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# Psychometric Evaluation of Child and Adolescent Mindfulness Measure (CAMM) with Turkish Sample

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**Abstract:**

*The purpose of this study was to examine the psychometric features as well as the correlates of Child and Adolescent Mindfulness Measure (CAMM) in Turkish adolescents. In total, 221 adolescents (125 female, 86 male) attended to the study. CFA analysis was used to examine the initially offered one factor structure of CAMM. So as to check the convergent and incremental validity, Mindful Attention Awareness Scale- Adolescent version (Brown, West, Loverich, & Biegel, 2011) Self-Compassion Scale (Neff, 2003) and Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004) were also utilized. The findings of CFA promoted the single factor CAMM in Turkish adolescents. In addition CAMM came out to have positive correlations to MAASA (r=.56, p<.01) and Self-Compassion Scale (r=.35, p<.01) while negative correlation to Difficulties in Emotion Regulation Scale (r=-.52, p<.01). Internal consistency indicator of Cronbach Alpha was also found as .80 for the whole scale.*

## I. INTRODUCTION

Mindfulness, holding certain connections to Buddhist teachings and practices, started to take its place in Western literature thanks to the favorable effects of tricennal mindfulness based stress reduction (MBSR) program initiated by John Kabatt-Zinn. Since the first introduction of mindfulness to the scope of psychology, this construct was described by various schools. In such a prominent description, Kabat-Zinn (1994) reported that mindfulness is paying intentional, purposeful and non-judgmental attention toward present moment in a certain way. Mindfulness was also conceptualized as observing all internal or external experiences arising in the present moment through an accepting and non-judgmental attitude (Baer, 2003). At another description, Bishop et al., (2004) highlighted mindfulness as a metacognitive attention and accepting awareness toward immediate experiences such as thoughts, senses and external world.

In the last era, abundant studies were carried out to enlighten the concept of mindfulness through both theoretical and structured intervention programs directed toward various populations (Shapiro & Carlson, 2009). In such studies, mindful attention was primarily found to be related to such psychological processes as well-being, self-confidence and hopefulness (Brown & Ryan 2003), acceptance of self (Carson & Langer, 2006), empathizing (Dekeyser, Raes, Leijssen, Leysen, & Dewulf, 2008), psychological symptoms (Bouvet, Grignon, Zachariou & Lascar, 2015), substance abuse (Karyadi, VanderVeen, & Cyders, 2014), regulating the feelings (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006), healing after trauma (Hanley, Peterson, Canto, & Garland, 2015), aggressive behaviors (Peters, Smart, Eisenlohr-Moul, Geiger, Smith, & Baer, 2015), interpersonal worry (Parsons, 2015), stress perception (Rodriguez, Wei,

Xiaoming, & Xinghua, 2015), burnout (Piatkowska, 2015) and etc. As well, structured mindfulness based programs also came out to be efficient in following psychological attributes as wellness, depressive tendencies and stress in youth (Lau & Hue, 2011), resilience (Johnson, Emmons, Rivard, Griffin, & Dusek, 2015), managing stress and self-concept (Berne-Cico, Possemato, & Cheon, 2013), binge eating tendencies (Brandenborg, 2015), anxiety problems (Kabat-Zinn, et al., 1992) and etc.

Referring to the initial studies in the mindfulness literature, it is notable that the main target group for the emergent studies was clinical and non-clinical adult populations. However, in the recent attempts, mindfulness literature can also be highlighted through the growing number of studies directed towards children and adolescent population emphasizing the concept as a promising therapeutic factor for these groups as well (Burke, 2010; Greco & Hayes, 2008; Greenberg & Harris, 2012). Correspondingly, many reviews specify the increasing number of scientific studies emphasizing positive relations and beneficial effects of mindful attention in psychological and social predictors of mental health for young people (Burke, 2010; Greenberg & Harris 2012; Kallapiran, Koo, Kirubakaran & Hancock, 2015; Thompson & Gauntlett-Gilbert, 2008).

In spite of the rising number of theoretical and interventional studies examining mindfulness specifically in children and adolescents, there are only a few assessment tools measuring mindfulness of young people in both global literature and Turkish culture as well. There are two well-known instruments of child and adolescent mindfulness that weren't translated and adapted in Turkey yet. One of them is Mindful Attention Awareness Scale-Adolescent version (MAAS-A),

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a 14-item inventory, measuring the main features of mindfulness in clinical and non-clinical adolescent groups (Brown, West, Loverich & Biegel, 2011). The internal consistency and test-retest reliability for MAAS-A were found seriatim .82 and .79 for normative adolescent population. Another instrument measuring mindfulness in children and adolescents is Child and Adolescent Mindfulness Measure that includes 10-items assessing mindful personality in child and adolescent population aged 10 to 17. Cronbach's Alpha for CAMM was found .80 indicating satisfactory evidence for internal consistency of the instrument (Greco, Baer & Smith, 2011).

Based on the therapeutic implications of mindful awareness for child and adolescent mental health and conversely the lack of mindfulness related measures for these populations in Turkish culture, the purpose of the current study is to assess the psychometric features and factor pattern of CAMM for 14-18 aged Turkish adolescents. First of all, CFA analysis was carried out to validate the originally derived one factor structure of CAMM. So as to examine the reliability, Cronbach alpha coefficient was checked out as the indicator of internal consistency. In order to examine the convergent and incremental validity of the scale, Mindful Attention Awareness Scale-Adolescent version (Brown, West, Loverich, & Biegel, 2011) Self-Compassion Scale (Neff, 2003) and Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004) were used. As implied in studies examining mindfulness and related constructs, self-compassion (Neff & Dahm, 2015) is expected to positively correlate to CAMM; conversely emotion dysregulation (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006), is expected to negatively correlate to CAMM.

## II. METHOD

### Participants

Sample of the study were 14-18 aged students attending to the high school in Istanbul. There were 211 participants distributed as 125 girls (59%) and 86 boys (41%) with the average age of 15.57 in the sample group. In order to select the sample, convenience sampling method was used on the grounds of time benefits of this technique for the researcher (Fraenkel, Wallen, & Hyun, 2011).

### Instruments

*Child and Adolescent Mindfulness Measure* was developed by Greco, Baer & Smith (2011) with the purpose of assessing mindfulness skills through the components of present-focused awareness and a nonjudgmental attitude toward intrinsic experiences in young people above 9 years. In the initial item development study of the scale, theoretically derived 25 items for CAMM was reduced to ten items through EFA analyses. These reduced ten items in the scale reflect lack of present-moment awareness and also judgmental and non-accepting responses to thoughts and feelings. CFA analysis for the ten item form supported a one factor structure for the scale with a good model fit to the data (RMSEA = .07; SRMR = .06; CFI =.90; NNFI ; .87). The items in the scale are reverse coded meaning that lower scores in the scale indicate higher levels of non-judgmental mindful awareness. CAMM scores came out to have negative

relations with somatic grumbles, intrinsic symptoms, troubles in externalizing conduct, the thought suppression and psychological inflexibility and positive relations to perceived life quality, teacher scores for social competence, and academic talent. Cronbach alpha for the scale was also found .80 for the ten item form of CAMM.

*Mindful Attention Awareness Scale-Adolescent version* was developed by Brown, West, Loverich, & Biegel (2011) as a self-report 14-item inventory in order to measure main characteristics of mindful awareness (a receptive state of attention, observation and awareness to the present and immediate experiences) in clinical and normative adolescent groups. The scale is in 6 point Likert type through the incremental scores pointing out to the existence of mindful awareness. Regarding the psychometric indicators of the scale in the original development process, Cronbach alpha and test-retest reliability were found seriatim .82 and .79 for non-clinical adolescent groups.

*Self-Compassion Scale* developed by Neff (2003) includes 26 items measuring compassion directed toward self through six different characteristics; self-kindness, self-judgment, common humanity, isolation, mindfulness and over-identification. The answers given to the items of the scale range from 1 indicating strong disagreement and 5 pointing out strong agreement. Incremental scores in the scale mean superior levels of self-compassion and vice versa. Internal consistency level for the whole scale was calculated as .93 and the scale exhibited satisfactory convergent relations with life satisfaction, depression and anxiety (Neff, 2003).

*Difficulties in Emotion Regulation Scale* consists of 36-item measuring emotion regulation difficulties through the six structures of non-acceptance of emotional responses, difficulties engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity (Gratz & Roemer, 2004). DERS has 5 point Likert type items in that the incremental scores show superior levels of emotional dysregulation. Cronbach's alpha level for the whole scale was calculated as .93 with a test-retest reliability of. 88 for the final form.

## III. RESULTS

### Preliminary Analyses

In order to examine the construct validity of the scale Confirmatory Factor Analysis was preferred (Brown, 2006). As emerged in the initial development of the scale (Greco, Baer & Smith, 2011) and later adaptation and validity studies for CAMM (Bruin, Zijlstra & Bögels, 2013; Kuby Mclean & Allen, 2015) confirmatory factor analysis was conducted to primarily validate the one factor structure of the scale.

Before conducting CFA, the assumptions of dealing with missing values and outliers, adequate sample size, linearity and normality were examined (Brown, 2006). Missing values were determined and as the number of missing cells were below 5% of the total, mean substitution was used for the missing data cells. In CFA, the adequate sample size is offered to be at least 200 cases in a study with 5 or 10 parameters which is 211 in this study meeting this assumption (Kline, 2011). In order to deal with univariate outliers,

standardized z scores were used and no cases were found to exceed ±3.29 range. Similarly, multivariate outlier analysis of Mahalanobis showed up no case exceeding critical $\chi^2$ value. In addition, bivariate scatterplots of linearity assumption and Skewness and Kurtosis values for normality criterion indicated that the data is linearly and normally distributed (Tabachnick & Fidell, 2006).

### Model Fit Indices and Standardized Parameter Estimates for CAMM

Based on getting satisfactory evidence for the assumptions of CFA as well as the normal distribution of data, Maximum likelihood estimation was conducted for testing one factor structure of 10-item CAMM through AMOS 18 (Byrne, 2001) statistical program. Firstly, model fit indices emerged through maximum likelihood estimation were examined. Goodness of fit of the scale was checked through the criterion indices of model chi-square value, normed chi square value, comparative fit indexes of CFI and Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA) and goodness of fit index (GFI) (Kline, 2011). The model fit indices emerged for CAMM are presented in Table 1.

**Table 1:** Model fit indices from measurement models of CAMM

| Goodness of Fit Indexes | Measurement Model of DERS | Criterion Ranges |
|---|---|---|
| $\chi^2$, df | 64.43; 32 | Significant |
| $\chi^2$/df | 2.01 | $\chi^2$/df < 3 |
| CFI | .94 | .90 < CFI or close to 1 |
| TLI | .91 | .90 < TLI or close to 1 |
| RMSEA | .07 | .05 < RMSEA < .08 |
| GFI | .94 | .90 < GFI |

Maximum likelihood method of CFA for one factor solution of CAMM showed up a significant model chi-square value ($\chi^2$= 64.43, df=32) that doesn't meet the criterion fit value. Kline (2011) mentions that model chi-square value is sensitive to the sample size so calculating normed chi square value can be preferred as the model fit criterion. The normed chi square value was found 2.01 that is below the cut-off 3 showing a good fit (Kline, 2011). Comparative fit indexes of CFI and TLI emerged as .94 and .91 both indicating a good fit for the scale (Bentler, 1990; Tucker & Lewis, 1973). GIF value was also found .92 indicating an acceptable goodness of fit. Similarly, RMSEA values of .07 shows a good fit as falling between the ranges of .05-.08 (Browne & Cudeck, 1993). Thus, the modification indices of normed chi-square value, CFI, TLI, GFI and RMSEA values satisfy the model fit criteria for CAMM.

After examination of model fit indices, unstandardized and standardized parameter estimates for 10-item CAMM were checked. Standardized errors, t values for each indicator and explained variance are presented in Table 2.

**Table 2:** Unstandardized and standardized parameter estimates for CAMM

| Scale | Item | Unstandardized Factor Loadings | Standardized Factor Loadings | SE | T | $R^2$ |
|---|---|---|---|---|---|---|
| Child and Adolesent Mindfulness Measure | Item 1 | 1.39 | .56 | .1 | 9.34 | .32 |
| | Item 2 | .63 | .34 | .07 | 10.02 | .12 |
| | Item 3 | 1.32 | .51 | .11 | 9.6 | .26 |
| | Item 4 | 1.9 | .73 | .09 | 8.03 | .54 |
| | Item 5 | .87 | .33 | .13 | 10.04 | .11 |
| | Item 6 | .85 | .37 | .1 | 9.97 | .14 |
| | Item 7 | 1.89 | .73 | .08 | 8 | .54 |
| | Item 8 | 1.51 | .54 | .13 | 9.49 | .29 |
| | Item 9 | 1.96 | .75 | .09 | 7.83 | .56 |
| | Item 10 | 1.0 | .39 | .12 | 9.92 | .15 |

Note. All t values were significant, p < .001.

As seen in Table 2, standardized factor parameters fall between .33 and .75 for the items of CAMM. Brown (2006), emphasizes that .30 is the cut-off point for an item to load on a scale in CFA meaning that factor loadings of the items to one factor mindfulness scale are satisfactory. In addition, the explained variance by each item of the scale range between 11% and 56% that were also found statistically significant. Thus, based on both modification indices and also the standardized parameters for CAMM, the one factor construct of the scale can be supported under the scope of this study.

### Convergent and Incremental Validity

For providing evidence over the convergent and incremental validity, Mindful Attention Awareness Scale-Adolescent version (Brown, West, Loverich & Biegel, 2011) Self-Compassion Scale (Neff, 2003) and Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004) were also used in order to examine the relations of these constructs with CAMM. Correlation analysis yielded that CAMM is significantly and positively correlated to MAAS-A (r=.56, p<.01) and Self-Compassion Scale (r=.35, p<.01); significantly and negatively correlated to Difficulties in Emotion Regulation Scale (r=-.52, p<.01) in the current study.

### Internal Consistency

Internal consistency of CAMM was checked through Cronbach Alpha and this value was calculated as .80 for the overall scale.

## IV. DISCUSSION

The purpose of the current study was understanding the psychometric features of CAMM in a group of Turkish adolescents. First of all, construct validity of the scale was checked through conducting CFA. Similar to the results emerged in the original scale development process (Greco, Baer & Smith, 2011) as well as in later validation studies (Bruin, Zijlstra & Bögels, 2013; Kuby Mclean & Allen, 2015),

the results of CFA supported one factor structure of CAMM that is named as *present-moment awareness and non-judgmental, non-avoidant responses to thoughts and feelings*. In addition, the evidence for convergent and incremental validity of the scale yielded positive significant relations of CAMM with MAAS-A (Brown, West, Loverich & Biegel, 2011) and SCS (Neff, 2003) while showing negative significant correlations with DERS (Gratz & Roemer, 2004). Lastly, internal consistency evidence of Cronbach Alpha value of .80 showed that the scale is a sound instrument for measuring mindful awareness in adolescents.

The results as mentioned above should be evaluated in terms of both limitations and contributions when referring to the current study. This study is one of the first studies adapting and testing psychometric properties of a mindfulness scale for adolescent population in Turkish culture. First of all, both reliability and validity indications examined for CAMM showed that the scale is a valid and reliable measurement tool of mindful awareness to be used in adolescents. Secondly, as part of the validity evidence, the scale was found to have good correlations with self-compassion and emotion regulation constructs that are both found to be critical for the psychological health in young people (Bluth & Blanton, 2014; Broderick & Zennings, 2012). Thus, it should be advocated that the scale representing mindful awareness in children and adolescents can be checked through its relations and implications for other psychological constructs that could also be important markers of mental health for young people.

One of the limitations of the study is related to the sample and sample selection method utilized. In order to select the sample for data collection purposes, convenient sampling method was used and the scales were applied to the students attending to the same high school. The homogeneity of participants as well as the number of participants included in the study may serve as a limitation of sample characteristics. In other words, examination of the same study procedures with heterogeneous and larger groups would have created more different results than the findings of the current study. In addition, CAMM is proposed as a measure of mindful attention for individuals who are above 9. In this study, the age range of the participants was 14-18 but it can be assumed that conducting the same or similar studies of CAMM with smaller age groups would lead to different conclusions for the utilization and application of the scale as well. Thus, researchers aim to use CAMM should be critical with the validity and reliability evidence of the scale emerged in this study.

## V. REFERENCES

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