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A Mixed Methods Research Study on School Dropout and Mathematics-Related School Dropout

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Abstract

School dropout is a persistent problem in educational sciences, and sample research has been conducted on this issue. Research has associated school dropout with various reasons, including academic failure. The current study aims to investigate the reasons of mathematics-related school dropout, as a sub-area of academic failure. The study adopted a mixed methods research design. In the quantitative phase, 955 adults completed a questionnaire regarding their school dropout and not continuing to a further school level. The quantitative data were analyzed using SPSS 25.0 program. The descriptive statistics revealed the reasons of general school dropout as family-related reasons, academic failure, environmental conditions, personal reasons, social reasons, teacher factor, health problems, and financial reasons. The inferential statistics (the chi-square test of independence) confirmed that adults' school dropout was not independent of mathematics failure. The qualitative data analysis program, MAXQDA 2020, was used to account for the reasons of mathematics-related middle school and high school dropout in detail. To this end, interviews were held with two participants who dropped out of middle and high school, and their statements revealed that the reasons of mathematics-related school dropout or not continuing to a further school level were mathematics attitude, test anxiety, mathematics anxiety, teacher's attitude, social factors, and main shortcomings. The qualitative data were analyzed through the single-case model and two-cases model and presented with MAXmaps. The results demonstrated that the qualitative findings explained and confirmed the quantitative findings. The study offers several recommendations for various disciplines based on the findings.

Keywords: school dropout, absenteeism, mathematics, mathematics *anxiety*, *MAXQDA*, *mixed-method*.

Introduction

Students who need to acquire basic skills and achievements in educational environments are expected to contribute to social development and welfare in the future (Yorğun, 2014). Undesirable social and educational consequences might arise when students do not continue their education or when they have to quit education (Karacabey, 2016). Students who drop out of school before graduation might experience unemployment, homelessness, poverty, early marriage, and tendency to violence and criminality (Baker et al., 2001; Campbell, 2003), which poses problems for both individuals themselves and society (Chung & Lee, 2018; Henry et al., 2012; OECD, 2017; Ugwulor-Onyinyechi et al., 2021; Wilson et al., 2011).

School dropout in a country is a substantial problem regarding its future. Several countries address school dropout as a priority in their education system in order to minimize these problems (European Statistical Office [EUROSTAT], 2020).

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The problem of school dropout has been recognized by all countries in the world, and each country is endeavoring to find solutions to this problem in line with its own educational vision. School dropout refers to leaving education without sufficient documentation to graduate (De Witte et al., 2013; National Center for Education Statistics [NCES], 2020). Dekkers and Claasen (2001) defined school dropout, which can be seen at all levels of education, as quitting school due to failure in educational life or various adverse reasons. School dropout is observed in all developed or underdeveloped countries (UNESCO, 2008) and it is a problem in Turkiye despite 12 years of compulsory education (Eryılmaz Ballı & Kartal, 2020). School dropout varies according to compulsory characteristics of education systems and education policies of countries (Yorğun, 2014). It is linked to various factors and these factors are caused by individual, society, family, school-related issues (Aküzüm et al., 2015; Brewster & Bowen, 2004; Marphatia et al., 2019; Weybright et al., 2017; Yenilmez & Özabacı, 2003), test anxiety (Çakır & Çolak, 2019; Yorğun, 2014), but, in general, economic issues (Franklin & Trouard, 2016; McDermott et al., 2019; Wils et al., 2019).

As the causing factors of school dropout, the literature highlights financial factors (Franklin & Trouard, 2016; Sheehan & Shi, 2019), family-related reasons (Carpenter & Ramirez, 2008; Rumberger, 1983), psychological and health problems (Liinamaa et al., 2022), environmental conditions (Dıyu, 2001; Hunt, 2008; Hussain et al., 2011; Şahin et al., 2016; Tamer, 2014), teacher and peer relationships (Contreas et al., 2022; Yavuz et al., 2016), absenteeism (Rodriguez & Conchas, 2009; Tabuchi et al., 2018), working in a job outside school (Orfield, 2004), and migration and school change (Friedenberg, 1999). According to the related literature, family structure, family conflict, and family separation increase the likelihood of students' school dropout (Lawrence & Adebowale, 2022). Insensitive and indifferent families towards their children, insufficient importance given to education by the family, parents' educational level, the death of the mother or father, the separation of the parents in terms of family integrity, the high number of siblings, and the occurrence of domestic violence are among the reasons why students drop out of school or do not continue to a further school level.

Personal issues or reasons experienced by adults during their student years also might cause school dropout or not continuing further education. According to Mikkonen et al. (2018), although no single factor is identified as the main cause of school dropout, mental disorders are of considerable importance. Situations such as disliking school (Christenson & Thurlow, 2004) or bad habits (Battin-Pearson et al., 2000) also might have caused students to drop out or not to continue school. Additionally, students' perspectives on school, in other words, the fact that they do not plan a future in relation to school and that they want to start their professional lives early can be shown among the reasons for dropping out or not continuing school. One of the dropout reasons has been determined to be teacher attitude. Similarly, it is reported in the literature (Contreas et al., 2022; Yavuz et al., 2016). Teacher attitude affects both academic and social dimensions of students' experiences at school (Bernstein-Yamashiro & Noam, 2013; Konold et al., 2018; Wang & Degol, 2016). According to some researchers, positive relationships between students and teachers reduce the dropout risk rate of students with high dropout risk (Orpinas & Raczynski, 2016; Rumberger & Palardy, 2005). Based on these results, we can infer that negative teacher attitude will increase the risk of school dropout.

Furthermore, one of the most significant causes of school dropout is low academic achievement (Alcaraz, 2020; Korhonen et al., 2014; Nakajima et al., 2018; No et al., 2016). With respect to low academic achievement, failure in mathematics and reading stands out (Bakırtaş & Nazlıoğlu, 2021). In a study conducted by Katıtaş (2012), the participants were asked the question "How were your

grades the year you left school, did you fail any lessons?" Findings revealed that 80% of the participants stated that they had one or more failed lessons, and many of these adults stated that they had failed their mathematics lessons. Thomson et al. (2003) argue that there are various factors affecting students' failure in mathematics, and these factors include student attitude, student-related factors, teacher factor, and school factor. According to researchers, mathematics failure, explained by various factors, is highly associated with school dropout (Aboltins et al., 2019; Jordan & Levine, 2009; Taylı, 2008). Bruno (2015), who examined whether mathematics anxiety affected school dropout, reported that mathematics anxiety did not affect school dropout, but the participants experienced school dropout due to different life-related and psychological reasons. Some researchers have stated that students suffering from mathematical anxiety do everything possible to avoid numbers and mathematical issues (Arem, 1993; Bisse, 1994; Carroll, 2010).

The current study focused on mathematics under the title of academic failure and aimed to investigate adults' reasons for dropping out of school due to mathematics. Mathematics-related dropout is largely an under-researched area (Bruno, 2015). This study focused on explaining why adults, who are now parents of primary school students, once dropped out of school. Accordingly, it is critical to determine adults' general and mathematics-related reasons for school dropout in order to prevent school dropout of students who might experience this situation in the future. Research aiming to reveal mathematics-related school dropout in the past might be useful for identifying some mistakes and negativities in mathematics education. To this end, answers to the following questions were sought.

1. What are the reasons for adults' school dropout or not continuing to a further school level?
2. Is adults' school dropout or not continuing to a further school level independent of mathematics failure?
3. What are the common reasons for mathematics-related middle school dropout and high school dropout among adults?
4. What are adults' reasons for mathematics-related school dropout or not continuing to a further school level?

Method

Research Design

This is a mixed methods research study employing both quantitative and qualitative data. Mixed method research enables more comprehensive analyses and interpretations with the support of quantitative and qualitative methods (Creswell & Plano Clark, 2007). The explanatory design among the mixed methods research designs was adopted in the study. The explanatory design initiates the research with the quantitative phase and the results of this phase are explained in the following qualitative phase (Creswell, 2009). The sequential explanatory design adopted in the study is presented visually in Figure 1.

Figure 1. *The Sequential Explanatory Design*

Qualitative data are employed to interpret and to clarify results from quantitative data analysis (Edmonds & Kennedy, 2016). The descriptive survey model was adopted within the quantitative phase and the case study model (single-case and two-case model) was employed within the qualitative phase.

Participants

The participants consisted of adults aged between 30 and 65 in the Southeastern Anatolia Region of Turkiye within the scope of the research, a questionnaire was applied to 955 parents in order to determine the reasons for school dropout. The participants' demographic characteristics are provided in Table 1.

Table 1

Characteristics of Participations (QUAN)

		n	%
Education Sta	Never	1	.10
	Primary School	332	34.76
	Middle School	219	22.93
	High School	265	27.74
	University	138	14.45
	Total	955	100.0
Gender	Female	480	50.26
	Male	475	49.73
	Total	955	100.0

As presented in Table 1, the majority of the participants were graduates of primary school and middle school (n = 551; 57.70%). The remainder were graduates of high school (n = 265; 27.74%) and university (n = 138; 14.45%). Only one participant had never attended school. The number of women (n = 480; 50.26%) and men (n = 475; 49.73%) participants was very close to each other.

We held semi-structured interviews with the two participants who stated that they had dropped out of school due to failure in mathematics. The characteristics of these participants are presented in Table 2.

Table 2

Characteristics of Participants (QUAL)

Participant	Age	Gender	Dropout
P1	36	Woman	Middle School
P2	45	Woman	High School

P1:Participant 1
P2:Participant 2

As Table 2 demonstrates, the two women volunteering participants in the qualitative phase were aged 36 and 45. P1 and P2 dropped out of middle school and high school, respectively, and they stated that the reason for their dropout was related to mathematics.

Data Analysis

The participants' responses regarding their reasons for school dropout or not continuing to further school levels were coded and used as categorical variables under certain themes. Descriptive statistics were used to reveal the reasons for school dropout, and inferential statistics (chi-square test of independence) were used to identify whether the school dropout/not continuing school was independent of mathematics failure. The quantitative data were analyzed using SPSS 25.0 program.

In the next phase, in the analysis of the qualitative data obtained through semi-structured interviews, the statements of the participants who reported mathematics-related school dropout were coded and categories were created. The qualitative data were analyzed via the content analysis method using MAXQDA 2020 analysis program, and they were visualized using single-case, two-case, and max maps tools. The main purpose in content analysis is to reveal themes and concepts that can explain the obtained data (Mayring, 2019). The current study adopted the content analysis method because it aimed to reveal categories in line with the obtained data and to explain the participants' statements elaborately within the qualitative analysis. Collecting the qualitative data through semi-structured interviews also enabled comparing the statements of parents who dropped out of middle school and high school due to mathematics.

Results

Quantitative Results

The findings related to the following research question are provided in Table 3: "What are the reasons for adults' school dropout or not continuing to a further school level?"

Table 3

Reasons of School Dropout

	Reasons	*n*	%
Valid	No dropout-completed	138	14.45
	Financial reasons	382	40.00
	Family related reasons	183	19.16
	Academic failure	68	7.12
	Environmental conditions	28	2.93
	Personal reasons	94	9.84
	Social problems	51	5.34
	Teacher	3	0.31
	Other	8	0.83
	Total	955	100.0

Table 3 demonstrates, based on data from 955 parents, that the reasons for general school dropout were financial reasons, family related reasons, academic failure, environmental conditions, personal reasons, social reasons, teacher factor and other reasons (e.g., health, political).

Of the 955 participating parents, 138 were university graduates (14.45%). The remaining 817 people (86.5%) had either dropped out of school or did not continue the next school level. Reasons for school dropout or not continuing further school levels included financial reasons (n = 382; 40.00 %), family-related reasons (n = 183; 19.16%), academic failure (n = 68;7.12%), environmental conditions (n = 28; 2.93%), personal reasons (n = 94; 9.84%), social problems (n = 51; 5.34%), teacher (n = 3; .0.31%), and other reasons (n = 8; .83%).

The findings related to the following research question are provided in Table 4: "Is adults' school dropout or not continuing to a further school level independent of mathematics failure?"

Table 4

The Chi-Square Test of Independence regarding Mathematics Failure

Variable		***n***			x^2	**df**	***p***
			Related	Unrelated			
Dropout	Completed at least one level	125	43	583	78.916	8	< .000
	Primary schoo dropout	0	17	39			
	Middle school dropout	0	10	48			
	High school dropout	0	9	59			
	University dropout	1	3	18			
Total		126	82	747			

0 cells (0,0%) have expected count less than 5.

As presented in Table 4, 751 participants had finished at least a school level; however, 43 participants reported that their decision to not continue to the further school level was associated with mathematics failure. Further, 17 participants associated primary school dropout with mathematics, and these figures are 10 for middle school dropout, 9 for high school dropout, and 3 for university dropout. In chi-square analyses, the expected frequencies in each cell should not be less than 5. Or, in large samples, the number of cells with expected frequencies less than 5 should not exceed 20% of the total number of cells. This assumption was met in the study. The results of the chi-square test of independence revealed that school dropout at different school levels were explained by mathematics failure ($x^2(8) = 78.92$; $p < .01$). This result suggests that school dropout is not independent of mathematics failure.

Qualitative Results

The data regarding the research question "What are the common reasons for mathematics-related middle school dropout and high school dropout among adults?" were analyzed via a two-case model, and the findings are summarized in Figure 2.

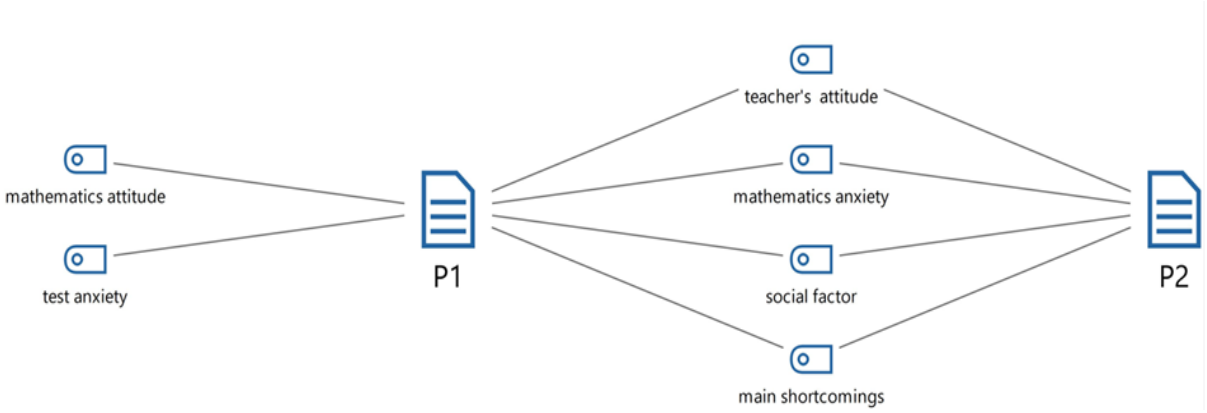

Figure 2. *Two-Case Model Regarding Mathematics-Related School Dropout*

The researchers asked some interview questions to the two participants who participated in the interviews to investigate their mathematics-related school dropout elaborately. The participants' stories of school mathematics were coded. In accordance with the statements of the two participants, the categories of mathematics-related school dropout were summarized in Figure 2. The frequencies of the codes can be generated for the case and their notes can be integrated. In a two-case model, two documents, groups of documents, sets of documents, or a mix of these levels can be compared (MAXQDA Manual, 2020). Using the two-case model within the study, middle school dropout and high school dropout were compared. The codes were mathematics attitude, test anxiety, mathematics anxiety, teacher's attitude, social factors, and main shortcomings. In the in-depth analysis of mathematics-related reasons of school dropout decisions, the intensity of all factors in the statements are presented in Figure 3.

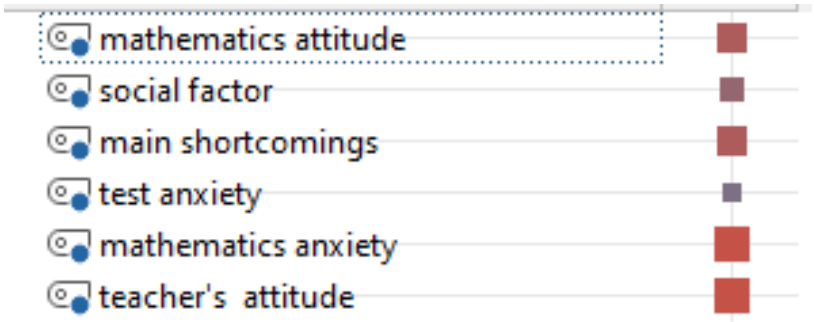

Figure 3. *The Code Matrix Browser Regarding the Reasons of Mathematics-Related School Dropout*

As Figure 3 presents, according to the code matrix browser data regarding the themes generated based on the interviews, the participants associated their mathematics-related school dropout mostly

with teacher's attitude and mathematics anxiety.

The findings regarding the research question, "What are adults' reasons for mathematics-related school dropout or not continuing to a further school level?," were analyzed thoroughly with the single-case model separately for both participants; they are presented in Figures 4 and 5.

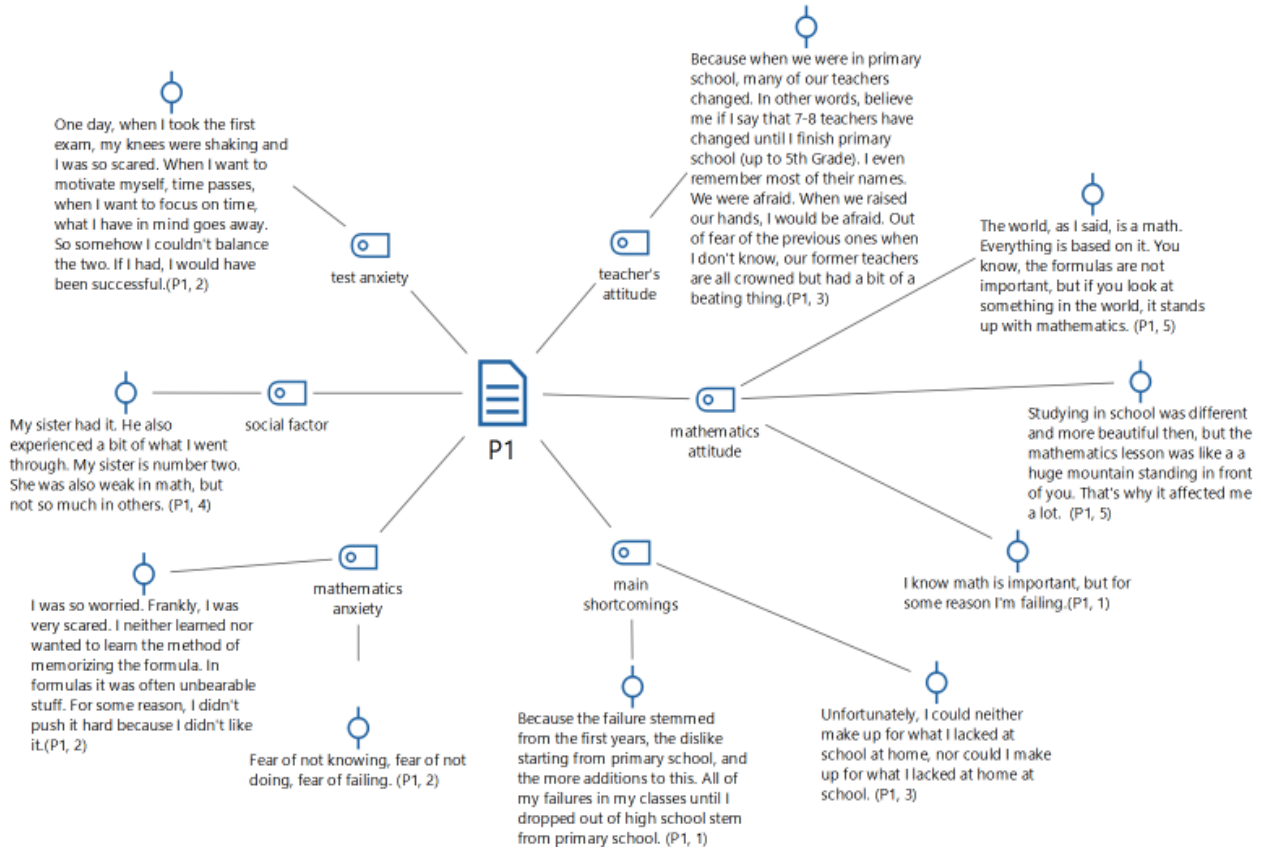

Figure 4. *Single-Case Model for The Reasons of Mathematics-Related School Dropout Based On P1's Statements*

Figure 4 presents P1's school dropout reasons stemming from mathematics failure in detail with the single-case model under the category of academic failure within the qualitative phase of the research. P1 associated mathematics-related school dropout with teacher's attitude, mathematics attitude, main shortcomings, mathematics anxiety, social factor, and test anxiety. P1's statements refer to mathematics attitude and mathematics anxiety as significant problems. P1's attitude toward mathematics lesson was negative and concerned. The participant regarded mathematics as something unattainable. P1 directly expressed her mathematics anxiety. Additionally, she mentioned about the teacher's negative attitude and the effect of social learning on her. Besides, she revealed that she could not compensate for her basic deficiencies due to the cumulative structure of mathematics that might have made her more anxious about this lesson.

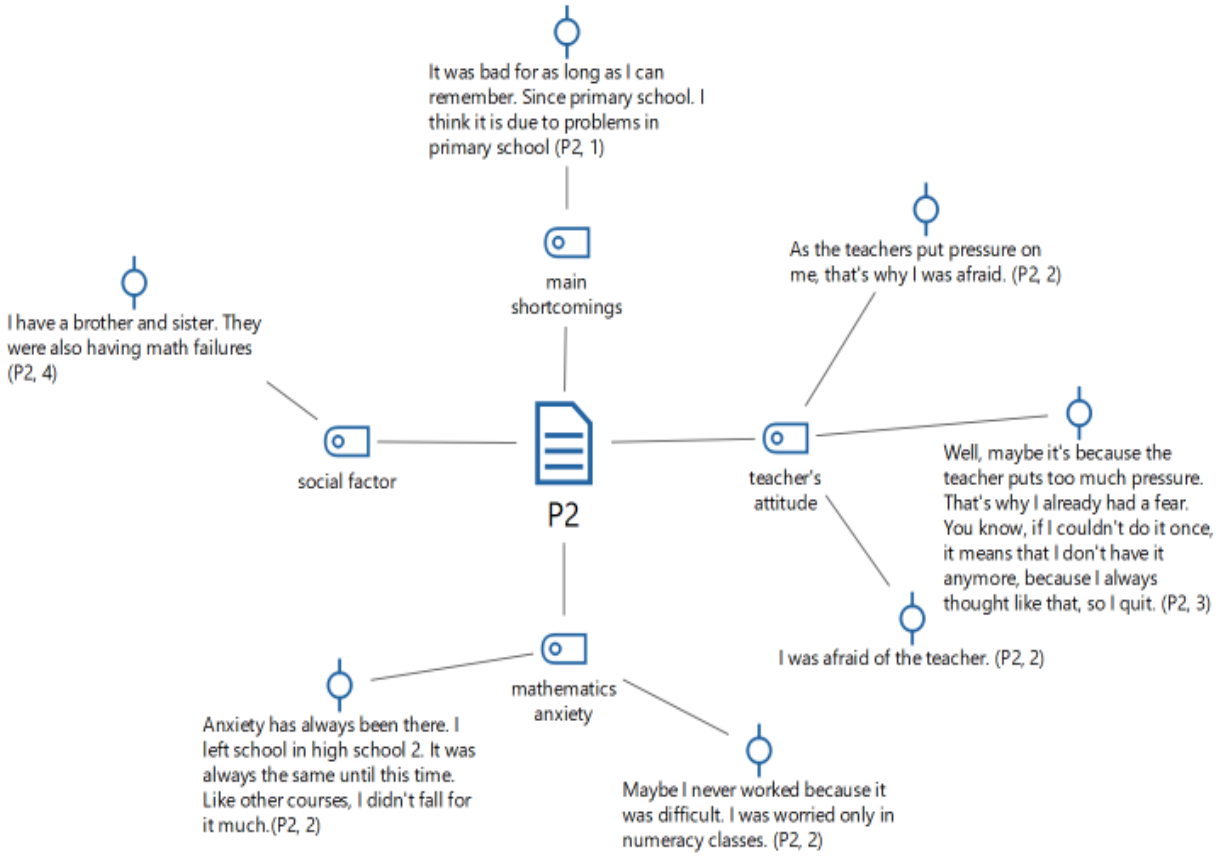

Figure 5. Single-Case Model for The Reasons of Mathematics-Related School Dropout Based on P2's Statements

Figure 5 demonstrates P2's school dropout reasons stemming from mathematics failure in detail with the single-case model. P2 associated mathematics-related school dropout with teacher's attitude, main shortcomings, mathematics anxiety, and social factor. P2 thought that the teacher's attitude was the main factor leading her to distance from school. She reported that she experienced the same anxiety in other quantitative lessons as she did in mathematics. Teacher pressure, lack of mathematical disposition in the family, and chronic deficiency in subject matter also were mentioned as other reasons.

In sum, the quantitative findings obtained in the quantitative data analyses were reinforced with the qualitative findings, and the phenomenon of mathematics-related school dropout was reported using themes and quotations.

Discussion and Conclusion

The current study investigated the reasons for adults' school dropout or not continuing to a further school level, whether their school dropout or not continuing to a further school level is independent of mathematics failure, the reasons of mathematics-related school dropout or not continuing to a further school level, and the reasons of mathematics-related middle school and high school dropout. The obtained results are discussed in this section in line with the research questions.

This study first investigated the reasons of adults' school dropout/not continuing to a further school level. The quantitative analysis revealed that the most significant indicators of school dropout or not continuing to a further school level were financial reasons (40%). The related literature highlights financial reasons as the most significant predictor of school dropout or not continuing to a further school level (Franklin & Trouard, 2016; McDermott et al., 2019; Sheehan & Shi, 2019; Wils et al., 2019). This finding lends its support to the findings in the literature. Families experiencing economic difficulties might have difficulties in meeting the educational expenses of their children. This situation, especially in boys, might have led them not to continue to the further level of education or to resort to early school dropout in order not to burden their families financially. According to Dıyu (2001), the region where the participants in the study group live affects school dropout or non-attendance. Similarly, Wils et al. (2019) argues that rural settlement is one of the main risk factors for school dropout. We can argue that the Southeastern Anatolia Region in Türkiye, which is the region where the participants who make up the study group of the current research live, is below the average of Turkiye in terms of socioeconomic status, which might have caused children not to continue to school or to drop out of school due to economic reasons. In addition, the number of households living in rural areas is high in the region. Therefore, providing education for the students who finish school in the village by sending them to the district or province is economically difficult for those living in the region. This situation might have caused students not to continue school or to drop out of school. This seems to be a universal problem (UNESCO, 2008).

According to the results of the quantitative analyses, 9.8% of the adults dropped out of school or did not continue to a further school level due to personal reasons. Failure of students to adapt to school can be considered among the personal reasons for school dropout as related studies reported (Battin-Pearson et al., 2000; Christenson & Thurlow, 2004; Lawrence & Adebowale, 2022; Mikkonen et al., 2018). Also, the other social factors of school dropout findings are supported in related literature (Aküzüm et al., 2015; Brewster & Bowen, 2004; Marphatia et al., 2019; Weybright et al., 2017)

Another finding of the research is that academic failure experienced by the students also leads to school dropout or not continuing education. The quantitative analysis of the present study demonstrated that 7.1% of adults experienced academic failure, which resulted in school dropout or not continuing to education. The related literature reports that students' low academic achievement and low academic engagement are important predictors of school dropout (Alcaraz, 2020; Korhonen et al., 2014; Nakajima et al., 2018; No et al., 2016). In addition, the fact that people think that their prestige is lost due to academic failure, students' academic anxieties, and school administrators, teachers and their families' not taking enough precautions in this regard might have caused them to drop out or not to continue school due to academic failure.

Another research question of the current study is whether adults' school dropout or not continuing to a further school level is independent of mathematics failure. The findings of the study reveal that, according to the analyses, there are individuals at all levels who reported that they experienced school dropouts due to mathematics failure. Poor basic skills in reading and mathematics are among the main factors related to education that cause school dropout (Bakırtaş & Nazlıoğlu, 2021). Participant P1's statement "Unfortunately, I could neither make up for what I lacked at school at home, nor could I make up for what I lacked at home at school" explains that she did not acquire basic skills related to mathematics in learning environments, and that she did not compensate for this situation in the home environment. In addition, research shows that in the 1980s, students in the United States experienced failures in mathematics and science compared to their Western peers, and this situation caused school dropout (Taylı, 2008). A study revealed that the academic achievement status at the end of the first semester or the first year of lessons that are difficult for students to achieve, such as mathematics lesson, is an important factor that causes students to drop out of school

(Katıtaş, 2012). Academic failure affects dropping out of school or not being able to continue school. The biggest share in academic failure is observed as the mathematics lesson. The finding of this study supports the related literature.

The single case model was used to determine the reasons for adults' school dropout or not continuing to a further school level due to mathematics. As a result of the interviews with participants P1 and P2, codes were formed. These codes were determined to be mathematics attitude, test anxiety, mathematics anxiety, teacher attitude, social factors, and main shortcomings. Mathematics anxiety, teacher attitude, social factors and main shortcomings are the codes that the participants stated in common and are discussed below in the two-case model. All of the coded reasons expressed by participant P2 were included in the section explained commonly. Test anxiety is among the factors that increase the risk of school dropout (Çakır & Çolak, 2019; Yorğun, 2014). On test anxiety, P1 stated: "One day, when I took the first exam, my knees were shaking and I was so scared. When I want to motivate myself, time passes, when I want to focus on time, what I have in mind goes away. So somehow, I couldn't balance the two. If I had, I would have been successful." According to Bruno (2015), test anxiety forces students to be divided among course-related behaviors and anxiety, self-criticism, and physiological bodily concerns. As P1 revealed, she attempted to motivate herself by making self-criticism, but she succumbed to his physiological/physical anxieties; in other words, her knees trembled, but she could not overcome her worries. Attitude towards mathematics is one of the reasons why adults drop out or do not continue school due to mathematics. Related to mathematics attitude, P1 stated: "Studying in school was different and more beautiful then, but the mathematics lesson was like a huge mountain standing in front of you. That's why it affected me a lot." Yenilmez and Özabacı (2003) report that the negative attitudes that students form due to problems arising from educational and environmental reasons are reflected in their behaviors over time and lead to failure by causing prejudice of failure and anxiety. Participant P1 might have formed a prejudice by overestimating mathematics with the combination of various factors that she encountered in the classroom, and this prejudice might have turned into anxiety and caused failure. According to P1's statements, such activities were not carried out in the classroom, the participant might have had a negative attitude towards mathematics, and this might have led to school dropout by experiencing mathematics failure.

In the following part of the study, the common reasons for adults' mathematics-related middle school and high school dropout or not continuing to education were investigated. Semi-structured interviews were conducted with participant P1, who dropped out of middle school due to mathematics, and participant P2, who dropped out of high school due to mathematics, and the reasons for mathematics-related school dropout were revealed. From the qualitative analyses, the common reasons for dropping out or not continuing to school due to mathematics were determined as follows: main shortcomings, mathematics anxiety, teacher attitude, and social factors. Mathematics-related problems, such as dropping out of school or not continuing to school, are caused by a lack of basic knowledge in mathematics (Aboltins et al., 2019; Jordan & Levine, 2009). The interviewed participants referred to this aspect, as well. On this P1 stated: "Because the failure stemmed from the first years, the dislike starting from primary school, and the more additions to this. All of my failures in my classes until I dropped out of high school stem from primary school." P2 stated: "It was bad for as long as I can remember. Since primary school. I think it is due to problems in primary school." These statements support the literature. In the same vein, Hunt (2008) stated that school dropout is a process, and Rumberger (2011) added that this complex process can occur from the first years of school life.

Another common result of the present study based on qualitative analyses is mathematics anxiety. Students with mathematics anxiety do everything they can to avoid numbers and mathematical

problems (Arem, 1993; Bisse, 1994; Carroll, 2010). P2 revealed the following about mathematics anxiety: "Anxiety has always been there. It has always been the same until this semester. I didn't think much about it like other courses." This statement implies that mathematics anxiety still continues with the words "it has always been the same until this semester." The other participant, P1, clearly expressed her mathematics anxiety with the following statement: "I was very anxious. I was frankly terrified. I neither learnt how to memorize formulas, nor did I want to. Formulas were usually unbearable. I didn't like them for some reason, so I didn't bother." A study also drew attention to the dropout rates of students at a college in a rural area of the United States. As a result of the analyses, it was observed that students experienced mathematics anxiety and postponed taking mathematics courses as much as possible due to this situation. The students chose courses that require little or no mathematics (Bisse, 1994). Therefore, mathematics anxiety affects students' future and the findings of this study support the related literature. It can be considered as a psychological factor-individual factor and it is determined among school dropout reasons (Liinama et al., 2022).

One of the common results of the qualitative analyses was teacher attitude. Participant P2 drew attention to the negative teacher attitude and stated, "I was under pressure because the teachers put pressure on me." Although students interact with many adults in their school lives, they form a special bond with their teachers, especially with their primary school teachers (Birch & Ladd, 1997). P1 stated:

> Because when we were in primary school, our teachers changed a lot. I mean, believe me, 7-8 teachers changed until I finished primary school (until the 5th grade). I even remember names of most of them. We were scared. I used to raise hands with fear. When I didn't know the subject. Because of the fear of the previous ones. Our previous teachers were honored, but there was a little bit of beating problem.

Using these statements, she implies that this special bond had not established in her primary school. Frequent teacher changes, pressure, and fear prevent the bond between students and teachers. On this P2 stated the following: "Well, maybe because the teacher put pressure on me. That's why I had a fear. I quit because I always thought that if I couldn't do it once, it means I couldn't do it anymore." Teachers' incorrect attitudes can lead to student alienation from school, academic failure, and discontentment, culminating in school dropout (Bernstein-Yamashiro & Noam, 2013). P2's statements are in line with the related research findings (Orpinas & Raczynski, 2016; Rumberger & Palardy, 2005).

Another common reason for adults' mathematics-related middle school and high school dropout is addressed under the heading of social factor. Related to this reason, P1 stated: "My sister had it too. She went through a bit of what I went through. She was number two. She was also weak in mathematics, but the others were not that bad." This statement indicated that her mathematics failure also was observed in her family members. P1 also referred to her family members regarding mathematics failure in the social factor section. She revealed: "I have a younger sibling and an elder brother. They also experienced mathematics failure." According to Battin-Pearson et al. (2000), the fact that family members also have a history of dropping out of school causes students' school dropout. Rumberger (1983) reports that if one of the parents or family members has experienced school dropout, other family members also are at risk of school dropout. Therefore, the finding of the current study is supported by the related literature.

Limitations and Recommendations

The qualitative phase of this study is limited to two participants who dropped out of middle school and high school. It has a limited quantitative research problem in terms of conducting the chi-square independence test regarding mathematics failure. It can be regarded as a robust study given that fact that it is the first study to identify the phenomenon with 955 participants. As is the nature of mixed method research, the related quantitative research problems were explained via the use of a qualitative research approach, and the reasons of mathematics-related school dropout, which is a social issue, were identified. It is thought that the study will contribute to the fields/disciplines of history of education, social sciences, and mathematics education. Further research might involve planning different studies with different problem statements. Future researchers might examine teacher attitude (in terms of behavioral sciences), mathematics anxiety (in terms of psychology, mathematics education), family and learning environments (in terms of educational sociology), which yielded notable findings in this study regarding the reasons of mathematics-related school dropout.

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