

Testing the Adversity Quotient Model in Early Childhood: Structural Equation Modeling (SEM) Analysis of the Dimensions of Reach, Origin and Ownership, Control, and Endurance

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ABSTRACT:

A child's ability to respond to and overcome various forms of adversity is a crucial aspect in the development of psychological resilience from an early age. One concept that explains this capacity is Adversity Quotient (AQ), which is an individual's ability to face challenges through four main dimensions: Control, Origin and Ownership, Reach, and Endurance. This study aims to test the structural model of Adversity Quotient in early childhood and identify the contribution of each dimension to shaping the AQ construct. This study used a quantitative approach with a survey design. The sample consisted of 325 children aged 5–7 years from several Early Childhood Education (PAUD) units and was selected through cluster random sampling. Data collection was conducted using behavioral observation instruments structured based on indicators in each AQ dimension. Data analysis was conducted using Structural Equation Modeling (SEM) with Confirmatory Factor Analysis (CFA) procedures to test construct validity and model suitability. The analysis results show that the AQ model, which includes the dimensions of Control, Origin and Ownership, Reach, and Endurance, has a good level of model fit and significantly shapes the Adversity Quotient construct in early childhood. These findings indicate that children's ability to face adversity is multidimensional and therefore requires comprehensive stimulation through early learning and social experiences.

Keywords: Adversity Quotient; Early Childhood Education; Structural Equation Modeling; Psychological Resilience; Latent Variable Modeling; Socio-emotional Development; Measurement Validation

INTRODUCTION

Early childhood development is a crucial phase in the human life cycle because it is during this stage

that the foundations of cognitive, social, emotional, and character abilities are formed. The various experiences children undergo during this

period have a significant influence on their psychological development and adaptive abilities later in life (Shonkoff & Phillips, 2000; Yoshikawa et al., 2013). As children's interactions with their social environment increase, they begin to face new situations that require the ability to adapt, manage emotions, and solve problems. Therefore, a child's ability to respond to and overcome difficulties constructively is an important competency that needs to be developed from an early age. This ability is closely related to the concept of psychological resilience, which plays a role in helping individuals face life's challenges and pressures adaptively (Masten, 2014; Masten & Barnes, 2018; Rutter, 2012).

One concept that explains an individual's capacity to face adversity is Adversity Quotient (AQ). This concept was introduced by Stoltz, who defined AQ as an individual's ability to face, manage, and overcome various forms of adversity that arise in life (Stoltz, 1997). Individuals with high AQ levels tend to have stronger psychological resilience, are able to interpret challenges as opportunities for learning, and demonstrate higher motivation and persistence in solving problems they face (Phoolka & Kaur, 2012; Hutagalung et al., 2018). In the educational context, AQ plays a crucial role in supporting the development of children's adaptability, self-regulation, and perseverance in facing challenging situations (Amir et al., 2017; Wang et al., 2024). This ability is also related to the concept of resilience, which explains how individuals are able to adapt positively when facing pressure or challenges. Previous research has shown that psychological factors such as self-control, motivation, and resilience play a role in shaping an individual's psychological well-being and their ability to cope with challenging situations (Apsari et al., 2024). Therefore, developing coping skills from an early age is a crucial aspect in supporting children's social and emotional development. Conceptually, Stoltz (1997) proposed that Adversity Quotient consists of four main dimensions known as the CORE concept: Control, Origin and Ownership, Reach, and Endurance. The Control dimension refers to the extent to which an individual perceives themselves as having control over their response

when facing adversity. The Origin and Ownership dimension relates to an individual's willingness to take responsibility for addressing the problems they face. The Reach dimension describes an individual's ability to limit the impact of adversity so that it does not spread to other aspects of life. Meanwhile, the Endurance dimension relates to an individual's perception of the duration of adversity, specifically whether the adversity is perceived as temporary or prolonged (Stoltz, 1997; Phoolka & Kaur, 2012). In the context of early childhood education, the ability to cope with adversity can be reflected in a child's various daily activities, such as when they fail to complete a play task, face conflict with peers, or when trying a new, challenging activity. These situations are an important part of a child's social and emotional learning process, contributing to the development of psychological resilience (Denham, 2006; Whitebread & Bingham, 2014). Therefore, understanding how the Adversity Quotient construct develops in early childhood is important as a basis for designing educational strategies that can strengthen children's adaptive abilities. Furthermore, the development of adversity skills is also significantly related to self-confidence and individual readiness to pursue a career in education and plays a crucial role in helping individuals overcome the pressures and challenges that arise in the educational environment (Prihatiandy et al., 2019; Halim et al., 2021). Children's ability to face adversity can be improved through learning approaches that support social-emotional development and professional support from educators and counselors (Dewi et al., 2024). In the context of developmental guidance and counseling, educators play a crucial role in helping children develop adaptation skills, emotional control, and the ability to face difficulties from an early age (Im Hambali, 2018). In this regard, guidance and counseling services play a crucial role in facilitating children's holistic development from an early age (Zamroni, 2018). Furthermore, an educational environment that supports children's psychological well-being can also strengthen children's ability to face academic pressures and challenges (Arbin Janu Setiyowati et al., 2026). In the context of early childhood education, these

abilities can be reflected through children's abilities to manage difficulties, maintain efforts, and develop adaptive attitudes when facing obstacles in play and learning activities.

Although the concept of Adversity Quotient has been extensively researched in various contexts, most previous studies have focused on adolescents, college students, and adults, particularly in higher education, organizations, and the workplace (Amir et al., 2017; Gradini & Noviani, 2024; Rizalno & Purwanto, 2022). Research specifically examining AQ in early childhood is still relatively limited. Furthermore, most previous studies used conventional statistical analysis approaches that focused on the relationships between observed variables, thus failing to comprehensively explain the latent relationships between AQ dimensions. However, psychological constructs like AQ are multidimensional and are more appropriately analyzed using approaches that can examine the relationships between latent variables simultaneously. In this context, Structural Equation Modeling (SEM) is an analytical approach that allows researchers to more comprehensively test measurement models and structural relationships between latent constructs (Hair et al., 2019; Kline, 2016). Through SEM, researchers can evaluate construct validity and identify the contribution of each dimension in forming a psychological construct (Byrne, 2016; Schumacker & Lomax, 2016). The application of SEM in the study of Adversity Quotient in early childhood is expected to provide a deeper understanding of the structure of the AQ construct and the relationships between its dimensions. Based on the description, there is a research gap indicating that studies on the structural model of Adversity Quotient in early childhood are still limited, especially those using the Structural Equation Modeling (SEM) analysis approach. Therefore, this study attempts to test the structural model of Adversity Quotient in early childhood by analyzing the relationship between the four main dimensions of AQ: Control, Origin and Ownership, Reach, and Endurance.

Specifically, this study aims to answer the following research questions:

1. Is the four-dimensional CORE model (Control, Origin and Ownership, Reach, and Endurance) empirically capable of representing the Adversity Quotient construct in early childhood?
2. How does each CORE dimension contribute to shaping the Adversity Quotient construct in early childhood?
3. Does the proposed structural model demonstrate an adequate level of goodness of fit?

This research is expected to provide theoretical contributions to the development of an Adversity Quotient measurement model for early childhood and to enrich studies on children's psychological resilience in educational contexts. Furthermore, the findings are expected to have practical implications for developing learning strategies in early childhood education that can strengthen children's abilities to face various developmental challenges.

METHODS

Research Design

This study used a quantitative approach with an explanatory survey design aimed at testing the structural model of Adversity Quotient (AQ) in early childhood. This quantitative approach was chosen because it allows researchers to empirically analyze the relationship between latent constructs and their measurement indicators through systematic statistical procedures (John W. Creswell & J. David Creswell, 2018). To gain a more comprehensive understanding of the AQ construct structure, this study employed the Structural Equation Modeling (SEM) approach. SEM allows researchers to simultaneously test a measurement model that evaluates the relationship between latent variables and their indicators, and a structural model that analyzes the relationships between latent constructs (Barbara M. Byrne, 2016; Rex B. Kline, 2016). Through this approach, the relationships between AQ dimensions can be analyzed in greater depth

while evaluating the model's fit with empirical data (John F. Hair Jr. et al., 2019).

Participants and Sampling

The study involved 325 children aged 5–7 years from several Early Childhood Education (PAUD) units. Participants were selected using a cluster random sampling technique, where PAUD units were randomly selected as research clusters. Cluster random sampling is widely used in educational research because participants naturally reside within institutional clusters such as schools or classes (John W. Creswell & J. David Creswell, 2018). This approach was used to obtain a broader representation of the early childhood population in an educational context while minimizing potential bias in the sample selection process.

Instrument Development and Validation

The research instrument used in this study was a behavioral observation sheet designed to measure children's ability to face difficulties based on the Adversity Quotient conceptual framework proposed by Paul G. Stoltz (1997). This instrument was developed by referring to the four main dimensions of AQ known as the CORE model: Control, Origin and Ownership, Reach, and Endurance. The development of observation instruments in educational research requires careful attention to the suitability of the indicators to the construct being measured and the learning context of the child (Akbar, 2013).

The Control dimension refers to a child's ability to manage their responses when facing challenging situations. The Origin and Ownership dimension describes a child's willingness to understand the source of a problem and take responsibility for resolving it. The Reach dimension reflects a child's ability to limit the impact of difficulties so they don't unduly impact other activities. Meanwhile, the Endurance dimension relates to a child's ability to view difficulties as temporary and manageable (Paul G. Stoltz, 1997).

Each dimension is operationalized into several behavioral indicators compiled in the form of an observational rating scale. This instrument is

designed to capture children's behavioral responses when facing challenging situations in play and learning activities. To ensure construct validity, the instrument was tested using Confirmatory Factor Analysis (CFA). This analysis is used to determine whether the indicators used empirically represent the construct being measured (Rex B. Kline, 2016; Barbara M. Byrne, 2016).

Data Collection Procedure

Data collection was conducted through direct observation of children's behavior in various learning and play activities within the PAUD (Early Childhood Education) environment. Observations were conducted using assessment sheets developed based on behavioral indicators in each dimension of the Adversity Quotient. Researchers observed children's responses when faced with situations that required adaptability, such as completing play tasks, trying new activities, or facing difficulties in social interactions with peers. Observational methods are widely used in child development research because they are able to capture children's behavior authentically in their natural learning environment (Susanne A. Denham, 2006). All observation results were systematically recorded and compiled as quantitative data, which were then analyzed using a statistical approach.

Data Analysis Strategy

Data analysis in this study was conducted using the Structural Equation Modeling (SEM) approach to examine the relationship between the dimensions of Adversity Quotient and evaluate the suitability of the proposed model. The analysis stage began with testing the measurement model through Confirmatory Factor Analysis (CFA) to assess the construct validity of each AQ dimension. Next, construct reliability was tested using Composite Reliability (CR) and Average Variance Extracted (AVE) values to ensure the internal consistency of the indicators used (John F. Hair Jr. et al., 2019).

The next stage is testing the structural model to identify the contribution of each CORE dimension in forming the Adversity Quotient construct. Evaluation of model suitability is

carried out using several goodness of fit indices commonly used in SEM analysis, including the Chi-square/df ratio, Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA). The model evaluation criteria refer to the recommendations of John F. Hair Jr. et al. (2019) and Rex B. Kline (2016) to determine whether the proposed model has an adequate level of fit with the empirical data.

RESULTS AND DISCUSSION

Structural Equation Modeling (SEM) Analysis Results

The data analysis for this study was conducted using a Structural Equation Modeling (SEM) approach using R Studio software with the lavaan package. The model tested was the Adversity Quotient (AQ) construct model, consisting of four dimensions: Control (CTR), Origin and Ownership (OWN), Reach (REA), and Endurance (END). This analysis aimed to determine the suitability of the theoretical model with the empirical data and to examine the relationships between latent variables.

1. Model Goodness of Fit Test

The test results indicate that the model has a very good level of feasibility. The model feasibility index values are shown in Table 1 below:

Feasibility Index	Value	Criteria and Interpretation
<i>Chi-square/df</i>	79.445/47 ($p=0.004$)	Still acceptable, sensitive to sample size
<i>Comparative Fit Index</i> (CFI)	0.988	≥ 0.95 : Very good model
<i>Tucker-Lewis Index</i> (TLI)	0.980	≥ 0.95 : Very good model
RMSEA (90% CI)	0.046 (0.028–0.063)	< 0.05 : Very good model
SRMR	0.023	< 0.08 : Good model

Based on Table 1, the CFI, TLI, RMSEA, and SRMR values indicate that the model has a very good fit. Thus, the tested structural model is deemed feasible and can be used for further analysis.

2. Construct Validity and Reliability

The results of the measurement model test indicate that all indicators in each latent construct have significant loading factor values ($p < 0.05$). The loading factor values for each indicator are shown in Table 2 below:

Constructs and Indicators	Loading Factor	Interpretation
CTR1–CTR2	0.410 – 0.422	Valid and strong (>0.4)
OWN1–OWN4	0.366 – 0.515	Valid, although OWN4 is a bit weak
REA1–REA2	0.248 – 0.435	Valid, REA2 is stronger
END1–END5	0.377 – 0.391	Valid and stable
AQ (dari CTR, OWN, REA, END)	0.786 – 1.325	The relationship is very strong and significant

All indicators have a loading factor value above 0.35 and are significant, indicating that these indicators are valid in representing the constructs being measured.

3. Relationship between Latent Variables (Structural Model)

The structural model illustrates the relationship between AQ dimensions and the Adversity Quotient construct as a whole. The estimation results are shown in Table 3 below:

Path of Influence	Estimate	p-value	Interpretation
AQ $\leftarrow$ CTR	-2.158	0.194	Not significant
AQ $\leftarrow$ OWN	3.562	0.050	Marginally significant
AQ $\leftarrow$ REA	7.167	0.000	Very significant
AQ $\leftarrow$ END	-5.852	0.929	Not significant

Based on Table 3, the Reach (REA) dimension has the strongest and most significant influence on Adversity Quotient, followed by Origin and Ownership (OWN). The Control (CTR) and Endurance (END) dimensions did not show a significant influence.

4. Correlation Between Dimensions

The correlation between latent constructs is shown in Table 4 below:

Variable Pairs	Estimate	p-value	Interpretation
CTR $\leftrightarrow$ OWN	0.480	0.000	Strong correlation
CTR $\leftrightarrow$ REA	0.487	0.000	Strong correlation
CTR $\leftrightarrow$ END	0.475	0.000	Strong correlation
OWN $\leftrightarrow$ REA	0.498	0.000	Strong correlation
OWN $\leftrightarrow$ END	0.498	0.000	Strong correlation
REA $\leftrightarrow$ END	0.511	0.000	Strong correlation

The results show that all dimensions of AQ are strongly correlated with each other, indicating theoretical consistency that AQ is a multidimensional construct that is interrelated between its dimensions.

5. SEM Model Visualization

Visualization of the relationship between latent constructs and indicators in the SEM model is presented in Figure 1 below:

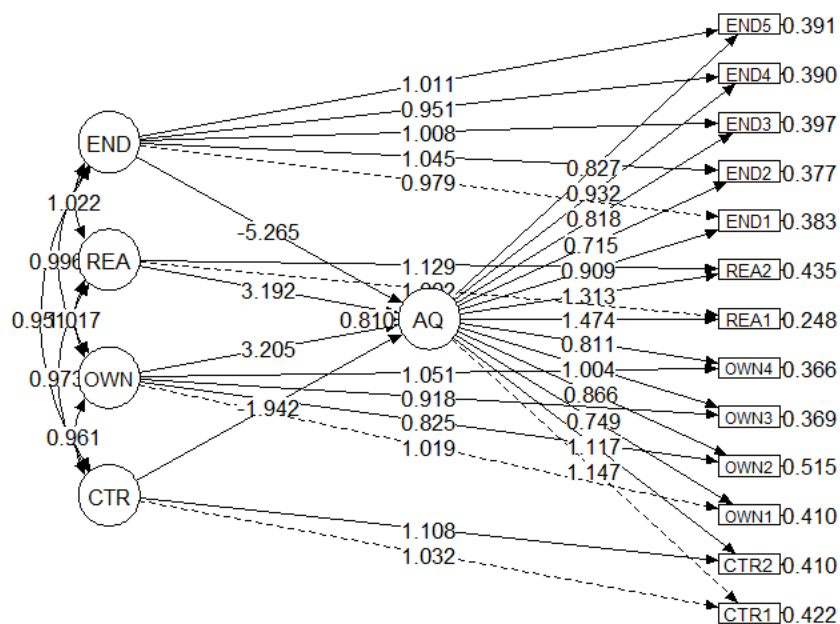


Figure 1 Diagram of the Results of the SEM Adversity Quotient Model Analysis

6. Substantive Interpretation

Conceptually, the results of this study indicate that an individual's ability to face adversity (Adversity Quotient) is most influenced by the extent to which the individual is able to limit the impact of adversity (Reach) and the willingness to take responsibility (Origin and Ownership). Meanwhile, the Control and Endurance dimensions have a lower contribution and are not directly significant. This finding is in line with Stoltz's (1997) theory which states that the four dimensions of AQ work synergistically, but in certain contexts, the Reach and Origin and Ownership dimensions are more dominant in shaping the ability to face adversity.

Thus, the SEM analysis results indicate that the proposed Adversity Quotient model has a good level of fit and can strongly explain the relationships between AQ dimensions. Reach, Origin, and Ownership play a significant role in enhancing an individual's ability to survive and recover from adversity.

Discussion

The results of the Structural Equation Modeling (SEM) analysis indicate that the Adversity Quotient (AQ) model, consisting of four dimensions: Control, Origin and Ownership, Reach, and Endurance, has a very good level of model fit. The model fit index values such as CFI, TLI, RMSEA, and SRMR indicate that the theoretical model used is able to adequately explain the empirical data. This finding strengthens the concept put forward by Stoltz that Adversity Quotient is a multidimensional construct that describes an individual's ability to respond adaptively to adversity through various interrelated psychological mechanisms (Stoltz, 1997). In addition, the use of the SEM approach in this study has proven effective in analyzing the relationship between latent variables in complex psychological constructs (Byrne, 2016; Kline, 2016).

The results of the measurement model analysis also showed that all indicators had significant loading factor values, thus validly representing the measured latent construct. This indicates that the instrument used in this study has good

construct validity, thus being able to accurately measure the psychological dimensions studied. In educational psychology research, construct validity is a crucial aspect to ensure that the research instrument accurately reflects the concept intended to be measured (Hair et al., 2019). This finding is also in line with previous research stating that Adversity Quotient measurement needs to use behavioral indicators that can describe how individuals respond to challenging situations in everyday life (Phoolka & Kaur, 2012).

A key finding in this study indicates that the Reach dimension has the strongest and most significant influence on Adversity Quotient, while the Origin and Ownership dimensions show significant but smaller influences. The Reach dimension describes an individual's ability to limit the impact of adversity so that it does not affect other aspects of life. This ability is closely related to the concept of psychological resilience, namely the ability of an individual to continue functioning adaptively when facing pressure or challenges (Masten, 2014; Rutter, 2012). These results are also in line with previous research showing that the ability to manage the impact of adversity is a crucial factor in shaping psychological resilience and individual success in facing academic challenges (Wang et al., 2024; Masten & Barnes, 2018). Meanwhile, the Origin and Ownership dimension relates to an individual's ability to understand the source of adversity and take responsibility for overcoming it, which plays a role in developing adaptive problem-solving strategies (Amir et al., 2017).

In contrast, the Control and Endurance dimensions did not show a significant direct influence on Adversity Quotient. This condition is likely related to the characteristics of early childhood development, where the ability to regulate emotions, self-control, and understanding the duration of difficulties are still developing gradually in early childhood (Denham, 2006; Whitebread & Bingham, 2014). Nevertheless, the results of the study show that all dimensions of AQ have a strong correlation with each other, confirming that Adversity Quotient is a multidimensional construct and

interconnected between its dimensions (Phoolka & Kaur, 2012). Overall, this study contributes to expanding the study of Adversity Quotient in early childhood, considering that most previous research has been conducted on adolescents and adults (Amir et al., 2017; Hutagalung et al., 2018). These findings also emphasize the importance of developing children's abilities to face difficulties from an early age through a learning environment that supports social and emotional development.

CONCLUSIONS

This study aims to test the structural model of Adversity Quotient in early childhood, which is constructed through four main dimensions: Control, Origin and Ownership, Reach, and Endurance. The results of the analysis using the Structural Equation Modeling (SEM) approach indicate that the proposed model has a good level of fit with the empirical data. These four dimensions are proven to significantly shape the Adversity Quotient construct in early childhood, thus providing empirical support for the CORE model proposed by Stoltz in explaining individual abilities when facing difficulties.

The findings of this study confirm that a child's ability to cope with various forms of adversity is a multidimensional psychological construct. This construct includes the child's ability to manage responses to challenging situations, a willingness to take responsibility for solving problems, the ability to limit the impact of adversity so that it does not affect other aspects of their activities, and an understanding that the difficulties faced are temporary. Therefore, developing Adversity Quotient in early childhood needs to be done through a learning approach that provides opportunities for children to explore, face challenges, and gain learning experiences from various situations that require adaptability.

Theoretically, this study provides an empirical contribution to the development of an Adversity Quotient measurement model in the context of early childhood education. The use of a Structural Equation Modeling (SEM) approach allows for a more comprehensive examination of the relationships between AQ dimensions, thereby enriching the study of the structure of the

psychological resilience construct in early development. The results also expand the literature, which has primarily examined AQ in adolescent and adult populations.

From a practical perspective, the findings of this study have implications for educators and early childhood education practitioners in designing learning strategies that can support the development of children's psychological resilience. Learning environments that provide space for children to try new activities, overcome difficulties, and learn from failure can play a crucial role in developing children's adaptive skills and psychological resilience from an early age.

However, this study has several limitations that should be considered. First, it used an observational approach to measuring children's behavior, which could potentially be influenced by observer subjectivity. Second, this study was conducted within the context of a specific educational institution, so generalizations of the results should be made with caution. Therefore, future research is recommended to involve a broader sample and combine more diverse measurement methods, such as teacher assessments and parent reports, to obtain a more comprehensive picture of Adversity Quotient development in early childhood.

Furthermore, future research could also examine the relationship between Adversity Quotient and other psychological variables, such as emotional regulation, learning motivation, and children's psychological resilience in the context of learning. A longitudinal approach could also be used to more deeply understand the development of Adversity Quotient (AQ) throughout a child's developmental stages.

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AUTHOR CONTRIBUTIONS STATEMENT

The authors' contributions to this study are structured based on the CRediT (Contributor Roles Taxonomy) framework. The first author contributed to the conceptualization of the study, the development of the theoretical framework, and the writing of the initial draft of the manuscript. The second author contributed to

the design of the research methodology and the development of the instruments used in this study. The third author was responsible for data collection and field investigations. The fourth author performed data analysis using the Structural Equation Modeling (SEM) approach and interpreted the results. The fifth author contributed to the instrument validation process, the review of the methodological aspects of the study, and the academic editing of the manuscript. The sixth author was responsible for research supervision, critical review of the article's substance, and finalizing the manuscript. All authors were involved in the review and revision process and have read and approved the final version of the article for publication.

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