

Received: October 24, 2021

Accepted: February 18, 2022

<http://dergipark.org.tr/rep>

Research Article

e-ISSN: 2602-3733

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April 2022 ♦ 6(Special Issue) ♦ 27-37

Doi: 10.54535/rep.1014296

Turkish Adaptation of a Scale to Measure Three Modes of Motivational Regulation Strategies: Self-, Co-, and Socially Shared Regulation of Motivation for Collaborative Activity

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Abstract

In this study, the scale of “Assess Self-regulation, Co-regulation, and Socially Shared Regulation of Intrinsic Motivation for Collaborative Activity (SCSRM)” developed by Ito and Umemoto (2021) was adapted into Turkish, and it was aimed to perform the validity and reliability studies of the scale. The original scale consists of 7 Likert and 15 items. The purpose of the scale was to identify experiences related to group activities in school tasks and to examine how intrinsic motivation affects the three modes of regulation. This research was carried out on 215 university students, who had completed group activities and learning tasks, using a purposive and convenient sampling method. The scale adaptation stages were followed in the study. At the last stage, the validity and reliability of the scale were calculated. In the analysis of the data collected in the study, various analyzes were used for the validity and reliability studies of the scale. As a result of the research, a valid and reliable scale that can be used to determine experiences related to group activities and to examine how intrinsic motivation affects the three regulation modes has been brought to the literature.

Key Words

Collaborative learning • Regulation • Intrinsic motivation • Motivational regulation strategies • University students

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Citation: Atman Uslu, N. & Yıldız Durak, H. (2022). Turkish adaptation of a scale to measure three modes of motivational regulation strategies: Self-, Co-, and Socially Shared Regulation of Motivation for collaborative activity. *Research on Education and Psychology (REP)*, 6(Special Issue), 27-37.

Collaborative learning involves the processes in which they work together to solve a problem, complete a task, or create a product (Laal & Ghodsi, 2012). Collaborative learning is seen as a source of cognitive development and as one of the foundations of learning (Stahl & Hakkarainen, 2021). Collaborative learning includes students' ability to share the responsibility of being the constructor of active and critical learning processes (Winne et al., 2010). It is important to understand regulation in collaborative learning to enable participation in social learning contexts (Volet & Summers, 2013). Self-regulated learning (SRL) is a process in which learners set their own learning goals, choose the appropriate strategy to achieve these goals, use these strategies, and make sense of their learning process (Schunk & Zimmerman 2008; Zimmerman, 2011). SLR includes cognitive, behavioral, and especially motivational processes in students' learning processes (Pintrich, 2000). In these processes, regulation of motivation is an important component (Boekaerts & Cascallar, 2006). Motivation is critical in biological, cognitive and social regulation (Ryan & Deci, 2000) and also plays an important role in collaborative learning contexts where social interaction is central. (Serrano-Cámara et al., 2014).

According to Järvelä and Hadwin (2013), regulation in collaborative learning takes place in three modes: (a) self-regulation (SR), (b) co-regulation (CoR), (c) socially shared regulation (SSR). Collaborative learning includes a process in which each group member organizes his/her own learning (SR), other members' learning (CoR), and also where all members collectively organize their learning (SSR) (Zheng, 2017). SR is defined as a process in which students set goals, monitor, and evaluate their cognitions, emotions, and behaviors (Pintrich, 2000). According to Usher and Schunk (2018), SR is the process of organizing an individual's thoughts, feelings, and actions to achieve their goals. Successful collaboration requires students' SR, both individually and, provides a rich context for learning (Lai, 2021). At the same time, SR is an important cornerstone for exploring more forms of social regulation such as CoR and SSR (Hadwin et al., 2018). CoR learning focuses on the mentoring relationship between the individual and a student, and the importance of giving and receiving support in peer interactions (Ito & Umomoto, 2021; McCaslin 2009). CoR highlights the social interactions that occur between two or more group members (Zheng & Yu, 2016). SSR refers to the processes by which group members regulate their collective activities, and this type of regulation refers to regulatory processes, beliefs, and knowledge (e.g., strategies, monitoring) linked to a co-created or shared process or shared collectively. (Hadwin et al., 2011; Järvelä et al., 2015). SSR is important in terms of contributing to productive collaborative learning (Järvelä et al., 2019). Also, it is a strategic activity that involves more active participation than task-oriented interaction in general, occurs during high engagement and plays a role in engagement dynamics (Isohäätä et al., 2017). It is critical for students make consistent efforts to regulate their learning and participation in the emergence of SSR in collaborative work. (Järvelä & Järvenoja, 2011).

Emotion and motivation affect regulation processes in complex ways, and more research is needed on how this effect happens. (Järvenoja et al., 2020). In order to design effective practices that will support motivation and collaboration, scientific evidence is needed in this regard, and this will prevent problems in commitment to the task (Tateno et al., 2016). However, the number of studies focusing on self-regulation (SR), co-regulation (CoR), and socially shared regulation (SSR) of motivation are limited in the literature (Ito & Umomoto, 2021). This study aims to introduce a data collection tool to Turkish literature to understand motivational regulation and antecedent factors for university students.

Purpose of the Study

The aim of the current research is to adapt the “SCSRM” scale into Turkish and to conduct validity and reliability studies of the scale. This scale is based on three modes of motivational regulation strategies (SR, CoR, and SSR of intrinsic motivation) and can be used for collaborative group processes. Especially the Covid-19 epidemic process has highlighted the importance of new approaches to increase the online education process and the effectiveness of this education. Collaborative activity and motivational regulation strategies are critical concepts in this context. However, there are not enough studies in the literature on this subject. In addition, it is thought that studies on this subject will make important contributions in the context of learning in higher education. In this context, the following research question has been considered in the context of the research purpose.

How is the validity and reliability of the “SCSRM Scale” adapted into Turkish?

Method

Research Design

This research, which was carried out to determine three basic motivational regulation strategies of university students in collaborative group processes, is scale adaptation research.

Participants

The participants of this research consist of 215 university students who have experienced collaborative group processes in various state universities in Turkey and studying in different classes online. The age range of the participants is between 18-24. 62.8% of the students are female and 37.2% are male. 18.1% of the university students participating in the research are freshman, 47.4% are sophomore, 20% are junior and 14.5% are seniors.

Research Instruments and Processes

SCSRM Scale: This scale was originally developed by [Ito and Umemoto \(2021\)](#). The adaptation of this scale to Turkish was carried out in the context of this study. This scale, which aims to determine the scope of internal motivation regulation in collaborative activities with the self-reported method, was developed for university students and adult learners. The original scale consists of 3 sub-dimensions and 15 items. There are five items on the scale for each of the three modes of intrinsic motivational regulation strategies. These items are in a 7-point Likert structure ranging from 1 (not at all true for me) to 7 (very true for me). As a result of the validity and reliability studies conducted by [Ito and Umemoto \(2021\)](#), it was concluded that the original scale is a valid and reliable data collection tool that can be used in the field. Within the scope of this study, the results regarding the adaptation process of the scale are presented in the findings section. The Cronbach’s alpha coefficient of the scale calculated within the scope of this study is 0.905.

In the scale adaptation process, firstly, permission was obtained from the authors who developed the scale via e-mail. Later, the items of the “SCSRM Scale”, which was translated into Turkish, were conveyed to the language experts. It was presented to two different language experts and their opinions and suggestions were received about the translation of each article. Adjustments were made according to the suggestions.

Data Analysis

In this study, data were collected through online and face-to-face interviews, by giving information about the study, and through online and printed forms. The data collected in printed form was then transferred to digital media. 246 university students participated in the research. After the data were cleared from extreme values, 215 cases were included in the analysis.

For the adaptation study of the scale, construct validity and item analyzes were analyzed. The data collected at this stage of the study were only used for scale adaptation analyses. LISREL 8.72 was used to analyze the data. The construct validity of the SCSRM scale was examined within the scope of validity studies. Construct validity, exploratory and confirmatory factor analyzes were performed. χ^2/df ratio in evaluating the fit of the model tested in confirmatory factor analysis, Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI), Comparative Fit Index (CFI), Incremental Fit Index (IFI) values were examined. NFI, NNFI, CFI, and IFI values above 0.95 in the literature indicate a perfect fit (Hu & Bentler, 1999; Sümer, 2000). It is recommended that RMSEA and SRMR values should be less than 0.08 (Şimşek, 2007). A χ^2/df ratio below three indicates a perfect fit (Kline, 2011).

Cronbach's alpha internal consistency coefficient values were calculated for the reliability studies of the scale. In addition, item-total correlations were examined, and independent samples t-test analysis was performed to determine whether there was a significant difference between the scores of the upper 27% group and the lower 27% group according to the total score obtained from the scale.

Results

Descriptive Findings

The mean, standard deviation, skewness, and kurtosis values of the items in the scale adapted to Turkish are given in Table 1.

Table 1

Mean, Standard Deviation, Skewness, and Kurtosis Values of Scale Items

| | Mean | Standard Deviation | Skewness | Kurtosis |
|--------|-------------|---------------------------|-----------------|-----------------|
| Item1 | 5.3994 | 1.32209 | -0.538 | -0.177 |
| Item 2 | 5.4076 | 1.23798 | -0.463 | 0.145 |
| Item 3 | 5.4787 | 1.27445 | -0.703 | 0.378 |
| Item 4 | 5.5723 | 1.24596 | -0.685 | 0.301 |
| Item 5 | 5.8007 | 1.14375 | -0.840 | 0.282 |
| Item 6 | 5.3233 | 1.31447 | -0.594 | 0.047 |

| | | | | |
|---------|--------|---------|--------|--------|
| Item 7 | 5.3450 | 1.18180 | -0.172 | -0.888 |
| Item 8 | 5.4822 | 1.20304 | -0.387 | -0.677 |
| Item 9 | 5.5469 | 1.07429 | -0.373 | -0.568 |
| Item 10 | 5.3957 | 1.27838 | -0.577 | -0.132 |
| Item 11 | 5.2344 | 1.42114 | -0.708 | 0.092 |
| Item 12 | 5.4127 | 1.21925 | -0.512 | 0.088 |
| Item 13 | 5.3784 | 1.22550 | -0.452 | -0.378 |
| Item 14 | 5.5364 | 1.08783 | -0.368 | -0.399 |
| Item 15 | 5.3782 | 1.30316 | -0.452 | -0.379 |

According to Table 1, the average scores of the items between 5.2344 and 5.8007, and their standard deviations between 1.07429 and 1.32209. The skewness and kurtosis values were found to be between +1 and -1 values. These findings regarding skewness and kurtosis show that the scores obtained from the items are in a normal distribution (Kline, 2011).

Confirmatory Factor Analysis

Confirmatory factor analysis was applied for the model consisting of three factors and 15 items for the factorial validity of the SCSRM scale. As a result of the analysis, the fit indices were found as [$\chi^2(87, N=215)=621.40$, RMSEA= 0.169, SRMR= 0.069, NFI= 0.91, NNFI=0.91, CFI=0.93, IFI=0.93]. Some of the items tested by confirmatory factor analysis were excluded because the fit indices were not in the recommended range and the factor loadings estimated above one for some items might be associated with multicollinearity (Item 1, Item 4, Item 7, Item 9, Item 12, Item 14). The values obtained after removing these items are as follows: [$\chi^2(24, N=215)=70.12$, RMSEA= 0.095, SRMR= 0.036, NFI= 0.96, NNFI=0.96, CFI=0.98, IFI=0.98]. These values indicate that the model has an acceptable and/or perfect fit. As a result of confirmatory factor analysis, standardized factor loads, and item structure parameters are presented in Figure 1.

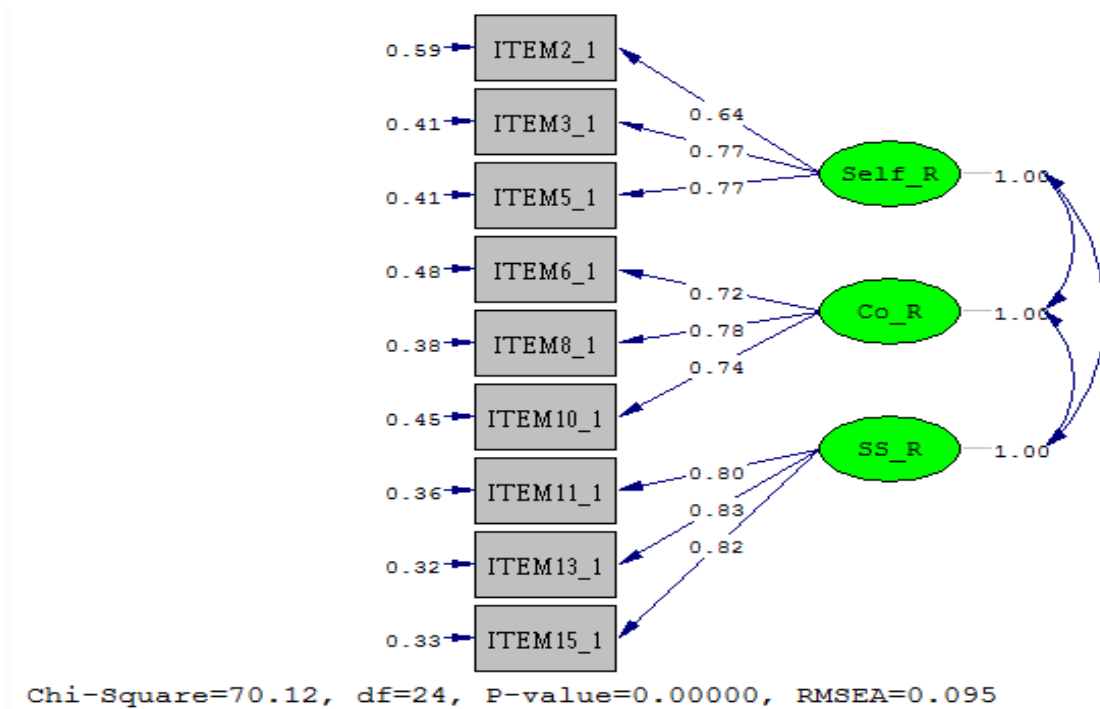


Figure 1. CFA Results

According to Figure 1, factor loadings are between 0.64 and 0.83 and it is statistically significant according to the t-test findings. These findings provide sufficient evidence for factorial validity.

Reliability

The reliability of the measurement tool in terms of internal consistency was tested with the Cronbach alpha coefficient. The Cronbach alpha internal consistency coefficient of nine items in the scale was calculated as 0.905. The Cronbach alpha internal consistency coefficient for the SR factor was 0.768, 0.792 for CoR, and 0.853 for SSR. The fact that these values are higher than 0.70 can be stated to provide evidence of reliability (Hair et al., 1998).

Item-total correlations, which are used to mean the relationship between the score for each item and the total score from the scale, were calculated. In addition, independent samples t-test analysis was performed to examine whether there was a statistically significant difference between the scores of the group in the upper 27% group (N=116) and the group in the lower 27% group, according to the total score obtained from the scale. Item analysis t-values and item-total score correlations between the lower and upper groups are presented in Table 2.

Table 2

Item-total correlations

| Factor | Item | Lower 27%-Upper 27% t-value | (r _{jt}) |
|----------------------------|---------|-----------------------------------|--------------------|
| Self-regulation | Item 2 | 10.953 | 0.514 |
| | Item 3 | 14.666 | 0.633 |
| | Item 5 | 12.635 | 0.630 |
| Co-regulation | Item 6 | 12.945 | 0.682 |
| | Item 8 | 16.572 | 0.745 |
| | Item 10 | 14.317 | 0.701 |
| Socially shared regulation | Item 11 | 15.210 | 0.722 |
| | Item 13 | 14.655 | 0.749 |
| | Item 15 | 16.197 | 0.745 |

When Table 3 is examined, it is seen that there is a significant difference between the independent samples between the upper 27% and the lower 27% groups according to the t values. Item-total correlation values were found to be between 0.514 and 0.749. In the literature, it is stated that 0.30 and higher item-total correlations for items have distinctiveness in terms of measured characteristics (Büyüköztürk, 2004). In this case, it is seen that the total score correlations of the items are sufficient.

Discussion, Conclusion and Suggestions

The aim of this research is to adapt the SCSRM Scale into Turkish and to carry out validity and reliability studies of the scale. The aim of the developed scale is to measure three basic motivational strategies of university students who are in collaborative group processes. In the context of this study, “SCSRM” developed by Ito and Umemoto (2021) has been adapted into Turkish and sufficient evidence has been obtained regarding the validity and reliability of the adapted scale.

Opinions of two language experts were sought to translate the scale into Turkish and bring it into an understandable form. Then, field experts were consulted for the items of the scale. Confirmatory factor analysis of the scale was performed to gain evidence for construct validity. For reliability, Cronbach's Alpha internal consistency coefficients, item-total correlation, and 27% lower-upper group discrimination were checked. As a result of the adaptation study of the scale, some items (Item 2, Item 4, Item 7, Item 9, Item 12, Item 14) were excluded from the scale because the fit indices were not in the recommended range and the factor loadings estimated above one for

some items might be related to the multicollinearity situation. As a result of the adaptation study, a 3-dimensional scale with 9 items and 5-point Likert Type was added to the literature. Scale sub-dimensions are as follows: SR, CoR, and SSR of Intrinsic Motivation.

The scale in this study can be used in different studies to measure the modes of three basic motivational strategies of university students in collaborative group processes. The scale adapted in this study can also be used to measure three modes of motivation in technology-enhanced collaborative learning experiences. Effective use of various digital tools is necessary to increase student performance and support participation in technology-rich environments (Saritepeci & Durak, 2016; Saritepeci & Yildiz, 2014). According to Jeong et al. (2019), supporting collaborative knowledge building and problem-solving by digital technologies improves collaborative learning. Therefore, studies in which motivation was examined as a dependent variable were conducted in the literature on computer supported collaborative learning. (e.g. Järvelä et al., 2008). Therefore, research with the CSCL, which examines three modes of motivation, could benefit from this scale, for which evidence of validity and reliability was presented in this study.

Ethic

In this study, all scientific ethical rules were followed.

Author Contributions

All stages of the study were organized and conducted by the authors.

Conflict of Interest

In addition, the authors declare that they have no conflict of interest.

Funding

This work has not received funding from any institution.

Acknowledge

This study is an expanded version of the oral presentation presented at the ERTE Congress.

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