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Relation between parents' education and sons' intellectual profile on Wechsler Intelligence Scale for Children – Fourth Edition

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ABSTRACT. Rispetto ad altre variabili demografiche molti autori hanno sottolineato l'importanza dell'istruzione dei genitori come miglior predittore delle prestazioni intellettive dei figli ed un fattore importante per il loro sviluppo cognitivo. Sono stati studiati i profili intellettivi alla WISC-IV di 2200 bambini e adolescenti tra i 6 e i 16 anni classificati in base al livello di istruzione dei genitori. In linea con la letteratura, i risultati mostrano differenze significative tra i subtest e gli indici. Più in particolare, i bambini i cui genitori hanno conseguito un titolo di studio universitario, hanno ottenuto prestazioni significativamente più elevate rispetto ad altri gruppi in quasi tutti i subtest dell'Indice di Comprensione Verbale della WISC-IV, seguiti dai bambini i cui genitori hanno un titolo di scuola superiore. Emergono risultati simili per il QI totale e l'Indice di Abilità Generale.

SUMMARY. Many authors have highlighted the importance of parents' education as a better predictor of intellectual achievement and an important factor for the cognitive development of the child compared with other demographic variables. The presence of significant differences across the intellectual WISC-IV profiles of 2,200 children and adolescents between 6 and 16 years classified according to their parents' education was investigated. In line with the literature, our results show significant differences between subtests and indexes. We observed that children, whose parents have university degrees, obtained significantly higher performance compared with other groups in all subtests and indexes of the WISC-IV, followed by the children whose parents have high school degrees. We obtain similar results for Full Scale IQ, General Ability Index, and Cognitive Proficiency Index.

Keywords: *WISC-IV, Parents' education, Intelligence, Children, Adolescents*

INTRODUCTION

The study of demographic variables effects on intellectual performances have always aroused interest in researchers. In particular, for the gender effect there are reports showing a small average sex difference in general intelligence (*g*) favoring men (e.g. Irwing, 2012; Nyborg, 2003); however, there are many also reports finding a null or negligible sex difference in *g* (e.g. Colom, Garcìa, Juan-Espinosa & Abad, 2002; Colom, Juan-Espinosa, Abad & Garcìa, 2000; Dolan et al., 2006; Jensen, 1998; Pezzuti & Orsini, 2016; Saggino et al., 2014; Tommasi et al., 2015). Again, it is widely acknowledged that differences in educational level are related with cognitive performance differences (e.g. Dolan et al., 2006; Gustafsson, 2001; Tommasi et al., 2015).

Then, the relationship between socio-economic status (SES) and cognitive development continues to receive special attention from researchers. In a recent study on the relationship between socio-economic factors and brain morphometry, Noble and colleagues (2015) found that parents' education and family income are associated with changes in the structural development of brain regions designed to language, executive functions and memory, all functions closely associated with intellectual functioning. Similar brain regions also have been linked with performance on intelligence tasks (e.g., Ebisch et al., 2012; Ebisch et al., 2013). Many authors (Brooks, 2011; Cianci, Orsini, Hulbert & Pezzuti, 2013; Craig, 2006; Meekes et al., 2015; Mercy & Steelman, 1982; Rindermann & Baumeister, 2015; Scarr & Weinberg, 1978;) have highlighted the importance of parents' education as a better predictor of intellectual achievement and important factor for the cognitive development of the child compared with other demographic variables. In particular, these authors observe that parents' education represent an indicator of parental IQ and reflect environmental and genetic factors, among which parents' cognitive abilities and their educational behavior, which influence directly and indirectly children development. Parents with high educational level may offer more educational and cultural inputs and a model of intellectual ability, determination and motivation to succeed (Brooks-Gunn, Han & Waldfogel, 2002).

However, the influence exerted by each of these factors varies with the phase of development of the person. The literature suggests that in the transition from childhood to adolescence the individual's cognitive development is most influenced by the environmental factor than the transition from adolescence to adulthood, when the influence on the cognitive development of the person is almost completely exercised by the genetic factor (Clarke-Stewart, Perlmutter & Friedman, 1988; Johnson, 2010; Sellers, Burns & Guyrke, 1996; Vanderploeg, Schinka, Baum, Tremont & Mittenberg, 1998). Again, an Italian study (Balsamo, Romanelli & Saggino, 2010) about elderly people showed that cognitive abilities differentiate from adolescence to adulthood and then this process is reversed in later adulthood.

Furthermore, in their work on clinical use and interpretation of the WISC-IV, Prifitera, Saklofske and Weiss (2005) cite numerous studies that observed the existence of the relationship between IQ and SES. The authors argue that parents' education is a good measure of SES and find that children with parents who have at least a university degree achieved an IQ score significantly higher than all the others with parents who have a lower level of education. Similarly, using the WISC-IV U.S. standardization sample. Brooks (2010) finds a relationship between low scores on the WISC-IV and fewer years of parental education. Subsequently, he also observes similar findings in the study conducted on Canadian Standardization of WISC-IV (Brooks, 2011).

The aim of the present was to examine the relationship between the parental education level on the WISC-IV intellectual profile (subtest scores, four indexes, Full Scale Intelligent Quotient, and two optional WISC-IV Index scores) of the Italian standardization sample (Orsini, Pezzuti & Picone, 2012). In particular, the aim was to study if these influences are the same on all cognitive abilities measured by WISC-IV.

METHOD

Participants

The normative sample of the Italian standardization of Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV; Wechsler, 2003; Orsini et al., 2012) was used. This sample comprises of 2200 children and adolescents between 6 and 16 years classified in 11 groups according to their age year.

Instrument

We used the Italian adaptation of the WISC-IV (Orsini et al., 2012) that retains the Full Scale IQ and the four main factor indexes, and also includes the two additional indexes (GAI

and CPI). Judging from the WISC-IV Italian test manual, internal consistencies, standard errors of measurement and reliability are comparable with those of the English version (Wechsler, 2003).

For the purposes of the present study, we examined the scores obtained in the 10 core subtest (*Block Design, Similarities, Digit Span, Picture Concepts, Coding, Vocabulary, Letter-Number Sequencing, Matrix Reasoning, Comprehension, Symbol Search*), and 5 supplemental subtests (*Picture Completion, Cancellation, Information, Arithmetic and Word Reasoning*) of the WISC-IV.

We calculated the Full Scale IQ (FSIQ) from the sum of the 10 subtests, and the 4 core factor indexes: the Perceptual Reasoning Index (PRI), which includes *Block Design, Picture Concepts* and *Matrix Reasoning*; the Verbal Comprehension Index (VCI), including *Similarities, Vocabulary* and *Comprehension*; the Working Memory Index (WMI) including *Digit Span* and *Letter-Number Sequencing*; and the Processing Speed Index (PSI) including *Coding* and *Symbol Search*. We then calculated the scores for the two additional indexes: the GAI, obtained from the VCI and the PRI; and the CPI, obtained from the WMI and the PSI. Additional information on the subtests, main factor indexes and additional indexes are available elsewhere (Flanagan & Kaufman, 2004; Orsini & Pezzuti, 2014, 2016; Wechsler, 2003).

Procedure

In the present study, we considered as independent variables age and parental education, and as dependent variables the 15 subtest scaled scores, the Full Scale Intelligence Quotient (FSIQ), the four main indexes of Verbal Comprehension Index (VCI), Perceptual Reasoning Index (PRI), Working Memory Index (WMI) and Processing Speed Index (PSI) and the two additional indexes of General Ability Index (GAI) and Cognitive Proficiency Index (CPI).

For age variable we considered the classification used in the WISC-IV Italian version, and for parental education variable we divided the sample into four groups (groups-edu), according to the level of parental education and Italian scholastic system: elementary school, middle school, high school and academic degree. Individuals classified into the four groups-edu according to the highest level of education achieved by either parent, in line with the findings in Scarr and Weinberg (1978) and Cianci et al. (2013), which show that parental education is a good predictor regardless of parental gender.

To compare the performance of individuals in the subtests, indexes, FSIQ, GAI and CPI by both parental education and age group, the data are analyzed through a series of MANOVAs and ANOVAs using SPSS-20 software. Effect sizes were also calculated using Eta-squared, considering effect sizes of Eta-squared of .01 as "small", those arounds .06 as "medium" and those exceeding .14 as "large" effect.

RESULTS

The MANOVA for the 15 WISC-IV subtests shows that highest parental education is a significant factor ($F_{(45, 6422)} = 8.99$; $p<.0001$; $\eta^2 = .06$) while age is not significant ($F_{(150,\ 21402)} = .88$; $p = .8500$; $\eta^2 = .01$) neither interaction between parental education and age ($F_{(450,\ 32102)} = 1.11$; $p = .0510$; $\eta^2 = .01$). So, a second MANOVA was performed, only with parents' education as an independent variable resulted significant ($F_{(45, 6542)} = 9.62$; $p<.01$; $\eta^2 = .06$). Table 1 shows the univariate comparisons results (ANOVAs) with the means, standard deviation (*SD*), differences maximum–minimum between the means, F, *p*, and effect size (η^2) for all scores obtained in each subtest, by the highest level of education achieved by either parent.

By post-hoc comparisons (with Sheffè-method), the subtest most influenced by the parents' education, with a large effect ($\eta^2 = .13$), is *Vocabulary*, and there are statistical significant differences across different parental education groups. Others subtests influenced by parents' education are: *Similarities* ($\eta^2 = .10$), *Information* ($\eta^2 = .10$), *Comprehension* ($\eta^2 = .06$) and *Word Reasoning* ($\eta^2 = .06$). Also for these subtest, the significant difference is between each pair of parent's education levels; these subtests belong all to the Verbal Comprehension Index. *Coding* is the subtest less influenced by the parents' education ($\eta^2 = .01$) showing a significant difference only between the middle school parental education group and the two groups of parents with the highest educational level (high school and academic degree).

If we observe the differences between maximum and minimum means of subtests we note that they may be between 3-4 scaled scores (i.e. *Similarities, Vocabulary, Information* subtest), then 1 standard deviation of scaled scores.

Subsequently, a MANOVA was carried out with 11 groups-age and 4 parental educational groups as independent variables on the four indexes as dependent variables, from

Table 1 – Univariate comparisons: subtest × group-edu

Subtest	Parental education level								
	[1] n = 80	[2] n = 604	[3] n = 1070	[4] n = 446	Difference max-min of means	$F_{(3,2196)}$	p	η^2	Sig. post-hoc (Scheffè)
	M (SD)	M (SD)	M (SD)	M (SD)					
Block Design	9.28(3.05)	9.42(2.80)	10.13(2.90)	10.80(3.11)	1.5	21.28	.0001	.03	[1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
Similarities	7.99(2.74)	8.85(2.77)	10.26(2.87)	11.38(2.80)	3.4	85.39	.0001	.10	[1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
Digit Span	9.29(2.86)	9.35(2.97)	10.07(2.94)	10.88(2.78)	1.6	25.34	.0001	.03	[1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
Picture Concepts	9.25(3.18)	9.39(2.88)	10.14(2.95)	10.85(3.03)	1.6	23.25	.0001	.03	[1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
Coding	9.76(3.02)	9.57(2.96)	10.10(3.00)	10.40(2.95)	.8	7.43	.0001	.01	[2]<[3]; [2]<[4];
Vocabulary	7.59(2.59)	8.74(2.58)	10.21(2.91)	11.54(2.80)	3.9	108.05	.0001	.13	[1]<[2]; [1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
Letter-Number Sequencing	8.55(2.61)	9.45(2.85)	10.09(2.94)	10.88(2.90)	2.3	27.78	.0001	.04	[1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
Matrix Reasoning	8.75(3.03)	9.28(2.85)	10.12(2.95)	11.08(2.89)	2.3	35.83	.0001	.05	[1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
Comprehension	8.61(2.55)	9.17(2.80)	10.12(2.95)	11.08(2.89)	2.5	44.26	.0001	.06	[1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
Symbol Search	9.45(2.68)	9.46(2.81)	10.14(3.11)	10.53(2.81)	1.1	13.14	.0001	.02	[1]<[4]; [2]<[3]; [2]<[4]
Picture Completion	8.51(2.51)	9.33(2.91)	10.10(2.90)	10.90(2.93)	2.4	32.82	.0001	.04	[1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
Cancellation	9.54(2.72)	9.49(2.82)	10.09(3.02)	10.56(3.07)	1.1	12.07	.0001	.02	[1]<[4]; [2]<[3]; [2]<[4]
Information	7.70(2.71)	8.91(2.85)	10.20(2.82)	11.23(2.75)	3.5	77.93	.0001	.10	[1]<[2]; [1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
Arithmetic	8.97(3.09)	9.32(2.93)	10.10(2.89)	10.91(2.89)	1.94	29.4	.0001	.04	[1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
Word Reasoning	8.01(2.65)	9.31(2.81)	10.18(2.91)	11.00(2.87)	3.0	44.07	.0001	.06	[1]<[2]; [1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]

Note. [1] elementary school (>5 years); [2] middle school (6-8 years); [3] high school (9-13 years); [4] academic degree (> 13 years).
For interpretation of Eta-squared η^2: η^2 = .01, small effect; η^2 = .06, medium effect; η^2 = .14, large effect.

which emerges the only statistical significant effect of parents' education ($F_{(12, 6455)} = 27.32$, $p<.01$, $\eta^2 = .05$) and no effect for age (age: $F_{(40, 8606)} = .65$, $p = .96$, $\eta^2 = .00$) and interaction (parental education × age: $F_{(120, 8606)} = 1.17$, $p = .1000$, $\eta^2 = .02$). By second MANOVA only with parents' education as an independent variable ($F_{(12, 6575)} = 29.25$, $p<.01$, $\eta^2 = .051$, power = 1.00), emerged results similar to those previously discussed for the subtests. In particular, by univariate comparisons emerge the VCI is mostly influenced by the parents' education variable, followed by the PRI, WMI, and from the PSI (see Table 2).

Finally, three ANOVAs were conducted to investigate the presence of significant differences on the FSIQ, the GAI and the CPI, obtained from 4 parental education groups and from 11 age groups. The findings show the significant differences for each parent's education level for all composite scores (FSIQ: $F_{(3,2156)} = 86.98$, $p = .0001$, $\eta^2 = .11$, GAI: $F_{(3,2156)} = 94.69$, $p = .0001$, $\eta^2 = .12$; CPI: $F_{(3,2156)} = 34.51$, $p = .0001$, $\eta^2 = .05$). For age, there are no significant differences (FSIQ: $F_{(10,2156)} = .78$, $p = .6500$, $\eta^2 = .00$; GAI: $F_{(10,2156)} = .94$, $p = .50$, $\eta^2 = .00$; CPI: $F_{(10,2156)} = .57$, $p = .839$, $\eta^2 = .00$). Also no significant differences emerged for interaction age × parental education (FSIQ: $F_{(30, 2156)} = .99$, $p = .470$, $\eta^2 = .01$; GAI: $F_{(30, 2156)} = 1.17$, $p = .240$, $\eta^2 = .02$; CPI: $F_{(30, 2156)} = .71$, $p = .874$, $\eta^2 = .01$).

Table 2 shows the univariate comparisons results (ANOVAs) on FSIQ, GAI and CPI: by univariate comparisons emerge the FSIQ and GAI are mostly influenced by the parents' education variable.

DISCUSSION

The results of present paper show significant differences obtained by 2,200 children and adolescents, belonging to four parental education groups with respect to WISC-IV subtests and indexes scores. Univariate comparisons show that children whose parents have university degrees obtained significantly higher performance compared with other groups in all subtests and indexes of the WISC-IV, followed by the children of parents have high school degrees.

This study presents evidence of a significant effect of parents' education on children and adolescent performance on the WISC-IV, similarly to what observed in the literature (e.g. Carneiro, Meghir & Parey, 2013; Cianci et al., 2013; Kaufman & Lichtenberger, 2006; Meekes et al., 2015; Rindermann, & Baumeister, 2015). However, this effect is most noticeable in the subtests that require verbal reasoning skills (*Vocabulary, Similarities, Information, Comprehension* and *Word Reasoning* subtests) governed by the crystallized intelligence, particularly affected by environmental and social conditions (Horn & Cattell, 1967; Picone, Pezzuti & Ribaudo, 2013). According to Bradley and colleagues (Bradley, Corwin, Burchinal, McAdoo & Garcia Coll, 2001) the parents with higher levels of education may have the opportunity to give their children significant educational and cultural input. Such parents are more likely to share with or enroll their children in after-school activities, including arts, foreign languages and the use of computers. So, these parents encourage the openness to experience (related to psychometric intelligence), development of knowledge and skills relevant for school learning, for example, vocabulary, information, comprehension skills and the understanding of the importance of evidence in argument (Carneiro et al., 2013; Evans, Kelley, Sikora & Treiman, 2010; Saggino & Balsamo, 2003).

For all other subtests, the performance of children and adolescents with parents have a high-school or graduate degree is higher than that of children and adolescents whose parents have completed the elementary or the middle school. The only exception is found for the *Coding* subtest, where differences in performance are only between children and adolescents whose parents completed the middle school and those whose parents have a high-school or a graduate degree. Such subtest showed a lower and non-significant size effect.

CONCLUSION

The study finds similar results for the indexes of FSIQ, VCI and GAI: they show a difference max-min of means from 17.8 to 19.6 IQ points between lower parent's education level (with elementary school) and higher parents' education level (with academic degree), so environmental and genetic factors underlying parents' education influence the results. Indeed, parents' education represents both environmental and genetic mechanisms: for example, Rindermann and Baumeister (2015) argued that parents' education was an indicator of parental cognitive ability, educational behavior, quality of developmental environment and genes responsible for the behavior of parents and children. Similarly, Meekes and colleagues (2015) assume that parents' education is an indicator both environment and parental IQ that have

Table 2 – Univariate comparison on all indexes x group-edu

Indexes	**Parental education level**								
	[1] n = 80	[2] n = 604	[3] n = 1070	[4] n = 446					
	M (SD)	M (SD)	M (SD)	M (SD)	Difference max-min of means	$F_{(3,2196)}$	p	η^2	Sig. post-hoc (Scheffè)
VCI	88.38 (12.93)	93.52 (13.45)	101.18 (14.65)	108.00 (13.88)	19.6	110.72	.0001	.13	[1]<[2]; [1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
PRI	93.85 (15.04)	95.60 (14.12)	100.64 (14.51)	105.53 (15.26)	11.7	45.15	.0001	.06	[1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
WMI	93.51 (12.53)	96.39 (14.54)	100.46 (14.92)	105.26 (14.09)	11.7	37.32	.0001	.05	[1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
PSI	97.60 (14.32)	97.12 (14.55)	100.68 (15.41)	102.72 (14.45)	5.6	13.84	.0001	.02	[1]<[4]; [2]<[3]; [2]<[4]
FSIQ	90.56 (13.27)	93.92 (13.77)	101.01 (14.56)	107.49 (13.70)	16.9	86.98	.0001	.11	[1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
GAI	89.90 (13.92)	93.82 (13.52)	101.06 (14.34)	107.68 (14.24)	17.8	94.69	.0001	.12	[1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]
CPI	93.60 (13.94)	96.00 (14.65)	100.64 (14.92)	105.15 (14.01)	11.6	38.80	.0001	.05	[1]<[3]; [1]<[4]; [2]<[3]; [2]<[4]; [3]<[4]

Legenda. VCI = Verbal Comprehension Index; PRI = Perceptual Reasoning Index; WMI = Working Memory Index; PSI = Processing Speed Index; FSIQ = Full Scale Intelligence Quotient; GAI = General Ability Index; CPI = Cognitive Proficiency Index.
Note. [1] elementary school (>5 years); [2] middle school (6-8 years); [3] high school (9-13 years); [4] academic degree (> 13 years).
For interpretation of Eta-squared η^2: η^2 = .01, small effect; η^2 = .06, medium effect; η^2 =.14, large effect.

genetic determinants on children IQ. With regard to the environmental determinants, more educated parents offer educational and cultural input to model of intellectual ability, determination, and motivation to succeed (Brooks-Gunn et al., 2002).

Regarding the genetic determinants, as on said, Noble and colleagues (2015) found that parental education and family income related a variation in independent characteristics of brain structural development in regions that are critical for the development of language, executive functions and memory. From what has been said parents' education is a variable representing both genetic and environmental mechanisms that appear to influence children intellectual profile. Even in studies conducted in recent years on the relationship between environmental and genetic factors and general cognitive ability of children it is observed that the influence that these factors have on the intellectual functioning varies along the person's development.

In particular, the environmental influences are more important in early childhood, while the genetic influences are gaining more and more importance gradually over the years until adulthood (Cianci et al., 2013; Johnson, 2010). Therefore, for the purpose of an early identification of developmental difficulties or disabilities, in both clinical and rehabilitative contexts, it is important to highlight to the families how relevant is to offer children an environment rich in educational and cultural stimulus, as this contributes to provide a baseline for an effective rehabilitative intervention.

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Italian version of the RIVEC Prejudice Scale

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ABSTRACT. Classicamente la psicologia sociale ha analizzato gli effetti che il contatto intergruppi ha sull'intolleranza e la discriminazione. In particolare, vari studi si sono focalizzati su come la coesistenza di culture diverse possa influenzare le dinamiche intergruppi, nello specifico dei processi che portano ad atteggiamenti tolleranti o parziali nei confronti di altri gruppi sociali. Sulla base della classica scala di pregiudizio sottile e manifesto, recentemente è stata proposta la scala RIVEC, che valuta il pregiudizio attraverso cinque componenti: minaccia e rifiuto (Rifiuto), perdita di intimità (Intimità), valori tradizionali (Valori), negazione di emozioni positive (Emozioni) e differenze culturali (Cultura). Nella presente ricerca, 409 partecipanti hanno risposto alla versione italiana di questa scala e ad altre scale relative al pregiudizio: razzismo moderno, orientamento alla dominanza sociale (SDO), etnocentrismo e competizione a somma zero. L'analisi dell'affidabilità interna e l'analisi confermativa hanno confermato la soluzione a cinque fattori.

SUMMARY. The effects of intergroup contact on intolerance and discrimination have been a classical topic in social psychology. Research has indeed focused on how the coexistence of different cultures affects intergroup dynamics, particularly the processes that are related to tolerant versus biased attitudes towards other social groups. Based on the classic blatant-subtle prejudice scale, the RIVEC Prejudice Scale was recently proposed, which assesses prejudice by way of five components: threat and rejection (Rejection), loss of intimacy (Intimacy), traditional values (Values), denial of positive emotions (Emotions), and cultural differences (Culture). In the present research, 409 participants responded to the Italian version of this scale and to other scales related to prejudice: i.e., modern racism, social dominance orientation (SDO), ethnocentrism, and zero-sum competition. RIVEC's internal reliabilities were investigated and a confirmatory factor analysis was performed. Results show adequate fit of both the total score and the single five dimensions.

Keywords: *Prejudice, RIVEC, Blatant and subtle, Italian context, CFA*

INTRODUCTION

Prejudice has been traditionally considered the emotional component of attitudes toward social groups and historically defined as reflecting overt intergroup hostility toward groups, especially marginalized groups (Allport, 1954; Brown, 2011; Dovidio & Jones, 2019). The current view defines prejudice as "an individual-level attitude (subjectively positive or negative) toward groups or their members that creates or maintains hierarchical status relations between groups" (Dovidio, Hewstone, Glick, & Esses, 2010, p. 7). Pettigrew and Meertens (1995; Meertens & Pettigrew, 1997) have suggested the existence of two distinct yet related types of prejudice expression in contemporary society: blatant (i.e. open and direct means of expressing prejudice) and subtle (i.e. covert and indirect behaviours that discriminate against a target out-group, particularly pernicious because it complies with social norms and is therefore less detectable). The two authors operationalised these two forms using 20 items as being referred to five facets of prejudice (Pettigrew & Meertens, 1995): two related to blatant prejudice (i.e. rejection and intimacy) and three related to subtle prejudice (i.e. values, culture and emotions). As the psychological literature has shown, the blatant and subtle prejudice scale has been used in many cultural and social contexts (for the Italian context see for example Arcuri & Boca, 1996; La Barbera & Cariota Ferrara, 2010; Mancini & Carbone, 2007; Manganelli Rattazzi & Volpato, 2001; Villano, 1999; Villano & Passini, 2018) and has been applied to the study of prejudice against indigenous people (Ungaretti, Etchezahar & Barreiro, 2018), sexual and gender prejudice (Cramwinckel, der Toorn & Scheepers, 2018; Krolikowski, Rinella & Ratcliff, 2016) or ethnic prejudice (Pirchio, Passiatore, Panno, Maricchiolo & Carrus, 2018).

Recently, some authors (Arancibia, Ruiz, Blanco & Cárdenas, 2016; Arancibia, Blanco, Ruiz & Castro, 2016; Cárdenas Castro, 2010; Gattino, Miglietta & Testa, 2008; Leone, Chirumbolo & Aiello, 2006) have focused their attention on the issue that Pettigrew and Meertens based their scale on the two-factor structure of the scale (blatant and subtle), but they did not separately measure the five distinct facets they theoretically proposed. Moreover, methodological problems related to the blatant and subtle prejudice scale have been identified. Firstly, some items contain double statements and are extremely long (Arancibia, 2014). Moreover, Arancibia (2014) pointed out that the items designed to measure the "cultural differences" component, assessed perceived cultural differences between out-group and in-group culture (by asking for the level of diversity of values, religious beliefs, etc..) rather than cultural bias. Therefore, it was incorrectly assumed that accounting for cultural differences would be comparable to cultural bias. Secondly, the subtle prejudice scale lacks construct validity due to the fact that the construct was operationalized via some items that do not show discriminant validity with the blatant prejudice measures (Leone et al., 2006). Thirdly, the high correlations between subtle and blatant prejudice (equal to or above .70) would lead one to consider that it is the same construct (Cárdenas Castro, 2010; Coenders, Scheepers, Sniderman & Verberk, 2001).

Measure of prejudice

Starting from these limitations, Arancibia, Ruiz and colleagues (2016) have recently proposed the RIVEC (Rejection, Intimacy, Values, Emotions, and Culture) scale. Although theoretically based on the theoretical model of Pettigrew and Meertens (1995), Arancibia, Ruiz and colleagues (2016) have completely rewritten all the items and then built a novel scale.

The RIVEC consists of 15 items distributed homogeneously across five dimensions (three items for each of them): threat and rejection (Rejection), loss of intimacy (Intimacy), traditional values (Values), denial of positive emotions (Emotions), and cultural differences (Culture). These five dimensions should be considered both as individual facets or components of prejudice and, on the whole, as a generalised measure of prejudice. As shown by the results obtained by Arancibia, Ruiz and colleagues (2016) in validating the scale, the RIVEC represents an adequate measurement of the expression of prejudice. Moreover, in accordance with Arancibia (2014), the RIVEC addresses some of the weaknesses of the blatant-subtle prejudice by consisting of just one-sentence items, by measuring the Culture dimension as tolerance with respect to perceived cultural differences, and by overcoming the problematic subtle and blatant distinction.

The aim of the present study is to adapt the scale to the Italian context and to analyse its psychometric properties and dimensionality. Moreover, we assess the

relationships of RIVEC with other variables related to the attitudes towards other social groups and intergroup bias. In particular, social dominance orientation (SDO), ethnocentrism, modern racism, and competitiveness were considered. Many scholars have shown a great connection between these variables and prejudice. For instance, some authors (Fontanella, Villano & Di Donato, 2016; Passini, 2017; Passini & Villano, 2018; Ungaretti et al., 2018; Villano & Zani, 2007) have demonstrated that people with higher levels of social dominance orientation will be more prejudiced but only towards the groups perceived as inferior in terms of competence or power.

Moreover, different studies have shown that ethnocentrism and some variables like age and political orientation correlate with prejudice (Aiello & Areni, 1998; Passini & Villano, 2013; Pedersen, Clarke, Dudgeon & Griffiths, 2005). In the present research, we hypothesized that SDO, ethnocentrism, modern racism, and competitiveness would positively correlate with the total prejudice score, obtained by considering the RIVEC as a single score. With respect to the relationship of these concepts with each one of the five dimensions of the RIVEC, the research intent is exploratory and therefore no specific assumptions are made.

METHODS

Participants

The participants were contacted online, using an Internet questionnaire constructed using Limesurvey, a survey-generating tool (http://www.limesurvey.org). Respondents were advised that their participation was voluntary and that their responses would remain anonymous and confidential. The data were collected in 2017.

A total of 409 Italian citizens (57.5% women) responded by accessing the website and filling out the questionnaire. Participant ages ranged from 18 to 69 years (M = 33.21, SD = 13.10). They were mainly born in the north of Italy (78.1%), while the 10.3% and the 11.6% came from the centre and the south, respectively, and 2.6% were born abroad. As regards their level of education, 9.4% declared they had completed middle school, 69.2% declared they had earned a high school diploma, 22% had a university degree and 8.8% a masters or Ph.D. qualification. Job-wise, 37.3% stated they were clerical workers, 33.8% university students, 9.9% factory workers/artisans, 7.7% self-employed, 4.2% teachers, 2.8% unemployed, 2.1% retired, and, finally, 2.1% chose other.

Measures

All measures employed seven-point response scales (ranging from 1 = *not at all* to 7 = *very much*). Where not specified, the original English versions were translated into Italian and submitted to a back-translation by a native English speaker. The back-translated items were then reviewed by the authors and, where necessary, any unclear statement was reformulated.

– *RIVEC Prejudice Scale*.
  Based on Pettigrew and Meertens' Blatant and Subtle Prejudice Scale (1995), Arancibia et al. (2016) developed the RIVEC (Rejection, Intimacy, Values, Emotions, and Culture) Prejudice Scale, consisting of fifteen items theoretically structured into five dimensions, each measured with three items. Responses were obtained on a 7-point Likert scale, ranging from "strongly disagree" to "strongly agree." The complete list of items is shown in Table 1. All the items were coded (and eventually reversed) so that that the higher the score, the higher the prejudice. There were no missing data.
– *Modern racism*.
  To measure modern racism, four items on a 7-point scale (from 1 = *strongly disagree* to 7 = *strongly agree*) from the modern sexism scale were adapted to fit racism toward immigrants (see Wohl & Branscombe, 2009). A sample item is "Discrimination against immigrants is no longer a problem in Italy". An overall anti-immigrant racism score was calculated by averaging the four items (α = .83, .5% of missing data).
– *Social Dominance Orientation* (*SDO*).
  Social dominance orientation was measured with the Italian 4-item version of the SDO scale (Pratto et al., 2013). The items were rated on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). A sample item of the scale is "Some groups of people are simply inferior to other groups" (α = .72, 1.5% of missing data).
– *Ethnocentrism*.
  To assess the level of ethnocentrism, participants responded to a reduced six-item form of the ethnocentrism

Table 1 – Descriptive statistics and factor loadings of the confirmatory factor analysis on the RIVEC Prejudice Scale

	Descriptive statistics				Factor loadings (dimension)	
	M	SD	Skewness	Kurtosis	One	Five
Threat and rejection items (Rejection)						
Immigrants live worse than Italians because they belong to a less able race (Gli immigrati vivono peggio degli Italiani perché sono meno capaci)	1.84	1.43	1.87	1.85	.49	.50
Immigrants take jobs, housing and school places that should be filled by Italian citizens (Gli immigrati occupano posti di lavoro, a scuola e abitazioni che dovrebbero essere occupati dai cittadini italiani)	2.71	1.96	.90	−.44	.78	.78
In general, immigrants are people that you cannot trust (In generale, gli immigrati sono persone di cui non ci si può fidare)	2.36	1.65	1.12	.28	.69	.69
Intimacy items (Intimacy)						
I do not think there is a difference between an Italian good friend and an immigrants good friend* (Non credo che ci sia una differenza tra un buon amico italiano e un buon amico immigrato)	5.79	1.85	−1.55	1.20	.41	.42
If I have to travel for work with a co-worker, I would prefer to travel with an Italian than with an immigrant (Se devo viaggiare per lavoro con un collega, preferirei farlo con un italiano piuttosto che con un immigrato)	2.33	1.86	1.24	.32	.77	.81
I would not mind if an immigrant person with a cultural level similar to mine married someone from my family* (Non mi disturberebbe se una persona immigrata con un livello culturale simile alla mia sposasse qualcuno della mia famiglia)	4.99	2.05	−.82	−.65	.42	.43
Traditional values items (Values)						
I perceive that immigrants living in Italy do not understand the friendship values that we have in Italy (Mi rendo conto che gli immigrati che vivono in Italia non capiscono i valori di amicizia che abbiamo in questo paese)	2.36	1.79	1.18	.26	.71	.77
The disadvantage of immigrants using some services (apartment rentals, hospitals, etc.) is that they don't know how to respect the established norms and rules (Il problema degli immigrati che utilizzano alcuni servizi (es. affitti, ospedali, ecc.) è che non sanno rispettare le norme e le regole del nostro paese)	3.56	2.00	.24	−1.21	.67	.70

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	Descriptive statistics				Factor loadings (dimension)	
	M	SD	Skewness	Kurtosis	One	Five
Immigrants don't have the ingrained value that we give to the family in Italy (Gli immigrati non hanno il valore fondamentale della famiglia che hanno gli Italiani)	2.28	1.76	1.32	.65	.62	.67
Positive emotions items (Emotions)						
I admire immigrants who come to Italy looking for better job opportunities* (Ammiro gli immigrati che vengono in Italia alla ricerca di migliori opportunità di lavoro)	5.09	1.75	−.70	−.47	.43	.52
In general, I feel sympathy for immigrants who come to live in our country* (In generale, mi sento solidale con gli immigrati che vengono a vivere nel nostro Paese)	4.93	1.70	−.49	−.69	.63	.87
In general, I consider that immigrants resident in Italy are friendly and educated* (In generale, ritengo che le persone immigrate residenti in Italia siano cordiali ed educate)	4.31	1.47	−.09	−.59	.43	.61
Cultural differences items (Culture)						
If my son had an immigrant classmate he will be enriched by recognizing different traditions and customs* (Se mio figlio avesse un compagno di classe immigrato, ne sarebbe arricchito perché apprezzerebbe tradizioni e costumi differenti)	5.73	1.54	−1.25	.93	.58	.56
The immigrant children who go to school in Italy should assimilate more to the culture of our country than their culture (I bambini immigrati che vanno a scuola in Italia dovrebbero assimilarsi di più alla cultura del nostro paese invece di mantenere la loro)	3.78	1.98	.17	−1.16	.55	.49
If an immigrant child goes to school in Italy he or she should be required to respect our cultural values and traditions (Se un bambino immigrato va a scuola in Italia, dovrebbe essere tenuto a rispettare i valori e le tradizioni culturali italiane)	4.60	2.01	−.36	−1.14	.46	.42

Note. * = Reversed items.

scale (Aiello & Areni, 1998), an Italian measure. Items were measured on a 7-point scale, anchored at *strongly agree* and *strongly disagree*. The scale had a good reliability (α = .92, .7% of missing data). An example of an item is: "It's no accident that our country's prisons are mostly filled with immigrants".

– *Zero-sum competition*.
The zero-sum competition scale (see Ho et al., 2012), made up of four items on a 7-point scale (ranging from 1 = *strongly disagree* to 7 = *strongly agree*), was used. A sample item is "More good jobs for immigrants means fewer good jobs for members of other groups". Cronbach's α was .92. This scale was collected in a subsample with n = 268 (no missing data).
– *Right-wing orientation*.
Participants indicated their ideological affiliation (from 1 = *extreme left* to 10 = *extreme right*, 19.3% of missing data).

Data analysis

First of all, confirmatory factor analysis with maximum likelihood estimation with robust standard errors (MLR) was performed in order to confirm the scale's structure. The analysis was performed using the lavaan R Package (Rosseel, 2012). We relied on the following indexes for the evaluation of the model fit: the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Standardized Root-Mean Square Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA). In line with the recommendation of Hu and Bentler (1999), goodness-of-fit criteria were used in order to quantify acceptable (CFI>.90, TLI>.90, SRMR<.10, RMSEA<.08) and excellent fit (CFI>.95, TLI>.95, SRMR<.08, RMSEA<.06). In particular, we examined two different structures: the one- and the five-dimensional (i.e. rejection, intimacy, values, emotions, and culture) solutions. To test significant improvement in model fit, the chi-square difference test to compare nested models was used. Second, the normality and the internal reliability [both with alpha and McDonald's (1999) omega coefficients] were examined. In particular, as concerns the scale's normality, values of skewness and kurtosis were considered. Normality of the data is considered acceptable when skewness and kurtosis are between ±2 (Gravetter & Wallnau, 2014). Finally, by computing zero-order and partial correlations we explored the association of RIVEC with other relevant dimensions related to discrimination.

RESULTS

CFA was used to verify the fit of the one- and five-dimensional solutions. We started with the five-dimensional structure. The model did not fit the data in an acceptable way: $\chi^2(80)$ = 269.69, CFI = .89, TLI = .85, RMSEA = .07, SRMR = .07. Modification indexes suggested correlating four error terms. These correlations were all plausible given that three of them were between reversed and anti-prejudice items: "I do not think there is a difference between an Italian good friend and an immigrants good friend" (intimacy) with "If my son had an immigrant classmate he will be enriched by recognizing different traditions and customs" (culture), with "I would not mind if an immigrant person with a cultural level similar to mine married someone from my family" (intimacy) and with "I admire immigrants who come to Italy looking for better job opportunities" (emotions). The last one is between two items of the same dimension (culture): "The immigrant children who go to school in Italy should assimilate more to the culture of our country than their culture" with "If an immigrant child goes to school in Italy he or she should be required to respect our cultural values and traditions". The final five-dimensions model fit the data: $\chi^2(76)$ = 187.70, CFI = .94, TLI = .91, RMSEA = .06, SRMR = .05. The one-dimension model with the same four correlations between error terms did not fit the data in an acceptable way: $\chi^2(86)$ = 308.40, CFI = .87, TLI = .84, RMSEA = .08, SRMR = .07. Factor loadings for both the uni- and the five-dimensions are shown in Table 1 and were all significant with p<.001.

As concerns psychometric properties, items had statistically acceptable values on normality (skewness and kurtosis <±2, see Table 2). Internal reliabilities of the five dimensions and the total score showed acceptable values for three dimensions and all the 15 items (α = .89; ω = .89): rejection (α = .72; ω= .73), values (α = .75; ω= .75), and emotions (α = .70; ω = .72). Intimacy and culture had reliabilities both of .62 (α = .61; ω = .65, respectively). However, considering the fact that they are composed by just three items, they were considered adequate, even if lower that the other ones.

Bivariate correlations showed statistically significant high values between all the five dimensions: rs were between .42 and .58, except for the value between rejection and values with r = .73. Both the complete RIVEC Prejudice Scale and its five dimensions were highly positively correlated with all the other variables investigated (see Table 2, above). Partial correlations (see Table 2, below) showed that, when each RIVEC dimension

Table 2 – Zero-order and partial correlation between RIVEC dimensions and the other variables

Correlations	SDO	Ethnoc.	Modern racism	Zero-sum Com.	Right-wing orientation
Zero-order					
RIVEC	.63***	.81***	.78***	.78***	.55***
Rejection	.55***	.71***	.68***	.72***	.43***
Intimacy	.49***	.51***	.54***	.54***	.34***
Values	.51***	.69***	.64***	.67***	.46***
Emotions	.47***	.53***	.54***	.49***	.44***
Culture	.47***	.71***	.67***	.64***	.54***
Partial					
Rejection	.19***	.32***	.27***	.36***	.04
Intimacy	.21***	.00	.10*	.11	−.02
Values	.10*	.22***	.14**	.19**	.12*
Emotions	.21***	.22***	.24***	.13*	.21***
Culture	.10*	.43***	.38***	.30***	.31***

Legenda. SDO = social dominance orientation; Ethnoc. = Ethnocentrism; Com. = Competition.
Note. RIVEC = All the 15 items of the RIVEC scale. ***p<.001, **p<.01, *p<.05

was controlled for the other four RIVEC dimensions, values and culture were modestly related to SDO, intimacy was only related to SDO, emotions were slightly related to zero-sum competition, and finally intimacy and values were not or just slightly related to right-wing orientation.

DISCUSSION

The aim of the present research was to analyse the psychometric properties and the dimensionality of the RIVEC scale and to adapt it to the Italian context. As concerns the structure, the results of the analyses confirm the existence of the five distinct dimensions measuring generalized prejudice. Specifically, the CFA proposes that the five-dimensional structure should be considered as statistically more robust that the one-dimensional structure (even if the bifactor solution had a satisfactory fit). Moreover, the item analysis shows adequate fit with univariate normality and the reliability coefficient of both the total score and the single dimensions are acceptable (also considering the small number of items for each dimension). It is worth noting that partial correlations show some discriminant association of the five dimensions with the other variables considered. In

particular, rejection and culture are more related to other forms of discrimination as ethnocentrism, modern racism, and zero-sum competition. Instead, rejection, intimacy, and values are not or else they are slightly related to right-wing orientation. Future studies should deepen the discriminant validity of these dimensions on other variables, confirming the utility of considering them separately, together with a single general measure of prejudice. For instance, it might be interesting to analyse whether they are differently related to basic values, as measured by Schwartz (1992).

This study had some limitations which have to be taken into account. First of all, the results are based on one single sample. Future studies should replicate these results. Secondly, intimacy and culture are the two weaker dimensions in a statistical sense. Future studies should investigate whether this weakness depends from the current sample or whether it may be better to improve the items of these two dimensions. Thirdly, in order to better compare RIVEC with the blatant-subtle scale, a study should be carried out in the future in which both scales are collected. Finally, the RIVEC scale may suffer from the same limitations as Pettigrew and Meertens' scale, that is social desirability (Olson, 2009). This limitation could be overcome by combining it with implicit measures.

Despite these limitations, the results presented in this article are promising. In particular, the RIVEC scale should be applied cross-culturally with other samples. Arancibia (2014) argues for the importance of studying expressions of prejudice in different social and cultural contexts and with different reference groups. Hence, the RIVEC scale should be considered as a useful tool for studying intolerant attitudes towards the out-groups. In Italy, as in many other countries, there is a need to focus studies and analysis on prejudice and its consequences. As shown by numerous news stories and official statistics[1], the increase in phenomena of overt discrimination and racism against immigrants is leading Italy towards a sort of "racist" emergency. For example, explicit anti-migrant prejudice has recently been shown to predict deliberate actions against migrants among British and Italian participants (Sheperd, Fasoli, Pereir, & Brainscombe, 2018). It might therefore be useful to work on the use of a scale, such as the RIVEC, which captures five dimensions of prejudice, in order to fully understand the various aspects of the phenomenon and consequently try to curb and reduce it. These five dimensions should be conceived as distinct facets, without, however, exasperating the subdivision in blatant and subtle forms as had been done in the past. In a review on quantitative and qualitative studies from social psychology, sociology, and political science, Leach (2005) has indeed remarked the non-existence of a clear temporal distinction between old and new expressions of prejudice and racism. "Formal expression of 'old-fashioned' racism was not as open, overt, blatant and direct as is commonly presumed. Indeed, formal expressions of racial ideology were 'subtl,', 'symboli,', indirect and covert" (p. 434). To corroborate this continuity in formal expression, Leach demonstrates that the formal expression of presumably "old-fashioned" prejudice continues today at levels not so different from the first half of the 20th century, for example by essentializing ethnic groups in terms of culture, religion, origin, or more general practice. Today prejudice in Italy is more overt and direct than ever, and this should lead social psychologists to raise this issue by working on adequate scales, such as RIVEC.

The study of prejudice, stereotyping, and discrimination remains an active research field (Dovidio & Jones, 2019; Krueger, Hall, Villano & Jones,,2008), and social psychologists should have the responsibility to study these kinds of phenomena that have important theoretical and practical implications. New scales like RIVEC could contribute to examining in depth not only personal responses to prejudice, but also how the expressions of prejudice differ in accordance with the social and cultural context (Crandall & Stangor, 2005).

1 See the report of hate crime data on the site of OSCE: http://hatecrime.osce.org/italy.

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Italian validation of the Approach-Avoidance Temperament Questionnaire

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ABSTRACT. L'*Approach-Avoidance Temperament Questionnaire* (ATQ) è lo strumento per la misurazione dei temperamenti di approccio ed evitamento del modello teorico di Elliot e Thrash (2002, 2010). In questo lavoro ci siamo proposti di dare un contributo alla validazione italiana dell'ATQ. Dall'analisi fattoriale esplorativa (EFA) in un campione pilota di studenti universitari (n = 98) e dall'analisi fattoriale confermativa (CFA) in un gruppo più ampio (n = 360), è emersa una solida struttura a due fattori, una soddisfacente affidabilità interna, invarianza per genere e livello di istruzione e validità convergente con la scala BIS-BAS. Anche se i nostri risultati attendono di essere confermati in campioni più grandi e diversificati, l'ATQ sembra essere uno strumento valido e affidabile per misurare i temperamenti di approccio ed evitamento.

SUMMARY. Our aim is to contribute to the Italian validation of the Approach-Avoidance Temperament Questionnaire (ATQ), an instrument devoted to evaluate approach and avoidance temperaments according to the Approach-Avoidance Temperament Model (Elliot & Thrash, 2002, 2010). We performed an exploratory factor analysis (EFA) in an university students' pilot sample (Sample 1, n = 98) and a confirmatory factor analysis (CFA) in an adults' convenience sample (Sample 2, n = 360). We evaluated the invariance across gender and education and we explored the convergent validity with the BIS-BAS scale. The ATQ reported an a-priori two-factor structure in the EFA, that was confirmed in the CFA, satisfactory internal reliability, invariance across gender and education and convergence with the BIS-BAS scale. Even though our results await to be confirmed in larger and diversified samples, the ATQ appears to be a valid, reliable and parsimonious instrument to measure approach-avoidance temperaments.

Keywords: *Approach temperament, Avoidance temperament, Italian validation*

INTRODUCTION

The motivated behavior is governed by two tendencies: the tendency to approach and the tendency to avoidance. Whereas researchers interested in approach and avoidance have analyzed these tendencies from specific angles (such as emotions, traits etc.), Elliot and Thrash (2002) have come to describe approach and avoidance in a broader perspective starting from the aim to identify the basic structures of personality.

Literature has identified three pairs of basic factors of personality: first, the Extraversion/Neuroticism, two traits which respectively concern optimism and sociability and insecurity and worry proneness (Elliot & Thrash, 2002); second, the positive/negative emotionality, two affective dispositions that induce the individual to experience positive (versus negative) emotions (Elliot & Thrash, 2002); third, the Behavioral activation system/Behavioral inhibition system (BAS/BIS), two motivational systems that facilitate (versus inhibit) behavior and generate positive (versus negative) affect (Gray, 1982).

Moving from the evidences of theoretical and empirical links between Extraversion, BAS and positive emotionality, and between Neuroticism, BIS and negative emotionality (Carver & White, 1994), Elliot and Thrash (2002) hypothesized that these two constructs' groups shared an underlying core rooted in the positive (versus negative) valence and in the neurobiological sensitivity to desiderable (versus undesiderable) stimuli. The authors confirmed their hypothesis in three empirical studies (1, 2, 6 studies: Elliot & Thrash, 2002) identifying two latent factors: the approach temperament from Extraversion, positive emotionality and BAS, and the avoidance temperament from Neuroticism, negative emotionality and BIS. Thus, Elliot and Thrash (2010) defined the temperaments as neurobiological sensitivities expressed by vigilance, emotional reactivity and behavioral inclination to valenced stimuli, specifically, inclination to reward stimuli for the approach temperament and to punishment stimuli for the avoidance temperament.

The Approach-Avoidance Temperament Questionnaire

To directly measure approach-avoidance temperaments, Elliot and Thrash (2010) developed the Approach-Avoidance Temperament Questionnaire (ATQ). In a series of 6 studies the authors documented satisfactory internal reliability (Cronbach's alphas are approach temperament = .80; avoidance temperament = .79) and a solid two-factor structure in an exploratory analysis (Study 1) and in a confirmatory factor analysis (CFI = .93, RMSEA = .063) (Study 2); they also confirmed the satisfactory internal reliability (Cronbach's alphas are approach temperament = .85; avoidance temperament = .86) and documented the test-retest stability (approach temperament r = .70, p<.05; avoidance temperament r = .85, p<.05) (Study 3). Moreover, they explored the convergent validity of the approach-avoidance temperaments with Extraversion-Neuroticism, positive and negative emotionality and BIS-BAS scales. After observing a medium-high correlation between temperaments and the like-valenced constructs in an eight-factors CFA model, the authors compared this result with a series of nested models, collapsing together the like-valenced constructs (e.g., approach temperament with BAS), and a full structural model in which approach and avoidance temperaments were the common roots of the like-valenced constructs. This final model showed better fit to the data confirming the theoretical assumptions that approach and avoidance temperaments should be considered as the underlying core of Extraversion/Neuroticism, positive negative emotionality and BIS BAS (Study 4). They also documented the discriminant (Study 5) and predictive validity of the ATQ (Study 6).

Walker and Jackson (2017) have recently noted that the approach-avoidance temperament model is an elegant and parsimonious theory that opened new possibilities to researchers since temperaments are considered as the basic foundation for personality's structure.

The ATQ has been used in literature to analyze approach-avoidance temperaments in relation to coping and sports performance (Yeatts & Lochbaum, 2013), dependency or autonomy-oriented help seeking (Komissarouk, Harpaz & Nadler, 2017), happiness, life satisfaction and well-being (Briki, 2018), showing satisfactory internal reliability in line with the original validation manuscript (Cronbach's alpha range: approach temperament = .75-.85, avoidance temperament = .73-.91) (Briki, 2018; Komissarouk et al., 2017; Yeatts & Lochbaum, 2013). Moreover, the ATQ has been translated into German and the authors confirmed adequate internal reliability (Cronbach's alpha range: approach temperament = .71-.80, avoidance temperament = .73-.81), a two-factor structure (CFI = .94, RMSEA = .060), as well as construct and predictive validity through a series of 4 studies that explored approach-avoidance temperaments in the work setting (Bipp, Kleingeld & Van Dam, 2015).

Approach-avoidance tendencies in the Italian context

Italian studies on approach-avoidance tendencies have been limited to the BIS-BAS scale (Carver & White, 1994) based on the Reinforcement sensitivity theory (Gray, 1982), since this has been the only available instrument validated in Italian (Leone, Pierro & Mannetti, 2002). Leone and colleagues found a satisfactory factorial structure, internal reliability and convergent validity of the BIS BAS factors with Extraversion, Impulsivity and Neuroticism, which although associated still represent different constructs. However, the BIS and BAS systems pertain to a constrained range of eliciting stimuli (i.e., reward and punishment) and processes, thus they are suited to analyze approach and avoidance only in relation to basic stimulus-response functioning (Elliot & Thrash, 2010).

The lack of a measure that assesses approach and avoidance thorugh a broader perspective inspired this contribution. We aim to provide Italian researchers with a measure for the approach-avoidance assessment in a broader perspective, the ATQ (Elliot & Thrash, 2010). We hypothesize that the Italian version of the ATQ will have an adequate factorial structure and internal reliability similar to the original instrument. In accordance with the theoretical background, we expect that approach and avoidance temperament scales will show convergent validity with the BAS and BIS constructs, but still maintaining their own identity.

Moreover, even though it has not been tested yet, we expect the two-factor structure of the questionnaire to be invariant across gender and education.

METHOD

Participants and procedures

We validated the questionnaire in two independent samples. Sample 1 consisted of 98 university students of psychology at the University of Cagliari, 25 men and 73 women, ages 20-50 (M = 22.41, SD = 4.83). Sample 2 was composed of 374 individuals, 210 males, 164 females, ages 18-65 (M = 34.91, SD = 13.41), 136 university students, 238 workers (e.g., employees, lawyers, masons, housewives, etc.), 251 cities residents, 123 small towns residents, 7-26 years of education (M = 14.63, SD = 2.87). The research was publicized through internet ads, leaflets and face-to-face recruitment in public places (universities, associations etc.).

The ATQ questionnaire was translated into Italian by three independent translators and the final version was back-translated into English by an expert.

The ATQ questionnaire was included within a battery of instruments and administered in two independent samples and two different sessions. Sample 1 completed the ATQ in classroom at the end of a lesson. Sample 2 completed the ATQ questionnaire and the BIS-BAS scale as a part of a larger study. All data were collected after obtaining informed consent and were anonymized through the assignment of a numerical code to each participant. The two studies were approved by the Ethics Committees of the Sapienza University of Rome and the University of Cagliari.

Instruments

The Approach-Avoidance Temperament Questionnaire (Elliot & Thrash, 2010) is composed of 12 items with a 7-point Likert scale response format (1 = Strongly disagree, 4 = Neither agree nor disagree, 7 = Strongly agree). The ATQ investigates with 6 items per scale, the approach temperament (e.g., "I am always on the lookout for positive opportunities and experiences") and the avoidance temperament (e.g., "When it looks like something bad could happen, I have a strong urge to escape").

The BIS-BAS scale (Carver & White, 1994; Italian version Leone et al., 2002) is composed of 20 items with a 5-point Likert scale response format (1 = It does not describe me at all, 5 = It completely describes me). The BIS explores anxious anticipation of negative events (7 items, e.g., "I worry about making mistakes"). The BAS investigates the reward sensitivity with three factors: BAS Drive that assesses proactive behaviors (4 items, BASd; e.g., "I go out of my way to get things I want"); BAS Reward Responsiveness that explores the tendency to be excited by reward opportunities (5 items, BASrr; e.g., "When I get something I want I feel excited and energized"); and BAS Fun Seeking that investigates the tendency to experiment new sensations (4 items, BASfs; e.g., "I crave excitement and new sensations"). The Italian version showed an adequate factorial structure (CFI = .95, RMSEA = .054) and acceptable internal reliability (Cronbach's alphas are BASd = .68, BASfs

= .75, BASrr = .74, BIS = .72) (Leone et al., 2002). In this study we confirmed its acceptable internal reliability (ω is BASd = .75, BASfs = .63, BASrr = .74, BIS = .78).

Analysis and models

Data analysis was conducted with structural equation modeling, the parameters were estimated with the full information maximum likelihood to manage the few missing cases (Sample 1 = 1 missing of item 5- 1.02%; Sample 2 = 1 missing of item 12- .27%). We excluded from the analyses 14 participants of the Sample 2 that abandoned the study. We tested the factorial structure through EFA in a university students' sample (Sample 1) and we confirmed the results with CFA in a larger adults' sample (Sample 2). To evaluate the model's adequacy, we referred to several fit indices, the chi-square value (χ^2), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI) and the Root Mean Square Error of Approximation (RMSEA). Researchers commonly consider as sufficient or satisfactory fit values CFI and TLI above .90 or .95 and RMSEA below .08 or .06 (Hu & Bentler, 1999).

To support the factorial invariance over genders and level of education the difference of CFI and RMSEA between the most restrictive model and the previous one should not exceed a ΔCFI of .01 and a ΔRMSEA of .015 (Cheung & Rensvold, 2002).

We calculated the internal reliability of the ATQ through McDonald's ω index (McDonald, 1970): $\omega = (\Sigma|\lambda i|)^2/([\Sigma|\lambda i|]^2+\Sigma\delta ii)$, where λi are the factor loadings and δii the error variances.

Finally, we examined the convergent validity of the ATQ with the BIS-BAS scale (Carver & White, 1994; Italian validation Leone et al., 2002) within a latent framework based on item parcels. This was done to reduce the complexity of the model, in line with recommendations of Leone and colleagues for the BIS-BAS scale (2002) and after testing the satisfactory fit and adequate parameters at the item-level factor structure for the ATQ (Marsh, Lüdtke, Nagengast, Morin & Von Davier, 2013)[1].

1 BIS-BAS scale: $\chi^2(21)$ =52.954, p<.05 Scaling Correction Factor = 1.1996, CFI = .95, TLI = .92, RMSEA = .065 with satisfactory factor loadings (>.500). ATQ: $\chi^2(8)$ = 8.640, p>.05, Scaling Correction Factor = 1.1359, CFI = .99, TLI = .99, RMSEA = .015 with robust factor loadings (>.650).

RESULTS

Exploratory factor analysis on Sample 1.

We tested the a-priori two-factor structure with exploratory procedures (EFA). Results showed adequate fit indices (CFI = .95, RMSEA = .051; see Table 1). All items showed satisfactory factor loadings on the corresponding factors (>.380), except for item 5 (see Table 2). This item is expressed in a negative form therefore some of the participants might have misunderstood the question; this might have affected the results, considering the small sample. In line with theoretical expectations and with results of the original instrument, no correlation between the two temperaments was found (r = −.026, p>.05). Satisfactory internal reliability was found for both scales (ω : ATQap = .75, ATQav = .75).

Confirmatory factor analysis and invariance over gender and education on Sample 2.

The two-factor structure was cross-validated using confirmatory procedures (CFA) in Sample 2. we found solid fit indices (CFI = .96, RMSEA = .043) (see Table 1) and satisfactory factor loadings for all items, including item 5 (see Table 3). We also confirmed a lack of correlation between approach and avoidance temperaments (r = .038, p>.05) and satisfying internal reliability (ω: ATQap = .74, ATQav = .82). These results are in line with the original and subsequent studies on the ATQ (Bipp et al., 2015; Elliot & Thrash, 2010). To explore the invariance of the factorial structure in addition to the gender groups we divided the sample in "low level education" group (up to 13 years of education) and "high level education" group (over from 13 years of education). The invariance models showed that the factorial structure of the ATQ is invariant across gender and education (ΔCFI<.01; ΔRMSEA<.015) from the less restrictive model (M1) to the more restrictive model (M6) (see Table 4 and Table 5).

Convergent validity with BIS-BAS scale.

To explore the convergent validity between approach-avoidance temperaments and BIS BAS constructs, we tested a latent model with six correlated latent factors: four factors for the BIS-BAS scale (BIS, BASd, BASfs, BASrr) and two factors for the ATQ (ATQap, ATQav). The model showed an acceptable fit to the data [$\chi^2(75)$ = 172.965, p<.05, CFI = .95, TLI = .93, RMSEA = .060] and satisfactory factor loadings (>.500).

The correlation matrix between BIS BAS and approach-avoidance temperaments can be observed in Table 6. Positive and high correlations were found between approach

Table 1 – Fit indices of EFA in Sample 1 and CFA in Sample 2

	χ^2	df	SCF	CFI	TLI	RMSEA	R. 90% C.I.	R. prob.
EFA Sample 1	54.128	43	.976	.95	.92	.051	.000-.090	.452
CFA Sample 2	85.172*	51	1.197	.96	.95	.043	.027-.059	.737

Legenda. df = degree of freedom; SCF = Scaling Correction Factor; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; R. 90% C.I. = 90% RMSEA Confidence interval; R. prob. = Probability RMSEA (*p<.05).

Table 2 – Exploratory factor analysis of the ATQ on Sample 1

Item		Factors		
		ATQap	**ATQav**	**Residual variance**
ZATQ2	Pensare alle cose che desidero mi dà proprio una forte carica.	.662*	.006	.562
ZATQ4	Mi entusiasmo subito, quando intravedo un'opportunità per qualcosa che mi piace.	.612*	.044	.624
ZATQ5	Non ci vuole tanto per entusiasmarmi e motivarmi.	.212	−.040	.953
ZATQ8	Sono sempre alla ricerca di opportunità ed esperienze positive.	.709*	−.182	.457
ZATQ10	Le cose belle che mi capitano mi influenzano molto intensamente.	.592*	.204	.614
ZATQ11	Quando voglio qualcosa, sento un forte desiderio di impegnarmi per ottenerla.	.616*	−.106	.606
ZATQ1	Per natura, sono una persona molto nervosa.	−.130	.395*	.824
ZATQ3	Non ci vuole molto a farmi preoccupare.	.043	.546*	.701
ZATQ6	Provo ansia e paura in modo molto intenso.	−.007	.830*	.310
ZATQ7	Le brutte esperienze mi colpiscono molto intensamente.	.079	.661*	.559
ZATQ9	Quando avverto che potrebbe accadere qaulcosa di brutto, sento la necessità di scappare.	.070	.383*	.850
ZATQ12	È facile per me immaginare cose brutte che potrebbero accadermi.	−.171	.568*	.643

Legenda. ATQap = ATQ approach temperament; ATQav = ATQ avoidance temperament (*p<.05).

Table 3 – Confirmatory factor analysis of the ATQ on Sample 2

Items		Factors		
		ATQap	**ATQav**	**Residual variance**
ZATQ2	Pensare alle cose che desidero mi dà proprio una forte carica.	.726**		.472
ZATQ4	Mi entusiasmo subito, quando intravedo un'opportunità per qualcosa che mi piace.	.629**		.604
ZATQ5	Non ci vuole tanto per entusiasmarmi e motivarmi.	.335**		.888
ZATQ8	Sono sempre alla ricerca di opportunità ed esperienze positive.	.541**		.708
ZATQ10	Le cose belle che mi capitano mi influenzano molto intensamente.	.593**		.649
ZATQ11	Quando voglio qualcosa, sento un forte desiderio di impegnarmi per ottenerla.	.564**		.682
ZATQ1	Per natura, sono una persona molto nervosa.		.542**	.706
ZATQ3	Non ci vuole molto a farmi preoccupare.		.618**	.618
ZATQ6	Provo ansia e paura in modo molto intenso.		.869**	.244
ZATQ7	Le brutte esperienze mi colpiscono molto intensamente.		.670**	.551
ZATQ9	Quando avverto che potrebbe accadere qaulcosa di brutto, sento la necessità di scappare.		.464**	.785
ZATQ12	È facile per me immaginare cose brutte che potrebbero accadermi.		.716**	.488

Legenda. ATQap = ATQ approach temperament, ATQav = ATQ avoidance temperament (*p<.05, **p<.001).

Table 4 – Invariance over gender of ATQ on Sample 2

	χ^2	df	CFI	TLI	RMSEA
CFA	85.712*	51	.960	.949	.043
M0-CFA gender groups	167.322*	122	.947	.942	.045
CFA female	79.466*	51	.927	.905	.059
CFA male	57.374	51	.986	.982	.025
M1-Configural	136.369*	102	.959	.948	.043
M2-Metric	153.247*	112	.951	.943	.045
M3-Scalar	167.322*	122	.947	.942	.045
M4-Residual variance	174.646*	134	.952	.953	.041
M5-Variance Covariance	177.866*	137	.952	.954	.041
M6-Mean	185.102*	139	.946	.948	.043

Legenda. df = degree of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation.

Note. Male N = 202; Female N = 158; comparing M0 to M6 models the factorial structure of the ATQ is invariant across genders (ΔCFI<.01; ΔRMSEA<.015) (*p<.05).

Table 5 – Invariance over education level of ATQ on Sample 2

	χ^2	df	CFI	TLI	RMSEA
CFA	85.712*	51	.960	.949	.043
CFA education groups	1670.575*	122	.958	.955	.042
CFA low level edu.	72.183*	51	.958	.946	.043
CFA high level edu.	66.068	51	.963	.952	.046
M1-Configural	138.527*	102	.960	.949	.045
M2-Metric	152.203*	112	.956	.949	.045
M3-Scalar	160.575*	122	.958	.955	.042
M4-Residual variance	170.636*	134	.960	.961	.039
M5-Variance Covariance	171.613*	137	.962	.964	.037
M6-Mean	172.497*	139	.964	.965	.037

Legenda. df = degree of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation.

Note. Low level education N = 221; High level education N = 139; comparing M1 to M5 models the factorial structure of the ATQ is invariant across level of education (ΔCFI<.01; ΔRMSEA<.015) (*p<.05).

Table 6 – Correlation matrix ATQ and BIS-BAS scale

	ATQap	S.E.	B&K Formula	ATQav	S.E.	B&K Formula
BASd	.610**	.055	.72	–.165*	.065	.29
BASfs	.583**	.080	.74	.242**	.067	.37
BASrr	.835**	.036	.91	.238**	.066	.37
BIS	.064	.069	.20	.895**	.030	.95

Legenda. ATQap = ATQ approach temperament; ATQav = ATQ avoidance temperament; BASd = BAS drive; BASfs = BAS fun seeking; BASrr = BAS reward responsiveness; S.E. = Standard Error; B&K Formula = Bagozzi and Kimmel Formula (1995) (**p<.001, *p<.05).

temperament and all BAS scales, as well as between avoidance temperament and BIS. Also, negative correlations between avoidance temperament and BAS drive and BAS reward responsiveness and a positive correlation with BAS fun seeking were found. These results confirm the pattern of correlations showed in the validation paper of Elliot and Thrash (2010), even though the authors considered the general BAS scale and not the BAS subscales, but are generally higher (e.g., approach temperament with BAS reward responsiveness r = .835, p<.001; avoidance temperament and BIS r = .895, p<.001). Therefore, in order to be sure that the examined constructs are not isomorphic, we applied the Bagozzi and Kimmel formula (1995)[2]. None of the results has exceed the criterion of 1 (.20-.95; see Table 6), thus it resulted that approach-avoidance temperaments and BIS BAS, although associated, remain distinct constructs.

2 To demonstrate the factor independence researchers should add to the correlation value 1.96 times the standard error of the correlation value to identify the upper limit of the 95% confidence interval for correlation (correlation + standard error of correlation + [(standard error of correlation/100) *96]). It is commonly considered as evidence of discriminating validity between the two factors when the value is below 1.

CONCLUSION

Starting from the aim to identify the basic structures of personality, Elliot and Thrash (2010) identified two constructs, the approach and avoidance temperaments, that represent the common root of traits adjective (Extraversion/Neuroticism), emotional predispositions (positive/negative emotionality) and motivational systems (BIS/BAS) and they developed the Approach-Avoidance Temperament Questionnaire (Elliot & Thrash, 2010). "The availability of direct measures of approach and avoidance temperament opens the door for efficient and flexible research on these personality dimensions ... [which] ... represent the core dispositions on which other dispositions rest" (Elliot & Thrash, 2010, p. 894).

This study was aimed to provide an Italian validation of the Approach-Avoidance Temperament Questionnaire (Elliot & Thrash, 2010), we documented the two-factors structure and adequate factor loadings in an exploratory factor analysis conducted in a university students' pilot sample and we confirmed a solid factorial structure and satisfactory internal validity in a confirmatory factor analysis conducted in a larger adults' sample. We demonstrated the invariance of the ATQ factorial structure

over gender and education and in the convergent validity analysis we observed that BAS-BIS scales and approach-avoidance temperaments, even though related, are still distinct constructs.

Although the results described are encouraging, this study presents some limits that should be considered. Future researchers should evaluate the psychometric properties of the ATQ in larger and more diversified samples and they should examine convergent-discriminant validity with Extraversion and Neuroticism as well as positive/negative emotionality in an Italian sample. Nonetheless, so far, the Italian version of the ATQ showed good psychometric properties comparable to the original instrument. In relation to the study of approach and avoidance tendencies, the only currently available measure in Italian is the BIS-BAS scale; however, BIS and BAS sensitivities seems to be constrained to a more limited set of eliciting stimuli, neurophysiological processes, and neuroanatomical structures (Elliot & Thrash 2010). Therefore, the ATQ can be employed in studies aimed to analyze approach and avoidance as broader concepts.

In conclusion, the ATQ is a brief and easy to administer instrument (12 items) and it could be considered a valuable and reliable instrument in approach-avoidance assessment.

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Work based learning: Italian adaptation of the Learning Potential of the Workplace scale (LPW)

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ABSTRACT. Il presente articolo si propone di tradurre e adattare la scala del potenziale di apprendimento lavorativo, *Learning Potential of the Workplace* (*LPW*), in lingua italiana e valutarne le proprietà psicometriche. Tre studi hanno testato la validità psicometrica della versione italiana su un campione di 729 lavoratori provenienti da 3 diverse organizzazioni italiane. Il primo ha esaminato la struttura e la validità della misura eseguendo una analisi fattoriale confermativa e calcolando l'affidabilità della scala. Il secondo ha analizzato le validità convergenti e divergenti della LPW attraverso l'analisi delle correlazioni tra le dimensioni della scala, le pratiche HR di formazione e il clima di tradizione organizzativa. Infine, il terzo studio ha testato la validità di costrutto utilizzando modelli di equazioni strutturali, indicando una relazione significativa tra attività sfidanti e feedback dalla mansione con le varie dimensioni della LPW. I risultati hanno indicato l'affidabilità della versione italiana, che presenta proprietà psicometriche simili a quelle della scala originale e, quindi, si presenta come uno strumento valido per valutare il potenziale di apprendimento del posto di lavoro.

SUMMARY. The present study sought to translate and adapt the Learning Potential of the Workplace Scale (LPW) into the Italian language and assess its psychometric properties. A sample of 729 workers was recruited from 3 different organizations located in Italy. Three studies tested the psychometric validity of the Italian version. The first tested the LPW's structure and validity by performing confirmatory factor analyses and calculating the scale's reliabilities. The second tested LPW's convergent and divergent validities through correlation analyses. The relationship between the LPW's dimensions, HR training practices, and organizational tradition climate were investigated. Lastly, the third study analyzed the scale construct validity by using structural equation modeling. The relationship of challenging tasks and task feedback with LPW dimensions was observed. Results indicated that the Italian version was reliable, with similar psychometric properties of the original scale and, therefore, a valid instrument for assessing the learning potential of the workplace.

Keywords: *Scale validation, Italian translation, Workplace learning, Learning potential, Job characteristics*

INTRODUCTION

Theoretical framework

In the current socioeconomic situation, organizations are facing new challenges stemming from technological, economic, and labor market-related changes (Rintala, Nokelainen & Pylväs, 2018). Maintaining a skilled workforce is key to firm's success and survival as it facilitates organizational adaptation to the everchanging environment. Consequently, companies are increasing their effort in promoting employees' learning at work (Noe, Clarke & Klein, 2014).

Workplace learning is a complex phenomenon representing "the way in which individuals or groups acquire, interpret, reorganise, change or assimilate a related cluster of information, skills and feelings. It is also primary to the way in which people construct meaning in their personal and shared organisational lives" (Marsick, 1987, p. 4).

This construct has attracted a growing attention in the recent years, nevertheless, it is a still largely unexplored concept and neither the mechanisms underlying it or the personal and contextual factors that can stimulate this type of learning are fully understood (Billett, 2008; Cangialosi, Odoardi & Battistelli, in press; Ellström, 2001; Nikolova, Van Ruysseveldt, De Witte & Syroit, 2014;). Similarly, the majority of studies on workplace learning have focused on assessing the effects of formalized training systems, while the potential of informal workplace learning has been often neglected. Nevertheless, research has frequently underlined that learning in the workplace often derives from work-related activities and interactions and does not just occur through training and education (Coetzer, Kock & Wallo, 2017).

Workplace learning involves both formal and informal aspects that occur in the work context in which learning, and work processes are intertwined (Hicks, Bagg, Doyle & Young, 2007). However, evidences suggest that employees acquire knowledge, skills and abilities more often outside formal learning contexts through informal learning activities, as interacting with others and through personal experiences (Eraut, 2000; Skule, 2004). Furthermore, providing formal learning has become more challenging due to limited resources and quickly changing work demands (Noe et al., 2014). Therefore, informal learning has gained increasing interest as it provides an important source for achieving personal and organizational goals (Eraut, 2004; Marsick & Watkins, 2015).

Several studies attempted to develop measures for workplace learning, but they were often context-dependent, and, as a consequence, scarcely applicable in different occupational settings (Nikolova et al., 2014). One exception is the van Veldhoven, Meijman, Broersen and Fortuin's four-item scale (2002) measuring learning opportunities at work.

This scale can be applied in different occupational contexts; however, it operationalizes workplace learning as a general concept, without detailing the processes and mechanisms underlying it. In order to overcome this drawback, a six-dimensional scale was constructed for measuring context-independent workplace learning including: learning via task execution, organizational facilitation for learning, learning through reflection, learning through exploration, learning via supervisor, and learning via colleagues (Taverniers, 2011). Moreover, Coetzer (2007) developed a multi-dimensional workplace learning instrument which incorporates multiple aspects of workplace learning, although it does not assess learning as a dynamic process.

Based on the efforts of Taverniers (2011) and Coetzer (2007) in assessing the different dimensions of learning in the workplace with a context-independent approach, Nikolova and colleagues (2014) presented a multidimensional scale measuring the learning potential of the workplace (LPW) designed for diverse occupations and settings.

The scale presents two core components of workplace learning: interactional and task-based. Based upon literature review, Nikolova and colleagues (2014) established that people develop and maintain interpersonal interactions in their work activities as source for gaining or increasing new KSAOs (Billett, 2004). Employees generally learn in the workplace through two types of interactions: with colleagues and supervisors (Coetzer, 2007; Evers, 2012; Kyndt, Dochy & Nijs, 2009; Taverniers, 2011). Learning from colleagues has been recognized as one of the most prevalent forms of workplace learning (Billett, 2004), because extensive professional contacts are salient for employees' development of their KSAOs (Billett, 2008). Also, learning from the direct supervisor is crucial for workplace learning as supervisors are an important source of vicarious experience (Hughes, 2004).

With regard to the task-related aspect of workplace learning, Nikolova and colleagues (2014) point out the difference between learning through reflection and learning through experimentation "as two interrelated cognitive-behavioral processes" (p. 3). Kolb (1984) posited that both reflective observation and active experimentation are essential to the learning cycle.

Also, Wielenga-Meijer, Taris, Kompier and Wigboldus (2010) underlined that in order to learn in the workplace individuals engage in practices of both exploration and experimentation.

In line with the aforementioned studies, workplace learning seems to play a major role in enhancing employees' individual growth and wellbeing as well as organizational success and competitive advantage (e.g., Noe et al., 2014; Watson, Tregaskis, Gedikli, Vaughn & Semkina, 2018). The aim of this study is to provide an Italian version of the Learning Potential of the Workplace (Nikolova et al., 2014), as having a reliable measure of workplace learning seems to be crucial in understanding learning dynamics happening within the organizational context, and no instrument has yet been developed to assess this construct in Italian.

Also, this paper analyzes its psychometric properties and validates it for following use in research and application in Italian-speaking population.

METHOD

The psychometric qualities of LPW were assessed by using a multiple analysis procedure (Hinkin, 1995) in 3 separated studies. The first study tested the structure validity of the overall scale by using confirmatory factor analysis (CFA) on the LPW four-factor initial model. Reliability was assessed by composite reliability and omega analysis. The second study tested a replication of CFA for the 4-factor model, and of the convergent/divergent validities by using correlation analysis. Finally, the last study tested another CFA of the 4-factor model and analysed the LPW construct validity via antecedents theoretically related to these factors.

The analyses were performed with R 3.5.3 (R Core Team, 2019) and *Mplus 8.2* software (Muthen & Muthen, 1998-2017). Data were collected using online survey procedure for 3 different organizations, ensuring thus diversity between the samples.

STUDY 1

Study 1: translation and confirmatory factor analysis

The scale translation follows the 3 steps procedure: translation in Italian, retranslation in English, and use of the Italian version for the validation (Brislin, 1970). Two bilingual researchers realized the translation/retranslation process, one at each different phase. Then, to ensure adequate validation, the translations were presented to work and organizational psychology and human resource management experts. The more adequate translations were selected (see Table 1) and used for the validation procedure.

Study 1: method

The sample (N = 253) was composed of workers from an Italian private organization operating in the automatic food distribution sector in central Italy. Most respondents were male (82%) with an average organisational tenure ranging from 10 to 12 years and an average age ranging from 41 to 45 years. The items were scored on a 5-point scale ranging from 1 (*not agree at all*) to 5 (*strongly agree*).

Study 1: results

To ensure a good factorial structure of the LPW instrument, Italian version, a CFA was conducted testing the initial 4-factor model. Byrne (2012) and Kline (2016) recommend the use of multiple fit indices to ensure goodness of fit. Thus, the Root Mean Square Error of Approximation (RMSEA), the RMSEA 90% confidence interval, the chi-square value and degree of freedom, the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Standardized Root Mean Square Residual (SRMR) were examined (Tabachnik & Fidell, 2012). The data followed approximately a normal distribution, allowing the use of the maximum likelihood estimation with Robust Standard Errors (MLR). The initial 4-factor model (model 1) presented good adjustment indices ($\chi^2(48) = 127.815, p<.001$; RMSEA = .07 [90% confidence interval CI = .06-.09]; CFI = .93; TLI = .91; SRMR = .05). The internal consistency was measured by the omega index (Ω), the Average Variance

Table 1 – Items of the learning potential of the workplace scale and factor loadings (N = 253). Study 2 (N = 226) and Study 3 (N = 250)

	Dimensions and items		Study 1	Study 2	Study 3
	Italian version	English version			
Learning through reflection					
1	Nel mio lavoro mi viene data l'opportunità di riflettere su differenti metodi di lavoro	In my work I am given the opportunity to contemplate about different work methods	.66	.59	.63
2	Nel mio lavoro mi viene data la possibilità di pensare a come realizzare i miei compiti in maniera più efficace	In my work I am given the chance to think about how I can conduct my tasks more efficiently	.83	.76	.79
3	Quando incontro delle difficoltà nei miei compiti vengo stimolato a riflettere al modo migliore per risolverle	When confronted with difficulties in my tasks, I am given the opportunity to consider what the best possible approach is	.80	.77	.82
Learning through experimentation					
4	Nel mio lavoro posso sperimentare differenti metodi di lavoro	In my job I can try different work methods even if that does not deliver any useful results	.47	.70	.62
5	Nel mio lavoro mi viene dato sufficiente tempo per trovare come realizzare i miei compiti più efficacemente	In my job I am offered sufficient time to find out how to conduct tasks more efficiently	.85	.87	.86
6	Nel mio lavoro mi viene offerto sufficiente tempo e opportunità per cercare nuove soluzioni ai problemi legati al compito	In my job I am offered sufficient time and opportunities to search for new solutions regarding task-related problems	.87	.75	.92
Learning from colleagues					
7	I miei colleghi mi informano se faccio qualche errore nel mio lavoro	My colleagues tell me if I make mistakes in my work	.55	.52	.70
8	I miei colleghi mi informano se non conosco come realizzare certi compiti nel mio lavoro	My colleagues advise me if I don't know how to conduct a certain task	.73	.82	.72
9	I miei colleghi sono entusiasti di collaborare con me nel cercare una soluzione ad un problema di lavoro	My colleagues are eager to collaborate with me in finding a solution to a work problem	.62	.79	.68

continued on next page

continued

	Dimensions and items		Study 1	Study 2	Study 3
Italian version		English version			
Learning from supervisor					
10	I miei diretti superiori mi aiutano a vedere i miei errori come un'esperienza di apprendimento	My supervisor helps me see my mistakes as a learning experience	.74	.40	.90
11	Il mio diretto superiore si appassiona nel pensare insieme a me come risolvere un problema legato al lavoro	My supervisor is eager to think together with me how to solve a work-related problem	.77	.67	.75
12	Il mio diretto superiore mi dà suggerimenti su come svolgere il mio lavoro	My supervisor tips me on how to do my work	.75	.74	.80

Extracted (AVE), and the Composite Reliability (CR) showing acceptable reliabilities (Ω = .70 to .82; AVE = .41 to .59; CR = .67 to .81). The use of omega has been favoured over Cronbach's alpha for its properties more suitable for calculating internal consistency (Peters, 2014). However, the implied correlation of the latent variable showed scores from .58 to .89 indicating the possible existence of a single factor combining the two task-related factors (see Table 2).

To ensure that the 4-factor structure was the best, model 1 (1) was compared to 4 alternative nested models (see Table 3). Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC) were added to allow the comparison between the 5 models. Furthermore, Satorra Bentler analysis ($\Delta\chi^2$) and the difference between TLI and CFI values (ΔTLI, ΔCFI) were also used. Overall, the initial model outperformed the 4 alternative models. The alternative 3-factor model (2), integrated the two task-related factors into a single factor ($\Delta\chi^2$ = 50.36, Δdf = 3, p<.01), while the second 3-factor model (3) the two interactional dimensions in a single factor ($\Delta\chi^2$ = 31.44, Δdf = 3, p<.01). The third model (4), combined the learning from colleagues and from supervisor into an interactional factor and learning through reflection and through experimentation into a task-related factor ($\Delta\chi^2$ = 58.93, Δdf = 5, p<.01). The last (5) model, consisted of the grouping of all the elements of the 4 subscales in a single factor ($\Delta\chi^2$ = 137.75, Δdf = 6, p<.01). These results confirm the structural validity of the scale in 4 factors.

Table 2 – Internal consistencies, implied correlation and intercept and standard deviation of LPW scale

	AVE	CR	Intercept	SD	1	2	3	4
Study 1 (N = 253)								
1. Learning through reflection	.59	.81	3.18	.70	(.82)			
2. Learning through experimentation	.57	.79	2.78	.60	.89**	(.81)		
3. Learning from colleagues	.41	.67	3.65	.59	.66**	.58**	(.70)	
4. Learning from supervisor	.57	.80	2.82	.89	.81**	.65**	.79**	(.80)
Study 2 (N = 226)								
1. Learning through reflection	.51	.75	3.74	.71	(.77)			
2. Learning through experimentation	.60	.82	3.51	.69	.90**	(.77)		
3. Learning from colleagues	.52	.76	4.65	.59	.87**	.64**	(.68)	
4. Learning from supervisor	.39	.64	3.08	.90	.66**	.63**	.53**	(.83)
Study 3 (N = 250)								
1. Learning through reflection	.56	.79	3.28	.60	(.81)			
2. Learning through experimentation	.66	.85	3.00	.63	.89**	(.75)		
3. Learning from colleagues	.49	.74	3.68	.62	.65**	.58**	(.88)	
4. Learning from supervisor	.67	.86	3.16	.92	.85**	.75**	.80**	(.90)

Legenda. AVE = Average variance extracted; CR = Composite reliability.

Note. **p<.01; number in parentheses are Omega (Ω).

Table 3 – Fit statistic of the initial and alternative model

Model	χ^2	df	RMSEA *(≤.08)	RMSEA 90% CI		CFI *(≥.90)	TLI *(≥.90)	SRMR *(≤.08)	AIC *smallest	BIC *smallest	Model Comparison	ΔCFI	ΔTLI	$\Delta\chi^2$
(1)	122.81	48	.07	.06	.09	.93	.91	.05	7327.91	7476.31	-	-	-	-
(2)	153.79	51	.08	.07	.10	.91	.88	.061	7357.78	7495.58	2 versus 1	−.02	−.02	$\chi^2(3) = 50.36$**
(3)	140.94	51	.08	.06	.10	.92	.89	.059	7344.90	7482.70	3 versus 1	−.01	−.01	$\chi^2(3) = 31.44$**
(4)	169.29	53	.09	.07	.10	.89	.87	.064	7374.64	7505.37	4 versus 1	−.03	−.03	$\chi^2(5) = 58.93$**
(5)	260.02	54	.12	.10	.13	.82	.78	.079	7482.36	7609.57	5 versus 1	−.11	−.13	$\chi^2(6) = 137.7$**

Legenda. df = degree of freedom; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion.

Note. N = 253. **p<.01; *cut-off.

STUDY 2

Study 2: convergent and divergent validities

Scale validation common procedure is to test the convergent and divergent properties of the construct by comparing it to close and opposite variables. Two constructs were selected: human resource training practices (Boselie, Hesselink, Paauwe & van der Wiele, 2001), and organizational tradition climate (Patterson et al., 2005). These factors were chosen by their relation to LPW, as it is well established in literature that HR training practices are salient for enhancing learning processes among employees (Nikolova et al., 2014),

Training practices are a function of HRM designed for increasing work performance through training processes aimed at improving knowledge, skills and specific attitudes for work tasks (Noe, Wilk, Mullen & Wanek, 2014). Previous studies show that HR training practices supports the acquisition, distribution and sharing of information and these are factors that constitute the learning potential of the workplace (Noe et al., 2014; Seeck & Diehl, 2017). The consensus among scholars is that certain HR training practices have to be present to trigger and improve knowledge acquisition, dissemination, and sharing, and that "… a good deal more work needs to be done to uncover the underlying mechanisms by which HR practices influence the development of knowledge" (Minbaeva, Foss & Snell, 2009, p. 478).

Conversely, an organizational tradition climate is detrimental to learning in the workplace as it hinders the required cognitive and interactional processes (Schein, 1993). Organizational tradition climate is part of Internal Process Model (Patterson et al., 2005) focused on stability, and on ignoring or minimizing environmental uncertainty. Organizational tradition climate is the extent to which established ways of doing things are valued and it was negatively related to adoption of a number of management practices associated with learning and communication in the organization (Dean & Snell, 1991; Patterson et al., 2005).

H1: HR training practices will be positively related to LPW;

H2: Organizational tradition climate will be negatively related to LPW.

Study 2: method

The sample (N = 226, 93% male) was carried out in an Italian public company belonging to the aerospace sector and operating on the entire national territory. Most of the employees were over 36 years (81%) and worked in the organization for more than 13 years (85%) and had an education level as follows: 10% master's degree, 7% bachelor's degree, 57% high school diploma, and 24% secondary school diploma.

Study 2: measures

Human resources training practices were assessed with a three-item scale developed by Boselie et al. (2000) which assesses the extent to which organizations developed training for their employees. An example of item is, "In my job, I get enough opportunities for personal growth and development".

Organizational tradition climate was measured with four items from the Organizational Climate Measure scale (OCM; Patterson et al., 2005). An example of item is "Management is not interested in trying out new ideas".

Study 2: results

First, a CFA confirmed a second time the 4-factor structure of the scale on the new sample ($\chi^2(48) = 99.767$, $p<.001$; RMSEA = .06 [90% CI = .05-.08]; CFI = .93; TLI = .90; SRMR = .04). Then, internal consistency analyses (Omega) assessed the measurements accuracy used for convergent and divergent validities. Omega scores were acceptable, ranging from Ω = .77 to .83 (see Table 4), except for learning from colleagues' dimension (Ω = .68). The analysis of convergent validity was conducted using HR training practice, and divergent validity was assessed using organizational tradition climate. The results are reported in Table 4. Concerning the convergent validities, correlation analysis confirmed positive and significative relationship between LPW factors and HR training practices (r = .31 to .42; $p<.01$). Hypothesis 1 is thus supported. The divergent validity analysis supported also Hypothesis 2. Results showed that negative correlation exist between 3 factors of LPW and organisational tradition climate (r = –.13 to –.14; $p<.05$). The correlation with learning from colleagues was found to be insignificant (r = –.00; p = ns). Furthermore, moderate to high correlation were

Table 4 – Mean, standard deviation, omega and score correlations for convergent and divergent validities

	M	SD	1.	2.	3.	4.	5.	6.
1. Learning through reflection	3.25	.71	(.77)					
2. Learning through experimentation	2.96	.69	.69**	(.77)				
3. Learning from colleagues	3.64	.59	.46**	.37**	(.68)			
4. Learning from supervisor	3.21	.90	.70**	.52**	.47**	(.83)		
5. Human resources practices for training	3.10	.81	.42**	.31**	.37**	.41**	(.82)	
6. Organizational Traditional climate	2.67	.71	−.14*	−.14*	−.00	−.13*	−.25**	(.79)

Note. N = 226. *p<.05, **p<.01; number in parentheses are Omega (Ω).

observed between the 4 LPW factors (r = .37 to .70; p<.01). All these results provide evidence for a good convergent and divergent validity of the Italian translation of LPW scale.

STUDY 3

Study 3: construct validities

This study investigates construct validities of LPW factors and thus develops an understanding of their commonalities and differences. Learning processes are facilitated by organizational contexts providing learning resources (Battistelli, Odoardi, Vandenberghe, Di Napoli & Piccione, 2019). From a theoretical point of view, job characteristics such as task feedback and challenging tasks have been described as learning supportive work features (Hackman & Oldham, 1980; Nikolova et al., 2014). Thus, the choice of antecedents focused on challenging task (Dragoni, Tesluk, Russell & Oh, 2009; Preenen, De Pater, van Vianen & Keijzer, 2011; Preenen, van Vianen & De Pater, 2014) and task feedback (Morgeson & Humphrey, 2006).

Challenging tasks are the level of difficulty and stimulation required by one's job and they are able to enhance on-the-job learning as they involve confronting new situations in which employees have to develop new strategies and skills (Preeneen et al., 2011).

Task feedback represents the opportunity to know how effectively one is performing directly from the job itself, it supports learning as it directly informs the employee on the quality of execution of the task, thus developing a deeper knowledge of the task itself (Bayona, Caballer & Peiró, 2015).

Several studies have highlighted the positive effect of job characteristics on workplace learning (e.g., Nikolova et al., 2014; Preeneen et al., 2011). Therefore, we expect that tasks that can challenge and offer feedback to the worker will stimulate employees to engage in more learning as they necessitate more complex solutions.

H3: Challenging tasks will be positively related to LPW;

H4: Task feedback will be positively related to LPW.

Study 3: methods

Data (N = 250, 90% of men) were collected from an Italian multinational manufacturing company in the production of recirculating ballscrews. The average age of employees interviewed were as follows: 11% between 18 and 30 years, 32% between 31 and 40 years, 36% between 41 and 50 years, 21% between 51 and 65 years. The tenure in the sample was over 11 years (70%). Finally, most of the workers were blue collars (86%).

Study 3: measures

Challenging tasks was assessed with a 6-item scale developed by Preenen et al. (2011) using a 5-point scale ranging from 1 (*Not at all*) to 5 (*Completely*). To evaluate challenging tasks, we followed Preenen et al. (2014) procedure and replaced "my supervisor" with "my job" in the items. An example item is, "My job provides me with tasks that are challenging". Omega was .84.

Task feedback was measured with a three-item scale from the *Work Design Questionary* (Morgeson & Humphrey, 2006). An example item is, "The job itself provides feedback on my performance". Omega was .82.

Study 3: results

Structural validity was tested with CFA for the new sample ($\chi^2(48)$ = 131.301, p<.001; RMSEA = .08 [90% CI = .06-.10]; CFI = .92; TLI = .90; SRMR = .05). Then, the positive association of challenging tasks and task feedback with the 4-factor LPW model was analysed. Structural equation modelling (Bootstrap, 5000) was used to test model fit adequacy. The suggested structural model showed good fit indices ($\chi^2(172)$ = 417.314, p<.001; RMSEA = .07; CFI = .91; TLI = .90; SRMR = .06). Hypotheses 3 and 4 were supported (see Table 5). Challenging tasks were less related to interactional LPW dimensions (β = .24 to .40; p<.05) than to the task-related (β = .40 to .62; p<.01). Task feedback was moderately related to each LPW factors (β = .24 to .31;

Table 5 – Path coefficients for the structural model testing the convergent validity

	Learning through reflection	95% CI	Learning through experimentation	95% CI	Learning from colleagues	95% CI	Learning from supervisor	95% CI
Challenging assignment	.62**(.07)	.46 - .76	.40**(.08)	.22 - .57	.24*(.10)	.02 - .44.	.40**(.08)	.22 - .55
Task feedback	.27**(.08)	.10 - .45	.31**(.08)	.14 - .49	.27**(.09)	08 - .46	.24**(.08)	.08 - .46
R^2	.58**	-	.35**	-	.17*	-	.28**	-

Legenda. 95% CI = 95% confidence interval.

Note. N = 250. *p<.05, **p<.01; number in parentheses are standard errors.

$p<.01$). Latent correlation between LPW scale interactional factors ($r = .75$; $p<.01$) and between task-related factors ($r = .87$; $p<.01$) were high. Learning from colleague's factor showed moderate latent correlation with learning through reflexion ($r = .58$; $p<.01$) and trough experimentation ($r =.46$; $p<.01$). Learning from supervisor factor showed higher latent correlation with through reflexion ($r = .80$; $p<.01$) and through experimentation ($r = .65$; $p<.01$). Latent correlation between challenging tasks and task feedback was the lowest ($r = .33$; $p<.01$).

GENERAL DISCUSSION

The aim of the present study was to translate the Learning Potential of the Workplace scale to Italian and assess its psychometric properties. The results provide evidence for the reliability and validity of the Italian version of the LPW. Several analyses, rigorously following well-established validation procedures, were carried out in order to analyze the psychometric characteristics of this scale.

First, the CFAs in Study 1 confirmed the internal and structural validity of the Italian version. The results obtained clearly showed that LPW scale is composed of 4 distinct factors. However, some intra-factor correlations were high (e.g., learning through reflection and learning through experimentation). Thus, it corroborated the potential existence of two second-order factors: task-related and interactional learning. Second, the correlational scores of Study 2 convergent and divergent validity analyses, supported most of the hypotheses formulated. Convergent validity was verified as the four LPW dimensions correlated moderately and positively to the HR training practices. Divergent validity was also established as low correlations between the three LPW dimensions and organizational tradition climate was observed. Moreover, a non-significant correlation, as observed between learning from colleagues and organizational tradition climate, is also an establishment of divergent validities.

Finally, study 3 examined how relevant job characteristics, such as challenging tasks or task feedback, were related to LPW dimensions, and a positive relationship between these constructs was observed. These results are related to previously observed researches showing that workplace learning is related to learning oriented job characteristics (Battistelli et al., 2019; De Witte, Verhofstadt & Omey, 2007; Nikolova et al., 2014). Results provided thus strong evidence of convergent validities.

The main contribution of the study was to show that the Italian version of the LPW scale has the appropriate characteristics to be used in research as well as in applied contexts. Considering that no instruments assessing workplace learning are available in Italian there is a clear need for a tool to measure this construct. As specified by Nikolova et al. (2014), the scale is both useful for practices and research, as it is oriented to help practitioners to examine the learning potential of organizations thus allowing them to gain a better understanding of the workplace learning dynamics. Furthermore, this study advances the literature by clarifying the contextual and psychological concepts related to the task-related and interactional learning potential of workplace, as shown in Study 3. Furthermore, by re-examining the psychometric properties of the LPW scale and testing it on different datasets from the original, this study increases the cultural generalizability of the original scale by successfully applying it in Italian cultural settings.

Limits and future research

Despite the practical and theoretical contributions of the studies, several limitations should be mentioned. First, the samples employed were essentially composed of male participants. Although we tried to recruit samples with similar gender proportions of male and female, the sectors investigated in each of the samples, whether private or public, were still mainly male oriented. Indeed, the female population responding in each of the samples concerned women working in management and administrative positions. Future research should investigate the gender proprieties of the Italian translation LPW scale. Nevertheless, different studies have shown no significant effect of gender on informal learning related constructs (e.g. Berg & Chyung, 2008; Harteis, Billett, Goller, Rausch & Seifried, 2015).

Second, contrary to the original scale validation, our studies used three independent samples to test the Italian translation scale validities, as traditionally used in cross-validation analysis (e.g., Mînjină, 2017). Despite this adapted procedure and the good fit indices for each sample that confirmed the four-factor structure as the best one, minor inconsistencies were observable in the reliability level. This could indicate an existing variance between original LPW

scale and the translated version. The scale structure could thus vary according to the national or even on the organizational cultural context. It will thus be necessary to use different structure between the factors for the LPW's scale. For example, Battistelli and colleagues (2019) used a two-factor structure LPW instead of the four-factor initial structure to test their hypothesized model in a military setting. Therefore, future research should investigate the role of national and organisational culture on the structure validity of the LPW scale and their respective effect on it.

Finally, all variables were self-reported. Although we used procedural remedies (Podsakoff, MacKenzie & Podsakoff, 2012), as creating a different sample to reduce potential inflation of the relationship between the measurement, Common Method Variance (CMV) remained possible. Therefore, we tested the CMV impact on data (Podsakoff, MacKenzie, Lee & Podsakoff, 2003) by introducing an orthogonal CMV factor to the hypothesized models, and on which all items displayed a separate loading (in addition to the existing loadings). Results suggest that CMV was not a serious concern for the three sample studies[1]. However, even if procedural remedies were used and CMV factor variance were under the recommended cut off, they exceed the twenty-five percent of the median score, especially for Study 1. Future research should address this issue by testing in advance common method variance bias or using the Johnson and colleagues' recommendation (Johnson, Rosen & Djurdjevic, 2011) for second higher order factors.

CONCLUSION

Workplace learning plays a fundamental role in many positive organizational outcomes. Therefore, it is important to establish psychometrically sound instruments for assessing this variable. The results of this research indicate that the Italian version of the LPW is reliable. As the scale is relatively new, we hope that it will activate new researches and practices aimed at improving workplace learning in the Italian community.

1 The fit of the CMV CFA (4 factor model) were good for Study 1 ($\chi^2(36) = 78.872$, $p<.001$; RMSEA = .06 [90% CI = .04-.08]; CFI = .96; TLI = .93; SRMR = .03), Study 2 ($\chi^2(36) = 74.697$, $p<.001$; RMSEA = .06 [90% CI = .04-.09]; CFI = .94; TLI = .90; SRMR = .03) and Study 3 ($\chi(153)= 224.744$, $p<.001$; RMSEA = .04 [90% CI = .03-.05]; CFI = .93; TLI = .90; SRMR = .04). They improved over the hypothesized models (Study 1: $\Delta\chi^2 = 21.46$, $\Delta df = 12$, $p<.05$; Study 2: $\Delta\chi^2 = 77.20$, $\Delta df = 12$, $p<.01$; Study 3: $\Delta\chi^2 = 31.42$, $\Delta df = 12$, $p<.01$). The CMV factor had score variance all inferior to the 50% score recommended (Study 1: 46%; Study 2: 30%; Study 3: 36%) in Podsakoff et al. (2003).

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An initial validation of Tepper's Abusive Supervision Scale

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ABSTRACT. La *Abusive Supervision* si riferisce ai comportamenti ostili, di tipo verbale e non verbale, messi in atto da parte del capo nei confronti dei collaboratori, con l'esclusione delle aggressioni fisiche. Il contributo presenta una prima validazione della versione italiana della scala di Tepper (2000), che rileva in che misura i collaboratori percepiscono la presenza di tali comportamenti. Lo studio è stato condotto su un campione di 496 infermieri occupati in tre ospedali, e ha evidenziato una buona validità e attendibilità: la scala può dunque essere utilizzata per iniziative di HR management e di ricerca.

SUMMARY. Abusive supervision refers to the subjective employees' perception of the extent to which supervisors engage in the sustained display of hostile verbal and nonverbal behaviors, excluding physical contact, against them. This study proposes a first validation of the Italian version of Tepper's (2000) 15-item scale, in a sample of nurses. 496 nurses working in three hospitals in the North-West of Italy were investigated. Analyses were performed using SPSS and MPlus. The CFA confirmed the one factor structure, as in the original version of the scale, with satisfactory fit indexes. Moreover, discriminant and criterion validity analyses were performed. The findings show the good properties of the tool in its Italian version.

Keywords: *Abusive supervision scale, Italian validation, Nursing profession*

INTRODUCTION

The term *abusive supervision* was introduced for the first time by Tepper (2000, p. 178), who defined it as the "subordinates' perceptions of the extent to which supervisors engage in the sustained display of hostile verbal and nonverbal behaviors, excluding physical contact". Furthermore, the term brings to mind the image of a tyrannical boss, who ridicules and underestimates his/her subordinates. Bies (2000) lists some typical behaviors of abusive supervision: public criticism, loud and angry tantrums, rudeness, inconsiderate actions, and coercion. Moreover, Tepper's (2000) definition highlights that abusive supervision behaviors are not necessarily enacted in order to cause harm, but to show either indifference or hostility (e.g. talking rudely to subordinates in order to obtain the desired performance from them), publicly diminishing subordinates.

The negative effects of this construct can be interpreted through the lens of Social Exchange Theory (SET), according to which relations generate obligations (Blau, 1964). Therefore, employees in organizations expect a good salary, awards and fair treatment in exchange of their work. If, on the contrary, they receive abusive supervision behaviors, they will probably experience a breach of their social exchange expectations. According to SET, engaged employees expect to receive positive feedback and support in exchange for a good job, but if they receive behaviors like being belittled, withholding information and the silent treatment, they will not feel equity in the exchange and will look for other options to restore balance (Valle, Kacmar, Zivnuska & Harting, 2019). This feeling of social exchange breach recalls the breach of the psychological contract (Morrison & Robinson, 1997). In this case, the breach could even be a violation, that is a mostly affective experience of frustration, anger or resentment experienced by the worker as a result of the organization's failure to keep one or more of the psychological contract's promises. This experience of violation could cause negative consequences for the organization, such as reduced trust in it, withdrawal behaviors, delays, absenteeism and turnover intentions.

That of abusive supervision is a subjective evaluation made by the subordinate about the leadership style of his/her boss, and so the same behavior can be abusive for someone but not for someone else. The aspect of time is important in the abusive supervision dynamic: Tepper (2000) shows that actions that make followers feel underestimated and ridiculous have to be extended in time to be able to talk about abusive supervision. The relationship between someone who behaves like an abusive supervisor and the target of this behavior can last until either the agent or the target terminates it, or the agent modifies his/her behaviors.

In a more recent article, Tepper and colleagues note that abusive supervision rates may be under-reported "because many targets are fearful of acknowledging their experiences as victims, even when reports can be made anonymously" (Tepper, Simon & Park, 2017, p.125).

The abusive supervision literature has shown that this style can have negative impacts on some outcomes for both the individual and the organization. For example, it has been demonstrated that it damages the worker because of its negative correlation with *employee attitudes, performance, well-being, and counterproductive behaviors* (Mitchell & Ambrose, 2012). Furthermore, "abusive supervision has been linked with lower levels of individual and group morale, executive functioning, and psychological health, as well as higher levels of counterproductive work behavior (CWB) and quit rates" (Tepper et al., 2017, p.125).

In a recent study, Watkins, Fehr and He (2019) showed that abusive supervision is not always enacted by bosses in order to denigrate their subordinates. According to their "instrumental perspective" of abusive supervision, leaders may attack their subordinates not only for its own sake, but in an effort to achieve pro-organization results (e.g. to improve subordinates' performance). Therefore, although leaders may be pushed to behave this way by constructive intentions, they damage the organization because of the subordinates' increased tendency to act counterproductively (Watkins et al., 2019).

Tepper (2000) developed the first abusive supervision scale. Starting from an initial 20-item scale, items taken from the literature about non-physical abusive behaviors, the author asked 68 candidates for a degree in business administration to place items in three categories: non-physical abuse, physical abuse and other (non-abusive behavior or other type of abuse). Confirmatory Factor Analysis (CFA) showed that a 15-item model provided the best fit. All loadings for the abusive supervision scale were strong (>.50) and reliable (p<.01), supporting the hypothesis that the items assessed a unique superordinate construct.

In addition, Tepper (2000) found that abusive supervision measured through this scale has negative correlations with psychological outcomes such as job satisfaction, life satisfaction, normative commitment, affective commitment

and positive correlations with continuance commitment, work-family conflict, family-to-work conflict, depression, anxiety, emotional exhaustion.

AIM

The present study aims to validate the Italian version of Tepper's (2000) 15-item scale in a sample of nurses by showing the results of the analyses to test for construct, discriminant and criterion-related validity. Construct validity is tested via Confirmatory Factor Analysis (Hinkin, 1998).

H1: the 15-item scale shows a monofactiorial solution.

Discriminant validity is shown through the correlation between abusive supervision (AS) and transformational leadership (TL), while criterion validity is shown through the correlation between AS and job satisfaction (JS) and emotional exhaustion (EE). It is assumed that AS is negatively correlated with TL, because the two concepts are divergent. In fact, this type of leadership occurs when leaders broaden and elevate the interests of their employees, when they generate awareness and acceptance of the purposes and mission of the group, and when they stir their employees to look beyond their own self-interest for the good of the group.

H2: AS is negatively correlated with TL.

Similarly, we assume that AS is negatively correlated with JS. Tepper (2000) assumed that JS was negatively correlated with perceived organizational injustice behaviours such as AS.

H3: AS is negatively correlated with JS.

Lastly, we assume a positive correlation between AS and EE. This dimension is considered one of the three components of the burnout syndrome, with depersonalization and reduced personal effectiveness. Emotional exhaustion can be described as a condition in which workers feel they are no longer able to give of themselves at a psychological level because their emotional resources are depleted.

H4: AS is positively correlated with EE.

METHOD

Participants

A sample of 496 nurses was recruited (M_{age} = 42.6; SD_{age} = 9.94), from three Northern Italian hospitals (Hospital 1 = 28.8%; Hospital 2 = 31%; Hospital 3 = 40.2%). The nurses in the sample reported to 55 different head nurses and three different nurse managers (Manager 1 = 14.3%; Manager 2 = 45.6%; Manager 3 = 40.1%). Particularly, the sample consisted of 83.6% women and 16.4% men; as for the education level, 53.5% of the sample had a professional nursing school diploma, 40.6% a bachelor's degree, and 5.9% a master's degree. Furthermore, 23.2% of the sample had attended one or more post-graduate courses (i.e., one or two-year programs after the bachelor's or master's degree); 79.1% of respondents worked shifts (specifically, 15.6% of these workers had two shifts during the work day and 63.5% had three shifts during the working day, and thus also worked nights); 74.2% of the sample also worked during holidays. On average, respondents had worked in the same hospital for 17.3 years (*SD* = 10.57), in the same service/ward for 11.65 years (*SD* = 8.72) and worked 36.86 hours per week (*SD* = 4.92).

Instruments

A back translation process (Brislin, 1970) was followed to develop the Italian version of the AS scale. The original 15 items of Tepper's scale were first translated in Italian by two researchers who worked separately. Their versions were compared to develop a single Italian version of the items. This version was translated blindly back into English by a native speaker. Minor divergences from the original were resolved, with the goal of making items easily understandable for participants.

The response scale is a 5-point Likert scale (from 1 "I cannot remember him/her ever using this behavior with me" to 5 "He/she uses this behavior very often with me"). The English and Italian versions of the items are given in the Appendix.

To assess TL, the 7-item scale by Carless and colleagues' (2000) scale (α = .93) was used. This brief scale assesses seven transformational leader's behaviors, such as "communicates a clear and positive vision of the future" or "treats staff as individuals, supports and encourages their development". The scale is on a 5-point Likert scale, from "Rarely or never" to "Very frequently, if not always".

To assess JS, the COPSOQ II (*Copenhagen Psychosocial Questionnaire*) scale (α = .82) from Pejtersen, Kristensen, Borg and Bjorner (2010) was used. The scale uses a 5-point Likert answer range to assess employees' satisfaction about some working aspects, with items like "Regarding your work

in general, how satisfied are you with the physical working conditions?" or "Regarding your work in general, how satisfied are you with the way your abilities are used?".

To assess EE, the OLBI (*Oldenburg Burnout Inventory*; Demerouti, Mostert & Bakker, 2010) was used. It contains questions on both ends of the exhaustion-vigor and cynicism-dedication continua. Emotional exhaustion is one of the three characteristics of the burnout syndrome (with depersonalization and personal accomplishment). "Exhaustion is defined as a consequence of intensive physical, affective and cognitive strain, that is, as a long-term consequence of prolonged exposure to certain job demands" (Demerouti et al., 2010, p.210). Scale's items examples, with a 4-points Likert answer range, are "There are days when I feel tired before I arrive at work" and "After my work, I usually feel worn out and weary".

Procedure

The study which collected the data for this validation was approved by the Bio-Ethics Committee of the University of Turin (Prot. No. 55631 of 01.02.2019).

Paper-and-pencil questionnaires were administered to participants, who were given an envelope in which they were suggested sealing the completed questionnaire. Together with the questionnaire, participants also received an invitation letter and an information sheet. Both documents provided all the necessary information about the ethics procedure developed for the study (i.e., information about the confidentiality of data, the fact that taking part in the study was completely voluntary, the data management and storage and the ways findings will be disseminated). One member of the research group collected the completed questionnaires from each ward involved in the data collection. The exact date of the gathering was specified on a large envelope used to collect the completed questionnaires sealed in the smaller individual envelopes.

Data analyses

Analyses were performed by using SPSS and MPlus softwares. SPSS was employed for: descriptive analyses of the sample, descriptive analyses of the single items (skewness and kurtosis), and reliability analyses (Cronbach's α) of the scale, correlations between abusive supervision and the other dimensions in order to test for discriminant and criterion validity.

With MPlus, a Confirmatory Factor Analysis (CFA) was performed using a robust statistical method of extraction (MLR Maximum Likelihood Robust), because the assumption of normality in the data distribution was violated (see Figure 1). The appropriateness of using MLR when the normality assumption is violated is emphasized by a recent study by Li (2015). CFA was used to test for the construct validity of the scale and to confirm the mono-factorial structure indicated by Tepper (2000).

RESULTS

Descriptive statistics

Descriptive analyses of single items (see Table 1) show mean values from 1.16 to 1.80 (*SD* from .568 to 1.151). Skewness and kurtosis values indicate a non-normal distribution of data. Positive skewness values indicate a concentration of data in the low values (skewness on the right) and the positive kurtosis values indicate a leptokurtic curve.

Items with the highest values for skewness were, in decreasing order: i14 (4.135); i2 (3.173); i1 (3.130); i12 (3.125); i6 (3.017); i5 (2.862); i13 (2.848); i4 (2.668); i8 (2.602), while items with the highest values for kurtosis were, in decreasing order: i14 (18.854); i2 (10.451); i12 (10.329); i1 (10.070); i6 (9.406); i13 (8.438); i5 (8.188); i4 (7.012); i8 (6.336); i11 (3.404); i15 (2.649); i3 (2.870). Kurtosis in particular showed much higher values than those expected for a normal distribution.

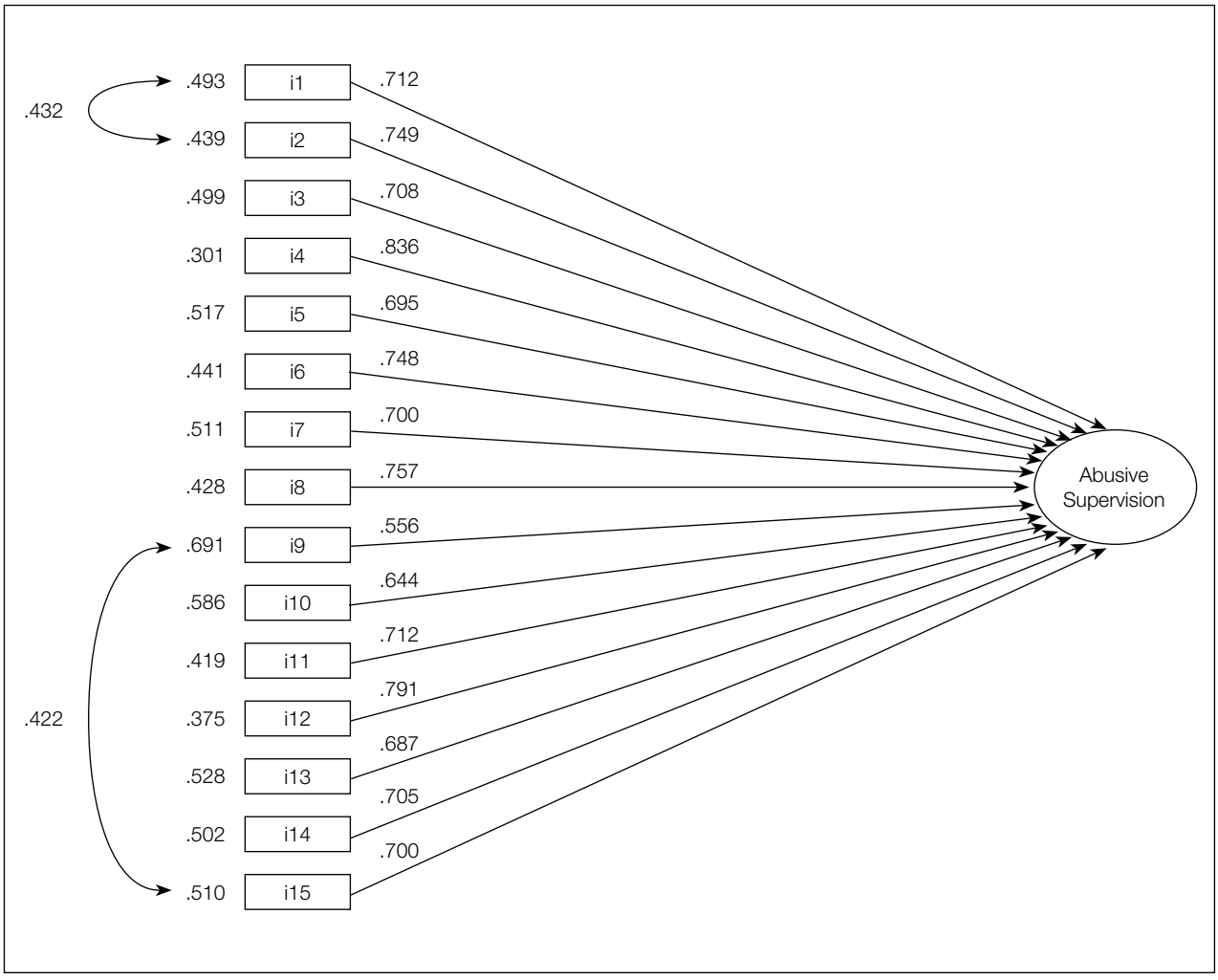
Reliability

The scale's reliability is satisfactory, considering the number of items: Cronbach's $\alpha = .935$.

Correlations

Table 2 shows the correlations between AS, TL, JS and EE, which are useful to test the study hypotheses (H2, H3, H4) regarding the discriminant and construct validity of the Italian version of the scale.

Figure 1 – Confirmatory Factor Analysis



A strong negative correlation was found between AS and TL (–.511, p<.01). This provides a first proof of the discriminant validity of these two constructs, confirming H2.

For criterion validity, there is a negative correlation between AS and JS (–.230, p<.01), which confirms H3.

Lastly, AS shows a positive correlation with EE (.165, p<.01), confirming H4 and proposing a further criterion analysis validity.

Confirmatory factor analysis

CFA bore out the monofactorial structure of the scale, showing the following fit indexes: χ^2 = 269.98; 90 df; p<.001; χ^2/df = 2.99; Comparative Fit Index (CFI) = .89; Tucker-Lewis Index (TLI) = .88; Root Mean Square Error of Approximation (RMSEA) = .06. Modification indexes suggested correlating the error terms between two pairs of items.

Table 1 – Descriptive analyses and Cronbach's alpha (total scale)

	N	M	SD	Skewness		Kurtosis	
				Stats	St. Err.	Stats	St. Err.
i1	489	1.26	.700	3.130	.110	10.070	.220
i2	488	1.23	.646	3.173	.111	10.451	.221
i3	489	1.53	.973	1.912	.110	2.870	.220
i4	489	1.31	.747	2.668	.110	7.012	.220
i5	489	1.30	.760	2.862	.110	8.188	.220
i6	488	1.30	.770	3.017	.111	9.406	.221
i7	487	1.62	1.041	1.594	.111	1.540	.221
i8	489	1.36	.847	2.602	.110	6.336	.220
i9	489	1.80	1.151	1.410	.110	1.086	.220
i10	488	1.75	1.093	1.422	.111	1.141	.221
i11	481	1.51	.958	1.991	.111	3.404	.222
i12	489	1.28	.738	3.125	.110	10.329	.220
i13	489	1.29	.713	2.848	.110	8.438	.220
i14	488	1.16	.568	4.135	.111	18.854	.221
i15	487	1.59	1.060	1.873	.111	2.649	.221

Note. $N = 474$; Cronbach's $\alpha = .935$

Table 2 – Correlations

	TL	JS	EE
AS	−.511**	−.230**	.165**

Legenda. TL = transformational leadership; JS = job satisfaction; EE = emotional exhaustion; AS = abusive supervision. **p<.01

Since the fit indexes were good but not completely satisfactory and since there were semantic reasons to proceed as suggested by the modification indexes, the correlation between two pairs of item errors (i1 and i2, i9 and i15) was thus added to the initial solution. From a semantic standpoint, i1 and i2 could be correlated because both mean "to ridicule someone", while i9 and i15 refer to the idea of "lying" (see Appendix).

The fit indexes obtained after correlating the errors of these two pairs of items [χ^2 = 198.22; 88 df; p<.001; χ^2/df = 2.25; CFI = .94; TLI = .92; RMSEA = .05], show a good fitting model, according to Hu and Bentler's (1999) cut-off values: >.95 for CFI and TLI, and <.06 for RMSEA.

Previous indexes show the goodness of a monofactorial model of the scale, and thus confirm H1.

DISCUSSION AND CONCLUSION

This study describes the findings of a first validation of Tepper's (2000) Abusive Supervision Scale in Italian. The analyses confirm the monofactorial structure of the scale, as hypothesized by the author, and show the reliability and validity of the Italian version. Furthermore, the analyses showed some shortcomings of the scale in its Italian version that can be due to semantic reasons linked to item development and/or translation. However, these shortcomings do not affect the instrument's general validity.

The first limitation is that only self-reported data were analysed in this study, and common method variance could thus be an issue. In addition, and considering the nature of the topic that the scale measures, another connected limitation is that we did not control for social desirability.

The third limitation is that this study involved only the nursing sector, so its findings must be considered in light of the characteristics of this specific population. The nursing sector's characteristics in fact differ from those of other professions (e.g. nurses have to manage different kinds of disease and deal with suffering, and may also be treated aggressively by patients; in addition, burnout is one of the most common psychological consequences affecting them). As a result, supervisors' leadership style could be perceived differently than in other professions. Hence, these analyses show the advisability of using the abusive supervision scale for future research projects with these professionals but its generalizability in the Italian context has not yet been demonstrated.

Future studies could use the Italian version of the abusive supervision scale to analyse, for instance, counterproductive behaviors by head nurses, and their possible outcomes for nurses' emotional condition. In this regard, this study shows the positive correlation of abusive supervision with emotional exhaustion, which is one of the three factors of burnout. It would be interesting to study the time trend of the relation between abusive supervision and emotional exhaustion or other wellbeing and motivation at work constructs, using longitudinal designs, namely diary studies. This could also make it possible to explore the centrality of the temporal dimension in the construct of abusive supervision as defined by Tepper (2000). Lastly, considering the practical implications for the HR management, the abusive supervision scale could be used to contribute to analyzing organizational and individual leadership and followership training requirements, in order to promote specific coaching or counselling actions linked to the emerging needs (Gatti, Ghislieri & Cortese, 2017).

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APPENDIX

English version and Italian version of the abusive supervision scale
(original source: Tepper, 2000)

"My boss…" 1 = "I cannot remember him/her ever using this behavior with me"		"Il mio capo…" 1 = "Non riesco a ricordare che lui/lei abbia mai usato questo comportamento con me"	
2 = "He/she very seldom uses this behavior with me"		2 = "Lui/lei molto raramente usa questo comportamento con me"	
3 = "He/she occasionally uses this behavior with me"		3 = "Lui/lei occasionalmente usa questo comportamento con me"	
4 = "He/she uses this behavior moderately often with me"		4 = "Lui/lei usa questo comportamento moderatamente spesso con me"	
5 = "He/she uses this behavior very often with me"		5 = "Lui/lei usa questo comportamento molto spesso con me"	
1 I cannot remember...	5 He/she uses this behaviour...	1 Non riesco a ricordare... questo comportamento	5 Lui/lei usa questo comportamento...
① ② ③ ④ ⑤		① ② ③ ④ ⑤	
1	Ridicules me	Mi ridicolizza	
2	Tells me my thoughts or feelings are stupid	Mi dice che i miei pensieri o sentimenti sono stupidi	
3	Gives me the silent treatment	Mi ignora	
4	Puts me down in front of others	Mi critica di fronte agli altri	
5	Invades my privacy	Invade la mia privacy	
6	Reminds me of my past mistakes and failures	Mi ricorda i miei errori e fallimenti del passato	
7	Doesn't give me credit for jobs requiring a lot of effort	Non mi dà credito per lavori che richiedono un grande sforzo	
8	Blames me to save himself/herself embarrassment	Mi incolpa di metterlo in imbarazzo	
9	Breaks promises he/she makes	Non porta a compimento le promesse che fa	
10	Expresses anger at me when he/she is mad for another reason	Esprime rabbia nei miei confronti quando è arrabbiato per un'altra ragione	
11	Makes negative comments about me to others	Fa commenti negativi su di me agli altri	
12	Is rude to me	È scortese con me	
13	Does not allow me to interact with my coworkers	Non mi consente di interagire con i miei colleghi	
14	Tells me I'm incompetent	Mi dice che sono incompetente	
15	Lies to me	Mi mente	

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