



An Assessment of Construct Validity and Reliability on Aggressive Behavior Scale

Ragil Adi Purnawan^a, Fatwa Tentama^{b*}

^{a,b}*Master of Psychology, Ahmad Dahlan University, Yogyakarta, Indonesia*

^a*Email: ragiladipurnawan94@gmail.com*

^b*Email: fatwa.tentama@psy.uad.ac.id*

Abstract

The purpose of this study is to test the validity and reliability of aggressive behavior scale and is also to examine aspects and indicators that can form variables of aggressive behavior. Aggressive behavior is measured by four aspects, namely physical aggression, verbal aggression, anger, and hostility. The subjects in this study were all X grade middle school students in Yogyakarta. The sample in this study was 60 students. The sampling technique used was quota sampling technique. The data collection method was the scale of aggressive behavior. Research data were analyzed with Structural Equation Modeling (SEM) through the SmartPLS 3.2.8 program. Based on the results of data analysis, the aspects and indicators that make up the aggressive behavior variable are declared valid and reliable. The most dominant aspect that reflects aggressive behavior is physical aggression that has a loading factor value of 0.903. Meanwhile, the weakest aspect that reflects aggressive behavior is hostility which has a loading factor value of 0.727. This shows that all aspects and indicators are able to reflect and form aggressive behavior variables. Thus, the measurement model can be accepted because the theory which describes the aggressive behavior variable fit with empirical data obtained from the subject.

Keywords: Physical Aggression; Hostility; Verbal Aggression; Anger; Aggressive Behavior; Structural Equation Modelling; 2nd Order CFA.

* Corresponding author.

1. Introduction

School as a place for the learning process should be a safe and comfortable place. However, this comfort is still often disturbed by the various negative behaviors that are shown by students. These behaviors include aggressive behavior. Examples of aggressive behavior carried out by students include saying inappropriate words such as calling a friend by the name of an animal and berating, doing damage to public facilities and belongings of a friend, and performing various acts of violence such as hitting, kicking and fighting with his friend. Reference [1] stated that aggressive behavior is very dangerous because it can affect the development of students in the next stage of development. Aggressive behavior if left unchecked, can develop into juvenile delinquency [2]. Students who exhibit aggressive behavior are at risk of experiencing personality disorders, involved in alcohol and addictive substance abuse [3,4], as well as injuring themselves and others [5,6]. Aggressive behavior is associated with poor mental health, exclusive friendships, bad past experiences [7] and suicide ideation [8]. Aggressive behavior can be caused by various factors, including maladaptive perfectionism [9], too high self-esteem [10] inability to manage negative emotions [11], jealousy and poor anger regulation [12], and low social support from parents, friends and teachers [13]. Researchers conducted interviews with 15 "X grade" Middle School students in Yogyakarta. The interview results show that: 1) All students have behaved in a way that is hurtful, and harmful to their peers. 2) There are eight students who interfere and threaten and make a rude rejection of their friends. 3) There are seven students who vent their emotions to their friends. 4) There are ten students who have jealousy and envy when they see their friend looking more attractive. This shows that aggressive behavior can cause many negative impacts and also occur many times on students in school. Aggressive behavior is a behavior to hurt others both physically and psychologically [14]. According to Sears [15] aggressive behavior is an action intended to hurt others. Aggressive behavior can be physical or verbal. Physical aggressive behavior is aggressive behavior carried out by means of physical violence such as slapping, hitting, and throwing objects at other people around him. In contrast, Verbal aggressive behavior is aggressive behavior carried out by issuing words to attack others. This can be in the form of mockery, insults, or verbal abuse. Reference [16] explains aggressive behavior is behavior that intentionally intends to hurt others physically or verbally and to destroy property. Reference [17] adds that aggressive behavior is intentional physical or verbal behavior and has the intention to hurt, destroy or harm others as well as to hurt objects that are the target of aggression. Aggressive behavior can be concluded as behavior that tends to hurt, harm or destroy something or someone [18]. In the last decade, empirical studies of aggressive behavior have shown that it can be caused by watching a lot of violent video games [19]. Reference [20]. They explain that it can affect emotional regulation. Researcher such as Barry, Reference [21,22] explain that aggressive behavior can affect adolescent self-esteem. The results of other studies show that aggressive behavior originates from parenting. For example, someone sees acts of abuse and arguments of parents [23,24]. According to [14], there are four aspects of aggressive behavior: 1). Physical aggression is an aggressive action that aims to hurt, disturb, or endanger others through motoric responses in physical forms, such as hitting, kicking, and others. 2). Verbal aggression is an aggressive action that aims to hurt, disturb or endanger others in the form of rejection and threats through verbal responses. 3). Anger is a negative emotion caused by unfulfilled expectations, a form of expression that can hurt others and themselves. Some forms of anger are feelings of anger, resentment, and inability to control it. These include irritability, which is about temperamental, tendency to get angry easily, and difficulty

controlling anger, 4). Hostility is an act that expresses hatred, antagonism, or a tremendous anger to another party. Hostility is a form of aggression that is classified as a covert (invisible). Hostility represents the cognitive component consisting of hatred such as jealousy and envy of others and suspicion such as distrust and worry.

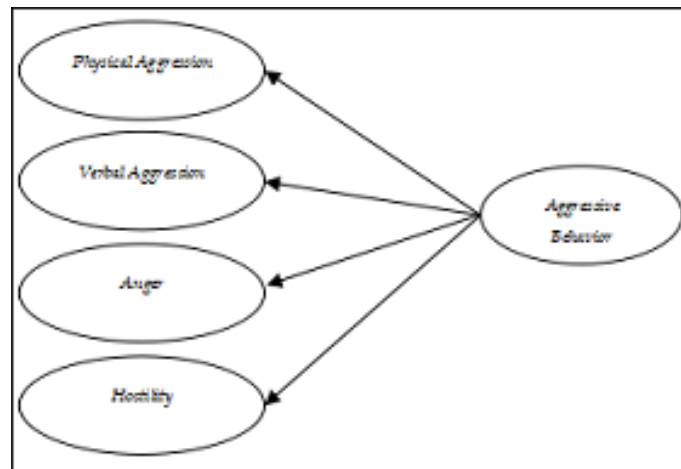


Figure 1: Conceptual framework of aggressive behavior

Based on Figure 1 above, this study hypothesizes that the aspects of physical aggression, verbal aggression, anger and hostility are capable of forming aggressive behavior variables.

One approach that can be used in testing the construction of a measuring instrument is Confirmatory Factor Analysis (CFA). Confirmatory Factor Analysis (CFA) is one of the main approaches in factor analysis. CFA can be used to test aspects of a construct. This test is used to carry out model measurements so that it can describe aspects in reflecting latent variables, namely aggressive behavior by looking at the loading factors of each aspect that forms a construct. CFA is also used to test the construct validity and construct reliability of the indicators (items) creating latent constructs [25]. The CFA used in this study is the second order Confirmatory Factor Analysis (2nd Order CFA), a measurement model that consists of two levels. The first level of analysis is carried out from aspects to its indicators, and the second analysis is carried out from latent variables to its aspects [25]. Based on the description above, the formulation of the problem in this study is: 1) Is the scale of aggressive behavior valid and reliable?. 2) Are the aspects of physical aggression, verbal aggression, anger and hostility able to determine the variable of aggressive behavior?. The purpose of this study is to: 1) Test the validity and reliability of the scale of aggressive behavior and 2) Test the aspects and indicators that can form the variable of aggressive behavior.

2. Research Method

2.1. Population, Sample, and Sampling Technique

The subjects in this study were all X grade Middle School students in Yogyakarta. The sample in this study was 60 X grade Middle School students in Yogyakarta. The sampling technique used in this study is the quota sampling technique.

2.2. Data Collection Method

Aggressive behavior is measured using a scale of aggressive behavior with a Likert scaling model. The researcher arranged the scale of this study by referring to aspects of aggressive behavior according to Buss and Perry [14], namely physical aggression, verbal aggression, hostility, and anger. Examples of items on the aspect of physical aggression are "I feel relieved when hitting a friend when a friend is bothering me". The example of an item on the aspect of verbal aggression include "I call a friend with an inappropriate name" and examples of items on the aspect of hostility are "I encourage friends with the aim of making them fall", and examples of items on the aspect of anger are "I am jealous seeing my friend look attractive". Blueprints that are used as a reference in the scale of aggressive behavior can be seen in table 1.

Table 1: Blueprint of aggressive behavior scale

Aspect	Indicators	Item Number		Total
		Favourable	Unfavourable	
Physical aggression	1. Hitting	1,5,9,13,34	17,21,25,29,33	10
	2. Kicking			
	3. Pushing			
	4. Punching			
Verbal aggression	1. Shouting	2,6,10,14,37	18,22,26,30,38	10
	2. Mocking			
	3. Cursing			
	4. Stigmatizing			
Hostility	1. Jealous	3,7,11,15,36	19,23,27,31,35	10
	2. Sad			
	3. Sensitive			
	4. Envious			
Anger	1. Mad	4,8,12,16,39	20,24,28,32,40	10
	2. Annoyed			
	3. Temperamental			
	4. Irritated			
Total		20	20	40

2.3. Construct Validity and Construct Reliability

To test the construct validity and construct reliability, this study uses the outer model testing through the SmartPLS 3.2.8 program. The construct validity test consists of tests of convergent validity and discriminant validity. The convergence validity can be seen when the loading factor value and Average Variance Extracted (AVE) value is > 0.5. According to Hair and his colleagues the higher the loading factor score, the more important the loading role will be in interpreting the factor matrix. With a loading and AVE value > 0.5, items can be considered significant. While discriminant validity can be seen from comparing the roots of Average Variance Extracted (AVE) between aspects. It must be higher than the correlation with other aspects [26]. The construct reliability test was conducted to show the internal consistency of the measuring instrument by looking at the value of composite reliability and Cronbach's alpha with a higher value. It would indicate the consistency value of each item in measuring latent variables. According to Hair and his colleagues the expected composite reliability and Cronbach alpha value is > 0.7, and the value 0.6 is still acceptable [26].

2.4. Data Analysis

The data in this study were analyzed using the outer model with the 2nd Order CFA approach through the SmartPLS 3.2.8 program. According to Abdillah and Hartono [27] Partial Least Square (PLS) is a variant-based Structural Equation Model (SEM) that can simultaneously test measurement models to test validity and reliability.

3. Result

The outer model testing the scale of aggressiveness conducted using the smart PLS 3.2.8 program can be seen in Figure 2 below.

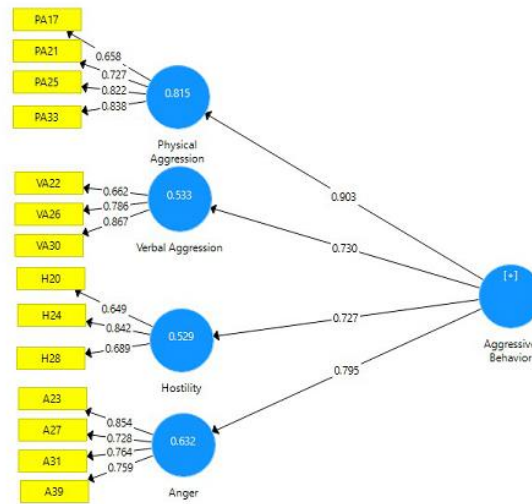


Figure 2: Output outer model of aggressive behavior scale

3.1. Construct Validity Test

3.1.1. Convergent Validity

Convergent validity test results are performed by testing the outer model seen from the loading factor value and Average Variance Extracted (AVE). This test is done by looking at the loading factor value > 0.5 and Average Variance Extracted (AVE) > 0.5. Based on the data analysis, it was found that the value of loading factors from variables to aspects and from aspects to indicators is > 0.5. A loading factor of 0.5 or more is considered valid and robust enough to explain latent constructs [28]. The results of convergent validity testing can be seen in table 2 and table 3.

Table 2: Loading factor values (variable - aspect)

Aspect	Loading factor	Explanation
Physical aggression	0.903	Valid
Verbal aggression	0.730	Valid
Hostility	0.727	Valid
Anger	0.795	Valid

Table 3: Loading factor values (aspect - item)

Item	Loading factor	Explanation
PA17	0.658	Valid
PA21	0.727	Valid
PA25	0.822	Valid
PA33	0.838	Valid
VA22	0.662	Valid
VA26	0.786	Valid
VA30	0.867	Valid
H20	0.649	Valid
H24	0.842	Valid
H28	0.689	Valid
A23	0.854	Valid
A27	0.728	Valid
A39	0.759	Valid

Furthermore, the results of the convergent validity test show the Average Variance Extracted (AVE) value is > 0.5. The Average Variance Extracted (AVE) value of the aggressive behavior variable is 0.505 and the Average Variance Extracted (AVE) value of each aspect can be seen in table 4.

Table 4: The AVE value of aggressive behavior

Aspect	AVE	Explanation
Physical aggression	0.605	Valid
Verbal aggression	0.535	Valid
Hostility	0.585	Valid
Anger	0.603	Valid

3.1.2. Discriminant Validity

The results of the discriminant validity test showed that the root value of the Average Variance Extracted (AVE) in each aspect is higher than the root value of the Average Variance Extracted (AVE) in other aspects, so the discriminant validity criteria are met. The root value of the Average Variance Extracted (AVE) variable of aggressive behavior can be seen in table 5.

Table 5: AVE root value of aggressive behavior

Aspect	Anger	Hostility	Physical aggression	Verbal aggression
Anger	0.778	0.605	0.586	0.502
Hostility	0.605	0.731	0.647	0.430
Physical aggression	0.586	0.430	0.765	0.502
Verbal aggression	0.502	0.430	0.594	0.776

3.2. Construct Reliability Test

Construct reliability testing is done by testing the outer model, which is seen from the value of composite

reliability and Cronbach alpha. This test is done by looking at the value of composite reliability and Cronbach alpha > 0.7 , which means that the scale in this study is reliable. Composite reliability and Cronbach alpha values are shown in table 6 below.

Table 6: Composite reliability and cronbach alpha value

Variable	Cronbach alpha	Composite reliability	Explanation
Aggressive behavior	0.835	0.877	Reliable

The results of construct reliability testing in table 6 shows that the scale of aggressive behavior has good reliability and it means that the aspects that measure the variable of aggressive behavior meet the unidimensional criteria [28]. This is indicated by the value of composite reliability of 0.877 and Cronbach alpha of 0.835. The results of research data analysis using the outer model testing show that the measurement model can be accepted because all aspects can reflect the variables formed.

4. Discussion

Based on the results of the analysis of construct validity and construct reliability, the aspects and indicators that make up the scale of aggressive behavior are declared valid and reliable. This shows that all aspects and existing indicators can reflect and shape the variable of aggressive behavior. The most dominant aspect that is able to reflect aggressive behavior is physical aggression with a loading factor of 0.903. Physical aggression is shown by the behavior of hitting, kicking, pushing, punching, and so on. This is consistent with the findings at the study site that the behavior that often arises in students is a form of aggressive physical aggression behavior like hitting, kicking, pushing and punching. The findings at the study site showed that the subject felt relieved when he could hit a friend who bothered him, when angry the subject also dared to encourage his friend and ask him to fight. According to [29] 40 percent of aggressive behavior is physical aggression. In boys physical aggression will further develop compilations of individuals who have high physical strength and fighting abilities [30]. The weakest aspect of reflecting aggressive behavior is hostility with a loading factor of 0.727. Hostility is shown by feeling jealous, sad, sensible, and envious. The findings at the study site showed that the subject feels annoyed and jealous when his friend has a more attractive appearance, and is more admired by his friends than himself. This finding is in accordance with previous research which found that verbal hostility is one aspect that can also form aggressiveness [31,32,33]. The results of this study are relevant to the results of previous studies. Nakano research results, Reference [34] showed that the scale of aggressiveness had met the reliability requirements with Cronbach alpha 0.77. Other research results from [35] showed Cronbach alpha 0.70, then Say, and Bag results [36] showed Cronbach alpha 0.77. The results of [37] reported a Cronbach alpha value of 0.71. Similarly, Reference [38] reported a Cronbach alpha value of 0.75, while the Cronbach alpha value obtained in this study was 0.835. This shows that the scale of aggressive behavior which is the result of this study is appropriate to be used or applied in revealing aggressive behavior in students, especially junior high school students because it has good and reliable validity and reliability. The results of this study are expected to provide an overview of the validity and reliability of the scale of aggressive behavior in the context of X grade Middle School students in

Yogyakarta so that it can be used in research data collection and become a reference in subsequent studies related to aggressive behavior.

5. Conclusion

Based on the results of the analysis and discussion, it can be concluded that: 1) The scale of aggressive behavior meets the validity and reliability. 2) All aspects and indicators can form aggressive behavioral variables, namely physical aggression, verbal aggression, anger and hostility. The aspect that has the most dominant influence on aggressive behavior is physical aggression, and the weakest aspect describing the variable of aggressive behavior is hostility. This study formed a model for measuring the scale of aggressive behavior in accordance with empirical data obtained from subjects at the study site.

Acknowledgements

The author would like to thank Ahmad Dahlan University and the Master of Psychology Programme University of Ahmad Dahlan for supporting the implementation of this research.

References

- [1] S. Kim, P. Orpins, Randy, R. Kamphaus and S.H. Kelder. "A multiple risk factors model of the development of aggression among early adolescents from urban disadvantaged neighborhoods." *Scholl Psychology Quarterly*, vol. 26, no. 3, pp. 215-230, 2011.
- [2] S. Barnow, M. Lucht and H.J. Freyberger. "Correlates of Aggressive and Delinquent Conduct Problems in Adolescence." *Aggressive Behavior*, vol. 31, no. 1, pp. 24–39, 2004.
- [3] J.G. Johnson, P. Cohen, E. Smailes, S. Kasen, J.M. Oldham, A.E. Skodol and J.S. Brook. "Adolescent personality disorders associated with violence and criminal behavior during adolescence and early adulthood." *American Journal of Psychiatry*, vol. 157, pp. 1406–1412, 2000.
- [4] K. Coomber, A. Curtis, B. Vandenberg, P.G. Miller, C. Heilbronn, S. Matthews, S.K. Smith, J. Wilsonc, F. Moayeric, R. Mayshaka, D.I. Lubmanc and D. Scott. "Aggression and violence at ambulance attendances where alcohol, illicit and/or pharmaceutical drugs were recorded: A 5-year study of ambulance records in Victoria, Australia." *Drug and Alcohol Dependence*, vol. 205, pp. 1-8, 2019.
- [5] I. Milaniak and C.S. Widom. "Does child abuse and neglect increase risk for perpetration of violence inside and outside the home?." *Psychology of Violence*, vol. 5, no. 3, pp. 246–255, 2015.
- [6] D. Kaur and R. Niwa. "Aggressive behaviour of secondary school students in relation to school environment." *International Journal of Advanced Research*, vol. 5, no. 5, pp. 801-809, 2017.
- [7] R. Thomas. "College student peer aggression: A review with applications for colleges and universities." *Aggression and Violent Behavior*, vol. 48, pp. 218-229, 2019.
- [8] E. Koyama, C.C. Zai, L. Bryushkova, J.L. Kennedy and J.H. Beitchman. "Predicting risk of suicidal ideation in youth using a multigene panel for impulsive aggression." *Psychiatry Research*, 2019.
- [9] D.S. Chester, L.M. Merwin and C.N. DeWall. "Maladaptive perfectionism's link to aggression and

- self-harm: emotion regulation as a mechanism.” *Aggressive Behavior*, vol. 41, no. 5, pp. 443–454, 2015.
- [10] J.P. Wyckoff and L.A. Kirkpatrick. “Direct and indirect aggression tactics as a function of domain-specific self-esteem.” *Personality and Individual Differences*, vol. 92, pp. 135–142, 2016, <https://doi.org/10.1016/j.paid.2015.12.038>.
- [11] C. Garofalo and P. Velotti. “Negative emotionality and aggression in violent offenders: The Moderating role of emotion dysregulation.” *Journal of Criminal Justice*, vol. 51, pp. 9–16, 2017.
- [12] N. Muñoz-Fernández and V. Sánchez-Jiménez. “Cyber-aggression and psychological aggression in adolescent couples: A short-term longitudinal study on prevalence and common and differential predictors.” *Computers in Human Behavior*, vol. 104, 2020.
- [13] M.F. Wright and S. Wachs. “Does social support moderate the relationship between racial discrimination and aggression among Latinx adolescents? A longitudinal study.” *Journal of Adolescence*, vol. 73, pp. 85-94, 2019.
- [14] A.H. Buss and M. Perry. “The aggression questionnaire.” *Journal of Personality and Social Psychology*, vol. 63, no. 3, pp. 452-459, 1992.
- [15] D.O. Sears, J.L. Freedman and L.A. Peplau, *Social Psychology (In Indonesia)*. Jakarta.: Erlangga, 2004.
- [16] Atkinson. *Introduction to psychology (In Indonesia)*. Jakarta.: Intertaksara, 2000.
- [17] D.G. Myers. *Social psychology*. Jakarta.: Salemba Humanika, 2012.
- [18] E. Roland and T. Idsøe. “Aggression and bullying.” *Aggressive Behavior*, vol. 27, no. 6, pp. 446-462, 2001.
- [19] P. Riva, A. Gabbiadini, L.J.R. Lauro, L. Andrighetto, C. Volpato and B.J. Bushman. “Neuromodulation can reduce aggressive behavior elicited by violent video games.” *Cognitive, Affective, & Behavioral Neuroscience*, vol. 17, no. 2, pp. 452–459, 2016.
- [20] P. Velotti, C. Garofalo, C. Petrocchi, F. Cavallo, R. Popolo and G. Dimaggio. “Alexithymia, emotion dysregulation, impulsivity and aggression: A multiple mediation model.” *Psychiatry Research*, vol. 237, pp. 296–303, 2016.
- [21] C.T. Barry, D.C. Loflin and H. Doucette. “Adolescent self-compassion: Associations with narcissism, self-esteem, aggression, and internalizing symptoms in at-risk males.” *Personality and Individual Differences*, vol. 77, pp. 118–123, 2015.
- [22] Z. Teng, Y. Liu and C. Guo. “A Meta-analysis of the relationship between self-esteem and aggression among Chinese students.” *Aggression and Violent Behavior*, vol. 21, pp. 45–54, 2015.
- [23] Q. Wang, W. Shi and G. Jin. “Effect of childhood emotional abuse on aggressive behavior: A moderated mediation model.” *Journal of Aggression, Maltreatment & Trauma*, vol. 28, no. 8, pp. 929-942, 2019.
- [24] J. Doncheva and D. Stoyanova. “Identifying with parents for determination prosocial and aggressive behavior in children.” *Mircea cel Batran*, vol. 18, no. 1, pp. 318-320, 2015.
- [25] H. Latan. *Structural equation modeling concepts and applications using LISREL 8.80 (In Indonesia)*. Bandung.: Alfabeta, 2012.
- [26] H.M. Jogiyanto. *Concept and application of structural equation modeling based on variants in business*

- research (In Indonesia). Yogyakarta.: UPP STIM YKPN, 2011.
- [27] W. Abdillah and J. Hartono. Partial Least Square (PLS): Alternative Structural Equation Modeling (SEM) in business research (In Indonesia). Yogyakarta.: Andi, 2015.
- [28] J.F. Hair, W.C. Black, B.J. Babin and R.E. Anderson. Multivariate data analysis. Upper Saddle River.: Prentice Hall, 2010.
- [29] Y. Hamaguchi and T. Fujiwara. "Proactive-reactive aggressiveness in high school students: Scale construction, examination of relations to physical and relational aggression, exploration of subtypes". Japanese Journal of Educational Psychology, vol. 64, no. 1, pp. 59-75, 2016.
- [30] J. A. Muñoz-Reyes, C. Gil-Burmann, B. Fink and E. Turiegano, "Physical strength, fighting ability, and aggressiveness in adolescents". American Journal of Human Biology, vol. 24, no. 5, pp. 611-617, 2012.
- [31] R.M. Chory-Assad. "The predictive validity of the verbal aggressiveness scale". Communication Research Reports, vol. 19, no. 3, pp. 237-245, 2002.
- [32] B.K. Sinha and D.C. Watson. "Hostility and personality disorder". Imagination, Cognition and Personality, vol. 25, no. 1, pp. 45-57, 2005.
- [33] S. Zihlerl, Z.Č. Travnik, B.K. Plesničar, M. Tomori and B. Zalar. "Trait aggression and hostility in recovered alcoholics". European Addiction Research, vol. 13, no. 2, pp. 89-93, 2007.
- [34] K. Nakano. "Psychometric evaluation on the Japanese adaptation of the aggression questionnaire." Behaviour Research and Therapy, vol. 39, no. 7, pp. 853–858, 2001.
- [35] S. Côté, R. Tremblay and F. Vitaro. "The development of physical aggression during childhood: Gender differences and family risk factors (In France)," Sociologie et Sociétés, vol. 35, no. 1, pp. 203-220, 2003.
- [36] S. Say and H. Bag. "The evaluation of the effect of a newly designed computer game on 7th grade students' motivation towards science and aggression." Eurasia Journal of Mathematics, Science and Technology Education, vol. 13, no. 8, pp. 5379-5393, 2017.
- [37] J. Hosie, F. Gilbert, K. Simpson and M. Daffern. "An examination of the relationship between personality and aggression using the general aggression and five factor models." Aggressive Behavior, vol. 40, no. 2, pp. 189–196, 2013.
- [38] J.L. Alcorn, J.L. Gowin, C.E. Green, A.C. Swann, F.G. Moeller and S.D. Lane. "Aggression, impulsivity, and psychopathic traits in combined antisocial personality disorder and substance use disorder." The Journal of Neuropsychiatry and Clinical Neurosciences, vol. 25, no. 3, pp. 229-232, 2013.