).

Exploratory Factor Analysis

To assess the appropriateness of factor analysis on the data set, the Kaiser-Meyer-Olkin (K-M-O) measure of sampling adequacy and the Bartlett test of sphericity were obtained. The K-M-O measure indicates the proportion of common variance in the measured variables. Values over 0.9 are considered appropriate for proceeding with factor analysis (Tabachnik & Fidell, 1989). In the present study the K-M-O was 0.96. The Bartlett test of sphericity was used to check for variable independence in conjunction with the factor analysis. The value obtained was 5190.86 ($df = 120$, $p < .001$) indicating scale item independence. Additionally, the ratio of usable responses to items was 32:1, which is considered acceptable to proceed with factor analytic techniques (Kline, 1994). The item-total correlations ranged from 0.45 to 0.78. Given every item achieved the desired 0.40 item-total correlation cut-off as recommended by Nunnally (1978) all items were retained for the factor analysis. The item-total correlations are presented in the first column of Table 1.

The Kaiser test indicated that two factors should be extracted from the factor analysis (eigenvalues of 8.55 and 1.34 for each factor). An examination of the scree plot confirmed this indication. To allow for correlations between the factors the chosen method for extraction was factor analysis with oblique rotation. While oblique rotation is less common in psychological research,

it often represents the variables more accurately since the axes can rotate more freely and correlations between the factors are possible. The pattern matrix from the oblique rotation is presented in Table 1.

Items had high loadings on their respective factor, with no cross loading above .40. The results defined two factors: emotional deprivation at work (items 1 through 9) and social companionship at work (items 10 through 16). The first factor explained 53.44% of the total scale variance and comprised seven negative items and two positive items, while the second factor explained 8.37% and was made up of six positive items and one negative item. The emotional deprivation factor measured the qualitative aspects of co-worker relationships, and included key words such as 'feel', 'isolated', 'alienated', and 'disconnected'. The items loading on this factor represent

Weiss' (1973) more general concept of emotional loneliness, reflecting items relating to the perception of the personal quality of relationships at work. This factor could therefore be defined as the *perception of the emotional quality of one's relationships at work*. The social companionship factor was associated with the quantitative aspects of co-worker relationships, and included words such as 'share', 'time with', 'part of a group' and other phrases that depicted reliable social alliance. The items loading on this factor reflected Weiss' (1973) concept of social loneliness, representing items on social networks and the quantity of social opportunities. This factor could be defined as the *perception of the quantifiable social aspects of one's relationships at work*. The emotional deprivation and social companionship factors were found to be quite strongly correlated ($r = .63$). The analysis

indicates that there are two dimensions of loneliness at work, which may not simply be the result of item polarity or response style.

Reliability

The alpha for the emotional deprivation factor was .93, and .87 for the social companionship factor. Two hundred and twenty one participants provided retest data. Test-retest reliability for the scale was estimated approximately 4-7 weeks after the first data collection session depending on when the respondent chose to complete the questionnaire. The test-retest reliability was .80 for both factors.

STUDY TWO: Confirmatory Factor Analysis and Criterion-Related Validity

The purpose of the second study was to confirm the factor structure for the 16-item scale on a new sample of

Table 1. Item-Total Correlations and Factor Analysis Pattern Matrix for the Loneliness at Work Scale

Item	Scale Items	Item-Total Correlations	Factor Loadings	
			Factor 1	Factor 2
<i>Items Relating to Emotional Deprivation</i>				
1.	I often feel abandoned by my co-workers when I am under pressure at work	.45	.74	.12
2.	I often feel alienated from my co-workers	.65	.80	.00
3.	I feel myself withdrawing from the people I work with	.65	.77	.06
4.	I often feel emotionally distant from the people I work with	.70	.79	.07
5.	I feel satisfied with the relationships I have at work*	.65	.64	.23
6.	There is a sense of camaraderie in my workplace*	.60	.72	.08
7.	I often feel isolated when I am with my co-workers	.74	.85	.01
8.	I often feel disconnected from others at work	.78	.89	.00
9.	I experience a general sense of emptiness when I am at work	.55	.75	.02
<i>Items Relating to Social Companionship</i>				
10.	I have social companionship/fellowship at work*	.69	.22	.68
11.	I feel included in the social aspects of work*	.60	.39	.47
12.	There is someone at work I can talk to about my day to day work problems if I need to*	.58	.03	.75
13.	There is no one at work I can share personal thoughts with if I want to	.57	.09	.81
14.	I have someone at work I can spend time with on my breaks if I want to*	.50	.09	.76
15.	I feel part of a group of friends at work*	.61	.27	.59
16.	There are people at work who take the trouble to listen to me*	.58	.10	.69
Eigenvalues			8.55	1.34
Percentage of Variance Explained			53.44	8.37
Cronbach's Alpha Reliability Coefficient			.93	.87

* Items that are asterisked have been reversed scored.

employees, and to examine preliminary evidence of its validity.

In order to determine whether the two factors were measuring work-related loneliness, as opposed to general loneliness, it was necessary to correlate each factor with similarly related work variables. Ideally, it would be optimal to compare the LAWS with other scales measuring the same construct. However, as noted earlier, there are no published or well-validated measures of loneliness specifically related to the workplace. Arguably, the scale could also be validated against factors of existing measures of general loneliness. However, it was thought the inclusion of a general loneliness scale, such as the UCLA Loneliness Scale (Russell, 1996), may have influenced the responses to the loneliness at work scale, in that respondents may have failed to conceptually differentiate between work and non-work emotional deprivation and social companionship when responding to items. Therefore, the difficulties of clearly determining what aspects of the individual's relationship deficiencies are being measured, and in what context the loneliness feelings are being assessed, may not have been overcome if a general loneliness measure was used. Thus, to address construct validity we included measures which assess workplace attitudes and should theoretically overlap with the two factors of loneliness at work.

Given loneliness encompasses a host of negative emotions and is psychologically distressing, it would be expected that the experience of loneliness in the workplace would be associated with negative job-related attitudes. If this hypothesis were true then feeling lonely at work (in terms of emotional deprivation and a lack of social companionship) should be negatively correlated with job satisfaction, organisational commitment, and positively correlated with intention to turnover (withdrawal behaviours). Co-worker and supervisor support should be negatively related with loneliness at work. Arguably, a lack of perceived social support at work is perhaps the most obvious source of loneliness. Rook's (1987) study on the relationship between instrumental and emotional support with loneliness

indicated that social companionship is a central concept for understanding loneliness. It is therefore hypothesised that the more supported, satisfied, and committed the employee is to the organisation the less likely they are to report feelings of loneliness. Moreover, because occupational stress involves an emotional reaction, particularly reactions involving negative emotional states (Bar-On, Brown, Kirkcaldy & Thome, 2000) it would be expected that the two factors of the loneliness scale would be positively related to measures of occupational stress. However, because the scale is not intending to measure stress, satisfaction, commitment, support or turnover it should not relate too highly with these constructs.

As a means of demonstrating discriminant validity, we correlated the two factors of the LAWS with dissimilar constructs that are not specifically related to the work environment, namely social support from family and friends and life satisfaction. Because the items within the scale are intended for measurement in the work environment and are related solely to work factors, we would not expect significant correlation with non-work measures.

Method

Sample

A total of 374 responses were received, of which 363 were usable. The majority of participants fell into the following occupational categories: educators (N = 79), managers or directors (N = 57), researchers or scientists (N = 50), and administrators (N = 35). The majority of participants were women (N = 243), were married or in a de facto relationship (N = 243), were from New Zealand (N = 214), worked full-time (N = 307) and held at least a Bachelor's degree (N = 275). The average age of the participants was 37.8 years ($SD = 11.1$). The data showed that, on average, participants had held their current job for 4.2 years ($SD = 5.3$) and had worked in their current organisation for 6.4 years ($SD = 7.1$).

Measures

The following scales were measured concurrently with the LAWS:

Co-worker Support was measured using O'Driscoll's (2003) four-item social support scale. The scale measured emotional and instrumental support and has a reported Cronbach alpha coefficient of $\alpha = .85$ (current study $\alpha = .87$).

Non-work Support was measured using a sub-scale from Caplan, Cobb, French, Van Harrison & Pinneau (1975). The four-items gauge general social support from spouse, family and friends, in terms of providing emotional and instrumental support. The reported alpha coefficient for the scale was $\alpha = .81$ (current study $\alpha = .80$).

Supervisor Support was measured by Greenhaus, Parasuraman, and Wormley's (1990) nine-item scale, designed to measure the extent to which employees feel they receive supervisory support in their job. The reported alpha coefficient for the scale was $\alpha = .93$ (current study $\alpha = .92$).

Intention to Turnover was measured using a three-item scale developed by Landau and Hammer (1986). The reported alpha coefficient was $\alpha = .77$ on a sample of 300 university employees, and $\alpha = .73$ on a sample of 372 state agency employees (current study $\alpha = .91$).

Organisational Commitment was measured using the six item British Organisational Commitment Scale developed by Cook and Wall (1980). Clegg and Wall (1981) reported an alpha coefficient of .67 while Peccei and Guest (1993) report alpha coefficients of .55, .60 and .73 (current study $\alpha = .83$).

Job Satisfaction was measured using Hackman and Oldham's (1975) three item measure of job satisfaction. Katz (1978) reported an alpha coefficient of $\alpha = .74$ (current study $\alpha = .83$).

Occupational Stress was measured using The Perceived Stress Scale adapted for employee-related research (Vandenberg, Park, deJoy, Wilson & Griffin-Blake, 2002). Vandenberg (*et al*, 2002) report a Cronbach alpha coefficient of .88 (current study $\alpha = .87$).

Life Satisfaction was measured using the Satisfaction with Life Scale, developed by Diener, Emmons, Larsen and Griffin (1985). The reported alpha coefficient was $\alpha = .87$ (current study $\alpha = .87$).

Procedure

Once more, the primary vehicle for data collection was the internet. Email addresses were sourced from national business directories, and twelve list servers related to organisational psychology or human resource management were utilised to recruit participants. To attract a wider pool of employees to the website advertising posters were displayed in staff rooms of various organisations throughout New Zealand. The research questionnaire consisted of the LAWS and a set of previously established scales, described above.

Study Two Results

Confirmatory Factor Analysis

The results from the exploratory factor analysis indicated that two factors best described the factor structure of the LAWS. Given the debate over the validity of multidimensional versus unidimensional measures of loneliness previously outlined, a single-factor model was submitted for analysis as a plausible competing model. Confirmatory factor analyses were conducted to determine the adequacy of fit of a single-factor model (all 16 items) and a two-factor model (as evidenced in the exploratory factor analysis). According to the recommendations of Hu and Bentler (1999) and Schumacker and Lomax (1996) the two CFA models were evaluated against a number of fit criteria or indices, namely the goodness of fit index, the adjusted goodness of fit index, the comparative fit index, the root mean square error of approximation, the Bayesian information criterion,

and the Chi-Square (χ^2) test. Model comparison was conducted on a subset of these fit measures, including the chi-square difference test (χ^2_{diff} test, $p < .05$, Kline, 1994). The RMSEA is used for model comparison (criterion of non-overlapping confidence intervals), along with the BIC test (criterion of a 10 points difference favouring the lower BIC, Raftery, 1995).

The results indicated that the two-factor model provided a significantly better fit, as depicted in Table 2. Change in chi-square ($\Delta\chi^2 = 300.4$ ($\Delta df = 1$)) was significant at the $p < .001$ level, favouring the lower values of the two-factor model. RMSEA confidence interval ranges were significantly different, again favouring the two-factor model. According to Raftery (1995) a BIC difference greater than 10 is considered very strong evidence in favour of the model with the smaller BIC. The BIC difference was 289.52, considerably larger than the 10 point criterion. In this respect, there is evidence to suggest the data fits a two-factor structure over a single-factor structure.

Despite the comparison tests favouring the two-factor model, the model did not meet the fit criteria, as shown in Table 2. The most meaningful of these criteria are CFI and RMSEA (Hu & Bentler, 1999), in which the two-factor model fell just short of being sufficient for the RMSEA criterion ($< .06$). However, the RMSEA range of .08 to .10 is not necessarily considered a poor fit according to criteria from Browne and Cudeck (1993). Given however the overall failure to meet the criteria for sufficient model fit, a model refinement

process was conducted for the two-factor model. Using the modification indices to guide model improvements, we tested various simulations of the model, including the removal of over 50 percent of the items and the addition of further latent variables to obtain a better fit. However, it was decided that the drastic theoretical modifications to the scale (which would be necessary to obtain sufficient fit), were not justified given the reasonable fit of the original two-factor model. Such considerations of the theoretical implications during the modelling process are a necessary aspect to model building, refinement, and evaluation (Schumacker & Lomax, 1996).

Criterion-Related Validity

Higher scores on the two factors of the LAWS (factor 1, emotional deprivation and factor 2, a lack of social companionship) were moderately associated with elevated levels of perceived work stress [F1: $r = .54$, $p < .01$; F2: $r = .34$, $p < .01$]. Higher degrees of loneliness at work were also related to lower levels of job satisfaction [F1: $r = -.56$, $p < .01$; F2: $r = -.39$, $p < .01$], reduced organisational commitment [F1: $r = -.53$, $p < .01$; F2: $r = -.39$, $p < .01$], and greater intention to turnover [F1: $r = .47$, $p < .01$; F2: $r = .34$, $p < .01$]. A perception of inadequate co-worker support was associated with higher levels of loneliness at work [F1: $r = -.60$, $p < .01$; F2: $r = -.53$, $p < .01$], as was poor supervisory support [F1: $r = -.51$, $p < .01$; F2: $r = -.33$, $p < .01$]. On all measures, the emotional deprivation factor showed stronger correlations with the workplace attitude measures.

Table 2. Fit statistics for one-factor and two-factor measurement models for the Loneliness at Work Scale

Model	Goodness of Fits				Comparative Fit	
	GFI	AGFI	CFI	RMSEA	RMSEA 90% CI	BIC
A: Single-factor LAWS ($\chi^2 = 683.9$; $df = 104$)	.75	.67	.85	.12	.12 - .13	872.51
B: Two-factor LAWS ($\chi^2 = 383.5$; $df = 103$)	.87	.83	.93	.09	.08 - .10	582.99
Model A vs. B comparison	$\Delta\chi^2 = 300.4$	$\Delta df = 1$	$p < .001$			

Note. GFI = goodness of fit; AGFI = adjusted goodness of fit; CFI = comparative fit index; RMSEA = root mean square error of approximation; CI = confidence interval; BIC = Bayesian information criterion; LAWS = Loneliness at Work Scale.

In terms of non-work factors, although greater support from family and friends was associated with lower scores on each factor of the LAWS, the relationships were small [F1: $r = -.11$, $p < .05$; F2: $r = -.12$, $p < .05$]. Satisfaction with life in general was also related to lower levels of loneliness at work, but again the relationships were only moderate [F1: $r = -.20$, $p < .01$; F2: $r = -.21$, $p < .01$]. Because loneliness tends to have far-reaching emotional and social consequences, it is not surprising to find a small degree of association with non-work measures.

Discussion

The purpose of this research was to develop and validate a self-report measure of loneliness at work. Exploratory factor analyses yielded two conceptually distinct components of loneliness at work. The moderate to high correlations with work-based measures, and the lower correlations with non-work scales partially demonstrates that the scale is measuring feelings of loneliness in the workplace, rather than general loneliness. The confirmatory factor analyses results suggest a two-factor structure best fits the data, although the RMSEA was slightly under the model-fit criteria. After several modifications to the model, the only structure which gave any theoretical and psychometric promise of a replicable factor solution was the two-factor (16-item) scale. The two factors consist of both positively and negatively worded items, and represent items relating to emotional deprivation (the quality of interpersonal relationships at work) and social companionship (the adequacy of social networks in the workplace). This finding supports the theoretical distinction between emotional and social isolation suggested by Weiss (1973), and also lends support to the empirical findings suggesting that loneliness is a multidimensional construct related nonetheless to a common psychological foundation (van Baarsen, Snijders, Smilt & van Duijn, 2001). As such, individuals suffering from emotional deprivation may share many of the same experiences as those suffering from a lack of social companionship, although the precursor

to feeling either emotionally or socially lonely may be differentiated.

Study Two was designed to test the scale's ability to measure work-related loneliness as opposed to general loneliness. The study was successful in determining this distinction, with the co-worker support variable demonstrating high correlations with the two factors and non-work support demonstrating the lowest correlations with the factors. This reflects loneliness research in general suggesting a lack of appropriate social support is a strong predictor of loneliness (Rook, 1988). Research from Lindorff (2001) demonstrates that support from work colleagues is appropriate for specific work problems and can relieve work anxiety more so than non-work support. As such, different types of relationships serve different functions (de Jong-Gierveld & van Tilburg, 1987), which may explain why work-related support (co-worker and supervisor) was related to the two factors of loneliness at work more so than non-work support. However, while this evidence provides support for the work – non-work distinction of the factors it fails to illustrate the differential precursor relationships and the usefulness in distinguishing between the two factors. The emotional deprivation factor showed stronger correlations with the work-related variables than the social companionship factor, perhaps illustrating that the underlying construct relating these variables is the perception of affective support and the quality of workplace relationships rather than the quantity or adequacy of social collegiality at work. To ascertain whether the two loneliness at work factors are in fact conceptually distinct and have differing predictors and outcomes, more specific measures relating to social companionship, such as the opportunity and prevalence of friendship at work (Nielsen, Jex & Adams, 2000), and emotional deprivation, such as work-related ostracism (Williams, 2002), should be considered for future research. As with Weiss' (1973) theory on social and emotional loneliness, it would be expected that different social provisions in the workplace would predict the two work-related loneliness factors. In this respect, it would be interesting to

determine the relationship each of the factors have with work-based social provisions, such as the opportunity for social integration, guidance, and reassurance of worth from colleagues. It would also be advantageous to study the effects the two factors have on work-based outcomes, both individually (such as reasoning and decision making ability) and organisationally (productivity or performance).

Krackhardt and Stern (1988) have noted that much of the influence and the actual work within an organisation is accomplished through an informal structure of friends, contacts, and 'accidental' communications. Broadly speaking, increased attention to the development and quality of interpersonal relationships at work may therefore be advantageous in understanding the dynamics of organisational behaviour and improving both individual and organisational wellbeing. Developing a conceptualisation and measure of loneliness at work is an important step in aiding our understanding of this workplace phenomenon. Recognising and appreciating the conditions in which people feel lonely at work may therefore contribute to efforts to avert the more severe, persisting consequences that can result from being chronically lonely.

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