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The Job Accommodation Scale (JAS): Psychometric evaluation of a new measure of employer support for temporary job modifications

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Abstract

INTRODUCTION—An employer offer of temporary job modification is a key strategy for facilitating return-to-work (RTW) for musculoskeletal conditions, but there are no validated scales to assess the level of support for temporary job modifications across a range of job types and organizations.

OBJECTIVE—To pilot test a new 21-item self-report measure (the Job Accommodation Scale [JAS]) to assess its applicability, internal consistency, factor structure, and relation to physical job demands.

METHODS—Supervisors (N = 804, 72.8% male, mean age = 46) were recruited from 19 employment settings in the USA and Canada and completed a 30-min online survey regarding job modification practices. As part of the survey, supervisors nominated and described a job position they supervised and completed the JAS for a hypothetical worker (in that position) with an episode of low back pain. Job characteristics were derived from the occupational informational network job classification database.

RESULTS—The full response range (1–4) was utilized on all 21 items, with no ceiling or floor effects. Avoiding awkward postures was the most feasible accommodation and moving the employee to a different site or location was the least feasible. An exploratory factor analysis

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suggested five underlying factors (Modify physical workload; Modify work environment; Modify work schedule; Find alternate work; and Arrange for assistance), and there was an acceptable goodness-of-fit for the five parceled sub-factor scores as a single latent construct in a measurement model (structural equation model). Job accommodations were less feasible for more physical jobs and for heavier industries.

CONCLUSIONS—The pilot administration of the JAS with respect to a hypothetical worker with LBP showed initial support for its applicability, reliability, and validity when administered to supervisors. Future studies should assess its validity for use in actual disability cases, for a range of health conditions, and to assess different stakeholder opinions about the feasibility of job accommodation strategies.

Keywords

Job accommodation; Task modification; Supervisor; Scales; Return to work; Evaluation

INTRODUCTION

Offering temporary job modifications is an important strategy for employers to facilitate return-to-work and improve disability outcomes for a host of acute, episodic, and chronic medical conditions [1–12]. Factors that influence job modification efforts include physical and psychological job demands, the extent of worker limitations or restrictions, the impact of related organizational policies and practices, and supervisor and co-worker support [13–15]. Successful return-to-work coordination often depends on the ability to develop and implement a modified work plan that fosters recovery and rehabilitation but is also responsive to concerns and agreeable to the injured worker, the healthcare provider, and employer [16–18]. Despite the acknowledged benefits of workplace job accommodation to prevent sickness absence and reduce disability costs, studies have provided a recurring theme that job modifications are often poorly planned or executed in the workplace [19–26].

Though it is quite common for workers and their healthcare providers to request temporary or permanent job modifications, successful accommodation can require substantial problem solving, coordination, tracking, communication, and follow-up at the workplace [15,18,19,21,27]. Potential issues include the need for arranging co-worker assistance, the complexities of shifting work schedules or locations, and the difficulties of altering workstations or workflow patterns [15,28–31]. Thus, supervisory experience, knowledge, and support for accommodation can be as important as standard ergonomic principles and medical restrictions. However, little research has been done to better understand the factors that influence supervisory support for different types of accommodations. Supervisors who are responsible for coordinating accommodations may be influenced by perceptions of the feasibility and appropriateness of the accommodation, leadership style, decision-making autonomy, beliefs about pain, and the culture of the organization [32–34]. Thus, an important research priority in work disability prevention is to explore factors influencing job modification practices and to identify the types of job modifications most likely to be implemented [35,36].

One particular limitation in the research of job modification practices is the lack of standardized tools and measures. This is complicated by the highly individualized nature of job demands and health impairments, the complexity of the job accommodation process, and the variability of job modifications available to workers in different industries and occupations. However, there is some commonality in the types of job modifications generally recommended or implemented for musculoskeletal conditions, and these fall within the domains of altering physical job tasks, changing the organization of work, modifying the pacing or scheduling of work, and substituting alternate duty tasks [7,18,28,37–39]. Despite tremendous differences in the job modification efforts that are necessary for individual cases, it may be feasible to assess job accommodation practices uniformly by employing general job modification principles and constructs, regardless of occupation and type of musculoskeletal impairment [2,37]. As a first step toward evaluating and understanding organizational policies and practices related to job accommodation, there has been a call for more standardized measures to assess the frequency and types of accommodations that are routinely provided [23,28,38].

The goals of this study were therefore to: (a) develop and evaluate the psychometric properties of a newly developed Job Accommodation Scale (JAS); and (b) identify a typology of accommodation strategies from the factor structure of the new scale. The JAS was designed to assess supervisor perceptions of feasibility and support for 21 commonly utilized accommodations for back injured workers. The study was designed to assess the new scale's applicability, internal consistency, factor structure, and relation to physical job demands when administered to supervisors from a range of industries who were managing workers in different occupations and employment settings.

METHOD

Participants

Participants in the study were 804 supervisors (59% male) from 19 participating employers in Canada (40.2%) and USA (59.8%). Employers in the study represented a non-random, convenience sample drawn from existing researcher contacts, institutional ties, and past collaborations. This non-representative sampling strategy was sufficient for the purposes of evaluating basic psychometric properties of the new scale. The employers represented a range of industries and company sizes, but recruitment efforts targeted industries where manual materials handling and other physical tasks might be common job requirements. This was intended to sample supervisors more likely to have encountered job modification responsibilities in their supervisory work. While it would have been preferable to also limit participation to supervisors with at least several years of supervisory experience, this additional inclusionary factor was not feasible to enact with the participating employers. The final industry mix included health care, energy/utility, retail, heavy manufacturing, high-technology manufacturing, and construction. Employers received aggregate survey results for benchmarking purposes as a benefit of participation. Employers encouraged supervisors to participate in the website survey during regular business hours, but participation was voluntary and included no supervisor incentives or individual feedback. Eligibility required that supervisors be at least 18 years old and able to read and write in English.

Procedures

Supervisors received an email invitation to participate, along with a copy of the consent form and contact information for the research team. The consent form described the purpose of the study and its voluntary and confidential nature. A computer link provided access to a 30-minute survey that allowed respondents to: (1) provide informed consent; (2) input demographic data; (3) describe a type of job position they routinely supervised; (4) read a hypothetical case scenario involving a worker (in that job position) having an episode of low back pain (LBP) (see "Appendix A"); and (5) respond to a 21-item list of possible job accommodations (see Job Accommodation Scale, below). The case scenario specified that job accommodations would be necessary for a period of at least 2 weeks. The design of the larger study was based around a conceptual framework hypothesizing that supervisor efforts to support, recommend, or coordinate specific job modifications are influenced by management policies, worker characteristics, information from medical providers, and the leadership style and attitudes of the supervisor (Figure 1). All procedures were approved by the ethics boards of Lakehead University, the University Health Network (University of Toronto), Lethbridge University, and the Liberty Mutual Research Institute for Safety.

Measures

Job Accommodation Scale (JAS)—The primary measure for the study was a new, 21-item self-report measure (Job Accommodation Scale) developed by the authors to assess the likelihood that various job modifications might be supported in the workplace (abbreviated scale items shown in Table 1). The content of the JAS was compiled from four sources: (1) the most frequent job modifications described by case managers and employers [8,22,39]; (2) the most frequent job modifications reported by workers with soft-tissue injuries [40]; (3) the job tasks that are of greatest concern to workers with LBP [31]; and (4) the most common job demands correlated with back disability duration [41]. For each item, respondents indicated their likelihood of supporting this type of job modification given the circumstances of the case vignette and based on their typical factors and constraints in the work setting. Responses were on a four-point Likert scale from "1" (very unlikely) to "4" (very likely). In cases where a particular job modification was irrelevant to a job or work setting, respondents could indicate this accommodation was "not an option for this job".

Job characteristics—Supervisors nominated a job position they supervised by providing a job title and brief description of responsibilities. From this information, we assigned a unique 8-digit code to the job position using the Occupational Informational Network (O*NET) system [42,43]. The O*NET is a U.S. system of standardized occupational job titles and descriptions created to provide a uniform language for job placement, vocational rehabilitation, research, and government benefit programs. It contains approximately 900 occupational classifications, with additional data on educational and training requirements and skills and job demands for each occupation that are based on collected information. From 30 available data elements, we chose six job demands that are known risk factors for LBP: (a) bending or twisting the body; (b) kneeling, crouching, stooping, or crawling; (c) sitting, (d) making repetitive motions, (e) standing, and (f) cramped workspace, awkward postures. The O*NET provides a single (mean) frequency value based on normative data for each occupation type, and these data were collected using a visual analog scale anchored by

"0" (never), "25" (once a year or more, but not every month), "50" (once a month or more but not every week), "75" (once a week or more but not every day), and "100" (every day).

Data Analysis

After examining response patterns to individual items, an Exploratory Factor Analysis (EFA) was conducted to assess the underlying factor structure of the scale and to establish a general typology of job accommodation practices. The EFA is useful to determine the number of first-order factors, the relative clustering of items and discrimination between factors, and which features are most prototypic of specific factors [44]. Principal axis extraction and Oblimin rotation methods were chosen because we assumed the factors would be moderately correlated. To address missing data, the EFA was first conducted with list-wise deletion (retaining only those with complete data) and then with mean substitution and regression imputation procedures to replace missing values. Replacing approximately 10% of missing values using these procedures takes full advantage of partial data and has been shown to have minimal impact on EFA factor loadings [45]. Reliability for the individual factors and total score were assessed using internal consistency (Cronbach's α).

To assess the validity of combining factor scores into a single latent construct reflecting supervisor support, structural equation modeling was used to calculate goodness-of-fit parameters when the parceled factor scores from the EFA were fit to a measurement model [46]. Goodness of fit indicators were the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the Root Mean Square Error of Approximation (RMSEA). For CFI and TLI, .95 or greater is interpreted as evidence of an appropriate model fit [47], while CFI and TLI between .90 – .95 is regarded as acceptable [48,49]. For interpreting RMSEA, the guideline is that < .05 indicates a good model fit, RMSEA between .05 and .08 indicates a reasonable model fit, and RMSEA >.10 indicates a poor model fit [50,51].

To assess criterion validity of the JAS, we compared JAS scores (both the arithmetic mean and measurement model value) for the job types being supervised on each of the six O*NET physical job descriptions. This was accomplished by grouping occupations by high and low demands (median split) and conducting independent samples t-tests of the total JAS score for each of the six job demands. We hypothesized that job accommodations would be less supportable for more physical jobs. JAS total scores were also compared by age, gender and years of supervisory experience and by industry type. An alpha level of .05 was set for each comparison.

RESULTS

Of the 3,077 supervisors who were invited to participate, 804 (26.1%) accessed the survey website and completed at least the first page of the survey (i.e., name of company and a job they supervised). Supervisors were 72.8% male, and the age range was from 19 to 69 (median = 47 years). Supervisors described their role as frontline supervision (69.4%), mid-level manager (28.2%), or executive (2.5%). Supervisors had from 0–45 years with the company (median = 12 years), and from 0–50 years doing supervisory work with any company (median = 12 years). Most (57.9%) had completed a college degree or trade school, and 25.4% reported some college or trade school. Half of supervisors (55.3%)

reported no labor union representation in their workforce, with 27.0% reporting all unionized workers, and 17.7% reporting partially unionized workplaces. The number of direct reports was “fewer than 5 workers” (15.2%), “6–10 workers” (15.4%), “10–20 workers” (24.4%), or “20 or more workers” (45.0%). Only 4.3% of supervisors reported <2 years of supervisory experience, and 5.5% reported <2 years with their present employer.

After nominating and describing a job under their supervision, 87 supervisors (10.8%) failed to read and respond to the case vignette that followed (essentially declining their participation). Thus, results for the Job Accommodation Scale (JAS) were available for 717 of the total survey respondents (89.2%). An analysis of completers and non-completers showed no statistically significant differences on the O*NET job context variables ($p > .05$); thus, there was no evidence of a selection bias, at least in terms of the physicality of jobs supervised. Of those supervisors who completed the JAS, 683 (95.3%) judged more than half of the JAS items as applicable to the job description they had nominated. Means and standard deviations for each of the JAS items are listed in Table 1. Most mean item scores were in the range from “3” (almost always) to “4” (often), suggesting a high level of support for job accommodations overall. There was no evidence of ceiling effects and the full range of possible responses from 1 to 4 were utilized on all 21 items. The accommodations applicable to the greatest number of jobs were avoiding the lifting of heavy objects (94.4%) and avoiding awkward postures (93.7%). The accommodations applicable to the least number of jobs were altering work surface height (76.3%) and moving to a different site or location (76.7%). When applicable, avoiding lifting heavy objects and avoiding awkward postures were judged the most feasible types of accommodation, and moving to a different site/location and changing work times were judged the least feasible options.

Construct validity and reliability of the scale

Supervisors who reported at least 50% of the JAS items as applicable (N = 682) were included in factor analysis and reliability results for the measure as a whole. The exploratory factor analysis (EFA) was conducted first among those for whom all JAS items were applicable (N = 338), then repeated for the larger sample (N = 682) by replacing missing values (1.3% left blank and 10.0% “not an option for this job”) using both mean substitution and regression imputation. Factor loadings, eigenvalues, and percentage of explained variance is shown in Table 2 for the sample of 338 surveys requiring no substitution of missing values. A five-factor solution for the job accommodation scale (*Modify physical workload, Modify work environment, Modify work schedule, Find alternate duties,* and *Arrange for assistance,* total 21 items) was obtained. The five factors accounted for 62% of the total variance. Internal consistency statistics (Cronbach’s α) of the scale was .85 (n =338). The values indicate reasonable scale reliability. When the exploratory factor analysis was repeated with the full dataset and substitution of missing values, there were no substantial differences in the number of factors or variance explained. Means, standard deviations, internal consistency statistics, and scale sub-factor inter-correlations are presented in Table 3.

The measurement model was computed first for participants without any missing values (n=338), then with all the participants by replacing missing values using regression

imputation (n=683). In order to justify parcelling of items within factors, the standardized root mean square residual (SRMR) of each of the five factors of the scale was examined, and none were above .10 (i.e., SRMR of factor 1 = .098, factor 2 = .060, factor 3 = .0003, factor 4 = .0003, and factor 5 = .0012). Using listwise deletion of missing values, the model fit indices for the measurement model indicated the five factors fit sufficiently within a single latent construct, and the results were similar when using regression imputation of missing values. Details of the analysis are summarized in Table 4 and shown in Figure 2. The single construct score for the JAS based on the measurement model results was highly correlated with a simple arithmetic mean of all endorsed items from the scale ($r = .98$, $N = 717$).

The total JAS score (both arithmetic mean and measurement model value) was then compared by supervisor and industry characteristics. When companies were divided into three groups representing heavy industry (e.g., manufacturing, warehousing, transportation; n = 390), health care (e.g., hospital workers, emergency medical technicians; n = 204), and light industry (e.g., education, research and development, high-tech manufacturing; n = 210), support for accommodation was lower in the heavy industry group than in the other two groups, $F(2,714) = 6.32$, $p = .002$ (Tukey post-hoc test). The total JAS score showed no significant correlation with age or years of supervision, but female supervisors ($M = 3.29$, $SD = 0.43$) were more likely to support accommodation than males ($M = 3.13$, $SD = 0.48$), $t(615) = 4.09$, $p < .05$. This association with gender remained statistically significant ($p < .05$) after controlling for the effects of industry type.

For the job positions nominated by supervisors, the mean frequency exposure ratings from the O*NET classification system were 37.36 ($SD = 19.12$) for bending or twisting the body, 22.70 ($SD = 13.99$) for kneeling, crouching, stooping, or crawling; 46.65 ($SD = 22.25$) for sitting, 49.74 ($SD = 16.24$) for making repetitive motions, 57.73 ($SD = 20.04$) for standing, and 28.46 ($SD = 19.12$) for cramped workspace, awkward postures. These mean values around 50 reflected an average frequency rating of approximately 1 to 3 times per month. Comparisons of total JAS scores for jobs with high or low physical demands (median split) (Table 5) showed that job accommodations were less feasible when jobs involved more bending, kneeling, sitting, repetitive motions, and cramped conditions ($p < .05$). Jobs that were high or low on standing showed no statistically significant differences in the feasibility of job accommodations overall ($p > .05$).

DISCUSSION

This study addresses the extent to which a 21-item standardized questionnaire (i.e., the Job Accommodation Scale [JAS]) might provide a useful, reliable, and valid measure to assess the feasibility and likelihood of support for job accommodations for back pain in different work settings. Overall, the results showed support for the psychometric properties of the JAS with factorial evidence of five general accommodation strategies, and the items were relevant across a variety of industries and occupations. Also, there was evidence for job accommodation support as a single unified construct. While more studies are needed to evaluate the validity of the JAS in different populations and settings, such a scale may provide an important measure of beliefs and circumstances affecting job accommodation efforts and workplace disability outcomes.

One goal of the study was to assess whether a typology of general accommodation constructs might be extracted and validated from the 21 items on the JAS checklist. The results of the exploratory factor analysis suggested job accommodation efforts within five general domains (modify physical workload, modify work environment, modify work schedule, find alternate work, and arrange for assistance). This result may provide a useful conceptual framework for generating and implementing job accommodations and for understanding barriers and facilitators in the workplace setting. In particular, the breadth of these five factors illustrates the importance of integrating social and work organization factors with ergonomic principles to produce feasible job modifications with workers and their supervisors. Physicians often offer discrete reductions in physical workloads (e.g., lifting no more than 20 pounds), but the literature suggests there are other avenues for modifying work around scheduling, co-worker assistance, environmental changes, and work style adjustments [18,23]. One method for reducing sickness absence and improving return-to-work outcomes is to encourage problem-solving interactions between workers and their supervisors to generate more possibilities for job modification in these domains.

A second goal of the study was to determine the reach of the new measure. Some items on the JAS were not applicable (not an option) for some job positions; nevertheless, supervisors responded to 88.6 percent of the checklist items overall. Based on this high number of valid responses, the JAS appears to be reasonably relevant across industries and occupations involving both high and low levels of physical job demands. Furthermore, the frequency of “not an option” responses showed no systematic variation between major industry groupings, so the relevance of specific items may have more to do with differences at the job level, not the industry level. Future studies might assess whether a separate list of accommodations might be needed for office workers or white-collar occupations, though the five general accommodation constructs seem to have face validity for this type of work as well.

One potential concern with the new measure was whether it would succeed in measuring a single attitudinal construct (“support for job accommodation”) that could be measured at the individual level and would transcend differences in occupational settings and usual job accommodation strategies. The goodness of fit parameters from the measurement model showed support for a single, overarching psychological construct. Also, differences in scores by industry and job demands showed statistically significant associations with the JAS, but these were relatively small group differences. Therefore, variance between supervisors may be just as relevant as differences between occupational settings, and support for accommodations is not simply a function of physical job requirements. Future studies should evaluate the extent to which supervisor traits and beliefs might affect their views on job accommodation.

Initial psychometric evaluation of the JAS showed evidence of good internal consistency, construct validity, and criterion validity. On four of the five O*NET physical job demand measures and in heavier industries, the hypothesized difficulties in providing job modifications were supported. Also, there were no significant differences in JAS total scores by supervisor age or supervisory experience. The small, but statistically significant difference between male and female supervisors may reflect a true effect of females being

more sympathetic about physical limitations (not just a measurement artifact), but more detailed studies are needed to understand these gender differences. While it was beyond the scope of this article to assess other factors that might impact the feasibility of job accommodations, possible factors include organizational policies and practices, supervisor and co-worker relationships, organizational climate with respect to safety and wellness, leadership styles, and productivity concerns. Measures such as the JAS may provide a quantitative basis for studying these relationships. With further use and evaluation, the JAS could also provide a diagnostic metric for evaluating job accommodation efforts within and between employers.

This pilot administration focused on supervisors and their beliefs about accommodating a worker with LBP, but it is conceivable that a larger measure of job accommodation type and frequency could be developed to cover a wider range of medical conditions. Such a measure might incorporate additional job accommodation strategies to address the non-musculoskeletal functional problems of workers with depression [52], workers surviving extensive cancer treatment [53,54], and those with stroke or heart attack [55,56]. Perhaps such a uniform measure would provide useful comparisons across a variety of disabling conditions and support a broader perspective on the issue of employer accommodation practices. Another dimension that could be integrated into a subsequent scale is the length of time that supervisors feel each job modification could be reasonably supported and sustained.

Limitations of the study are the convenience sampling method that was used, the focus on LBP only, and a potential self-selection bias among supervisors and employers who chose to participate. Also, the convenience sampling of collaborating employers may have inflated accommodation rates if this biased toward employers with more proactive return-to-work policies and supervisor training in absence management. The irrelevance of some JAS items for particular job types may pose practical challenges for use of the JAS, but the overall factor structure seemed to be consistent with or without missing items. Development of the JAS was based on the presumption that frontline supervisors have some level of autonomy and decision-making when it comes to job modification for their workers, and this is supported by the evidence that supervisor support for job modifications is a key factor in return-to-work outcomes [57–60]. In this study, only 7.0 % of supervisors indicated no decision-making freedom for altering job requirements. In some employment settings, decisions about job modification may be handled exclusively by a return-to-work coordinator or disability case manager, but even in those circumstances supervisors may still have some say in determining whether recommended job modifications are feasible to implement. Overall, our results suggest that supervisors do have measurable attitudes about the feasibility of job modifications, and this seems a reasonable target for intervention and training to prevent disability. A routine offer of job modification is consistently shown to improve return-to-work and work disability outcomes [6–8, 11–13].

Despite some methodological limitations, this initial evaluation found the 21-item JAS to be a reliable and valid measure for assessing the feasibility of job accommodations for LBP when administered to supervisors in a range of industries and occupations. Future studies should apply the JAS in different stakeholder groups and for different musculoskeletal

conditions. Using the JAS to compare the attitudes of workers, supervisors, personnel managers, and clinicians about the feasibility of job accommodations would be an interesting future application, and one that might help shape communications among stakeholders that could lead to agreeable conditions for resuming work activities.

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Appendix A

The Standard Case Vignette for Supervisors to Estimate Support for Job Accommodations.

Imagine a 38-year old worker (Robert) that you supervise, who is employed as a _____. This morning, Robert experienced a sudden onset of back pain while maneuvering some equipment in the workplace. You recommended that Robert see a doctor, who told him that his pain was due to a back sprain caused by overexertion. Before the physician can make a formal recommendation about Robert's return to work, he needs some advice from the company on what types of job modifications are typical for your work setting. Robert took the day off to rest and recover, but he will return to work tomorrow morning if it's possible to temporarily modify his job responsibilities to reduce discomfort. Robert has no prior sickness absence due to back pain.

You have been asked by the company to suggest possible job modifications that would allow Robert to return to modified duty, but the job modifications should be easy for you to arrange with no substantial reduction in your group's productivity or undue burden to other workers. Also, the job modifications should be changes that Robert would appreciate as helpful, without him feeling embarrassed or undervalued. You can presume that any job modifications would be in effect for at least 2 weeks.

On the following screen, you will be provided a list of possible job modifications to choose from. Based on the circumstances of this case, the typical practices in your organization, your usual supervisory demands, and the job requirements of this position, how likely is it that you would have recommended each of the following job modifications in Robert's case?

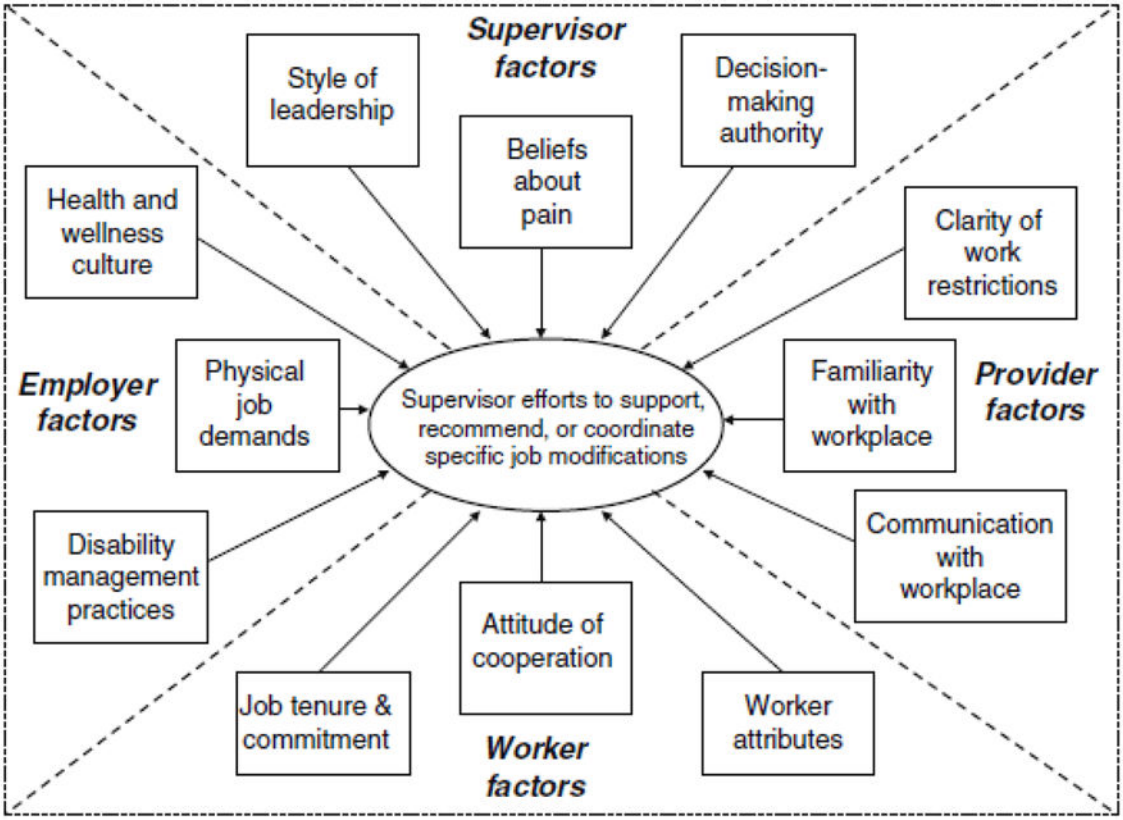

Figure 1.

A conceptual framework showing potential factors influencing supervisor support for job modifications (basis for the larger CIHR Grant MOP-102571).

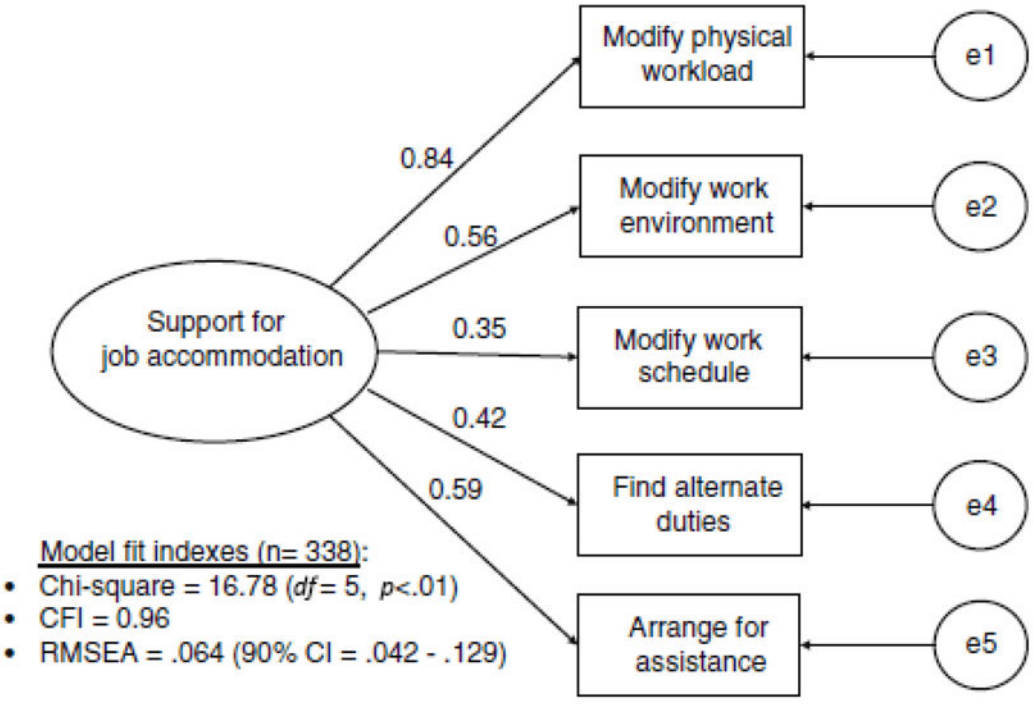

Figure 2.

Results of the measurement model testing the goodness of fit among JAS factors to explain a central hypothetical construct of support for job accommodations.

Table 1

Supervisor response patterns and means and standard deviations for the 21 items of the Job Accommodation Scale (N = 717)

		No. supervisors responding			Statistics	
No.	**Item description**	**Missing**	**Not applicable**	**Applicable**	***M***	***SD***
1	Arrange for others to help	1 (0.1%)	100 (13.9%)	616 (85.9%)	2.75	1.09
2	Shorten work days	2 (0.3%)	75 (10.5%)	640 (89.3%)	2.64	1.02
3	Change work time	2 (0.3%)	85 (11.9%)	630 (87.9%)	2.58	1.05
4	Arrange more breaks and rest periods	2 (0.3%)	56 (7.8%)	659 (91.9%)	2.98	0.93
5	Replace normal job tasks with easier things	5 (0.7%)	45 (6.3%)	667 (93.0%)	3.21	0.92
6	Reduce long periods of prolonged sitting	3 (0.4%)	47 (6.6%)	667 (93.0%)	3.24	0.88
7	Rotate between job tasks	4 (0.6%)	50 (7.0%)	663 (92.5%)	3.03	0.90
8	Move to a different site or location	10 (1.4%)	157 (21.9%)	550 (76.7%)	2.18	1.06
9	Use special equipment or tools to make work less painful	8 (1.1%)	125 (17.4%)	584 (81.5%)	2.87	1.00
10	Rearrange workplace to be more comfortable	11 (1.5%)	112 (15.6%)	594 (82.8%)	3.04	0.97
11	Alter height of work surface	11 (1.5%)	159 (22.2%)	547 (76.3%)	2.96	0.98
12	Avoid twisting or bending	12 (1.7%)	42 (5.9%)	663 (92.5%)	3.60	0.68
13	Limit pushing or pulling heavy objects	12 (1.7%)	37 (5.2%)	668 (93.2%)	3.76	0.52
14	Avoid prolonged periods of standing	11 (1.5%)	42 (5.9%)	664 (92.6%)	3.58	0.66
15	Avoid lifting of heavy objects	13 (1.8%)	23 (3.8%)	677 (94.4%)	3.86	0.46
16	Avoid awkward postures	16 (2.2%)	29 (4.0%)	672 (93.7%)	3.80	0.50
17	Find a more comfortable place to sit	15 (2.1%)	83 (11.6%)	619 (86.3%)	3.28	0.85
18	Find someone else to do heavy work	15 (2.1%)	60 (8.4%)	642 (89.5%)	3.55	0.77
19	Assign to another job temporarily	15 (2.1%)	69 (9.6%)	633 (88.3%)	2.82	1.02
20	Avoid work with objects at floor level	15 (2.1%)	65 (9.1%)	637 (88.8%)	3.52	0.75
21	Ask co-workers to assist as needed	18 (2.5%)	47 (6.6%)	652 (90.9%)	3.37	0.87

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Table 2

Exploratory factor analysis (EFA) results for the Job Accommodation Scale (N = 338).

	Factor				
Factor 1: Modify physical workload (F1)	F1	F2	F3	F4	F5
Avoid lifting of heavy objects	.86				
Avoid awkward postures	.82				
Limit pushing or pulling of heavy objects	.80				
Avoid prolonged periods of standing	.66				
Avoid twisting or bending	.57				
Avoid working with objects at floor level	.37				
Factor 2: Modify work environment (F2)	F1	F2	F3	F4	F5
Rearrange workplace to be more comfortable		.85			
Alter height of work surface		.78			
Use special equipment or tools to make less painful		.54			
Find a more comfortable place to sit		.44			
Rotate between job tasks		.39			
Reduce long periods of prolonged sitting		.32			
Factor 3: Modify work schedule (F3)	F1	F2	F3	F4	F5
Change work time			.86		
Shorten work days			.78		
Arrange more breaks and rest periods			.47		
Factor 4: Find alternate duties (F4)	F1	F2	F3	F4	F5
Assign to another job temporarily				.54	
Replace normal job tasks with easier things				.50	
Move to a different site or location				.43	
Factor 5: Arrange for assistance (F5)	F1	F2	F3	F4	F5
Ask co-workers to assist as needed					.71

	Factor				
Arrange for others to help					.49
Find someone else to do the heavy work	.40				.48
Eigenvalues	6.20	2.24	1.82	1.49	1.19
Percentage variance	29.50	10.66	8.65	7.08	5.69
Cumulative variance	29.50	40.16	48.81	55.89	61.58

Note. Extraction method: Principal Axis Factoring. Rotation method: Oblimin.

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Table 3

Descriptive statistics and internal consistency of the job accommodation scale with factor inter-correlations (N = 682).

	mean (SD)	α	F1	F2	F3	F4	F5
1. Factor 1: Modify physical workload (F1)	3.67 (0.49)	.85	1.00	0.36	0.25	0.30	0.34
2. Factor 2: Modify work environment (F2)	3.06 (0.67)	.78		1.00	0.24	0.27	−0.02
3. Factor 3: Modify work schedule (F3)	2.72 (0.84)	.72			1.00	.205	0.10
4. Factor 4: Find alternate duties (F4)	2.76 (0.79)	.53				1.00	0.18
5. Factor 5: Arrange for assistance (F5)	3.19 (0.78)	.67					1.00
Total score		.85	0.75	0.74	0.61	0.55	0.60

Table 4

Measurement model results (goodness-of-fit) for parcelled factor scores to represent a single latent construct.

EFA models	Fit Indexes			
	X^2 (*df*)	CFI	TLI	RMSEA (90% CI)
Model 1: Five-Factor (n=338)	16,783 (5)	.96	.91	.084 (.042–.129)
Model 2: Five-Factor (n=683)	16,904 (5)	.97	.91	.059 (.030–.091)

Note. Model 1: analysis was conducted with participants without any missing values on the scale (n=338); Model 2: missing values were replaced by means using regression imputation (n=683)

Table 5

Comparison of total Job Accommodation Scale (JAS) scores by O*NET job demands.

	Total JAS score (arithmetic mean)					Total JAS score (measurement model)				
O*NET job demands	***N***	***M***	***SD***	***t***	***p***	***N***	***M***	***SD***	***t***	***p***
Bending										
Low	335	3.23	0.44			313	3.23	0.43		
High	353	3.09	0.51	3.68	<.001	317	3.14	0.45	2.71	.007
Kneeling										
Low	311	3.22	0.43			287	3.23	0.41		
High	377	3.11	0.52	2.88	.004	343	3.15	0.47	2.11	.035
Sitting										
Low	330	3.12	0.50			301	3.16	0.46		
High	358	3.19	0.46	1.99	.047	329	3.21	0.43	1.31	.190
Repetitive										
Low	320	3.21	0.47			299	3.22	0.46		
High	368	3.12	0.49	2.50	.013	331	3.15	0.43	1.98	.048
Standing										
Low	338	3.18	0.48			312	3.20	0.45		
High	350	3.13	0.48	1.27	.206	318	3.17	0.44	0.69	.493
Cramped										
Low	341	3.21	0.45			310	3.24	0.41		
High	347	3.11	0.50	2.85	.004	320	3.14	0.47	2.73	.006

Note: t statistics are for Independent Samples t-tests.