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# Assessing the factorial structure and internal consistency of the mental fitness and resiliency inventory (MFRI)

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Received 12 July 2019
Revised 24 September 2019
16 November 2019
Accepted 6 January 2020

## Abstract

**Purpose** – This paper explores the use of the mental fitness and resiliency inventory (MFRI) as a tool for the management of workplace health and well-being. The MFRI provides information on the extent to which positive workplace practices are experienced within three mental fitness domains and five resiliency domains. The purpose of this study was to investigate the factorial structure and internal consistency of the MFRI.

**Design/methodology/approach** – The MFRI was administered to 1,519 employees in multiple workplace environments in Canada. The factorial structure of the MFRI was examined to conduct confirmatory factor analysis (CFA). In addition to the CFA indexes, the internal consistency of each latent construct was calculated, with results reported using Cronbach's coefficient alpha.

**Findings** – The reliability of the MFRI is very high (alpha = 0.973). The fit indexes from the CFA indicate that the model is permissible. The MFRI can be used with confidence to highlight mental fitness and resiliency strengths, as well as areas needing further development in workplace environments.

**Research limitation/implications** – Limitations may include the selection of fit indexes upon which to base judgment as to whether the model is satisfactory. Although the MFRI model has been confirmed based on the data from the study sample, there is not yet sufficient data to conclude that the model is a true predictive model. Current and ongoing research will enable elaboration on this matter. In addition, formal documented observations regarding the MFRI's face validity and ease of explanation and understanding of the results may confirm *a priori* expectations on the part of the users and may strengthen the conclusions from this study.

**Practical implications** – Implications for workplaces arising from the validation of the MFRI include a growth in capacity to measure the existence of positive psychology practices within organizational environments and to identify and address areas for needed growth and development. By assessing the prevalence of mental fitness and resiliency practices in workplace environments, reports can be produced that indicate various levels of development and integration of these practices. The application of the MFRI facilitates the use of evidence-informed decision-making in addressing organizational goals related to positive workplace cultures. **Originality/value** – The MFRI is a new, validated instrument that measures the presence of positive practices that contribute to healthy and effective workplace cultures. The results of the MFRI provide workplace health managers with a profile of organizational strengths (practices that are embedded and comprehensive) and areas for development (practices requiring promotion and capacity building) related to mental fitness and resiliency.

**Keywords** Mental health, Assessment, Workplace health management, Psychological well-being, Resiliency, Mental fitness

**Paper type** Research paper

International Journal of Workplace Health Management
© Emerald Publishing Limited
1753-8351
DOI 10.1108/IJWHM-07-2019-0100

## 1. Introduction

Efforts to improve employee mental fitness and resiliency in workplace environments are becoming increasingly prevalent. The mental fitness and resiliency inventory (MFRI) was developed to assess these two domains, providing workplace environments with quantitative results on their strengths across three mental fitness and five resiliency subdomains.

Mental fitness is a state of psychological well-being derived from one's thoughts and emotions and is based on our needs for relatedness, competency and autonomy-support. Deci and Ryan (2007) assert that interactions with others will either impede or facilitate the fulfillment of these core psychological needs. When these needs are met within individuals, people experience greater motivation and self-determination in pursuing positive change.

When these needs are met within relationships in the environment, workplaces become settings in which psychological wellness and positive team interactions are fostered.

Resiliency is the ability to persist in the face of adversity and "bounce back" when challenges are encountered. Resiliency comes from a combination of positive attributes developed through families, education, social and cultural connections, as well as through workplace experiences. Resiliency assets may reflect both individual and organizational strengths that facilitate empowerment, positive coping, healthy transitions and learning.

The MFRI was developed and reviewed by content and assessment experts. Preliminary data were analyzed using principal components analysis (PCA) which led to further refinement of the MFRI, resulting in the inclusion of 32 workplace practices to which respondents indicate prevalence in their workplace using a five-point Likert scale. The MFRI was initially administered to 1,519 employees in multiple work environments in Canada. The MFRI's reliability structure and factor structure were obtained using CFA. Since its validation, the MFRI has been administered to over 20,000 individuals within Canadian industry, government and educational sectors (Morrison *et al.*, 2018a, 2018b; Peterson and Morrison, 2018).

Reports provide information on the extent to which positive workplace practices are experienced within three mental fitness domains and five resiliency domains. Each scale has been validated for its reliability and validity. Example item types included in the MFRI (with rating scales that describe their prevalence) include:

(1) My workplace is characterized by respectful interactions.

(2) My workplace is open to employees' questions and concerns about their work.

(3) My workplace recognizes the strengths of employees.

(4) People know what is expected of them in their workplace.

(5) People have opportunities to learn new things in their workplace.

(6) People have others who care about them in their workplace.

The purpose of this study was to investigate the factorial structure and internal consistency of the MFRI.

## 2. A review of literature

Current research underscores the importance of creating workplace cultures that foster the psychological health and wellness of employees within their team and work environments. Healthy workplaces support well-being and are psychologically safe environments, providing a foundation for effective team functioning. Organizations can be proactive by taking targeted actions to safeguard the well-being of employees and by ensuring the creation of positive and healthy workplace cultures (Seppeala and Cameron, 2015).

Understanding the vital role that workplace culture plays in creating psychologically healthy workplaces is essential for mitigating or decreasing the escalation of mental health

concerns and for ensuring and enriching employment experiences for those with an existing mental health condition (Coduti *et al.*, 2016).

Creating conditions for positive workplace cultures is a frontline tool for combatting rising rates of attrition and employee turnover (Davis, 2016).

Research in the area of workplace well-being supports the assertion that positive workplace cultures go beyond traditional problem-focused approaches and the mitigation of employee mental health concerns, to focus on the creation of cultures of engagement, well-being and performance. Within such cultures, employees adopt a shared vision of their workplace as an efficient and productive environment, and managers are able to understand the elements of engagement and productivity and foster them within their own organizations (Akin and Hopelain, 1986). In order to develop and foster a productive workplace culture, organizations and their leaders understand the key elements that must be present to cultivate the desired cultural outcomes.

Stevenson (2009) describes environments that are conducive to a workplace culture of productivity:

> "When people know where they are going and have been involved in planning how to get there, and when good and open communication provides feedback and reinforcement on their activities, motivation increases, and productivity improves. It tells us that solutions to the productivity problem are in leadership, employee engagement, staff development and an understanding that staff are motivated by different things" (p. 14).

### *2.1 Key environmental conditions*

Research in positive psychology has identified three environmental conditions that are essential for building healthy and effective workplace environments that contribute to employee well-being, engagement and thriving (Deci and Ryan, 2012). The first condition involves the development of a sense of relatedness or connectedness among employees. This workplace characteristic is created when employees feel welcome and included and people practice greeting and acknowledging one another on a daily basis. Interactions among employees include friendly exchanges that contribute to a sense of knowing others and being known. As people gain a sense of positive connectedness, they also become sensitive to each other when stressors are experienced. Connected employees practice checking in with one another and provide mutual support when additional assistance may be needed to carry out or complete work-related tasks (Peterson and Morrison, 2017a).

A second core condition is the development of a sense of competency among employees. The creation of this workplace characteristic involves recognizing and valuing the strengths, skills and potential of all members of the team. Ideally, shared work goals provide opportunities for employees to be engaged in using their strengths and skills and to recognize how their skills complement the strengths of other team members, maximizing the collective effectiveness and performance of the full team. In contrast to the existence of workplace gossip or conversations that are destructive to team relationships, developing a sense of competency in the workplace is supported by expressions of appreciation and gratitude among employees and managers for the strengths and contributions that all members bring to the team (Peterson and Morrison, 2017a).

A third condition that is critical to building healthy and effective workplaces is autonomy support. In contrast to overcontrolling environments, this workplace characteristic is evident when people's voice, perspectives and ideas are heard and valued in workplace routines and interactions. Practices that promote autonomy support include seeking others' perspectives instead of just giving advice, finding opportunities to collaborate with colleagues or peers on work projects and inviting team members to collectively build solutions or strategies for addressing emerging or existing challenges or goals. Developing autonomy-supportive workplace environments counteracts behaviours that bully or marginalize others and creates

psychologically-safe work spaces for all employees. The creation of autonomy-supportive workplace environments depends largely on the development of trust among employees and leaders. Building a sense of relatedness and competency within workplace teams is foundational to the growth of trust and often precedes the development of autonomy-supportive practices (Peterson and Morrison, 2017b).

Karasek's Job Demand Control Model (1979) provides a complementary perspective related to the power of autonomy-supportive workplace environments. In an evaluation of the interplay of stress factors and health promotion, Karasek posited that employee stress and strain can be mediated by decision latitude, which is determined by the level of autonomy support (or capacity for decision-making within workplace demands). Karasek's model suggests that when workplace demands are relatively greater than decision latitude, employees are more apt to experience mental strain. According to Karasek, "Strain equals the excess of demands over decision latitude" (p. 288).

Healthy and effective workplace cultures involve being intentional about creating environmental conditions that foster relatedness, competency and autonomy support within team relationships and routines. Targeted training for teams and managers on relationship practices that promote these conditions may be an important initial step in optimizing the workplace culture.

### *2.2 Positive mental health*

The Public Health Agency of Canada (PHAC) describes positive mental health as "*the capacity of each and all of us to feel, think, and act in ways that enhance our ability to enjoy life and deal with the challenges we face. It is a positive sense of emotional and spiritual well-being that respects the importance of culture, equity, social justice, interconnections and personal dignity*" (PHAC, 2006, p. 2). PHAC highlights the following five key components involved in the achievement of positive mental health:

(1) Ability to enjoy life.

(2) Capacity to work through challenges.

(3) Emotional well-being.

(4) Spiritual well-being.

(5) Equity, respect for cultures and dignity within social environments.

Workplaces have an important role to play in creating environments that foster individuals' capacity to flourish, thrive and experience hope, even in the face of challenging situations. Components of well-being in people and their environments may include positive emotions, life satisfaction, sense of purpose in life, positive psychological coping and adaptation, social emotional competencies and positive relationships and attitudes.

*Dual pathway to enhance mental health.* The shift toward a "dual pathway" approach to enhance mental health involves the recognition that psychological well-being is not only influenced by the presence or absence of problems and mental health concerns but also is impacted by individual strengths that contribute to well-being (Morrison, 2018). Within a dual pathway model for enhancing mental health, one pathway has a focus on addressing areas of mental health concern, and the other focuses on promoting environmental factors or practices that contribute to an enhanced sense of well-being and functioning. The term positive mental health has been used to describe this second pathway.

### *2.3 Conceptualizing a positive workplace framework*

When positive mental health needs are met within workplace environments, people are more likely to be engaged, to be motivated to initiate and embrace personal life changes and to

perform at their best in individual and team activities. In contrast, the absence of positive mental health practices can potentially contribute to increased employee stress related to feelings of isolation, lack of recognition, perceptions of limited choice or self-doubt, diminished trust in relationships and even unsupportive interactions among colleagues. Such stresses can lead to a loss in focus and productivity, as well as increased absenteeism, and can contribute over time to increased conflict and more intensified social and emotional concerns.

The positive workplace framework (PWF) (Peterson and Morrison, 2016) was designed to build organizational capacity for promoting and embedding evidence-based positive workplace practices over the long term. The PWF equips leaders and management with the skills and resources for applying, modelling and training others in positive workplace practices. The use of validated PWF measures are undertaken to provide a baseline profile of workplace environments, to focus on strategic planning activities and to monitor progress related to embedding mental fitness and resiliency in the workplace.

### *2.4 Evaluating organizational well-being*

The MFRI measures the presence of positive practices that contribute to healthy and effective workplace culture. The results of the MFRI provide a profile of organizational strengths (those practices that are embedded and comprehensive) and areas for development (those practices requiring promotion and capacity building) related to mental fitness and resiliency. Reports are accompanied by a menu of over one hundred strategies that can be tailored to specific workplace teams based on their respective results.

Measuring practices in terms of stages of change/progression over time provides a snapshot of evolving processes within positive workplace initiatives (Coghlan *et al.*, 2003). Changing environments involves planning and monitoring that is attuned to the population affected (Kellogg, 2004; Rogers, 2008). Theories of change must be addressed in ways that build capacity within the population, thus preparing them for the change process and for sustaining positive change over time (Morrison and Peterson, 2015). The theory of change of Prochaska and Diclemente can be easily adapted to various contexts, providing a relevant framework for evaluating progress throughout the implementation phases of an organizational initiative.

Shahzad *et al.* (2012) highlight the need for instruments to measure and evaluate the impact of change on employees as organizations embrace positive psychology principles and seek to enact positive change. Research conducted in the Canadian workplace context has provided clarity as to the costs that are incurred through low levels of workplace mental health or mental fitness (Rogers, 2008). Pertinent statistics referenced in the 2006 report include the following:

AQ: 5

(1) 75 percent of short-term disability claims and 79 percent of long-term disability claims are related to mental illness.

(2) Corresponding drug treatments cost Canadian companies over $1.1 billion annually.

(3) Presenteeism related to mental illness on the job accounts for over $8 billion annually in Canada.

(4) Canadian workers reported that 51 percent of their total stress was derived from activities at work (the remaining 49 percent being financial problems, family, health and relationships).

An updated study was undertaken in 2010 to fill a gap in pan-Canadian information about the number of people living with mental health problems and illness and the associated costs (CMHA, 2011). Key statistics related to the workplace include the following:

(1) The economic cost to Canada related to mental health problems and illnesses is $50 billion annually, or 2.8 percent of the 2011 GDP.

(2) Over the next 30 years, the total cost to the economy will add up to more than $2.5 trillion.

(3) People in their early and prime working years are among the hardest hit by mental health problems and illnesses.

(4) About 21.4 percent of the working population in Canada currently experience mental health problems and illnesses which can affect their productivity significantly.

Although data are readily available regarding the economic costs related to mental health concerns in the workplace, there are few measures that address the effectiveness of workplace mental health programs (Avey *et al.*, 2011). There are apparent gaps in the literature that could be reduced by the development of case studies that take place over multiple reporting periods using validated instruments. Within organizations, multiple periods could be segregated using intervention techniques and programs, and corresponding changes in baseline data could be analyzed.

The development of specific measurement and reporting tools for workplace mental health strategies should draw upon frameworks and promising practices for measurement and reporting. Specifically, there is a need for the development of inventories that focus on resiliency, engagement, relatedness, autonomy, competency and self-efficacy.

## 3. Development of the mental fitness and resiliency inventory

### *3.1 Description of the MFRI and its theoretical model*

The MFRI is a confidential questionnaire that takes approximately eight minutes to complete via a secure online survey link. Expert review to ensure the MFRI's content validity, in addition to preliminary exploratory factor analyses during its development phase, led to the retaining of 32 items that measure the extent to which practices related to mental fitness and resiliency are found in workplaces. Each item describes a clear and easily understood practice or behavior that may or may not be present in workplaces. Respondents indicate the extent to which they believe each of the individual 32 mental fitness and resiliency practices to be present in their workplace on a five-point scale, ranging from "least like my workplace" to "most like my workplace". Items that measure mental fitness are clear, descriptive statements expressed in the form of "People. . ." where the rest of each statement is an observable and measurable behavior common to positive workplace environments, for example, people have opportunities to share their perspectives in meetings. Resiliency items are clear statements expressed as "My workplace. . ." where the rest of each statement is an observable and measurable behavior common to positive workplace environments, for example, the workplace communicates upcoming changes to employees.

In previous unpublished work during the MFRI's development phase, exploratory factor analysis (EFA) with a promax rotation was applied to show that 62.8 percent of the total variance is explained by three factors. Promax rotation was used instead of the more common varimax rotation as the theory on which the items were created suggests that these should be correlated (Gorsuch, 1983). The number of factors was determined by following the Kaiser–Guttman rule (Guttman, 1954; Kaiser, 1960) which states that the number of factors in a questionnaire equals the number of factors with eigenvalues greater than 1.0. The scree plot (Cattell, 1966) from the EFA was interpreted to ensure that all factors that explained a high

percentage of the variance were included. EFA results led to the conclusion that the MFRI has three factors best described as well-being, mental fitness and resiliency. Theoretically, the well-being domain comprises two separate constructs including mental fitness and resiliency.

There are three subdomains for mental fitness including relatedness needs, competency needs and autonomy support needs and there are five subdomains for resiliency including relationship assets, professional assets, attitudinal assets, emotional intelligence assets and adaptation assets. To clarify the terminology in this report, the eight subdomains are referred to as first- order factors, the two domains including mental fitness and resiliency as second-order factors and well-being as the third-order factor. Each of the eight first-order factors contains four items or observed variables. Thus, mental fitness is measured by combining the 12 items in its three first-order factors, and resiliency is measured by
F1 combining the 20 items in its five first-order factors (see Figure 1). These factors are viewed as critical in promoting well-being, engagement and productivity in a workplace setting.

*3.2 Methods*

AQ: 6 Examination of the CFA on the MFRI data set was undertaken due to the conceptual assumption regarding its structure. Thus, the factorial structure of the MFRI was examined using Mplus 6 software (2010) to conduct CFA with the robust maximum likelihood (MLR) estimator. The relationship between the 12 mental fitness items and the three first-order factors was investigated and the relationship between the first-order factors and the second-order factor, i.e. mental fitness was also investigated. The approach was repeated for the twenty resiliency items and the five first-order factors and the first-order factors and the second order factor, i.e. resiliency. Finally, all 32 items were investigated together to examine the factorial structure of the complete MFRI.

*3.2.1 Study participants and sample size.* The MFRI data used in this study were provided by 1,519 participants from workplace environments that included four provincial government departments (covering 17 different directorates or branches), two federal government branches in the same department and a municipal government office. Obtaining data from 20 different workplaces ensured sufficient response variability. Because the purpose of the study was to assess the factorial structure and internal consistency of the MFRI rather than to compare results from each workplace with those obtained elsewhere or to a known standard, no attempt to ensure representativeness across the region was necessary. The sample size to item ratio was 47.5:1, which easily surpasses the 20:1 ratio recommended by Bollen (1989). The generally agreed-upon ratio of 10 participants for every free parameter in the CFA (Schreiber *et al.*, 2006) is also surpassed as we obtained a ratio of 14.2:1 for the complete MFRI model. The participant: parameter ratio for the CFA with the mental fitness construct was 37.7:1, with the resiliency construct being 22.9:1. There were no missing data because the online questionnaire ensures that all questions are answered before submitting the completed response. Response rates were very high based on analysis from the leaders in each workplace. Although this last fact should not impact the CFA results, it increases the confidence in the quality of the data collected for the study.

*3.2.2 Suitability of the data for CFA.* Suitability for factor analysis of the data set was ensured by calculating the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and verifying if Bartlett's test of sphericity (Bartlett, 1937) was significant. The KMO is a statistic that indicates the proportion of variance that might be caused by underlying factors. Values close to 1.0 generally indicate that factor analysis may be useful (IBM, 2017). Bartlett's test of sphericity tests the hypothesis that the correlation matrix is an identity matrix, which would indicate that variables are unrelated and therefore unsuitable for structure detection. Small values (less than 0.05) of the significance level indicate that a factor analysis may be useful (IBM, 2017). The KMO value for the MFRI data set was 0.984, which is in the "marvelous"

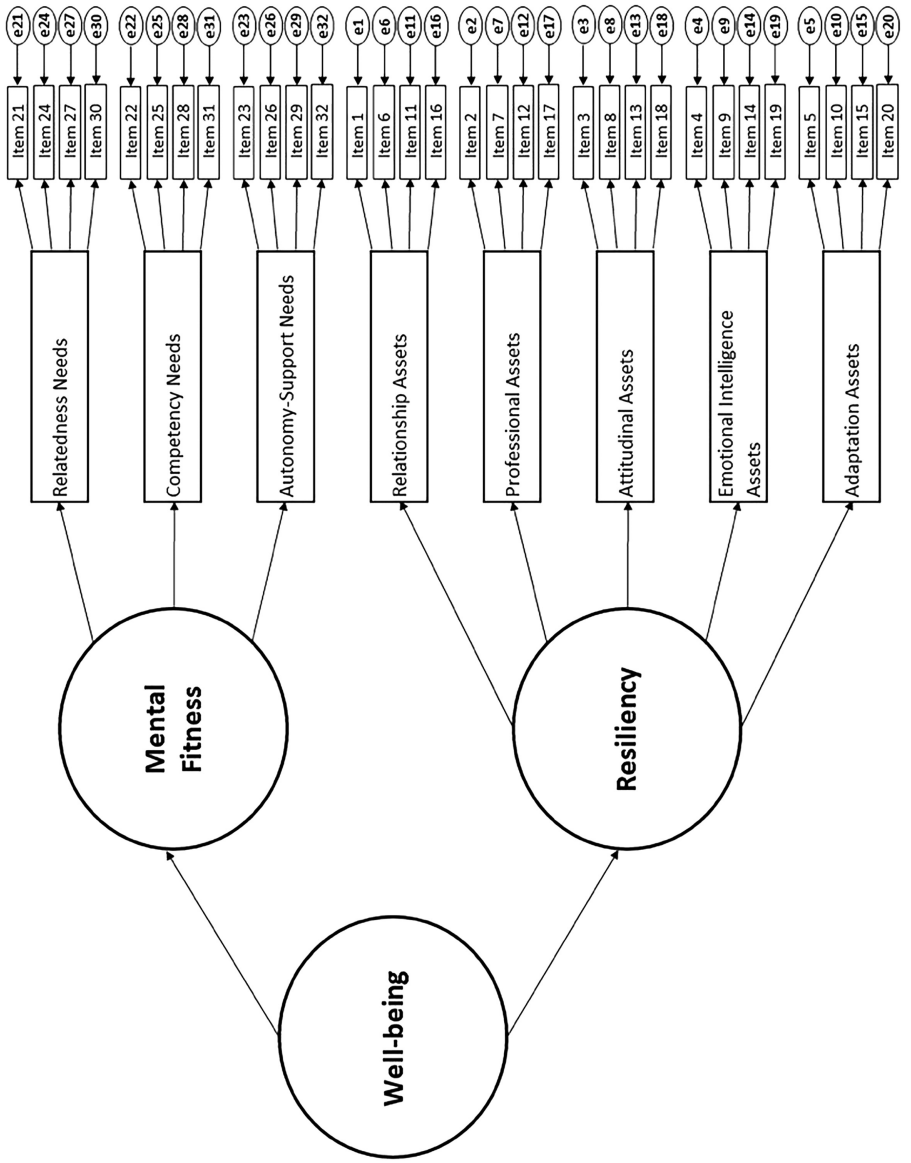


**Figure 1.**
MFRI theoretical model

range identified by Kaiser (1974). Bartlett's test of sphericity showed that the results were significant.

Kolmogorov–Smirnoff and Shapiro–Wilk tests were run to ensure that the data were normally distributed, a necessary condition for performing CFA. Both tests indicated that the data were normally distributed. In addition, the mean of the errors was zero, indicating that the variance of the data does not represent a source of bias. Based on these results, it was concluded that the data were suitable for pursuing factor analysis techniques.

*3.2.3 Assessing model fit.* When evaluating model fit based on CFA results, it is recommended to use multiple measures to better capture an overall model fit (Hoyle and Panter, 1995). Schreiber *et al.* (2006) (p. 327) state that: "if the vast majority of the CFA indexes indicate a good fit, then there is probably a good fit". Although this statement may seem obvious, it supports the recommendation by Hoyle and Panter (1995) that the determination of the goodness of fit for a model should not be based on a single index.

In a one-time analysis study such as the MFRI assessment, Schreiber *et al.* (2006) state that reporting the root mean square error of approximation (RMSEA), CLI and TLI indexes is sufficient, an approach used by McIntosh (2008). However, to provide a broader perspective for the interpretation of the various fit indexes, we also reported the $\chi^2$ statistic and the SRMR index. Despite well-known issues with the $\chi^2$ statistic as a measure of model fit due to its sensitivity to sample size (Brown, 2006; Browne and Cudek, 1993; Hooper *et al.*, 2008; Hu and Bentler, 1999; Kaplan, 1990; McDonald and Marsh, 1990, and Newsom, 2018) and due to the fact that it is rarely used in applied research as the sole index of model fit (Brown, 2006), the measure was included because it serves as the basis for many other fit indexes. Hayduk *et al.* (2007) and Kline (2005) consider it essential to report the $\chi^2$ statistic along with its degrees of freedom and associated $p$ values. The $\chi^2$ statistic can also be used to show that the sample size is sufficiently large for the purposes of the study.

The RMSEA indicates how well the model fits the population covariance matrix (Steiger and Lind, 1980) and is considered "one of the most informative fit indexes" (Diamantopoulos and Siguaw, 2000). An RMSEA value of zero indicates a perfect fit and although this index has no theoretical upper limit, it is rare to see values above 1.0 (Brown, 2006). The interpretation of the RMSEA cutoff value has fluctuated and has generally become more stringent in the last two decades. RMSEA values below 0.06 (Hu and Bentler, 1999) with a definite upper limit of 0.07 (Steiger, 2007) are currently generally accepted to indicate that the model is acceptable. However, although these cutoff points for RMSEA are generally accepted, some researchers consider cutoff values with an upper limit of 0.08 (MacCallum *et al.*, 1996) and even as high 1.0 (McIntosh, 2008) to represent a model with adequate fit.

The SRMR or standardized root mean square residual indicates the average discrepancy between the hypothesized and sample covariance matrices. Values below 0.05 for SRMR indicate that the model is acceptable. The RMSEA and SRMR fit indexes are classified as absolute fit indexes for which lower values represent better fitting models.

The other two fit indexes reported here, the CFI and the Tucker–Lewis index (TLI) are classified as comparative fit indexes. Although the TLI can be classified in more than one category (Brown, 2006), it is usually considered a CFI. The CFI values result from the comparison of the hypothesized model and the independence model. CFI values range from 0 to 1 with values closer to 1.0 representing better fitting models. The TLI values indicate the relative amount of variance and covariance explained by the hypothesized model (Byrne, 2001) and range from 0 to 1. Similar to the CFI, values for the TLI closer to 1.0 represent better fitting models. For several years, a cutoff value of 0.90 was generally accepted as being sufficient to indicate a good model fit; however, Hu and Bentler (1999) suggest that values above 0.95 for the CFI and TLI are necessary to consider the model as being a good fit.

In addition to the CFA indexes, the internal consistency (or how well the items in the same scale "hang together") of each latent construct was calculated, with results reported using

Cronbach's coefficient alpha. Values greater than 0.60 are considered acceptable for newly developed instruments (Kline, 2000).

*3.3 Results*

Table I presents the fit indexes for the three models that were tested including mental fitness, resiliency and well-being. This is consistent with the theoretical model presented earlier in Figure 1. The values for $\chi^2$, degrees of freedom and number of parameters shown in Table I reflect the complexity of each model based on their respective number of items. Also shown is the number of parameters in each model, two absolute fit indexes (RMSEA and SRMR) and two confirmatory fit indexes (CFI and TLI).

The $\chi^2$ results were all significant, which was not surprising given the study sample size because this statistic usually rejects the model when large samples are used (Bentler and Bonnet, 1980; Jöreskog and Sörbom, 1993; Kaplan, 1990). The complete thirty-two item model (well- being) had the higher values for the degrees of freedom and number of parameters, while the model with the least number of items (mental fitness) had the lower values. Results for RMSEA, SRMR, CLI and TLI show that all three models are acceptable. The estimates for the mental fitness model are presented in Figure 2.

The estimates between the items and the first-order factor ranged from 0.651 (item 31 – competency needs) to 0.851 (item 23 – autonomy support). The measurement errors ranged from 0.010 (item 24) to 0.018 (item 31). The estimates between the first-order factor and the second order factor ranged from 0.905 to 0.996. The small number one above the relatedness needs factor and the competency needs factor indicates that this value was assigned as the initial estimate to these predictors in the CFA model. The estimates for the resiliency model are presented in Figure 3.

The estimates between the items and the first-order factor ranged from 0.635 (item 1 – relationship assets) to 0.890 (item 16 – relationship assets). The measurement errors ranged from 0.008 (item 14 and item 16) to 0.019 (item 1). The estimates between the first-order factor and the second order factor ranged from 0.891 for attitudinal assets to 0.985 for professional assets. The small number 1 above the attitudinal assets factor and the emotional intelligence assets factor indicate that this value was assigned as the initial estimate to these predictors in the CFA model.

The estimates for the full Well-being model are presented in Figure 4.

The estimates between the items and the first-order factors ranged from 0.629 (item 1 – relationship assets) to 0.892 (item 16 – relationship assets). The estimates between the first- order factors and second-order factors ranged from 0.883 (autonomy support – mental fitness) to 0.997 (emotional intelligence – resilience). The estimates between the second-order factors and the third-order factor were 0.981 (mental fitness) and 0.986 (resiliency). The measurement errors ranged from 0.008 (item 14 and item 16) to 0.019 (item #1). The small number 1 above the relatedness needs factor, the competency needs factor, the attitudinal assets factor and the emotional intelligence assets factor indicates that this value was assigned as the initial estimate to these predictors in the CFA model.

| | df | χ2 | Parameters | RMSEA (90% CI) | CFI | TLI | SRMR |
|---|---|---|---|---|---|---|---|
| Mental fitness model | 49 | 394.685* | 41 | 0.068 (0.062–0.074) | 0.957 | 0.943 | 0.029 |
| Resiliency model | 164 | 1290.148* | 66 | 0.067 (0.064–0.071) | 0.938 | 0.928 | 0.032 |
| MFRI (well-being) model | 454 | 2878.486* | 106 | 0.059 (0.057–0.061) | 0.919 | 0.911 | 0.035 |

**Table I.** Fit indexes for CFA of MFRI scores

**Notes:** $N$ = 1519. df = degrees of freedom; $\chi 2$ = chi-square; RMSEA = residual root mean square approximation; CI = confidence interval; CFI = comparative fit index; TLI = Tucker-Lewis index; SRMR = standardized root mean square residual. * $p < 0.001$

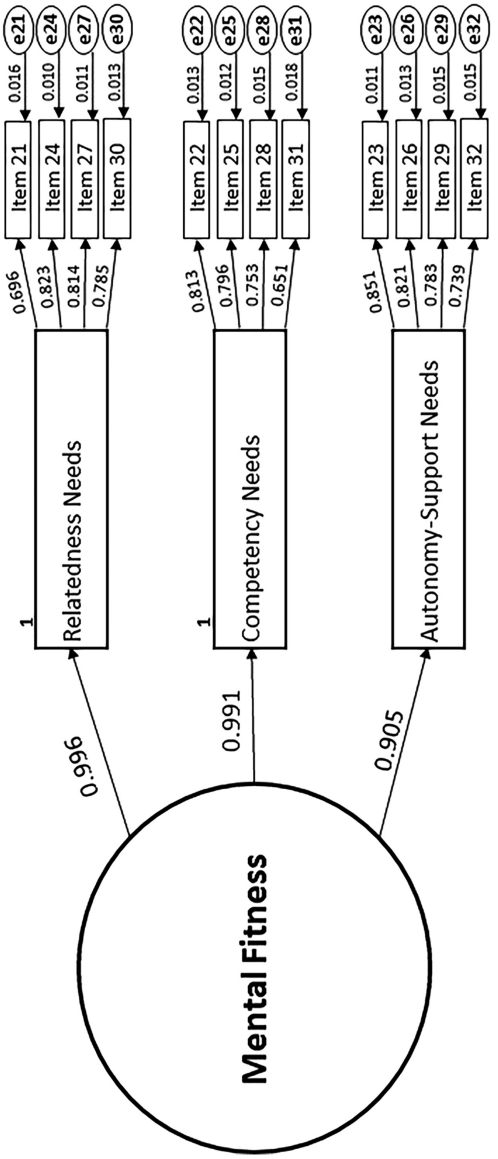


**Figure 2.**
Mental fitness model estimates

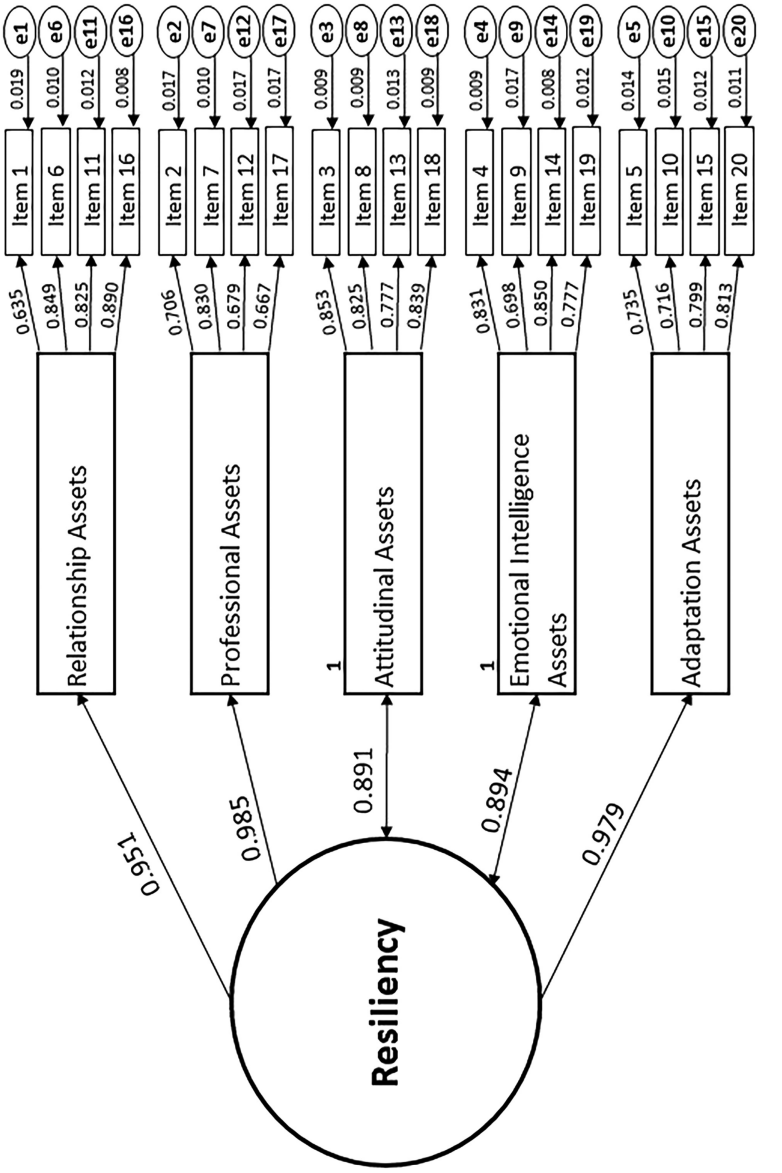


**Figure 3.**
Resiliency model estimates

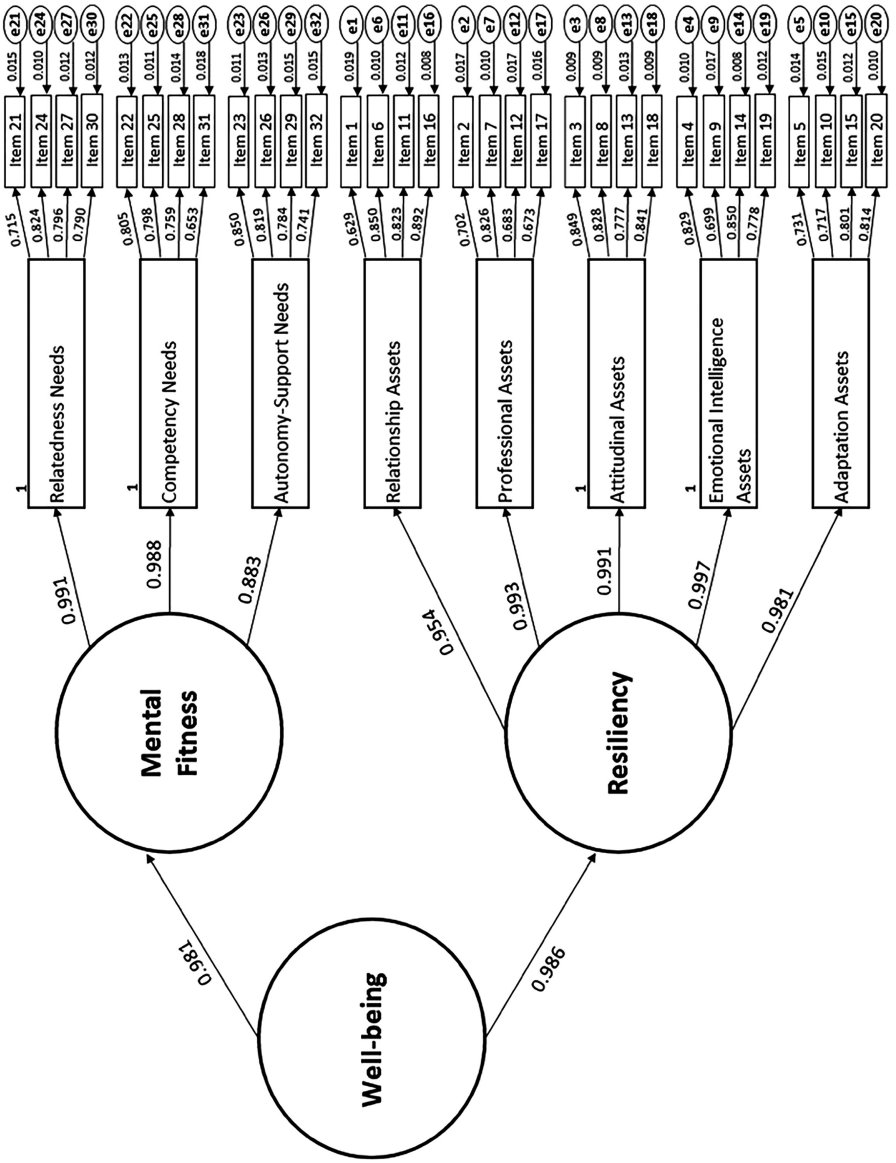


**Figure 4.**
MFRI model estimates

*3.3.1 Reliability*. The internal consistency of the complete thirty-two item MFRI as measured using Cronbach's alpha was very high ($\alpha = 0.977$), which is not surprising given the number of items in the questionnaire. Alpha values for the complete MFRI, the mental fitness and resiliency factors or domains and their subdomains are presented in Table II. T2

Kline (2000) claims that alpha values greater than 0.60 are considered acceptable for newly developed instruments. Based on this criterion, the internal consistency of the MFRI scales is very strong.

## 4. Discussion

The purpose of this study was to assess the factorial structure and internal consistency of the MFRI, a questionnaire designed to measure levels of mental fitness and resiliency in workplace environments. By assessing the prevalence of actual mental fitness and resiliency practices in workplace environments, reports can be produced that indicate various levels of development and integration of these practices.

Because of the impact that the MFRI's results can have on workplaces and their efforts to improve well-being, engagement and performance, it is important for the questionnaire and its results to be trustworthy, in other words, the MFRI must be reliable and valid.

Consistent with the literature, the MFRI was developed to respect the fact that well-being is a multidimensional construct consisting of mental fitness and resiliency. In this study, CFA was used to assess the quality of the MFRI. The overall interpretation of the CFA results for the fit indexes reported here ($\chi^2$, RMSEA, SRMR, CLI and TLI) suggests that the 32-item well-being model, the 12-item mental fitness model and the 20-item resiliency model that comprise the MFRI are all acceptable based on the generally accepted cutoff values for each index. The internal consistency as reported using Cronbach's alpha is excellent, especially for a new questionnaire.

These conclusions are important given that the MFRI is currently used in several contexts (e.g. schools, companies, government departments) to assess the level of mental fitness and resiliency in their respective workplaces; however, having strong psychometric properties is not sufficient to declare a questionnaire as valid. Indeed, while it is imperative that the MFRI be credible and valid, it is also important that the interpretation and use of the MFRI results and the inferences stemming from these be considered (Kane, 2006, 2009; Messick, 1980, 1989, 1995, 1998). Zumbo (2007, 2009) has asserted that construct validity should include an explanation for test scores "in the sense of the theory having explanatory power for the observed variation in test scores" (Zumbo, 2009, p. 69) while still being a matter of inference and weighing of the evidence at hand.

These current views of validity are well respected by the MFRI as immediate and rapid acceptance of its results has been noted consistently by end users. This can be explained, in part, based on the theory validated in this study. Moreover, and perhaps more importantly,

**Table II.**
Cronbach alpha values for the MFRI, its domains and subdomains

| MFRI (well-being) (0.977) | |
|---|---|
| Mental fitness (0.941) | Relatedness needs (0.859)<br>Competency needs (0.839)<br>Autonomy support needs (0.873) |
| Resiliency (0.967) | Relationship assets (0.873)<br>Professional assets (0.818)<br>Attitudinal assets (0.893)<br>Emotional intelligence assets (0.867)<br>Adaptation assets (0.849) |

the results can also be readily explained by those involved in the workplace environments by considering the actual workplace environment context before and during the time that the MFRI was administered (unpublished observations). Thus, it can be said that the MFRI has very high face validity, whether a test or questionnaire appears (at face value) to measure what it claims to measure (McLeod, 2013). Although face validity is certainly the least scientific measure of all the validity measures and often not regarded as a true psychometric property of a measurement instrument, in the context of this study it is still important to note that the MFRI covers the constructs it purports to measure and that its results can make an important impact on workplace environments. In short, it is important that the MFRI not only has acceptable "true" psychometric properties but that it is also regarded as a credible measurement instrument.

Limitations of the current study may include the selection of fit indexes upon which to base judgment as to whether the model is satisfactory. To avoid this possible bias, the study included the $\chi^2$ statistic with df and number of parameters in each of the three models, knowing that the result would have little to no impact on judgment given the very large sample size. Four other indexes (two absolute indexes and two confirmatory indexes) were presented to influence judgment on a broader set of data. Although the MFRI model has been confirmed based on the data from the study sample, there is not yet sufficient data to conclude that the model is a true predictive model. Current and ongoing research will enable elaboration on this matter. In addition, formal documented observations regarding the MFRI's face validity and ease of explanation and understanding of the results may confirm *a priori* expectations on the part of the users and may strengthen the conclusions from this study.

Implications for workplaces arising from the validation of the MFRI include a growth in capacity to measure the existence of positive psychology practices within organizational environments and to identify and address areas for needed growth and development.

Workplace leaders, managers and human resource professionals may often be drawn toward structured programs that have been applied elsewhere or that have been widely publicized. A focus on evidence-informed approaches moves beyond program labels with an emphasis on underlying practices and conceptual frameworks that may be found implicitly or explicitly within specific models of intervention. Focusing on evidence-informed practices allows organizational leaders to recognize and reinforce existing strengths that align with well-being, engagement and thriving in people. Similarly, emphasizing evidence-informed practices leads to integrating or embedding such practices within workplace cultures (policies, routines, interactions) in lieu of overlaying another program or approach upon existing workplace processes, responsibilities or demands. The application of the MFRI facilitates the use of evidence-informed decision-making in addressing organizational goals related to positive workplace cultures. As organizations consider measures related to assessing workplace cultures and targeting specific practices for development, the MFRI may provide a viable option given its psychometric properties and its reported practicality within organizational settings.

## 5. Conclusion

CFA using data from MFRI administrations supports the assertion that that well-being is a multidimensional construct consisting of mental fitness and resiliency. Analysis also confirms that the mental fitness construct consists of three separate sub-constructs: relatedness needs, competency needs and autonomy support needs; and that the resiliency construct consists of five separate sub-constructs: relationship assets, professional assets, attitudinal assets, emotional intelligence assets and adaptation assets. Each of these eight

constructs is measured using four separate items that describe distinct observable practices in workplace. In addition, analysis confirms that the internal consistency of the MFRI is very high. Thus, the MFRI can be used with confidence to measure the integration of mental fitness and resiliency practices in workplace environments.

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