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Adaptation of the Short Form of the Intrinsic Motivation Inventory to Turkish

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ABSTRACT

Intrinsic motivation has a crucial role in students' learning and should therefore be taken into consideration in educational activities. In this study, the short scale of intrinsic motivation scale developed by Wilde et al. in 2009 was adapted to Turkish Culture. This is an intrinsic motivation scale, which is an adapted, time-economic version of the "Intrinsic Motivation Inventory" introduced by Deci and Ryan. The short scale has four factors, namely interest/enjoyment, perceived competence, perceived choice and pressure/tension with three items each. Data were collected from 230 high school students in two public high schools in Northwestern Turkey in order to analyze the scale's factorial and construct validity. The linguistic equivalence step was carried out by consulting expert opinion because intrinsic motivation differs from one context to another. Results from a confirmatory factor analysis, construct validity and tests for reliability showed that its version adapted to Turkish is a good and time-saving assessment tool for measuring intrinsic motivation during lessons.

Keywords:
Motivation, Intrinsic Motivation, Adaptation, Inventory.

1. Introduction

The concept of motivation derived from the word motive and can be expressed as a conation or effort that pushes a person to achieve a certain goal (Ryan & Deci, 2000a). It is possible to find the concept of motivation defined by researchers in different ways. While some researchers define motivation as an "internal power" that motivates a person to reach a goal and emphasize that this power stems from within the person (Başaran, 1982; Pintrich & Schunk, 2002), some other researchers considered it as a person's desire and consistency process in order to reach a goal and the sum of the motives in this process (Genç, 2012; Heckhausen, 1991; Snow & Farr, 1983). A number of researchers, however, have emphasized the element of continuity and argued that the motivation should be continuous, and internal, external and should be evaluated together (Ryan & Deci, 2000a; Ryan & Deci, 2000b; Gagne & Deci, 2005).

Researchers studying the concept of motivation have described the types of motivation as extrinsic and intrinsic motivation (Brophy, 1983; Moldovan, 2014; Ryan & Deci, 2000b). The desire to achieve a specific goal, the sense of enjoyment and satisfaction acquired as a result of obtaining this goal is considered personal and internal, and such a feeling is defined as intrinsic motivation (Gagne et al., 2010; Gottfried, Fleming & Gottfried, 2001). The motivation caused by a wide variety of behaviors caused by external factors such as money, praise or course grades has been defined as external motivation (Vallerand & Ratelle, 2002; Ryan & Deci, 2000a). Intrinsic motivation strengthens a person's interest in a job and ensures his or her active participation in the process since it is related to the satisfaction and enjoyment of the person in his or her own

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inner world. Intrinsic motivation ensures that a person has positive feelings towards the nature of the work being done. In the case of external motivation, unlike intrinsic motivation, activities that are carried out trigger a person and provide guidance as a result of the activities, not in terms of their structure. A person who is motivated externally maintains that behavior in order to get rewards or to get rid of punishment. Decreasing the impact of environmental factors weakens external motivation, thus negatively affecting the continuity of the individual in the process (Gagne & Deci, 2005; Ryan & Deci, 2000a). Studies show that intrinsic motivation is related to spiritual issues such as a person's inner world and spiritual satisfaction, and is personal. Extrinsic motivation, on the other hand, is related to material and environmental issues such as getting good grades, making money, securing positions, and getting promoted.

Different measurement instruments related to intrinsic motivation have been developed. One of them is the "Intrinsic Task Rewards" scale developed by Mottaz (1985). The scale consists of 3 different factors: "autonomy of the task," "significance of the task" and "commitment to the task." Another intrinsic motivation scale is the Task Reaction Questionnaire (TRQ) developed by Mayo (1976). The scale has 7-point Likert-type options. Its internal consistency is between 0.93 and 0.95. Work Preference Inventory (WPI), developed by Amabile et al. (1994), is a scale for measuring intrinsic and extrinsic motivation together. The scale, consisting of 30 items, has two sub-dimensions that measure intrinsic motivation: Interest/enjoyment and challenge.

Deci and Ryan (1985) mainly emphasized the link between intrinsic motivation and elements of interest, enjoyment, autonomy, competence and pressure. The "Intrinsic Motivation Inventory" (IMI) they developed has been used not only in research fields such as education and instruction but also in the fields of medicine, business, culture, sports and environment (Deci & Ryan, 2002). The full version of the IMI measurement instrument adapted for different purposes includes 45 items with seven sub-scales. Deci and Ryan (2003) offer a scale, a standard tool for measuring motivation for intrinsic activity, with four sub-scales and 22 items. Wilde et al. (2009) have carried out a scale adaptation study involving a 12-item scale as a short and economic version of "Intrinsic Motivation Inventory "(IMI). The four-factor model of the scales was confirmed in Germany with >1,700 secondary school students by a confirmatory factor analysis (Wüst-Ackermann et al., 2018). In the present study, this 12-item, 4-factor measurement instrument developed by Wilde et al. (2009) was adapted to Turkish.

2. Method

2.1. Research Model

This research study is a scale adaptation study. In scale adaptation studies, a scale developed in a certain language is adapted to another language and culture. In this respect, the intrinsic motivation scale developed in English was adapted to Turkish language and culture. In scale adaptation studies, a scale is first translated and back translated for its linguistic translation. For linguistic equivalence, scales in both languages are administered to those who have knowledge of both languages, and the similarity of scores is evaluated. Moreover, the scale is administered to a sampling group, and studies are carried out to examine criterion-related, factorial and construct validity and reliability (Hambelton, 2005). Such studies were carried out in the present study, as well. However, the linguistic equivalence step was carried out by consulting expert opinion because the scale measures intrinsic motivation and because intrinsic motivation differs from one context to another.

2.2. Sample

The sample in this study was a group determined to analyze criterion-related, factorial and construct validity of the scale. The sample included a total of 230 high school students studying in the second semester of the 2018–2019 academic year. This number corresponds to approximately 20 times the number of items in the scale. In scale development and adaptation studies, the number of people in a sample that is ten times or more of the number of items is considered sufficient in terms of establishing samples (Osborne and Costello, 2004). Of the students participating in the study, 140 (60.9%) were female and 90 (39.1%) were male. Of these students, 75 (32.6%) were at the 9th grade, 48 (20.9%) were at the 10th grade, 66 (28.7%) were at the 11th grade, and 41 (17.8%) were at the 12th grade. Questionnaires were administered to 107 (46.5%) of these students at

the mathematics class, 50 (21.7%) at the Turkish Language and Literature class, 25 (10.9%) at the physics class, 25 (10.9%) at the chemistry class and 23 (10%) at the biology class. The students were 14 to 18 years old. The average age of the sample was 15.98 (±1.07).

2.3. Data Collection Instruments

The Intrinsic Motivation Scale is a short and economic scale developed by Wilde, Bätz, Kovaleva and Urhahne in 2009 by using the "Intrinsic Motivation Inventory" developed by Deci and Ryan. The scale, which consists of 12 items, has 4 factors: Interest/enjoyment, perceived competence, perceived choice, pressure/tension. Each factor in the scale has 3 items. . The internal consistency and composite reliability values of the scale were found to be .85 and .89 for "*interest/enjoyment*," .83 and .79 for "*perceived competence*," .75 and .79 for "*perceived choice*," and .54 and .53 for "*pressure/tension*," respectively.

2.4. Data Analysis

During the adaptation of the intrinsic motivation scale, first, the scale was translated into Turkish. Then it was translated back into German, and the translations were compared. Opinions were received from experts who were knowledgeable about both languages with regard to the items in the original German scale and those in the translated Turkish scale. After this process, validity and reliability analyses of the scale were carried out.

Confirmatory factor analysis was carried out first for factorial validity during the validity and reliability studies. Then, convergent and discriminant validity were examined for construct validity, correlation analysis for criterion validity, and internal consistency (Cronbach alpha) and composite reliability analysis for reliability. Correlation analyses and Cronbach alpha test for criterion-related validity were carried out using SPSS 21.0, and the confirmatory factor analysis was conducted using Lisrel 8.54 package program.

3. Results

When the intrinsic motivation scale was adapted to Turkish, first it was translated to Turkish by faculty members working in the Department of Foreign Languages Education. It was initially translated into Turkish by 2 experts. The Turkish form prepared after the translation by the experts was translated back into German by 2 other experts, and its correspondence to the original form was examined. The scale was put into a form that contained the original items, the translated items, and proposals to be made. And then, it was distributed to 2 yet other experts to get their feedback. After opinions were received from the experts, a focus group interview was carried out with the participation of the researchers and an expert to revise the scale. After these operations, the Turkish form of the scale was finalized. This form was administered to the sample to begin conducting validity and reliability studies.

3.1. CFA Findings of the Intrinsic Motivation Scale

When CFA was carried out, the compatibility of 12 items with the model of the original scale which had a four-factor structure was tested. Based on the CFA, the standard solution, T and R^2 values of each item are given in Table 1 in the order given, and the standard solution form for factorial validity is given in Figure 1.

Table 1. Intrinsic motivation scale CFA Results

	SS	T	R^2		SS	T	R^2		SS	T	R^2		SS	T	R^2
M1	.94	17.58	.88	**M2**	.58	9.24	.33	**M3**	.89	16.19	.79	**M4**	.74	12.35	.55
M5	.78	13.20	.61	**M6**	.83	14.47	.70	**M7**	.87	14.45	.76	**M8**	.78	12.71	.61
M9	.40	5.81	.16	**M10**	.79	12.88	.62	**M11**	.95	16.10	.91	**M12**	.61	9.58	.37

When Based on the CFA conducted for factorial validity of the intrinsic motivation scale, it was determined that the standard solution values of the 12 items were between .40 and .95, their t values were between 5.81 and 17.58, and their R^2 values were between .16 and .91. The resulting standard solution, t and R^2 values show that all 12 items were important and statistically significant to the 4 factors and the scale they belonged to (Jöreskog & Sörbom, 1996).

The fit indices of the intrinsic motivation scale were found to be χ^2 (48) = 88.21 ($p < .001$), χ^2/sd = 1.84, RMSEA = 0.060, SRMR = 0.056, GFI = 0.94, AGFI = 0.90, CFI = 0.98, NFI = 0.95, and NNFI = 0.97. All fit indices of the intrinsic motivation scale showed acceptable fit values compared to the fit index values proposed by Schermelleh-Engel, Moosbrugger and Müller (2003). In this respect, it can be said that the Turkish form of the intrinsic motivation scale has factorial validity.

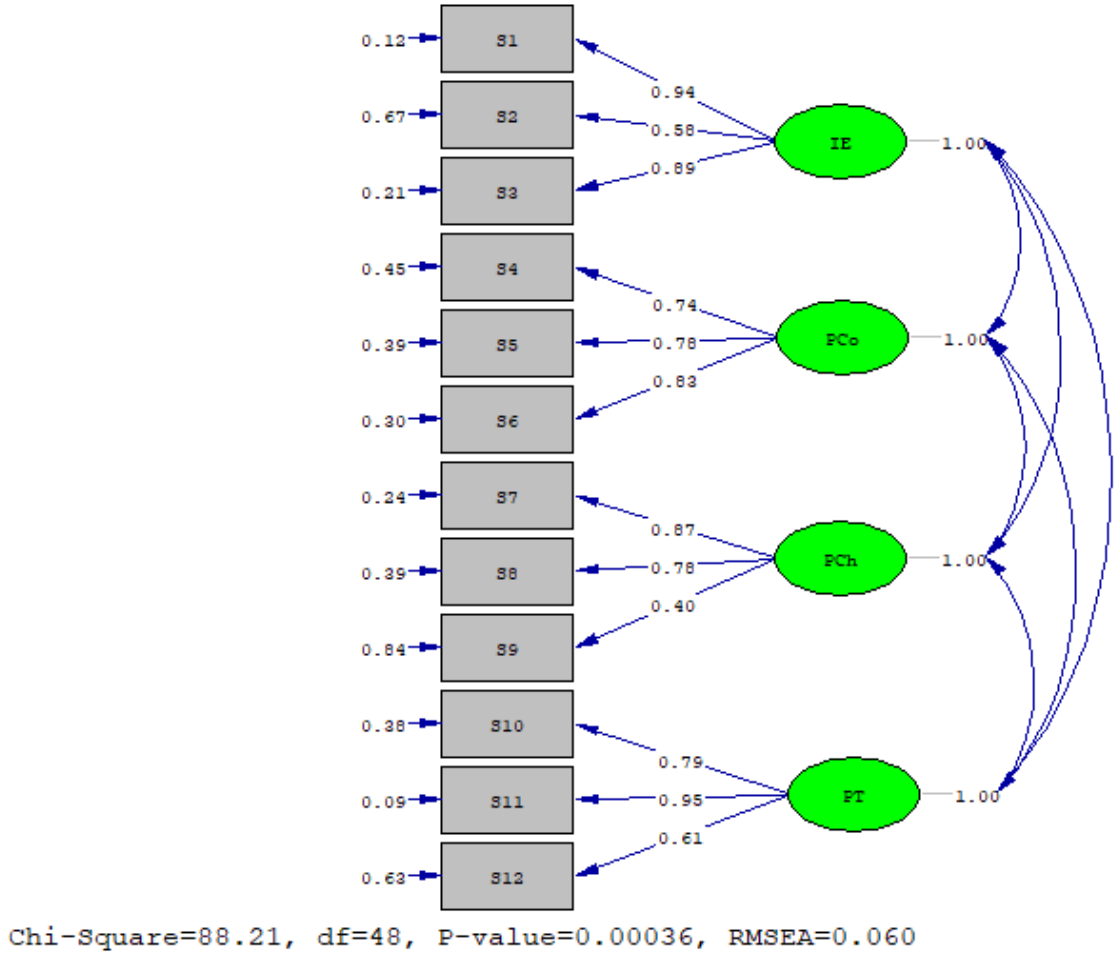

Figure 1. Factor loadings of the four-dimensional model established based on CFA

3.2. Construct Validity

Discriminant and convergent validity were examined to determine the construct validity of the intrinsic motivation scale to explore whether it measured the structure established by the factorial validity. During the testing of convergent validity, Average Variance Explained (AVE) values of the 4 factors — attention/enjoyment, perceived competence, perceived choice and pressure/tension — were found to be 0.668, 0.618, 0.509 and 0.633, respectively. These values are desired to be greater than 0.50 (Fornell & Larcker, 1981). All values in the present study were greater than 0.5. Therefore, it can be said that the intrinsic motivation scale has convergent validity. In terms of discriminant validity, the square roots of the AVE values of the scale were found to be greater than both the correlation between the structures and 0.50. Thus, it was shown that the scale had discriminant validity (Fornell & Larcker, 1981) (Table 2).

Table 2. *Discriminant Validity Values* for Intrinsic Motivation Scale

	Interest/Enjoyment	Perceived Competence	Perceived Choice	Pressure/Tension
Interest/Enjoyment	**0.817**			
Perceived Competence	0.500	**0.786**		
Perceived Choice	0.300	0.475	**0.714**	
Pressure/Tension	-0.125	-0.121	-0.167	**0.796**

3.3. Criterion-Related Validity

In the present study, the students' course grades and the intrinsic motivation scores were compared in terms of criterion-related validity. The course grades were found to have significantly positive correlations with the interest/enjoyment, perceived competence and perceived choice dimensions of the intrinsic motivation scale, but an insignificant negative correlation with the pressure/tension dimension. this is not a meaningful relationship. Similar results have been obtained in literature such as Akgun & Ciarrochi (2003). These findings showed that the dimensions of the intrinsic motivation scale had a positive effect on the course grades as expected (Randler et al., 2011). This can be said to provide evidence for the criterion-related validity of the scale. All results regarding the criterion-related validity are presented in Table 3.

Table 3. *Correlations between dimensions of* the Intrinsic Motivation *scale and course grades*

Criterion	Interest/ Enjoyment	Perceived Competence	Perceived Choice	Pressure/Tension
Course Grade	r = .230	r = .358	r = .172	r = -.044
	(p = .001)	(p = .000)	(p = .017)	(p = .544)

3.4. Reliability Findings

The reliability of the intrinsic motivation scale was checked by Cronbach alpha internal consistency and composite reliability coefficients. The internal consistency and composite reliability values of the scale were found to be .839 and .853 for "*interest/enjoyment*," .829 and .829 for "*perceived competence*," .713 and .741 for "*perceived choice*," and .813 and .834 for "*pressure/tension*," respectively. The total value of the scale was .789. When the internal consistency and composite reliability values are examined, it can be said that the scale produces consistent and reliable data.

4. Discussion, Conclusion

The aim of this study was to adapt to the Turkish culture the twelve-item four-factor Intrinsic Motivation Scale, which was developed by Wilde, Bätz, Kovaleva and Urhahne (2009) to define intrinsic motivation (which drives people to taking action) briefly and concisely (Ryan and Deci, 2000a) in four dimensions with three items for each dimension. Because the scale measures intrinsic motivation and intrinsic motivation differs from one context to another, the linguistic equivalence step was carried out by consulting expert opinion. The findings have demonstrated that the Turkish form of the scale is equivalent to its German form.

The confirmatory factor analysis (CFA) results, construct validity results and reliability results of the scale have shown that the scale is a reliable measurement instrument in Turkish culture.

Chi-Square goodness of fit test, GFI, AGFI, CFI, NFI, RMSEA and SRMR values were examined to demonstrate the efficiency of the model which was tested through a CFA for suitability. The chi-square value was found to be significant, and considering the fit index criteria, perfect fit was obtained for the GFI, AGFI, CFI, NFI and SRMR indices (Bentler, 1980; Bentler and Bonett, 1980; Schermelleh-Engel, Moosbrugger and Müller, 2003; Marsh, Hau, Artelt, Baumert and Peschar, 2006). The RMSEA value was found to have acceptable goodness of fit (Brown and Cudeck, 1993; Byrne and Campbell, 1999). Excellent and acceptable goodness of fit values

for the criterion fit indices show that the four-factor model established in CFA has acceptable goodness of fit, and the factor structure of the original form of the scale was verified in the Turkish context.

In terms of construct validity, convergent and discriminant validity of the scale were examined to determine whether it measured intrinsic motivation. The AVE values were checked for each factor to determine convergent validity. It was found that the AVE value was 0.509 for the factor with the lowest AVE value and the AVE values of the other factors were greater than that. These values' being greater than .50 has been pointed out to provide evidence for convergent validity (Bagozzi and Youjae, 1988). In this respect, it can be said that the scale had convergent validity. In terms of discriminant validity, whether the square roots of AVEs of the scale were greater than both the correlations between the structures and 0.50 (Fornell & Larcker, 1981), and the scale was determined to have discriminant validity.

For the reliability of the scale, Cronbach alpha internal consistency and composite reliability coefficients were examined. Internal consistency values for the dimensions of the scale ranged from .713 to .839, while its composite values ranged from .73 to .85. The fact that all internal consistency and composite reliability values were greater than .70 indicates that the scale has high reliability values. In other words, it generates consistent data.

The fact that the original scale has 12 items has been emphasized. It has been pointed out that the scale with 12 items has acceptable psychometric values. It has also been indicated that this scale consists of only 12 short items, giving the opportunity for ease of use and healthier data collection (Wilde, Bätz, Kovaleva and Urhahne, 2009).

In conclusion, based on the findings of this study, it can be said that the intrinsic motivation scale is a valid and reliable measurement instrument in Turkish culture and can be used to measure personality in high school students.

4.1. Suggestions

- The introduction of a form that can be used directly for intrinsic motivation in Turkish culture can increase the use of such a form.
- The scale can be used to measure intrinsic motivation directly, to achieve clearer results with its short form, and to get results in a short time.
- Because the scale is short, it may be recommended to associate it with other variables and use it to examine inter-variable relationships.

Scale can be used in different types of courses and teaching by researchers in Turkey.

References

Akgun, S., & Ciarrochi, J. (2003). Learned resourcefulness moderates the relationship between academic stress and academic performance. Educational Psychology, 23(3), 287-294. doi: 10.1080/0144341032000060129

Amabile, T., Hill, K.G., Hennesey, B.A., Tighe, E.M. (1994). The work preference inventory: Assesing intrinsic and extrinsic motivational orientations. Journal of Personality and Social Psychology, 66(5), 950- 967.

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. Journal of the academy of marketing science, 16(1), 74-94.

Başaran, İ. E. (1982). Örgütsel davranış: Ankara: Ankara Üniversitesi Eğitim Fakültesi yayınları.

Bentler, P. M. (1980). Multivariate analysis with latent variables: Causal modeling. Annual review of psychology, 31(1), 419-456.

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. Psychological bulletin, 88(3), 588.

Brophy, J. (1983). Conceptualizing student motivation. Educational Psychologist, Vol. 18, 200-215.

Brown, M., & Cudeck, R. (1993). EQS structural equations program manual. Multivariate Software Inc., Los Angeles.

Byrne, B. M., & Campbell, T. L. (1999). Cross-cultural comparisons and the presumption of equivalent measurement and theoretical structure: A look beneath the surface. Journal of Cross-Cultural Psychology, 30(5), 555-574.

Deci, E. L. & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behavior. New York: Plenum.

Deci, E. L. & Ryan, R. M. (Eds.) (2002). Handbook of self-determination research. Rochester:University of Rochester.

Deci, E. L., & Ryan, R. M. (2003). Intrinsic motivation inventory. Self-determination theory, 267.

Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of marketing research, 18*(3), 382-388.

Gagne, M. & Deci, E. L. (2005). Self-determination theory and work motivation. Journal of Organizational Behavior, 26(4), 331-362. doi: 10.1002/job.322

Gagné, M., Forest, J., Gilbert, M., Aubé, C., Morin, E. and Angela, M. (2010). The motivation at work scale: Validation evidence in two languages. Educational and Psychological Measurement, 70(4), 628-646. doi: 10.1177/0013164409355698

Genç, N. (2012). Yönetim ve organizasyon: Çağdaş sistemler ve yaklaşımlar (4. Baskı). Ankara: Seçkin Yayıncılık.

Gottfried, A. E., Fleming, J. S. and Gottfried, A. W. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study. Journal of educational psychology, 93(1), 3-13. doi: 10.1037//0022-0663.93.1.3

Hambleton, R. K. (2005). Issues, Designs and Technical Guidelines for Adapting Tests Into Multiple Languages and Cultures. In R. K. Hambleton, P. F. Merenda and C. D. Spielberger (Eds.). Adapting Psychological and Educational Tests for Cross-Cultural Assessment. NJ: Lawrence Erlbaum.

Heckhausen, H. (1991). Motivation and action. New York: Springer.

Jöreskog, K. & Sörbom, D. (1996). *LISREL 8: Structural equation modeling with the SIMPLIS command* language. Chicago: Scientific Software International/Erlbaum.

Marsh, H. W., Hau, K. T., Artelt, C., Baumert, J., & Peschar, J. L. (2006). OECD's brief self-report measure of educational psychology's most useful affective constructs: Cross-cultural, psychometric comparisons across 25 countries. International Journal of Testing, 6(4), 311-360.

Mayo, R.J. (1976). The development and construct validation of a measure of intrinsic motivation. Unpublished doctoral dissertation, Purdue University.

Moldovan, O. D. (2014). Intrinsic and extrinsic motivation to primary school children. J Educatia Plus, 10(1), 203-211.

Mottaz, C.J. (1985). The relative importance of intrinsic and extrinsic rewards as determinants of work satisfaction, Sociological Quartely, 26(3), 365-385.

Pintrich, P. R. & Schunk, D. H. (2002). Motivation in education: Theory, research, and applications (2nd ed.). Upper Saddle River, NJ: Merrill Prentice-Hall.

Randler, C., Hummel, E., Glaser-Zikuda, M., Vollmer, C., Bogner, F. X., & Mayring, P. (2011). Reliability and Validation of a Short Scale to Measure Situational Emotions in Science Education. *International Journal of Environmental and Science Education, 6*(4), 359-370.

Richard, P. B., & Youjae, Y. (1988). On the evaluation of structural equation models. Journal of the academy of marketing science, 16(1), 74-94.

Ryan, R. M. & Deci, E. L. (2000a). Intrinsic and extrinsic motivations: Classic definitions and new directions. Contemporary Educational Psychology, 25, 54-67. doi:10.1006/ceos,1999.1020.

Ryan, R. M. & Deci, E. L. (2000b). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. American Psychologist, 55, 68-78.

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. Methods of psychological research online, 8(2), 23-74.

Snow, R.E. & Farr, M.J. (1983). Cognitive-affective processes in aptitude, learning, and instruction: An introduction. Conative and affective process analysis, 3, 1-10

Vallerand, R. J. & Ratelle, C. F. (2002). Intrinsic and extrinsic motivation: A hierarchical model. Handbook of self-determination research, 128, 37-63.

Wilde, M., Bätz, K., Kovaleva, A., & Urhahne, D. (2009). Überprüfung einer Kurzskala intrinsischer Motivation (KIM). Zeitschrift für Didaktik der Naturwissenschaften, 15: 31-45.

Wüst-Ackermann, P., Vollmer, C., Itzek-Greulich, H., & Randler, C. (2018). Invertebrate disgust reduction in and out of school and its effects on state intrinsic motivation. *Palgrave Communications*, *4*(1), 1-9. doi: 10.1057/s41599-018-0122-8