

Verbal hostility, corporal punishment, nonreasoning strategies, and directiveness in reflecting authoritarian parenting style

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Abstract

Parenting is classified into several types, one of which is authoritarian parenting. Verbal hostility, corporal punishment, nonreasoning / punitive strategies, and directiveness are characteristics of this parenting style. The construct validity and construct reliability of the authoritarian parenting scale, as well as the characteristics and indicators that reflect authoritarian parenting, are being investigated. This study included all students in class VIII at Yogyakarta's state junior high schools X, Y, and Z, which totaled 524 students. This study's sample size was 185 students. The sampling technique employs cluster random sampling. Data is gathered using an authoritarian parenting scale. The research instruments are distributed directly to the subject. Structural Equation Modeling (SEM) was used to analyze the research data in the SmartPLS 3.2.8 program. The data analysis results of this study show that the characteristics and indicators that reflect authoritarian parenting are valid and reliable. The most dominant aspect that reflects authoritarian parenting is corporal punishment, while directiveness is the weakest aspect that reflects authoritarian parenting. As a result, because the theory describing the construct of authoritarian parenting corresponds to empirical data obtained from the subject, the measurement model can be accepted.

Keywords

authoritarian parenting, corporal punishment, directiveness, nonreasoning strategies, verbal hostility

Introduction

Children's cognitive, linguistic, motor, and socioemotional development is believed to significantly affect their life wellbeing (He *et al.*, 2020). The parenting style is among important factors affecting children's development (Lassassi, 2020; Olla *et al.*, 2018). Parenting styles represent a combination of different elements that create an emotional climate when parents communicate and behave towards their children. Parents' behaviors may be presented through gestures, intonation, emotional reaction, attention, and any behaviors shown toward their children (Dalimonte & Williams, 2020). Baumrind (1967) classifies parenting styles into three styles: authoritative, authoritarian, and permissive parenting styles.

Authoritarian parenting style is defined as a style that attempts to shape, control, and evaluate children's behaviors and attitude according to the parents' standards, provides a minimum discussion between parents and children, and demands children to adhere to rules set by the parents (Baumrind, 1968). Authoritarian parents oblige their children to follow values expected by the parents despite children's difficulties and problems due to their parenting style (Olla *et al.*, 2018).

Children with an authoritarian parenting style may encounter numerous developmental stages (Olla *et al.*, 2018). Authoritarian parenting style is reported to be associated with children's poor regulation of emotion, making them difficult to regulate their emotions (Shaw & Starr, 2019), risk of depression (Liu & Merritt, 2018), and even being permissive, perceiving suicidal action as normal (Choi *et al.*,

2020). Children with authoritarian parenting style tend to exhibit late learning readiness (Kim *et al.*, 2018), which result in poor learning performance and achievement (Oliveira *et al.*, 2018; Albuhairan *et al.*, 2017). Regarding their interaction with the environment, children with authoritarian parenting styles tend to find it difficult to adjust themselves to the environment (Yazdani & Daryei, 2016), and become a bully (Muhopilah *et al.*, 2019, 2021), tend to exhibit aggressive behaviors as they imitate their parents' violence (Olla *et al.*, 2018; Muñoz *et al.*, 2017).

The authoritarian parenting style highlights a high degree of behavioral control with low acceptance (Robinson *et al.*, 2001), where parents urge their children to follow their commands without providing opportunities to talk and discuss (Santrock, 2011), parents make rules and expect their children to follow them (Richardson & Schuster, 2004), and view negative punishment as a normal when children disobey (Moscatelli & Rubini, 2011).

According to Robinson *et al.* (1995), the characteristics of authoritarian parenting style are: 1) Verbal hostility. Authoritarian parents often verbally abuse their children, e.g., scolding them, shouting at them for their bad behavior, debating them, and showing disapproval by quarreling. 2)

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Corporal punishment. Authoritarian parents usually use corporal punishment as a method to discipline their children. 3) Nonreasoning/punitive strategies. Parents punish their children by taking children’s rights without reasonable reasons or only a little explanation. They leave their children alone in a place without or with only a little explanation. 4) Directiveness. Authoritarian parents often tell their children what they have to do, demand children to do what they say, criticize their children when their behaviors are not like what they expect. Based on this description, the hypothesis in this study is that the characteristics of authoritarian parenting are verbal hostility, corporal punishment, nonreasoning/punitive strategies, and directiveness, which together reflect the construct of authoritarian parenting.

The Confirmatory Factor Analysis (CFA) is one of the approaches used to test the measurement construct. This test is performed to measure the authoritarian parenting style model in order to depict the characteristics and indicators of the authoritarian parenting style. The latent construct is tested through the construct validity test, while the construct reliability is examined using second-order CFA (Ghozali & Latan, 2012). Based on the description above, authoritarian parenting style is an important variable to understand, thus requiring a valid, reliable scale to measure the authoritarian parenting style. Two research problem in this paper was formulated as follows: the authoritarian parenting style scale is a valid and reliable scale, and (b) verbal hostility, corporal punishment, nonreasoning/punitive strategies, and directiveness simultaneously reflect authoritarian parenting style construct. This study aims to test the construct validity and reliability of the authoritarian parenting scale and examine the characteristics and indicators reflecting the authoritarian parenting style. This study attempts to test the conceptual model of authoritarian parenting through the 2nd Order CFA approach. This research shows the role of verbal hostility, corporal punishment, nonreasoning/punitive strategies, and directiveness in reflecting the authoritarian parenting style.

Method

Population, Sample, and Sampling Technique

The population in this study were all class VIII students at schools X, Y, and Z, a state junior high school in Yogyakarta, with a total of 524 students. The sample in this study was 185 students consisting of 98 boys and 87 girls with an age range of 13-16 years (*M* = 14 years). The sample in this study was taken by a sampling technique, namely the cluster random sampling technique. The way to do this is to make rolls of many classes in each school, write the name of each class and then take one roll. The class name of the scroll was selected as the sample in the study. Data was collected by distributing the research scale directly to participants.

Data Collection Method

The authoritarian parenting style in this study was measured using an authoritarian parenting style scale, which was developed following the characteristics of the Authoritarian parenting style proposed Robinson *et al.* (1995) : verbal hostility, corporal punishment, non-reasoning/punitive strategies, and directiveness. Sample items

Table 1. Authoritarian Parenting Style Blueprint

Characteristics	Item no.		Item
	Favorable	Unfavorable	
Verbal Hostility	1, 9, 17	5, 13, 21	6
Corporal Punishment	2, 10, 18	6, 14, 22	6
Nonreasoning/Punitive Strategies	3, 11, 19	7, 15, 23	6
Directiveness	4, 12, 20	8, 16, 24	6
Total			24

of the questionnaire read “My parents talk harshly when they think I’ve done poor work,” “My parents threaten me when I do not obey them,” “My parents punish me without telling my mistakes,” and “My work has to be done according to my parents’ word.” The following table 1 presents the blueprint of the scale.

Construct Validity and Reliability

The construct validity and reliability in this study were tested using the outer model test with smartPLS 3.2.8. The validity test consists of convergent and discriminant validity tests. The construct is deemed to have convergent validity if its loading factor and cronbach’s alpha values are higher than 0.5 (Jogiyanto , 2011; Hair *et al.*, 2014). Meanwhile, the construct is deemed to have discriminant validity when the root AVE of the characteristics is higher than the correlation with the root AVE of other characteristics (Jogiyanto , 2011; Ghozali, 2014; Ghozali & Latan, 2015). The construct reliability was measured by determining the instrument’s internal consistency. The reliability score could be seen from the composite reliability and Cronbach’s alpha values. The expected composite reliability and cronbach’s alpha values are >0.7 and 0.6, respectively (Jogiyanto , 2011; Hair *et al.*, 2014). Figure 1 displays the model tested in this study.

Data Analysis

The data in this study were analyzed using outer model with 2nd order CFA approach through SmartPLS 3.2.8. Partial Least Square (PLS) is one of the tools to test a construct validity and reliability, which is categorized as variance-based SEM (Abdillah & Hartono , 2015).

Result and Discussion

The following Figure 2 shows the outer model measurement.

Construct Validity Test Result

Convergent validity The convergent validity analysis was made by seeing the loading factor and the Average Variance Extracted (AVE) values. Based on the data analysis result, the loading factor of the variable to the characteristics and the loading factor of the characteristics to the indicator of > 0.5. The next step was seeing the AVE values. The AVE value of the authoritarian parenting style was 0.519 (> 0.5). Table 2 presents the factor loading and AVE value of each characteristic.

Discriminant Validity. The construct discriminant validity was determined by comparing the root Average Variance

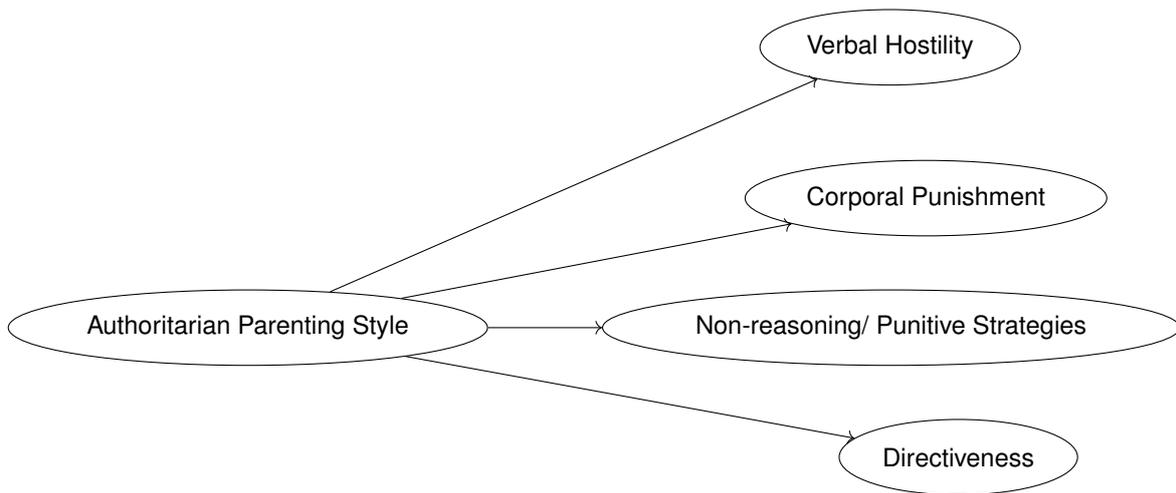


Figure 1. Authoritarian parenting style conceptual model

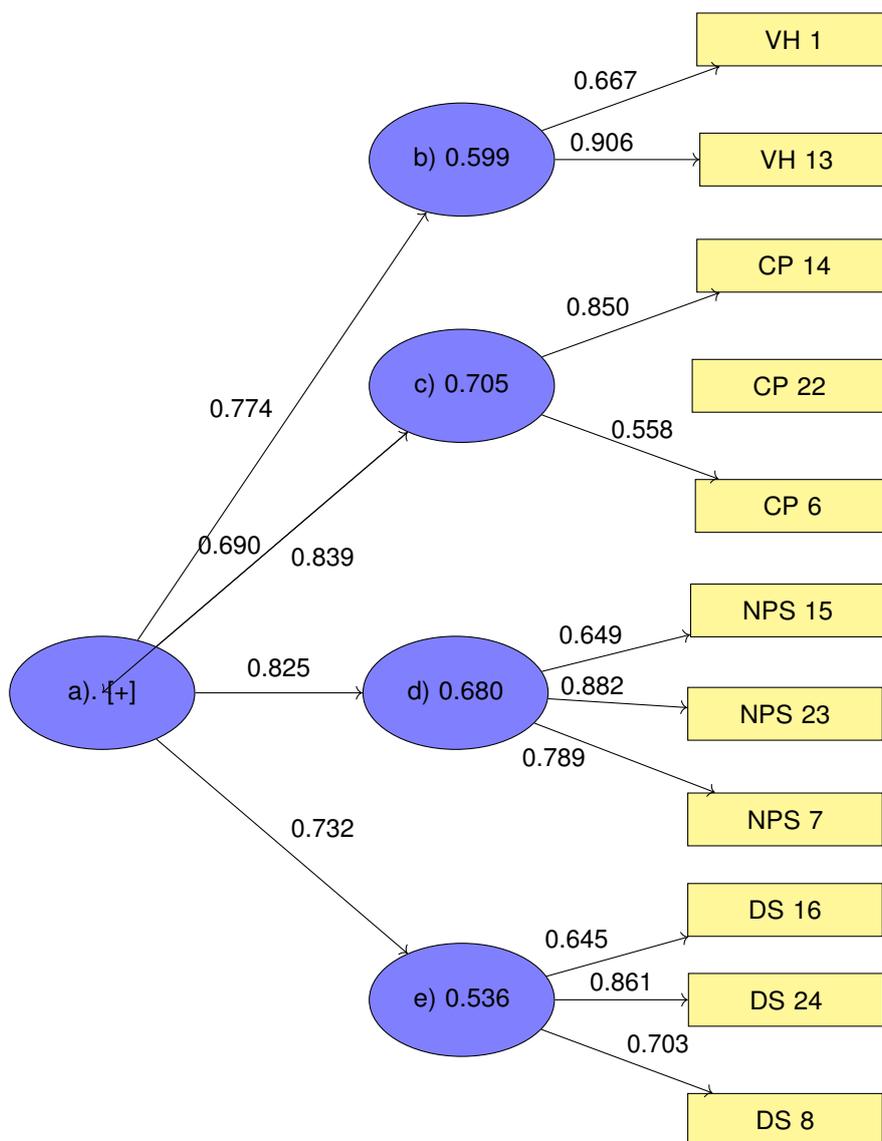


Figure 2. Outer Model Output. Note: a) Authoritarian Parenting, b) Verbal Hostility, c) Corporal Punishment, d) Non-reasoning/ Punitive Strategies, e) Directiveness

Extracted of the four characteristics. The result showed that the the correlation value of root AVE of each characteristic was higher than the correlation value of AVE with other

characteristics Thus, the discriminant validity in this study has met the requirement. Table 3 presents the root AVE value of authoritarian parenting style.

Table 2. Convergent Validity Test Result

Characteristics	Factor loading		AVE	Description
	Item	Variable		
Verbal Hostility	0.667 - 0.906	0.774	0.633	Valid
Corporal Punishment	0.558 - 0.850	0.839	0.503	Valid
Nonreasoning/Punitive Strategies	0.649 - 0.882	0.825	0.607	Valid
Directiveness	0.645 - 0.861	0.732	0.55	Valid

Table 3. Discriminant Validity Test Result

	Verbal Hostility	Corporal Punishment	Nonreasoning/Punitive Strategies	Directiveness
Verbal Hostility	0.796	0.586	0.542	0.352
Corporal Punishment	0.586	0.71	0.691	0.62
Nonreasoning/Punitive Strategies	0.542	0.691	0.779	0.733
Directiveness	0.352	0.62	0.733	0.742

Construct Reliability Test Result

The construct reliability was determined by seeing the composite reliability and Cronbach’s alpha values. The construct was deemed reliable if its composite reliability and Cronbach’s alpha value is higher than 0.7. In this study, the composite reliability and Cronbach’s alpha value was 0.838 and 0.757, respectively. In other words, the characteristics measuring the authoritarian parenting style has met the unidimensional criteria (Hair *et al.*, 2014). The validity and reliability tests performed in this study showed valid and reliable items capable of reflecting the characteristics of authoritarian parenting style. They were items number 1, 6, 7, 8, 13, 14, 15, 16, 22, 23, and 24. The analysis result indicated that the measurement model is acceptable as the observed characteristics can reflect the authoritarian parenting style.

Discussion

The analysis results in this study indicate that the authoritarian parenting scale has met the validity and reliability of the construct with aspects that reflect the authoritarian parenting pattern, including verbal hostility, corporal punishment, nonreasoning/punitive strategies, and directiveness. Corporal punishment is dominant in reflecting authoritarian parenting, with a loading factor value of 0.839. Corporal punishment is described as children being confused about what their parents want, parents not explaining why individuals have to do something, and parents being rude when children make mistakes (Adawiah, 2017). The weakest characteristic and ability to reflect authoritarian parenting is directiveness, with a loading factor value of 0.732. Directiveness is shown by parents who do not support the activities that children do, one of which is that children will have difficulty making decisions when they will determine their careers in the future (Firdaus & Kustanti, 2019). Authoritarian parents do not understand the reasons for the child’s violation and do not provide direction or assistance when the child has difficulties (Dewi & Susilawati, 2016). Authoritarian parents supervise but do not want to listen to their children (Einstein & Indrawati, 2017).

The authoritarian parenting scale in this study has a reliability value of 0.838 [>0.70], so it can be said to be satisfactory or good (Hair *et al.*, 2017). The results of previous studies regarding the construct of authoritarian parenting, which also explained the validity and reliability

of the authoritarian parenting scale, included the research of Lavrič & Naterer (2020), which measured authoritarian parenting using the Parenting styles scale compiled by Robinson *et al.* (1995) on this scale authoritarian parenting is reflected through the dimensions of verbal hostility, corporal punishment, and directiveness. The results of this study indicate that the measurement of authoritarian parenting is valid and reliable by obtaining Cronbach’s alpha of 0.736. Another study was conducted by Melis & Selcuk (2018); this study also used the Parenting styles scale compiled by Robinson *et al.* (1995). In this study, authoritarian parenting obtained a Cronbach’s alpha score of 0.750. In previous studies, the reliability value of the authoritarian parenting questionnaire for adolescents in Denpasar using SPSS 15.0 was 0.876 (Purnamasari & Marheni, 2017). The reliability value in has a Cronbach’s alpha of 0.897 with vocational students as research subjects (Putri, 2018). Another test of the authoritarian parenting scale using SPSS with the subject of high school students with a Cronbach’s alpha value of 0.940 (Lukouw *et al.*, 2021).

The results of this study, when compared with previous studies, indicate that this study can also be an instrument to measure authoritarian parenting. This is based on the reliability value, which indicates that the scale in this study has a higher reliability value with a composite reliability value of 0.838 and Cronbach’s alpha of 0.757. According to Nunnally & Bernstein (1994), the score is in the good category. Therefore, the results of this study are expected to be a reference in describing the validity and reliability of the authoritarian parenting scale construct for junior high school students in Yogyakarta and can be a reference in subsequent research related to the authoritarian parenting style variable.

Conclusion

Based on the analysis result, it could be concluded that: 1) the authoritarian parenting style scale is valid and reliable, and 2) all characteristics and indicators can reflect the authoritarian parenting style. The most dominant aspect reflecting the authoritarian parenting style was corporal punishment, whereas the weakest aspect to reflect this parenting style was directiveness.

Recommendation

Future studies on authoritarian parenting style is expected to link the authoritarian parenting style variable to other variables. It is also recommended to apply more comprehensive analysis techniques.

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References

- Abdillah, W., & Hartono, J. (2015). *Partial least square (PLS): Alternatif structural equation modeling (SEM) dalam penelitian bisnis*. Andi.
- Adawiah, R. (2017). Pola asuh orang tua dan implikasinya terhadap pendidikan anak: Studi pada masyarakat Dayak di Kecamatan Halong Kabupaten Balangan. *Jurnal Pendidikan Kewarganegaraan*, 7(1), 33-48. <http://dx.doi.org/10.20527/kewarganegaraan.v7i1.3534>
- Albuhairan, F., Abou Abbas, O., El Sayed, D., Badri, M., Alshahri, S., & De Vries, N. (2017). The relationship of bullying and physical violence to mental health and academic performance: A cross-sectional study among adolescents in Kingdom of Saudi Arabia. *International journal of pediatrics and adolescent medicine*, 4(2), 61-65. <https://doi.org/10.1016/j.ijpam.2016.12.005>
- Baumrind, D. (1967). Child care practices anteceding three patterns of preschool behavior. *Genetic Psychology Monographs*, 75(1), 43-88.
- Baumrind, D. (1968). Authoritarian vs authoritative parental control. *Adolescence*, 3(11), 255-272. <https://psycnet.apa.org/record/1969-06772-001>
- Choi, S. H., Lee, S. E., Lee, C. W., Maeng, S., Son, J., Kim, W. H., ... & Kim, H. (2020). Association between perceived parenting style and adolescents' attitudes toward suicide. *Journal of the Korean Academy of Child and Adolescent Psychiatry*, 31(4), 193. <https://doi.org/10.5765/jkacap.2000322>
- Dalimonte, M. D., & Williams, J. M. (2020). Parenting styles and their effects. JM Williams. <https://doi.org/10.1016/B978-0-12-809324-5.23611-0>
- Dewi, N. P. A. R., & Susilawati, L. K. P. A. (2016). Hubungan antara kecenderungan pola asuh otoriter (authoritarian parenting style) dengan gejala perilaku agresif pada remaja. *Jurnal Psikologi Udayana*, 3(1), 108-116. <https://doi.org/10.24843/JPU.2016.v03.i01.p11>
- Einstein, G., & Indrawati, E. S. (2017). Hubungan antara pola asuh otoriter orangtua dengan perilaku agresif siswa/siswi SMK Yudya Karya Magelang. *Jurnal Empati*, 5(3), 491-502. <https://doi.org/10.14710/empati.2016.15390>
- Firdaus, S. A., & Kustanti, E. R. (2019). Hubungan antara pola asuh otoriter dengan pengambilan keputusan karier pada siswa SMK Teuku Umar Semarang. *Jurnal Empati*, 8(1), 212-220. <https://doi.org/10.14710/empati.2019.23596>
- Ghozali, I. (2014). Model persamaan struktural konsep dan aplikasi dengan program AMOS 22.0. Universitas Diponegoro.
- Ghozali, I., & Latan, H. (2012). *Partial least squares: Konsep, metode dan aplikasi menggunakan program warPLS 2.0 untuk penelitian empiris*. Semarang. Universitas Diponegoro.
- Ghozali, I., & Latan, H. (2015). *Partial Least Squares, konsep, teknik dan aplikasi menggunakan program Smartpls 3.0 untuk penelitian empiris*. Universitas Diponegoro.
- Hair, J. F., Black, W. C., Babin, B. J. & Anderson, R. E. (2014.). *Multivariate data analysis*. 7th Edition, Pearson Education, Upper Saddle River.
- Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2014). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage publications. <http://doi.org/10.1007/978-3-030-80519-7>
- Hair, J.F., Hult, G.T.M., Ringle, C.M. and Sarstedt, M. (2017). *A Primer on partial least squares structural equation modeling (PLS-SEM)*. 2nd Edition, Sage Publications Inc., Thousand Oaks, CA.
- He, Y., Liu, C., Chen, Y., Huang, J., & Luo, R. (2020). Intergenerational transmission of parenting style in rural China and the mediation effect of Caregiver's mental health. *Children and Youth Services Review*, 117, 105319. <https://doi.org/10.1016/j.childyouth.2020.105319>
- Jogiyanto, H. M. (2011). *Konsep dan aplikasi structural equation modeling berbasis varian dalam penelitian bisnis*. UPP STIM YKPN.
- Kim, Y., Calzada, E. J., Barajas-Gonzalez, R. G., Huang, K.-Y., Brotman, L. M., Castro, A., & Pichardo, C. (2018). The role of authoritative and authoritarian parenting in the early academic achievement of Latino students. *Journal of Educational Psychology*, 110(1), 119-132. <https://doi.org/10.1037/edu0000192>
- Lassassi, M. (2020). Does pre-school improve child development and affect the quality of parent-child interaction? Evidence from Algeria, 557. *GLO Discussion Paper*.
- Lavrič, M., & Naterer, A. (2020). The power of authoritative parenting: A cross-national study of effects of exposure to different parenting styles on life satisfaction. *Children and Youth Services Review*, 116, 105274. <https://doi.org/10.1016/j.childyouth.2020.105274>
- Liu, Y., & Merritt, D. H. (2018). Examining the association between parenting and childhood depression among Chinese children and adolescents: A systematic literature review. *Children and Youth Services Review*, 88, 316-332. <https://doi.org/10.1016/j.childyouth.2018.03.019>
- Lukouw, J. F. T. E., Solang, D. J., & Kapahang, G. L. (2021). Hubungan pola asuh otoriter orang tua dengan penyesuaian diri di sekolah pada siswa SMA Katolik Karitas Tomohon. *Psikopedia*, 2(3), 231-236. <https://ejournal-mapalus-unima.ac.id/index.php/psikopedia/article/view/3545>
- Melis, Y. H., & Selcuk, B. (2018). Predictors of obesity and overweight in preschoolers: The role of parenting styles and feeding practices. *Appetite*, 120, 491-499. <https://doi.org/10.1016/j.appet.2017.10.001>
- Moscattelli, S., & Rubini, M. (2011). Parenting style in adolescence: The role of warmth, strictness, and psychological autonomy granting in influencing collective self-esteem and expectations for the future. *Handbook of Parenting: Styles, Stress & Strategies*, 342-349. Retrieved from https://www.researchgate.net/publication/290587689_Parenting_styles_in_adolescence_The_role_of_warmth_strictness_and_psychological

- autonomy_granting_in_influencing_collective_self-esteem_and_expectations_for_the_future (accessed 02 April 2022)
- Muhopilah, P., & Tentama, F. (2019). Faktor-faktor yang mempengaruhi perilaku bullying. *Jurnal Psikologi Terapan dan Pendidikan*, 1(2), 99-107. <http://dx.doi.org/10.26555/jptp.v1i2.15132>
- Muhopilah, P., Tentama, F., & Yuzarion. (2021). The model influence of authoritarian parenting, extraversion personality, and conformity to bullying in students. *International Journal of Evaluation and Research in Education*, 10(2), 483-493, <http://doi.org/10.11591/ijere.v10i2.20914>
- Muñoz, J. M., Braza, P., Carreras, R., Braza, F., Azurmendi, A., Pascual-Sagastizábal, E., ... & Sánchez-Martín, J. R. (2017). Daycare center attendance buffers the effects of maternal authoritarian parenting style on physical aggression in children. *Frontiers in Psychology*, 8, 1-7. <https://doi.org/10.3389/fpsyg.2017.00391>
- Novianty, A. (2016). Pengaruh pola asuh otoriter terhadap kecerdasan emosi pada remaja madya. *Jurnal Psikologi*, 9(1), 17-15. <https://ejournal.gunadarma.ac.id/index.php/psiko/article/view/1539>
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory*, 3, 248-292. <https://doi.org/10.1177/014662169501900308>
- Oliveira, F. R., de Menezes, T. A., Irfi, G., & Oliveira, G. R. (2018). Bullying effect on student's performance. *Economia*, 19(1), 57-73. <https://doi.org/10.1016/j.econ.2017.10.001>
- Olla, M. B., Daulima, N. H. C., & Putri, Y. S. E. (2018). The experience of parents implementing authoritarian parenting for their school-age children. *Enfermeria Clinica*, 28, 122-125. [https://doi.org/10.1016/S1130-8621\(18\)30050-0](https://doi.org/10.1016/S1130-8621(18)30050-0)
- Purnamasari, K. N., & Marheni, A. (2017). Hubungan antara pola asuh otoriter dengan perilaku menjalin persahabatan pada remaja di Denpasar. *Jurnal Psikologi Udayana*, 4(1), 20-29. <https://doi.org/10.24843/JPU.2017.v04.i01.p03>
- Putri, A. A. (2018). Hubungan antara pola asuh otoriter dan kenakalan remaja [Skripsi tidak dipublikasikan]. Universitas Islam Indonesia Yogyakarta.
- Richardson, J., & Schuster, M. (2004). *Everything you never wanted your kids to know about sex (but were afraid they'd ask): The secrets to surviving your child's sexual development from birth to the teens*. Harmony. Retrieved from https://books.google.co.id/books/about/Everything_You_Never_Wanted_Your_Kids_to.html?id=-PQTAdDcQTIC&redir_esc=y (accessed 02 April 2022)
- Robinson, C. C., Mandleco, B., Olsen, S. F., & Hart, C. H. (2001). The parenting styles and dimensions questionnaire (PSDQ). *Handbook of Family Measurement Techniques*, 3, 319-321. Sage Publications. Retrieved from https://www.researchgate.net/publication/284239814_The_Parenting_Styles_and_Dimensions_Questionnaire_PSDQ (accessed 02 April 2022)
- Robinson, C. C., Mandleco, B., Olsen, S. F., & Hart, C. H. (1995). "Authoritative, authoritarian, and permissive parenting practices: Development of a new measure. *Psychological Reports*, 77(3), 819-830, <https://doi.org/10.2466%2Fpr0.1995.77.3.819>
- Santrock, J. W. (2011). *Child development*. Mc-Graw-Hill.
- Shaw, Z. A., & Starr, L. R. (2019). Intergenerational transmission of emotion dysregulation: The role of authoritarian parenting style and family chronic stress. *Journal of Child and Family Studies*, 28(12), 3508-3518. <https://doi.org/10.1007/s10826-019-01534-1>
- Yazdani, S., & Daryei, G. (2016). Parenting styles and psychosocial adjustment of gifted and normal adolescents." *Pacific Science Review B: Humanities and Social Sciences*, 2(3), 100-105. <http://dx.doi.org/10.1016/j.psr.2016.09.019>