FACTOR VALIDITY OF THE MERIDEN SCHOOL CLIMATE SURVEY- STUDENT VERSION (MSCS-SV)

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The goal of this research was a factor validation of the BCS translation of the Meriden School Climate Survey–Student Version (MSCS-SV). The sample comprised 1036 students (63.1% females) from four Republic of Srpska high schools. An initial confirmatory factor analysis (CFA) revealed that a proposed correlated 7-factor model had poor fit. The main reason of bad fit was the School Safety subscale, which had generally poor psychometric properties, including very pronounced local dependency between its items. Because of this, this subscale had to be removed, which resulted in a reduced 23-item, 6-factor model, which had decent fit, but mostly poor internal consistencies. The model had the same factor structure, equivalent loadings and thresholds for boys and girls, with only slight differences in factor means on 3 factors. This means that the questionnaire is largely gender invariant and there is likely no need for the separate gender norms. The removal of the School Safety subscale is a notable limitation, given that feeling safe at school is thought of as being an important protective factor for student wellbeing. Thus, we can only give a reserved recommendation for the use of MSCS-SV in the BCS speaking area. The questionnaire should be improved, namely by expanding the existing item base with newly written items, including the whole new set of the School Safety items.

Keywords: school climate, the Meriden school climate survey–student version (MSCS-SV), questionnaire validation, factor validity, confirmatory factor analysis (CFA)

Introduction

Although there is plenty of research on the topic of school climate, there is still no consensus between the authors in regards to defining and measuring this construct (Cohen, McCabe, Michelli, & Pickeral, 2009; Gage, Larson, & Chafouleas, 2016; Kantarová, 2009; Thapa, Cohen, Guffez, & Higgins-D'Alessandro, 2013). There were several efforts to precisely explain and investigate the school climate, but it turned out to be a very complicated job (Thapa, et al., 2013; Zullig, Koopman, Patton, & Ubbes, 2010). Zulling and colleagues (2010) summarize the attempts to define the school climate, concluding that researchers usually investigated these five domains: order; safety and discipline; academic achievement; social networks and support; school environment and commitment to school. While there is...
no universally agreed upon definition of school climate, some authors (e.g., Cohen et al., 2009; Thapa et al., 2013) do provide a comprehensive attempt of defining it, such as that school climate refers to the way that students experience the quality and type of the school life, norms, values, goals that prevail in school, interpersonal relationships with peers, teachers and parents, and attitude towards learning.

Research shows the importance of warm, positive, supportive, and tolerant school climate in predicting better academic achievement (Cohen et al., 2009; Gage et al., 2016; Peterson & Skiba, 2001; Wentzel, 1991), higher student motivation (Wentzel, 1991), mental health (Adelman & Taylor, 2012; Cohen et al., 2009; Lester & Cross, 2015), self-respect (Adelman & Taylor, 2012) and so on.

In light of a potential value of a school climate as a construct, but also keeping in mind the lack of a universal theoretical model, the aim of this research was to investigate the factor validity of one of the newest additions to the school climate models/instruments – The Meriden School Climate Survey–Student Version (MSCS-SV; Gage et al., 2016) for the purpose of adapting it to Slavic (BCS) languages.

**Method**

**Sample and procedure**

The sample comprised 1036 students (63.1% females) from the 4 Republic of Srpska high schools (grades I through IV): gymnasium, economy school, civil engineering school, and a mixed/trade school. The students completed an anonymous paper-and-pen questionnaire during their regular school classes.

**Instruments**

**MSCS-SV: The Meriden School Climate Survey-Student Version (Gage et al., 2016).** It was developed as a measure of the quality and character of school life as experienced by students. It has 38 items (5-point Likert type) and 7 subscales: Adult Support at School, School Safety, Respect for Differences, Adult Support at Home, Academic Support at Home, Aggression Towards Others, and Peer Support. The referenced fit (Gage et al., 2016, p. 6) was: $\chi^2_{(585)} = 5862.4, p < .001$, CFI = .900, TLI = .880, RMSEA = .048, SRMR = .069. The questionnaire was translated for the purpose of this research.
Results

Factor structure and internal consistency

A 7-factor model comprising all 38 MSCS-SV (Gage et al., 2016) items was tested using a WLSMV/DWLS based confirmatory factor analysis (CFA) in “lavaan” program for R (Rosseel, 2012). The initial MSCS-SV fit was poor (Hooper, Coughlan, & Mullen, 2008): $\chi^2(644) = 3020.86, p < .001; \text{CFI} = .819, \text{TLI} = .802, \text{RMSEA} = .060, 90\% \text{ CI [.058, .062].}$ Two items were removed due to low factor loadings ($\Lambda$) on their targeted factors: $\Lambda_{22}=.01$ and $\Lambda_{12}=.26$. Amongst the rest of the items, there were 19 locally dependent (LD) item pairs. LD means that there are substantial partial correlations between items after accounting for the main latent factor (i.e., standardized residual correlations $\geq |0.2|)$; Reise & Revicki, 2014). Especially worrisome was the fact that all but one (23) School Safety subscale items were involved in at least one LD pair. This subscale also had poor internal consistencies ($\alpha = .69, \omega_H = 64; \text{McDonald, 1999; Zinbarg, Revelle, Yovel, & Li, 2005}$) and low average variance extracted (AVE = .30), suggesting that the variance due to measurement error was much larger than the variance accounted for by the construct itself (Fornell & Larcker, 1981). Due to such poor properties and a lack of a good reason to correlate so many error terms (e.g., Brown, 2015; Hermida, 2015), the whole subscale was removed, which led to an improvement in fit: $\chi^2(390) = 1574.38, p < .001; \text{CFI} = .892, \text{TLI} = .880, \text{RMSEA} = .054, 90\% \text{ CI [.051, .057].}$

After the School Safety removal, 7 LD item pairs still remained. Items with lower $\Lambda$s from each pair were removed, i.e.: 39, 3, 41, 37, 9, 42, and 21. This resulted in the final 23-item, 6-factor model, which had decent fit (Hooper et al., 2008): $\chi^2(215) = 627.32, p < .001; \text{CFI} = .941, \text{TLI} = .931, \text{RMSEA} = .043, 90\% \text{ CI [.039, .047].}$ Model parameters are shown in Figure 1.

We established that this model had the same factor structure, equivalent loadings and thresholds for boys and girls, i.e., it exhibits a “strong” invariance (Chen, 2007; Hirschfeld & von Brachel, 2014; Vandenberg & Lance, 2000; Wu, Li, & Zumbo, 2007) in regards to gender. Partial non-invariance was only detected in regards to the factor means ($\Delta\text{CFI} = .009$, i.e., a rounding error away from the .01 value, which is used as a cutoff for non-

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2 For easier comparisons, we kept the item numeration in accordance to the original numbering as reported by Gage and colleagues (2016), where initial 47-item scale was used (out of which 38-item version was derived).
invariance; Chen, 2007; Hirschfeld & von Brachel, 2014; Wu et al., 2007). Girls self-reported trivially higher Academic Support at Home (t(777.79) = 2.69, p = .02, d = 0.17), and slightly higher Peer Support (t(770.92) = 6.19, p < .001, d = 0.40) than boys. Boys self-reported slightly higher Aggression Toward Others (t(713.36) = -5.58, p < .001, d = 0.37).

Discussion and conclusion

Our results have shown that the original 38-item MSCS-SV scale (Gage et al., 2016) had poor psychometric properties, with many items that had to be removed, mostly due to extensive LD issues. This was the most obvious for the School Safety subscale, which was “beyond repair” and had to be removed entirely. Given that feeling safe at school is an important protective factor for student wellbeing (e.g., Lester & Cross, 2015), this is potentially a large limitation. Regardless, we ended up with the reduced 23-item 6-factor MSCS-SV revision, which has a decent fit (Hooper et al., 2008), that is better than the referenced fit of the 38-item 7-factor model reported by Gage and colleagues (2016), while the factor loadings were generally similar. However, internal consistencies are noticeably lower in this research. This might partly be due to the smaller number of items, but it does not change the fact that the scale suffers from the poor precision of measurement. This is also evident from the low AVE values, 4 of which are below the recommended cutoff of .50 (Fornell & Larcker, 1981), even in the reduced model. Thus, while the model fit in this research is better than the referenced one (Gage et al., 2016, p. 6), precision of measurement is worse. Note, however, that the questionnaire is largely gender invariant, meaning that there is likely no need for the separate gender norms and that girls and boys can be compared directly.

In conclusion, we obtained a better fitting, but less internally consistent shorter version of the original MSCS-SV. The removal of the School Safety subscale is a notable limitation. Thus, we can only give a reserved recommendation for the use of MSCS-SV in the BCS speaking area. The questionnaire should be improved, namely by expanding the existing item base with newly written items, including the whole new set of the School Safety items.
Figure 1. CFA results for the reduced 23-item 6-factor MSCS-SV model. All Λs are standardized and significant at $p < .001$. Nonsignificant factor correlations are underline.
Factor validity of the Meriden school climate survey - student version (MSCS-SV)

References


Zinbarg, R. E., Revelle, W., Yovel, I., & Li, W. (2005). Cronbach’s α, Revelle’s β, and McDonald’s ω_H: Their relations with each other and two alternative conceptualizations of reliability. *Psychometrika, 70*(1), 123-133.