Suicidal Behavior at Work Scales: Development and Validation of the Work-Related Suicidal Ideation, Defeat, and Entrapment Brief Scales

Escalas de comportamiento suicida en el trabajo: Desarrollo y validación de las escalas breves de ideación suicida, derrotismo y atrapamiento relacionado con el trabajo

Lillian V. Rovira-Millán [1] , Rafael A. Blanco-Rovira [2] ,
Ana C. López-Iglesias [1] , and Ernesto Rosario-Hernández [3, 4] *

1 - University of Puerto Rico, Cayey, Puerto Rico.
2 - Carlos Albizu University, San Juan, Puerto Rico.
3 - School of Behavioral & Brain Sciences, Ponce Health Sciences University, Ponce, Puerto Rico.
4 - Ponce Research Institute, Ponce Health Sciences University, Ponce, Puerto Rico.

Abstract

Background: Suicide is a health problem around the world, since suicide rates among Americans aged 45 to 54 is the highest, and most of these individuals were employed at the time of their death. Thus, there is a need to better understand suicidal behavior at work by developing appropriate measurement instruments in order to create prevention and treatment programs. Therefore, the aim of this study was to develop and validate three brief self-report measures of suicidal behavior at work: defeat, entrapment, and work-related suicidal ideation.

Materials and Methods: A total of 1,829 employed individuals from different organizations in Puerto Rico participated in this cross-sectional research design. We conducted item, exploratory, and confirmatory factor analyses. Also, we tested measurement invariance of the new brief scales of suicidal behavior at work.

Results: The final version of the suicidal behavior at work brief scales obtained excellent reliability coefficients using Cronbach's alpha and McDonald's omega techniques. The results of the EFA and CFA support their internal structure. The new scale appears to be invariant among groups.

Conclusion: The scores of the new suicidal behavior at work brief scales appear to be reliable, valid, and invariant, which will help to study and to better understand these behaviors in order to create treatments and prevention programs in our workplaces.

Keywords: *CFA, EFA, Defeat, Entrapment, Measurement Invariance, Suicidal Ideation, Work-Related Suicidal Ideation*

Resumen

Antecedentes: El suicidio es un problema de salud en todo el mundo, ya que las tasas de suicidio entre los estadounidenses de 45 a 54 años son las más altas, y la mayoría de estas personas estaban empleadas en el momento de su muerte. Por lo tanto, existe la necesidad de comprender mejor el comportamiento suicida en el trabajo desarrollando instrumentos de medición apropiados para así crear programas de prevención y tratamiento. Por lo tanto, el objetivo del presente estudio fue desarrollar y validar tres medidas breves de autoinforme de comportamiento suicida en el trabajo: la percepción de derrotismo, el atrapamiento y la ideación suicida relacionada con el trabajo.

Materiales y Método: Un total de 1,829 personas empleadas de diferentes organizaciones en Puerto Rico participaron en este diseño de investigación transversal. Realizamos análisis de reactivos, factores exploratorios y confirmatorios. Además, probamos la invariancia de medición de las nuevas escalas breves de comportamiento suicida en el trabajo por género, edad, entre otros.

Resultados: La versión final de las escalas breves de conducta suicida en el trabajo obtuvo excelentes coeficientes de confiabilidad mediante las técnicas alfa de Cronbach y omega de McDonald. Los resultados de los análisis de factores exploratorios y confirmatorios respaldan su estructura interna. Las nuevas escalas parecen ser invariantes.

Conclusiones: Las puntuaciones de las nuevas escalas breves de conducta suicida en el trabajo parecen ser confiables, válidas e invariantes, lo que ayudará a estudiar y comprender mejor estas conductas para crear tratamientos y programas de prevención en los lugares de trabajo.

Palabras clave: *CFA, EFA, fracaso, atrapamiento, invariancia de medida, ideación suicida, ideación suicida relacionada con el trabajo*

Introduction

No matter how industrialized or wealthy a nation is, suicide is one of the most significant health and behavioral problems (Otsuka et al., 2016). The World Health Organization (WHO, 2021) estimates that 800,000 individuals worldwide commit suicide each year, making it the third global leading cause of death. According to Mortali and Moutier (2019), who rate suicide as the tenth-leading cause of death overall and the fourth-leading cause for people under the age of 65, it is also a significant public health concern in the United States (US). In Puerto Rico, according to the Commission for the Prevention of Suicide (CPS, 2016), a suicide happens every 28 hours, or at least once every day.

The Morbidity and Mortality Weekly Report (MMWR) asserts that this critical health concern affects workplaces as well (Peterson et al., 2018). The suicide rate among Americans in their working years climbed by 34% between 2000 and 2016. However, unlike a workplace injury, a suicide that takes place at work does not count as "occupational suicide" (Kasl & Jones, 2003). Tiesman et al. (2015) found that suicide rates have sharply increased recently, even though national workplace suicide trends have not been widely studied. According to Mortali and Moutier (2019), the suicide rate among Americans aged 45 to 54 is the highest (19.72 per 100,000) and most of these individuals were employed at the time of their deaths.

The research of work-related suicide behavior involves studying its relationship with some aspects that have been considered as possible predictors of suicide behavior such as previous suicidal attempts, depression, hopelessness and mental disorders (e.g., O'Connor & Nock, 2014). Even though suicide behaviors are public health issues, there seems to be a paucity of empirical research testing the strength, direction, and nature of these relationships at work. Therefore, research efforts are needed to understand the etiology of suicide (e.g., Suominen et al., 2004), and especially, to assess suicidal ideation and better manage suicide behavior (Avendaño-Prieto et al., 2018). Moreover, the rising number of workplace suicides highlights the need for more study of occupation-specific risk factors and the development of evidence-based initiatives that may be applied in the workplace (Tiesman et al., 2015). However, to increase these research efforts, it is important to develop measurement instruments of these suicide behavior predictors.

There are new theoretical frameworks which focus on suicidal behavior from ideation to action (Klonsky et al., 2018). One of these theories under this paradigm is the Integrated Motivational-Volitional (IMV) model of suicidal behavior proposed by O'Connor (2011). O'Connor combined the primary components of the most popular models of suicidal conduct into the IMV model of suicidal behavior, an integrated three-phase model that aims to distinguish between suicide ideators and suicide attempters. The IMV model is a three-phase framework to elucidate the origins of suicidal ideation and behavior, which are pre-motivational, motivational, and volational. Background elements and triggering events are included in the pre-motivational phase. This pre-motivational phase is significant because it emphasizes how the interacting diathesis-environment-life-events triad that makes up this phase of the model influences the IMV model. In other words, suicide ideation and conduct are the outcome of a biological or genetic interaction that confers a susceptibility that is activated or increased in the presence of stress. Suicidal ideation and intention development, on the other hand, are part of the motivational phase. Feelings of defeat can lead to feelings of entrapment, which can result in suicide ideation

and intent. Self-moderators like rumination can contribute to the move from concepts of defeat to feelings of entrapment. The volitional phase describes when suicide attempts are more likely to occur. According to the IMV model, a set of elements, known as volitional moderators, influences the conditions and situations in which a person is more likely to engage in suicidal behavior. A volitional moderator, according to O'Connor, is any factor that bridges the suicidal ideation-behavior gap, that is to say, any element that makes it probable that people will act on their suicidal ideation (e.g., impulsivity).

Research Purpose

The purpose of this study was to develop and validate three brief self-report measures of suicidal behavior related to work (work-related suicidal ideation, feelings of defeat and entrapment) based on the IMV model of suicide behavior. Moreover, another objective was to examine whether these new scales were invariant in terms of gender, age, job position, type of organization and type of contract.

Method
Participants

A total of 1,829 protocols of employed individuals from different organizations in Puerto Rico that had participated in two studies conducted by the authors were used in this instrumental research design. In those two studies, they were selected based on their availability and volition. Besides, anonymity and the right to abandon the research were guaranteed when they considered it necessary. Table 1 shows the description of the sample's sociodemographic characteristics.

Materials

Background questionnaire. We designed a background questionnaire to gather information about the participants in the research. In this background questionnaire, we asked the participants to provide information about their gender, age, tenure, marital status, among others, to enable us to describe the subjects of the study.

Suicidal ideation. To measure suicidal ideation, we developed the Work-Related Suicidal Ideation Scale (WRSIS). The WRSIS is composed of 15 items, which intent to measure suicidal ideations related to work issues. This instrument is in a Likert-frequency response format ranging from 1 (*Never*) to 6 (*Always*).

Defeat. We developed the Defeat Scale to measure feelings of defeat. This is a six-item instrument in a Likert-agreement response format ranging from 1 (*Totally Disagree*) to 6 (*Totally Agree*), which aims to measure general feelings of defeat.

Entrapment. We developed the Entrapment Scale to measure feelings of being trapped without possibilities to get out of a situation. This is a six-item instrument in a Likert-agreement response format ranging from 1 (*Totally Disagree*) to 6 (*Totally Agree*), which intends to measure general feelings of entrapment.

Depression. To measure depression, we used the PHQ-9 developed by Kroenke et al. (2001). The PHQ-9 is a nine-item questionnaire used for the assessment of depressive symptoms in primary care settings. This questionnaire assesses the presence of depressive symptoms over the 2 weeks prior to the test's being filled out. Each of the items can be scored from 0 (*not at all*) to 3 (*nearly every day*).

Anxiety. To measure anxiety, we used the GAD-7 (Spitzer et al., 2006). The GAD-7 is a seven-item questionnaire that quantifies general anxiety symptomatology and by which patients were asked how often, during the prior 2 weeks, they

Table 1
Socio Demographic Characteristics of the Sample.

Variable	Freq.	%	Variable	Freq.	%
Gender			**Type of Employment**		
Males	731	40.0	Tenure	1,217	66.5
Females	1,026	56.1	Temporary	549	30.0
Age			**Years Working**		
21-30 (Early Career)	378	20.7	1 - 5	669	36.6
31-50 (Peak of Career)	313	17.1	6-10	321	17.6
51 (Past Peak of Career)	275	15.0	11-15	257	14.1
Marital Status			16-20	181	9.9
Single	713	39.0	21-25	155	8.5
Married	688	37.6	26-30	106	5.8
Widowed	50	2.8	31	97	5.3
Divorced	166	9.1	**Type of Organization**		
Living Together	198	10.9	Public	576	31.9
Job Position			Private	1,080	59.0
Managerial	351	19.2		**Mean**	**SD**
Non-Managerial	1,409	77.0	**Education** (In Years)	15.20	2.80

Note. n = 1,829.

were bothered by each symptom. Response options were *not at all*, *several days*, *more than half the days*, and *nearly every day*, scored as 0, 1, 2, and 3, respectively.

Rumination. We used the Affective Rumination subscale of Work-Related Rumination Scale-Spanish version (Cropley et al., 2012; Rosario-Hernández et al., 2021) to measure one of the moderators of the IMV model of suicide behavior (O'Connor et al., 2011). As part of the current study, we used only the Affective rumination subscale of the WRRS-Spanish version.

Social desirability. We used the Social Desirability Scale developed by Rosario-Hernández and Rovira-Millán (2002). This is an 11-item instrument in a Likert-agreement response format ranging from 1 (*Totally Disagree*) to 6 (*Totally Agree*),

which intends to measure a response bias in which people respond to a test thinking what is socially acceptable.

Procedures

The Institutional Review Board (IRB) of the Ponce Health Sciences University socially approved of the realization of the two studies. Protocol numbers were 160913-ER and 180313-ER.

In order to develop the instruments, we revised the literature and other similar measures. Thus, we developed 15 items for the WRSI, and six items for each of the Defeat Scale, and the Entrapment Scale. The developed items of the

scales were administered to a sample of employees from different organizations in Puerto Rico. We conducted individualized item analysis for each of the three scales. It was established as criterion following recommendation of some of the literature (e.g., DeVellis, 2017; Spector, 1992) that all items with an item-total correlation or r_{bis} ≥ .30 were included in the next step of the exploratory factor analysis (EFA). Also, EFA at first was conducted individually for each scale and the criterion established in the EFA was that all items with a factor loading ≥ .30 on its corresponding factor were selected (e.g., Kline, 1994). After conducting all individualized scale's EFA, we conducted an EFA including all the items of the three scales and then we proceeded to conduct a confirmatory factor analysis (CFA) using structural equation modeling via the lavaan package of the R program (Rosseel, 2012). Moreover, to establish convergent and divergent validity, we correlated observed scores and latent constructs of the three new scales and the Social Desirability Scale (Rosario-Hernández & Rovira-Millán, 2002). Finally, reliability and descriptive statistics were computed for the new scales.

Data analysis

First, we performed descriptive statistics analyses to obtain sociodemographic characteristics of the sample. Also, we conducted descriptive analyses of the three scale's items, such as the mean and standard deviation values. An item analysis was also performed to obtain the discrimination index which is also known as corrected item-total correlation or r_{bis}. We used the whole sample to perform these descriptive and item analyses.

Second, the total sample was randomly split into two samples, and then each of them was also randomly split into two more samples each hereafter referred to as sample 1 (n_1), sample 2 (n_2), sample 3 (n_3), and sample 4 (n_4). This method allows examining the stability of the structural factor's solution across the halves (Fabrigar et al., 1999). Third, exploratory factor analyses (EFAs) were conducted with sample 1 and sample 2 using SPSS v.28 (IBM, 2021). EFAs were conducted using the extraction method of principal axis factoring with a direct oblimin rotation. As selection criteria, all those items that obtained a factor loading ≥ .30 in the factor to which it supposedly belongs were selected as recommended by Kline (1994). At first, we individualized EFAs to each set of items of each scale and then we included all the items of the three scales that comply with the criteria and conducted another EFA with all of them using sample 1. In order to cross-validate the three-factor structure, we conducted another EFA using sample 2.

Fourth, all items selected from the EFA were subjected to CFA using the structural equation modeling to examine the internal structure of the suicidal behaviors at work brief scales using the weighted least squares-mean and variance adjusted (WLSMV) estimator with the lavaan package of the R3.6.3 program (Rosseel, 2012), which robustly deals with potentially non-normal data and items are treated as ordinal (Li, 2016a, 2016b). To evaluate the results of the CFA, several fit indices of the structural equation models were used. Kline (2016) recommends the use of at least four fit indices, although more can be reported. One of the indices reported is Chi-Square (χ^2), which is a fundamental index of absolute fit and is basically the same one that is used when you want to examine the association between nominal variables. However, the crucial difference when it is used as an index of fit in the structural equations model is that the researcher looks for no differences between the matrices to support

that the tested model represents the data (Hair et al., 2019). Given the fact that the χ^2 is sensitive to the sample size and, therefore, the probability of rejecting the hypothesized model increases when the sample size grows, it is recommended to take into account other indices (Marsh et al., 1996). This way, the Root Mean Square Error of Approximation (RMSEA; Byrne, 2016; Hu & Bentler, 1999) was used, in which values ≤ .05 indicate a good fit of the model, values < .08 for the RMSEA indicate an acceptable fit; values ranging from .08 to .10 are considered as medi-ocre (Browne & Cudeck, 1993; MacCallum et al., 1996). In addition, Standardized Square Root Mean Residual (SRMR; Hu & Bentler, 1995) was used, which examines the average difference between predicted and observed variances and covariances, based on the residual standard er-ror. The lower the SRMR, the better the fit of the model and, to be considered an acceptable model, it must be equal to or less than .05. On the other hand, the Bentler Comparative Fit Index (CFI) was used as an increased fit index to compare the theoretical model with the null model, which assumes that the latent variables of the model they do not correlate with each other and values greater than .90 are considered acceptable (Hair et al., 2019). Another increased adjustment index is the Tucker-Lewis Index (TLI), which reflects the proportion in which the theoretical model im-proves the adjustment in relation to the null model (Littlewood-Zimmerman & Bernal-García, 2011; Tucker & Lewis, 1973). Values greater than .90 are considered acceptable. We conducted CFA's with sample 3 to calibrate and sample 4 to vali-date results.

Fifth, we recombined the samples and as-sessed measuring invariance across gender, age, job position, type of organization, and type of contract. We tested configural invariance, met-ric invariance, and scalar invariance as suggest-ed by some in the literature (e.g., Byrne, 2016; Muthén & Muthén, 2012; Wang & Wang, 2012). We conducted hierarchical tests for invariance of measurement parameters. First, we examined the configural invariance model or pattern invariance, which imposes no equality restrictions on mod-el parameters. This is a necessary condition for testing invariance by comparing it with other in-variance models based on fit indices. Second, we examined the weak invariance model or metric invariance. In this model, the factor loadings are treated as invariant across groups. This ensures that the measures are on the same scale across groups. Third, we examined the strong invariance model. This model imposes invariance on both factor loadings and item intercept across groups. This is to ensure that the underlying factors can be compared across groups. We capitalized on fit index differences for CFI, SRMR, and RMSEA (i.e., ΔCFI, ≤-.01, ΔSRMR & ΔRMSEA ≥.015) reference points as recommended by Chen (2007), who found in a Monte Carlo study that these in-dices were equally sensitive to all types of invari-ances. Notably, as the χ^2 is known to be highly in-fluenced by the sample size (e.g., Rigdon, 1995), it was reported but not considered as fit index for the invariance testing.

Sixth, with the recombined sample, we ex-amined the convergent and divergent validity of the three new self-report measures of suicidal be-havior at work by their covariation and estimating the average variance extracted (AVE), maximum shared variance (MSV), and the shared mean variance (ASV) based on a CFA with the total sample. According to Fornell-Larcker (1981), as the value of the AVE is greater than .50, it implies that it measures more variance of the construct and less error. Furthermore, if all AVE constructs are higher than .50 and are higher than the MSV and ASV, it supports the convergent and diver-gent validity of the scales. Similarly, we assessed

Table 2
Descriptive statistics and corrected item-total correlation (r_{bis}) of the Three Self-Report Work-Related Suicidal Behavior Brief Scales.

Item	Mean	SD	r_{bis}	Item	Mean	SD	r_{bis}
Work-Related Suicidal Ideation				**Defeat**			
WRSI-1	1.20	0.644	.675	Def-1	2.16	1.573	.130
WRSI-2	1.14	0.545	.731	Def-2	1.47	1.111	.664
WRSI-3	1.16	0.591	.712	Def-3	1.72	1.369	.594
WRSI-4	1.17	0.598	.632	Def-4	1.41	1.045	.661
WRSI-5	1.10	0.492	.802	Def-5	1.34	0.961	.670
WRSI-6	1.07	0.387	.848	Def-6	1.25	0.855	.684
WRSI-7	1.06	0.408	.852	**Entrapment**			
WRSI-8	1.06	0.375	.822	Ent-1	1.32	0.952	.799
WRSI-9	1.05	0.375	.820	Ent-2	1.31	0.917	.776
WRSI-10	1.06	0.381	.820	Ent-3	1.29	0.868	.817
WRSI-11	1.06	0.391	.847	Ent-4	1.38	1.013	.808
WRSI-12	1.11	0.482	.798	Ent-5	1.66	1.308	.753
WRSI-13	1.07	0.394	.831	Ent-6	1.82	1.463	.623
WRSI-14	1.06	0.394	.817				
WRSI-15	1.06	0.381	.824				

Note. n = 1,829; SD = Standard Deviation; r_{bis} = item-total correlation.

the convergent and divergent validity of the new scales by correlating observed scores of the scales with each other and with observed scores from other instruments measuring rumination, depression, anxiety, and social desirability. Finally, we performed internal consistency reliability via Cronbach's alpha and McDonald's omega, standard error of measurement and 95% confidence interval and descriptive statistics to estimate mean and standard deviation of the scales.

Results

First, we obtained descriptive statistics and conducted an analysis of the items from the three suicidal behavior brief scales. Table 2 shows the mean, the standard deviation, and the corrected item-total correlations (r_{bis}). Only item 1 of the Defeat Scale did not reach a r_{bis} of .30; therefore, it was eliminated and not included in subsequent analyses.

EFA were performed for each scale individually with sample 1. The results of these EFA for the defeat and entrapment scales showed a one-dimensional internal structure, while the WRSI Scale showed a two-factor structure. When examining the items, those that expressed work-related suicidal ideation loaded on Factor 1 and those that expressed suicidal ideation, in general, loaded on Factor 2. Therefore, it was decided to select those items that expressed work-related suicidal ideation, that is, the items that loaded on Factor 1. Thus, the nine items from the WRSI

Scale, five from the Defeat Scale and six from the Entrapment Scale, were included in the next EFA and the results showed an internal structure of three-factors explaining 69.55% of the variance. All items obtained factor loadings ≥ .30 on their respective factors as suggested by the literature (e.g., Kline, 1994); however, item 5 of the Defeat Scale had cross-loading on Factor 2 and 3. Nevertheless, it was included in subsequent analyses because it obtained a much higher loading in its respective Factor 3 and barely passed the threshold of .30 on Factor 2 (see Table 3). A second EFA was conducted, but this time with sample 2 to cross-validate results from previous EFA. As shown in Table 3, the three-factor structure was also supported and explained 74.72% of the variance.

We tested three competitive models, one-factor, two-factor, and three-factor structure models of the suicidal ideation behaviors at work scales using structural equation modeling. We used sample 3 for this first CFA as a calibration sample. The one-factor model included all items of the three scales loading just in one factor and obtained acceptable fit indices, except for the SRMR since it exceeded the recommended threshold of .05 (Hu & Bentler, 1995). Also, we tested a two-factor model in which items from the Defeat and Entrapment Scales as one factor as some findings in the literature suggest (e.g., Taylor, Wood et al., 2010) and WRSI items as another one. This two-factor model obtained better fit indices than the one-factor model, including a better SRMR although still above the threshold of .05 (see Table 4). Finally, we tested the three-factor model and results showed that this was the best fitted model of all, since all fit indices were within the thresholds (see Table 4). Thus, as fit indices of the three-factor model were very good, it was decided to probe this model with sample 4 to cross validate the three-factor structure model.

Table 4
Fit indices of the Three Self-Reports Work-Related Suicidal Behavior Brief Scales for models tested.

Model	χ^2 (df)	SRMR	RMSEA (90% CI)	CFI	TLI
1 Factor (Sample 3)	344.524* (170)	.086	.048 (.040, .055)	.994	.993
2 Factor (Sample 3)	299.107* (169)	.053	.041 (.033, .049)	.996	.995
3 Factor (Sample 3)	245.685* (167)	.047	.032 (.023, .041)	.997	.997
3 Factor (Sample 4)	266.857* (167)	.042	.036 (.028, .044)	.998	.997

Note. n_3 = 454; n_4 = 457; χ^2 = chi-square statistic; df = degree of freedom; SRMR = Standardized Root Mean Squared Residual; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval.

All fit indices obtained were very good (see Table 4), supporting the three-factor model implicating that each scale measures a different construct and all items of the three scales obtained factor loadings ≥ .70, except item 6 of the Entrapment Scale with the whole sample, but with sample 3 and sample 4 were above .70 (see Table 5).

Measurement invariance was achieved with a bottom-up approach, from an unrestricted model to a model with strong restriction (Stark et al., 2006). Thus, we tested an unrestricted model of equality (configurational invariance) and continued with successive restrictions applied to factor loadings, thresholds (metric invariance) and intercepts (scalar invariance). Considering the sample size (> 300), the invariance criteria were: CFI < .010, SRMR < .030, and RMSEA < .015 (Chen, 2007). As such, measurement invariance in every group analyzed (i.e., gender, age, job position, organization type, and employment type) was

Table 3
Exploratory factor analyses of the Three Self-Report Work-Related Suicidal Behavior Brief Scales on sample 1 and sample 2.

Item	Sample 1				Sample 2			
	Factor			h^2	Factor			h^2
	1	2	3		1	2	3	
WRSI-6	**.78**			.685	**.87**			.862
WRSI-7	**.90**			.838	**.96**			.928
WRSI-8	**.88**			.826	**.98**			.929
WRSI-9	**.93**			.899	**.85**			.747
WRSI-10	**.84**			.790	**.98**			.954
WRSI-11	**.84**			.702	**.86**			.808
WRSI-13	**.80**			.768	**.93**			.849
WRSI-14	**.93**			.826	**.96**			.928
WRSI-15	**.79**			.744	**.87**			.816
Def-2			**.67**	.520			**.68**	.477
Def-3			**.56**	.456			**.63**	.505
Def-4			**.69**	.603			**.79**	.626
Def-5		.31	**.56**	.655			**.79**	.746
Def-6			**.60**	.632			**.90**	.797
Ent-1		**.81**		.848		**.74**		.649
Ent-2		**.74**		.752		**.84**		.744
Ent-3		**.87**		.799		**.84**		.805
Ent-4		**.80**		.678		**.86**		.780
Ent-5		**.72**		.555		**.75**		.584
Ent-6		**.54**		.333		**.64**		.411
Eigen Value	8.88	52.38	52.38		9.63	54.45	54.45	
% Variance Explained	7.87	13.70	66.08		6.96	15.12	69.57	
% Variance Accumulated	5.98	3.47	69.55		7.28	5.15	74.72	
KMO	.909				.915			
χ^2 (*df*)	10,671*	(190)			11,675*	(190)		

Note. n_1 = 458; n_2 = 460; *p < .01; *df* = degree of freedom.

Table 5
Factor Loadings of Items of the Three Self-Reports Work-Related Behavior Brief Scales from the Confirmatory Factor Analyses.

Scale	Item	Factor Loadings		
		Sample 3	Sample 4	Total Sample
Work-Related Suicidal Ideation	WRSI-6	.984	.980	.963
	WRSI-7	1.01	.982	.984
	WRSI-8	.974	.952	.973
	WRSI-9	.973	.987	.979
	WRSI-10	.954	.990	.973
	WRSI-11	.966	.986	.973
	WRSI-13	.974	.981	.975
	WRSI-14	.990	1.00	.983
	WRSI-15	.993	.972	.980
Defeat	Def-2	.805	.873	.831
	Def-3	.788	.828	.815
	Def-4	.888	.916	.890
	Def-5	.912	.893	.928
	Def-6	.941	.967	.955
Entrapment	Ent-1	.957	.956	.955
	Ent-2	.943	.966	.956
	Ent-3	.987	.966	.970
	Ent-4	.909	.926	.921
	Ent-5	.885	.881	.876
	Ent-6	.812	.785	.777

Note. $n_3 = 454$; $n_4 = 457$; $n_T = 1,829$.

good and complied with the established criteria. The differences between fit indices (Δ_{CFI}, Δ_{RMSEA}, and Δ_{SRMR}) were within limits, suggesting that the three self-report measures of suicidal behavior were invariant among those groups (see Table 6).

Table 7
Average Variance Extracted (AVE), Maximum Shared Variance (MSV), Average Shared Variance (ASV) and correlation between latent constructs to establish convergent and divergent validity.

Scale	AVE	MSV	ASV	1	2	3
1. WRSI	.95	.64	.63	1		
2. Def	.78	.72	.67	.78**	1	
3. Ent	.83	.72	.68	.80**	.85**	1

Note. $n = 1,829$; $*p <.05$; $**p <.01$.

First, to evaluate convergent validity of reflective construct as work-related suicidal ideation, feelings of defeat and entrapment, we checked that the average variance extracted (AVE) value of items of the three-scales were developed and all were ≥.50 (see Table 7). We calculated the AVE using the whole sample for WRSI, Defeat, and Entrapment Scales and they were .95, .78, and .83, respectively; all well above the threshold of .50 (see Table 7). Also, we estimated the maximum shared variance (MSV) and the average shared variance (ASV) to establish divergent validity and all AVEs of the three new scales were larger than the MSV and the ASV, supporting convergent and divergent validity of the three brief self-report measures of suicidal behavior at work.

In order to establish the convergent and divergent validity of the three new brief scales of suicidal behavior at work, we correlated their observed scores with observed scores of depression, anxiety, rumination, and social desirability measures. Table 8 shows that the observed score correlations between the three brief scales of suicidal behavior at work with depression, anxiety, rumination, and social desirability correlated in the expected direction and magnitude. For example, entrapment scores were higher in terms of depression, anxiety, and rumination, which can be

Table 6
Measurement Invariance of the Three Self-Reports Work-Related Suicidal Behavior Brief Scales by Gender, Age, Job Position, Type Organization, and Type of Employment.

Model	χ^2 (df)	SRMR	RMSEA (90% CI)	CFI	Reference Model	Δ^2	ΔSRMR	ΔRMSEA	ΔCFI
Multigroup analysis by gender (male/female)									
1. Configural	497.399* (334)	.044	.023 (.019, .028)	.998	-----	-----	-----	-----	-----
2. Metric	512.284* (351)	.046	.023 (.018, .027)	.998	1	+14.885	+.002	.000	.000
3. Scalar	588.959* (401)	.044	.023 (.019, .027)	.998	2	+76.675	-.002	.000	.000
Multigroup analysis by age (21-30/31-50/51)									
1. Configural	612.959* (501)	.078	.019 (.013, .024)	1.00	-----	-----	-----	-----	-----
2. Metric	641.451* (535)	.079	.018 (.012, .023)	1.00	1	+28.582	+.001	-.001	.000
3. Scalar	753.803* (615)	.078	.019 (.014, .024)	1.00	2	+112.352	-.001	+.001	.000
Multigroup analysis by job position (managerial/non-managerial)									
1. Configural	630.353* (334)	.035	.032 (.028, .036)	.997	-----	-----	-----	-----	-----
2. Metric	604.418* (351)	.037	.029 (.025, .032)	.998	1	-25.935	+.002	-.003	+.001
3. Scalar	701.587* (424)	.034	.027 (.024, .031)	.998	2	+97.169	-.003	-.002	.000
Multigroup analysis by organization type (public/private)									
1. Configural	565.729* (334)	.032	.029 (.025, .033)	.998	-----	-----	-----	-----	-----
2. Metric	597.756* (351)	.035	.029 (.025, .033)	.998	1	+32.027	+.003	.000	.000
3. Scalar	639.324* (423)	.033	.025 (.021, .029)	.998	2	+41.568	-.002	-.004	.000
Multigroup analysis by type of employment (tenure/temporary)									
1. Configural	583.843* (334)	.033	.029 (.025, .033)	.998	-----	-----	-----	-----	-----
2. Metric	616.399* (351)	.037	.029 (.025, .033)	.997	1	+32.556	+.004	.000	-.001
3. Scalar	677.257* (420)	.034	.026 (.023, .030)	.998	2	+60.858	-.003	-.003	+.001

Note. *p < .05; df = Degree of Freedom.

Table 9
Descriptive statistics and reliability of the three self-report work-related suicidal behavior brief scales.

| Scale | # Items | Mean | SD | Reliability (CI) | | sem | 95% CI | Min | Max | Possible Range |
				∝	ω					
WRSI	9	9.55	3.19	.976 (.963, .983)	.976 (.962, .983)	0.49	±1	9	52	9 – 54
Def	5	7.18	4.36	.865 (.838, .888)	.866 (.840, .888)	1.59	±3	5	30	5 – 30
Ent	6	8.78	5.46	.902 (.886, .918)	.902 (.884, .917)	1.70	±3	6	36	6 – 36

Note. n = 1,829; ∝ = Cronbach's alpha; ω = McDonald's omega; CI = Confidence Interval; sem = Standard Error of Measurement; WRSI = Work-Related Suicidal Ideation; Def = Defeat; Ent = Entrapment.

Table 8
Correlation between observed scores of the Three Brief Self-Reports of Suicidal Behavior at Work and other measures to establish convergent and divergent validity.

Scale	WRSI	Def	Ent
WRSI	1		
Def	.53**	1	
Ent	.59**	.68**	1
Dep	.41**	48**	.57**
Anx	.40**	.47**	.56**
Rum	.22**	.34**	.38**
SD	-.10*	-.04^{NS}	-.13*

Note. n = 898; *p < .05; **p < .01; NS = Not Significant; WRSI = Work-Related Suicidal Ideation; Def = Defeat; Ent = Entrapment; Dep = Depression; Anx = Anxiety; Rum = Rumination; SD = Social Desirability.

Reliability and Descriptive Statistics

We estimated the mean, the standard deviation, the standard error of measurement, and the 95% of confidence interval for the scores of the final version of the three suicidal behaviors at work scales (see Table 8). Moreover, we estimated the reliability using Cronbach's alpha and McDonald's omega with their respective confidence intervals, and all reliability coefficients were above .70 as suggested by some of the literature (e.g., DeVellis, 2017; Spector, 1992).

Discussion

The objective of this study was to develop and validate three brief self-report measures of suicidal behavior at work: (1) WRSI, (2) Feelings of Defeat, and (3) Entrapment Scales. The EFA results that were scale-specifically supported a unidimensional internal structure of each of the three scales. Additionally, when we integrated all three scales' items and performed an EFA, all items loaded onto their respective factors, which allowed to corroborate the internal structure of

considered to have medium to large effect sizes (Cohen, 1988). Finally, observed correlations between scores of the three new developed scales and social desirability scores were very low and close to zero.

one-factor for each scale. Further, similar outcomes were obtained when an EFA was conducted using sample 2, which also demonstrated that the set of items for each scale loaded on its corresponding factor. Meanwhile, three models were tested for the CFA: (a) one-factor, in which all items loaded on a single factor; (b) two-factor, in which the items from the WRSI scale loaded on one factor and those from the defeat and entrapment scales loaded on the other; and (c) three-factor, where the items from each scale loaded on their respective factor. Although the fit indices for all three models were acceptable, the three-factor model had the best fit indices. Consequently, this three-factor model was tested with sample 4 and the results of the CFA also supported the internal structure in which it obtained acceptable fit indices. These results support the internal structure of the developed scales based on the motivational phase of the IMV model of suicidal behavior (O'Connor, 2011), which implicitly considers suicidal ideation, feelings of defeat and entrapment as unique and independent, but related, constructs.

The present study provides insight on measurement invariance of the three brief scales across gender, age, job position, type of organization, and type of employment. We tested the measurement invariance of the suicidal behavior brief scales among employees of different organizations in Puerto Rico. Exploration on the first two levels revealed configural and metric invariance (i.e., weak measurement invariance) and scalar invariance (i.e., strong measurement invariance) of the three-factor model across gender, age, job position, and type of organization. Metric invariance is important to ensure the measure across multiple groups is on the same scale, or the factors are measured in the same way in all groups (e.g., Wang & Wang, 2012). Scalar invariance refers to the item intercepted being invariant across

multiple groups in the present study. This indicates that none of the groups tends to be systematically higher or lower on the items of scales than other groups (Wang & Wang, 2012). The present study met both invariance requirements. These results confirm that the compared groups had an equivalent understanding on each of the scale's items, which is an important prerequisite for making a meaningful comparison between groups on these suicide behaviors at work. Researchers have argued that error variance invariance (i.e., strict measurement invariance) is not required for substantive analyses in many disciplines and such invariance is considered unnecessary (Wang & Wang, 2012).

To establish convergent and divergent validity of the three suicidal behaviors at work brief scales, first, we calculated the AVE, MSV, and ASV. The AVE $\geq$ .50 indicates that the items share a high proportion of the variance, the higher the value of the AVE, the lower the error variance (Fornell & Larcker, 1981). Therefore, the indicators of each scale developed share a high proportion of variance supporting their convergent validity. Moreover, the AVE's value of the three scales were greater than the MSV and ASV values, supporting the divergent validity of the scale as some authors suggest (e.g., Fornell & Bookstein, 1982; Fornell & Larcker, 1981). In addition, observed correlation directions between the three suicidal behaviors at work brief scales with rumination, depression, anxiety, and social desirability were as hypothesized. Current results shown that defeat and entrapment are related to suicidal ideation as some of the literature has found (e.g., Rosario-Hernández et al., 2019; Taylor, Wood et al., 2010). In the case of the defeat and entrapment constructs, some authors have conceptualized them as one-factor construct (e.g., Taylor et al., 2010) because of their high correlation. Therefore, the large correlation be-

tween them was expected in the present study. In fact, results show that defeat and entrapment appear to be two constructs that are closely related (e.g., Taylor et al., 2009), while still having distinct qualities that set them apart. WRSI, defeat, and entrapment are theoretically related within them, as shown by our findings and certain literature (e.g., O'Connor et al., 2016). Moreover, the relationship found in the present study between the results of the three short self-report scales and other constructs tend to support the convergent validity of these scales, as some literature suggest for depression (e.g., Tang et al., 2010), anxiety (e.g., Tang et al., 2010), and rumination (e.g., Treynor et al., 2003), even when some literature argue that this relationship is mediated by feelings of entrapment (Teismann & Forkmann, 2017). On the other hand, the relationship between the social desirability and the suicidal behaviors at work scales was negative, but with much lower correlation coefficients when compared to other studies' results (e.g., Caputo, 2017; Curns, 2014). Nevertheless, these results support the divergent validity of the three new developed scales.

Regarding reliability, the coefficients alpha and omega, the levels obtained can be considered as excellent from a general perspective and considering the interaction between the small number of items, especially the Defeat and Entrapment Scales, the sample size and the values obtained (Ponterotto & Ruckdeschel, 2007). These scales' primary usage is for group applications, but because their coefficients are high (i.e., ≥.85), it may be assumed that the likelihood of error is low, even in cases when judgements on individual subjects are required (Ponterotto & Ruckdeschel, 2007). However, given the similarity of ∝ and ω, it is considered that any differences in the factor loadings were minor and did not significantly affect how close one coefficient was to the other (Hayes & Coutts, 2020). This distance is typically

related to the level of factorial item loading equality, or tau-equivalence, which is a prerequisite for validating ∝ coefficient (Hayes & Coutts, 2020). The calculation of internal consistency can be done successfully using ∝ and without the need for SEM modeling or SEM modeling methodologies to estimate ω, according to an implication of this similarity. This application can be induced to other contexts if the prerequisites for application in future usage and the data cleaning are successful.

Theoretical and Practical Implications

This study makes a valuable contribution to current research on suicidal behavior at work by developing and validating three robust scales to measure WRSI, feelings of defeat and entrapment. Unlike previous measurement scales of suicidal behavior, the scale developed in this study, especially the WRSI scale, is more appropriate for studying suicidal ideation related to work because it incorporates causal attributions to work. Thus, in comparison to other suicidal ideation measures, the items selected for the WRSI scale explicitly ask respondents whether they attribute their suicidal ideation to wok; therefore, the WRSI scale has a protocol to help dismiss suicidal ideation attributed to nonwork sources (e.g., a conflictual spousal relationship) or a source the respondent cannot identify. Also, these scales might contribute to the study of suicidal behavior at work in the prevention and control in the foreseeable future by providing brief, but robust measures of these constructs. In addition, the developed and validated scales include three important constructs of the motivational phase of the IMV model of suicidal behavior from which scores derived and they appear to have excellent reliability and evidence of their validity based on their items. The results also indicate that these three constructs are

essential for the measurement of the motivational phase of the IMV model of suicidal behavior, and the validated suicidal behavior at work scales derived from this study can be used as a primary benchmark tool to help in the study of suicidal behavior at work to develop suicide prevention programs in workplaces. Thus, it would contribute to mitigate the risk of suicide and the overall well-being of employees using, at least in part, the IMV model of suicidal behavior. The implementation of the suicidal ideation at work scales can also provide rich feedback to policymakers, mental health professionals, and managers to plan interventions about suicidal behavior at work. In terms of prevention, having valid and reliable tools to identify the risk of suicide is desirable (Vecco at al., 2021) and these developed suicidal behavior at work scales have the potential to help in this end.

Limitations and Recommendations

When evaluating the findings, it is important to consider the current study's numerous flaws. First, because the sample was not chosen randomly and the population resemblance was not confirmed, the population representativeness cannot be assured.Therefore, it is important to cross validate these results with other samples of Puerto Rican employees. Second, because multiple procedures can create varying percentages of type I and type II errors, it may be necessary to investigate how other approaches compare to the single procedure used to examine measurement invariance (i.e., differential operation approach of items). Finally, the reliability evaluation of the stability of the scores was not completed. Consequently, to finish the evaluation of this element, the score's repeatability over time using a test-retest methodology should be investigated.

Conclusion

The final version of the suicidal behavior at work scales consists of three brief measures of work-related suicidal ideation, feelings of defeat and entrapment that are essential constructs of the motivational phase of the IMV of suicidal behavior. The scales' reliability, the evidence of their validity, and the strong measurement invariance between groups (i.e., gender, age, job position, type of organization, and type of employment) suggest that these measures are robust to be used in the occupational health psychology field in the context of organizations in Puerto Rico.

References

Avendaño-Prieto, B. L., Pérez-Prada, M., Vianchá-Pinzón, M., Martínez-Baquero, L., & Toro, R. (2018). Propiedades psicométricas del inventario de ideación suicida positiva y negativa PANSI. *Revista Evaluar, 18*(1). https://doi.org/10.35670/1667-4545.v18.n1.19767

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136-162). SAGE.

Byrne, B. M. (2016). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (3rd ed.). Routledge. https://doi.org/10.4324/9781315757421

Caputo, A. (2017). Social desirability bias in self-reported well-being measures: Evidence from an online survey. *Universitas Psychologica, 16*(2). https://doi.org/10.11144/Javeriana.upsy16-2.sdsw

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14*(3), 464-504. https://doi.org/10.1080/10705510701301834

Cohen, J. (1988). *Statistical power analysis for the behav-*

ioral sciences (2nd ed.). Routledge Academic. https://doi.org/10.4324/9780203771587

Commission for the Prevention of Suicide. (2016). *Estadísticas preliminares de casos de suicidio Puerto Rico, enero – diciembre 2016*. Estado Libre Asociado de Puerto Rico, Departamento de Salud. https://www.dropbox.com/s/va6cwyh84ajamu6/Estadisticas%20Suicidios%20en%20Puerto%20Rico%20Diciembre%202016.pdf?dl=0

Cropley, M., Michalianou, G., Pravettoni, G., & Millward, L. J. (2012). The relation of post-work ruminative thinking with eating behaviour. *Stress & Health, 28*(1), 23-30. https://doi.org/10.1002/smi.1397

Curns, D. B. (2014). *A validity study of the Reasons for Life Scale with emerging adult college students*. Unpublished dissertation for University of Alaska Fairbanks and Anchorage. https://scholarworks.alaska.edu

DeVellis, R. F. (2017). *Scale development: Theory and applications* (4th ed.). SAGE.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the Use of Exploratory Factor Analysis in Psychological Research. *Psychological Methods, 4*, 272-299. https://doi.org/10.1037/1082-989X.4.3.272

Fornell, C., & Bookstein, F. L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing Research, 19*(4), 440-452. https://doi.org/10.2307/3151718

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50. https://doi.org/10.2307/3151312

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning EMEA.

Hayes, A. F., & Coutts, J. J. (2020). Use Omega rather than Cronbach's Alpha for estimating reliability. But… *Communication Methods and Measures, 14*(1), 1-24. https://doi.org/10.1080/19312458.2020.1718629

Hu, L.-T., & Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 76-99). SAGE.

Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1-55. https://doi.org/10.1080/10705519909540118

IBM Corp. (2021). IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp.

Kasl, S. V., & Jones, B. A. (2003). An epidemiological perspective on research design, measurement, and surveillance strategies. In J. Campbell Quick & L. E. Tetrick (Eds.), *Handbook of Occupational Health Psychology* (pp. 377-398). American Psychological Association.

Kline, P. (1994). *An easy guide to factor analysis* (1st ed.). Routledge.

Kline, R. B. (2016). *Principles and practice of structural equation modelling* (4th ed.). The Guilford Press.

Klonsky, E. D., Saffer, B. Y., & Bryan, C. J. (2018). Ideation-to-action theories of suicide: A conceptual and empirical update. *Current Opinion in Psychology, 22*, 38-43. https://doi.org/10.1016/j.copsyc.2017.07.020

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine, 16*(9), 606-613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Li, C.-H. (2016a). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavior Research Methods, 48*(3), 936-949. https://doi.org/10.3758/s13428-015-0619-7

Li, C.-H. (2016b). The performance of ML, DWLS, and ULS estimation with robust corrections in structural equation models with ordinal variables. *Psychological Methods, 21*(3), 369-387. https://doi.org/10.1037/met0000093

Littlewood-Zimmerman, H. F., & Bernal-García, E. R. (2011). *Mi primer modelamiento de ecuación*

estructural: LISREL. Centro de Investigación en Comportamiento Organizacional (CINCEL).

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1*(2), 130-149. https://psycnet.apa.org/doi/10.1037/1082-989X.1.2.130

Marsh, H. W., Balla, J. R., & Hau, K. T. (1996). An evaluation of incremental fit indexes: A clarification of mathematical and empirical properties. In G. A. Marcoulides & R. E. Schumacker (Eds.), *Advanced structural equation modeling techniques* (pp. 315-353). Lawrence Erlbaum.

Mortali, M. G., & Moutier, C. (2019). Suicide prevention in the workplace. In M. B. Riba, S. V. Parikh & J. F. Greden (Eds.), *Mental health in the workplace: Strategies and tools to optimize outcomes*. Springer.

Muthén, L. K., & Muthén, B. O. (2012). *Mplus User's Guide: Statistical Analysis with Latent Variables* (7th ed.). Muthén & Muthén.

O'Connor, R. C. (2011). Towards an integrated motivational-volitional of suicidal behavior. In R. C. O'Connor, S. Platt & J. Gordon (Eds.), *International handbook of suicide prevention: Research, policy and practice* (pp. 181-198). Wiley-Blackwell.

O'Connor, R. C., Cleare, S., Eschle, S., Wetherall, K., & Kirtley, O. J. (2016). The integrated motivational-volitional model of suicidal behavior: Update. In R. C. O'Connor & J. Pirkis (Eds.), *The International Handbook of Suicide Prevention* (pp. 220-240). John Wiley & Sons.

O'Connor, R. C., & Nock, M. K. (2014). The psychology of suicidal behaviour. *The Lancet Psychiatry, 1*(1), 73-85. https://doi.org/10.1016/S2215-0366(14)70222-6

Otsuka, Y., Nakata, A., Sakurai, K., & Kawahito, J. (2016). Association of suicidal ideation with job demands and job resources: A large cross-sectional study of Japanese workers. *International Journal of Behavioral Medicine, 23*(4), 418-426. https://doi.org/10.1007/s12529-016-9534-2

Peterson, C., Stone, D. M., Marsh, S. M., Schumacher, P.

K., Tiesman, H. M., McIntosh, W. L.-K., Lokey, C. N., Trudeau, A.-R.T., Bartholow, B., & Luo, F. (2018). Suicides rate by major occupational group – 17 states, 2012 and 2015. *Morbidity and Mortality Weekly Report, 67*(45), 1253-1260. http://dx.doi.org/10.15585/mmwr.mm6745a1

Ponterotto, J. G., & Ruckdeschel, D. E. (2007). An overview of Coefficient Alpha and a reliability matrix for estimating adequacy of internal consistency coefficients with psychological research measures. *Perceptual and Motor Skills, 105*(3), 997-1014. https://doi.org/10.2466/pms.105.3.997-1014

Rigdon, E. E. (1995). A necessary and sufficient identification rule for structural models estimated in practice. *Multivariate Behavioral Research, 30*(3), 359-383. https://doi.org/10.1207/s15327906mbr3003_4

Rosario-Hernández, E., & Rovira-Millán, L. V. (2002). Desarrollo y validación de una escala para medir actitudes hacia el retiro. *Revista Puertorriqueña de Psicología, 13*, 45-60. https://www.repsasppr.net/index.php/reps/index

Rosario-Hernández, E., Rovira-Millán, L. V., & Merino-Soto, C. (2021). Review of the internal structure, psychometric properties, and measurement invariance of the Work-Related Rumination Scale – Spanish Version. *Frontiers in Psychology, 12*. https://doi.org/10.3389/fpsyg.2021.774472

Rosario-Hernández, E., Rovira-Millán, L. V., Vega-Vélez, S., Zeno-Santi, R., Farinacci-García, P., Centeno-Quintana, L., Navedo-Santos, J., Feliciano-Toro, B. P., De Jesús-Caraballo, R., Morell-Fausto, J., Cepeda-Fax, S., Cintrón-Lugo, M., Colón-Burgos, L., Sánchez-Ortiz, N., Sánchez-Collazo, I., Díaz-Pla, L., Toledo-Medina, M. A., Flores-Quirós, A. S., & Pagán-Torres, O. M. (2019). Exposure to workplace bullying and suicidal ideation: An exploratory study. *Journal of Applied Structural Equation Modeling, 3*(1), 55-75. https://doi.org/10.47263/JASEM.3(1)06

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software, 48*(2), 1-36. https://doi.org/10.18637/jss.v048.i02

Spector, P. E. (1992). *Summated rating scale construction: An introduction*. SAGE.

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder. Tthe GAD-7. *Archives of Internal Medicine, 166*(10), 1092-1097. https://doi.org/10.1001/archinte.166.10.1092

Stark, S., Chernyshenko, O. S., & Drasgow, F. (2006). Detecting differential item functioning with confirmatory factor analysis and item response theory: Toward a unified strategy. *Journal of Applied Psychology, 91*(6), 1292-1306. https://doi.org/10.1037/0021-9010.91.6.1292

Suominen, K., Isometsä, E., Ostamo, A., & Lönnqvist, J. (2004). Level of suicidal intent predicts overall mortality and suicide after attempted suicide: A 12-year follow-up study. *BMC Psychiatry, 4*, Article 11. https://doi.org/10.1186/1471-244X-4-11

Tang, N. K. Y., Goodchild, C. E., Hester, J., & Salkovskis, P. M. (2010). Mental defeat is linked to interference, distress and disability in chronic pain. *Pain, 149*(3), 547-554. https://doi.org/10.1016/j.pain.2010.03.028

Taylor, P. J., Gooding, P. A., Wood, A. M., Johnson, J., Pratt, D., & Tarrier, N. (2010). Defeat and entrapment in schizophrenia: The relationship with suicidal ideation and positive psychotic symptoms. *Psychiatry Research, 178*(2), 244-248. https://doi.org/10.1016/j.psychres.2009.10.015

Taylor, P. J., Wood, A. M., Gooding, P., & Tarrier, N. (2010). Appraisals and suicidality: The mediating role of defeat and entrapment. *Archives of Suicide Research, 14*(3), 236-247. https://doi.org/10.1080/13811118.2010.494138

Taylor, P. J., Wood, A. M., Gooding, P., Johnson, J., & Tarrier, N. (2009). Are defeat and entrapment best defined as a single construct? *Personality and Individual Differences, 47*(7), 795-797. https://doi.org/10.1016/j.paid.2009.06.011

Teismann, T., & Forkmann, T. (2017). Rumination, entrapment and suicide ideation: A mediational model. *Clinical Psychology & Psychotherapy, 24*(1), 226-234. https://doi.org/10.1002/cpp.1999

Tiesman, H. M., Konda, S., Hartley, D., Chaumont-Menéndez, C., Ridenour, M., & Hendricks, S. (2015). Suicide in U.S. workplaces, 2003-2010: A comparison with non-workplace suicides. *American Journal of Preventive Medicine, 48*(6), 674-682. https://doi.org/10.1016/j.amepre.2014.12.011

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research, 27*(3), 247-259. https://doi.org/10.1023/A:1023910315561

Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika, 38*(1), 1-10. https://doi.org/10.1007/BF02291170

Vecco, G. A., Flores-Kanter, P. E., & Luque, L. E. (2021). Análisis psicométrico del Inventario de Orientación Suicida ISO-19, en adolescentes cordobeses escolarizados. *Revista Evaluar, 21*(1), 39-52. https://doi.org/10.35670/1667-4545.v21.n1.32831

Wang, J., & Wang, X. (2012). *Structural equation modeling: Applications using Mplus* (1st ed.). John Wiley & Sons.

World Health Organization. (2021). *Suicides worldwide in 2019: Global health estimates*. https://www.who.int/publications