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Family size and children's emotional adjustment: a comparative study of anxiety and aggression using the Family Drawing Test

Masoome Sanaty,[1] Ghazal Sadat Pournesaei,[2] Masoume Maleki Pirbazari[2]

[1]Master of Educational Psychology, Department of Psychology, Rahman Institute of Higher Education, Ramsar; [2]Department of Psychology, Rahman Institute of Higher Education, Ramsar, Iran

Correspondence: Ghazal Sadat Pournesaei, Department of Psychology, Rahman Institute of Higher Education, Ramsar, Iran.
E-mail: gh.pournesaei@rahman.ac.ir

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Abstract

This study aimed to investigate differences in anxiety and aggression among children from one-child, two-child, and multiple-child families using the Family Drawing Test. The research employed a causal-comparative design. Participants included 90 children aged 7 to 12 years (30 from each family type), who were purposefully selected from elementary schools in western Mazandaran and eastern Gilan provinces during the 2023-2024 academic year. The Family Drawing Test was administered, and data were analyzed using chi-square tests in SPSS-24. Findings revealed significant differences in anxiety and aggression levels across family types ($p \leq 0.01$). Children from one-child families displayed lower levels of anxiety and aggression compared to those from two-child and multiple-child families. However, no significant difference was observed between children from two-child and multiple-child families. The results suggest that family size and birth order can influence children's emotional and behavioral development. The Family Drawing Test proved to be an effective tool for assessing inner emotional states such as anxiety and aggression in a non-threatening manner.

Introduction

Anxiety disorders are among the most prevalent psychological issues in childhood, significantly impairing children's capacity to engage in age-appropriate, adaptive behaviors.[1] These disorders are associated with heightened fear, persistent anxiety, and stress stemming from psychological and emotional strain, which often manifest as maladaptive behaviors in daily life.[2] Anxiety can adversely affect academic performance, social adjustment, family dynamics, and peer relationships.[3]

Although the core symptoms of anxiety are relatively consistent across age groups, their manifestations vary by developmental stage. Children with anxiety disorders frequently report physical complaints and exhibit heightened sensitivity to bodily sensations. Compared to their peers, they tend to be more emotionally reactive, often crying easily, a reflection of diminished self-confidence. These children may appear quiet, tense, irritable, dissatisfied, and impatient, frequently voicing concerns over various issues. If left unaddressed, chronic anxiety can lead to long-term difficulties such as social withdrawal, interpersonal challenges, emotional distress, and significantly reduced self-esteem.[4]

The etiology and maintenance of childhood anxiety disorders are multifactorial, involving the interplay of genetic, developmental, cognitive, neurobiological, and psychosocial factors.[5]

Aggression is another major concern in childhood, and its mismanagement can escalate into violence, adversely influencing children's emotional, social, and cognitive development.[6] In recent

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years, childhood aggression has become a global public health issue.[7] From the preschool period (when children begin to engage more extensively with peers), aggressive behavior emerges as a critical challenge for both children and their families. Various environmental contexts, including home and caregiving settings, play a pivotal role in either exacerbating or alleviating aggressive tendencies. Family-related stressors such as bereavement, relocation, migration, exposure to violence, and financial hardship may evoke distress and frustration in children, increasing the likelihood of aggressive responses.[8]

According to Adler, one of the key factors in shaping a child's personality and lifestyle is birth order and family size. Although an individual's perception of their birth position is more influential than the numerical order itself, birth order remains a significant determinant. Adler proposed distinct characteristics associated with different birth positions: for instance, firstborns may develop a heightened sense of power and superiority, along with excessive anxiety and defensiveness; second-born children are often more cooperative and socially oriented; youngest children may be pampered; and only children may exhibit exaggerated superiority and a false self-concept.[9]

Various aspects of the family, such as sibling structure (being an only child or having one or more siblings), parenting style, parent-child relationships, and the quality of sibling interactions, play a crucial role in shaping children's emotional patterns. According to attachment theory,[10] early interactions with caregivers and the sense of security or insecurity within the family environment form the foundation for the development of either anxiety or inner calm. In families where secure attachment is not established, or where dysfunctional structures such as high-conflict, instability, or lack of emotional support prevail, the likelihood of heightened anxiety and aggressive symptoms in children increases.[11]

From the perspective of Adlerian individual psychology, a child's birth order (*e.g.*, first-born, middle child, last-born, or only child) directly affects their experience of rivalry, their need for attention, and the way they express emotions.[12,13] For example, only children may develop performance anxiety or strong dependence due to receiving concentrated parental attention, while in multi-child families, sibling interactions may lead either to aggressive behavior or, conversely, to the development of social competence.[14]

Additionally, family systems theory suggests that family roles and boundaries, when dysfunctional, can become a source of chronic stress for the child.[15] For instance, in families where children are expected to take on caregiving roles typically reserved for parents (a phenomenon known as parentification), suppressed anxiety or anger may emerge over time.

Various methods can be employed in psychology to assess children's emotional and behavioral problems. One particularly effective projective technique that has garnered attention is the use of drawing tests. From an Adlerian perspective, a child's position within the family system influences their psychological development. Drawings may include symbolic representations of sibling rivalry, and certain drawing characteristics may be related to the child's birth order.[16] Through structured drawing tasks, children can express both conscious perceptions and unconscious emotions.[17]

When children are asked to draw their family, they often project not only the presence of parents but also the quality of past and present relationships with their siblings. Since a child's emotional life is deeply rooted in these relationships, interpreting their drawings may reveal hidden motivations behind their behaviors, particularly maladaptive ones.[18]

The Family Drawing Test can provide insights into a child's personality traits based on birth order, family dynamics, sibling relationships, and underlying conflicts, as well as parental interactions.[19] This test serves as a tool for evaluating emotional-cognitive development, mental health, and children's perception of their familial relationships.[6]

From a psychoanalytic perspective, drawing is considered a clinical-projective activity, an expressive outlet through which individuals may externalize unconscious material that could be causing anxiety or emotional distress. Visual arts, including drawing, can thus serve as tools for projection, emotional release, communication of thoughts, and expression of inner conflicts and desires. Since children possess a more limited emotional vocabulary compared to adults, drawing can act as an alternative language for expressing complex emotions such as aggression.[20] Therefore, a child's drawing is a message, one that conveys what they cannot yet articulate in words.[21]

Overall, children's drawings can serve as a valuable means for understanding the psychological challenges they may face within the family context, including depression, aggression, and anxiety. For example, studies on children's drawings suggest that the size of the drawing is influenced by their emotional and psychological state. Children with more positive mental health conditions (*i.e.*, typically developing children) tend to produce larger drawings than those exposed to unfavorable environments or negative psychological states (such as children of divorced families).[21] Similarly, Taher and Montazeri found that certain drawing features, such as the first figure drawn, the largest figure, the child's self-identified figure, the last person drawn, the addition of a new person, and omission of individuals, were more prevalent among children from single-child families.[22]

Clinicians and psychologists widely agree that early identification and timely intervention can help resolve many childhood disorders and prevent their long-term negative consequences. However, since most assessment tools for uncovering children's internal and especially unconscious issues rely on parent- and teacher-report questionnaires, clinical interviews, or other observational methods, they often fail to provide a comprehensive understanding for the therapist. Given this limitation, it becomes crucial to invest in more nuanced assessments of childhood aggression and anxiety to inform appropriate interventions. Psychological assessments thus play a vital preventive role by enabling early detection of these issues and optimizing referrals for targeted treatments.[23]

Furthermore, considering that most techniques for identifying children's inner conflicts, particularly unconscious ones, are based on indirect assessments through adults and fail to fully capture the child's lived experience, researchers argue that a simple interview with a child is unlikely to reveal their genuine emotions toward their family. Children, aware of adult expectations, may employ defense mechanisms such as silence, lying, or providing irrelevant responses.[24] Given the significance of childhood anxiety and aggression and their long-term implications for adulthood, it is essential to pay greater attention to these constructs in children's drawings. Timely diagnosis can help prevent potential psychological problems that may emerge later in life.[25]

Based on these premises, the present study seeks to address the following research question: is there a significant difference in the levels of anxiety and aggression among children from single-child, two-child, and multi-child families, as assessed by the Family Drawing Test?

Materials and Methods

Research design

The present study employed a descriptive causal-comparative research design. The statistical population consisted of children aged 7 to 12 years from single-child, two-child, and multi-child families who were enrolled in elementary schools during the 2023-2024 academic year in the western region of Mazandaran and the eastern region of Gilan provinces in Iran.

Participants

Using purposive sampling, 90 children were selected, with 30 children in each of the three groups: single-child, two-child, and multi-child families. This sample size was determined based on the recommendation that a minimum of 30 participants per group is appropriate for comparative research.[26] Inclusion criteria were: i) children aged between 7 and 12 years; ii) children from families with one, two, or more than two children; iii) willingness of the children to participate; iv) no history of using sedative, anti-anxiety, or anti-aggression medication.

Instrument

Kerman Family Drawing Test Interpretation

The Family Drawing Test, developed by Kerman,[20] was the first tool designed to assess family drawings that, beyond revealing individual characteristics of the test subject, also reflects their family relationships and needs. In Kerman's administration method, the examiner asks the child to draw a family of their choice, a family they would like to have. The scoring method of the test is conducted in four stages to examine the family drawings: 1 = overall impression; 2 = examination of specific details; 3 = objective scoring; 4 = integration.[17] In the overall impression stage, the drawing is assessed holistically, paying attention to the psychological state, the general message, and the emotional tone conveyed to the viewer. In the examination of specific details, different elements of the drawing are logically analyzed, focusing particularly on unusual aspects such as the size of the figures and the quality of detail, including instances of idealization. In the objective scoring stage, specific recurring characteristics in children's family drawings, such as omission of the self or body parts, omission of parents, addition of animals, drawing at the bottom of the page, devaluation, and idealization, are recorded accurately, often through consultation with experts in the field. The frequency of these features across children's drawings is then noted.[27] Regarding the validity and reliability of the Family Drawing Test (Kerman's method) and the interview questions, various studies have been conducted, yielding different results. The reliability coefficients from different evaluations ranged from 0.87 to 0.95, and Cronbach's α was reported at 0.71.[28] In a study by Salehi *et al*.,[29] the Cronbach's α was reported at 0.87.

Procedure

After obtaining the necessary permissions, the researcher selected 10 elementary schools from the western part of Mazandaran Province and the eastern part of Gilan Province. Following coordination with school authorities and on-site visits, 90 students were selected using purposive sampling: 30 from single-child families, 30 from two-child families, and 30 from families with more than two children. After obtaining informed consent from both parents and children and assuring them of the confidentiality of their information and research results, the Family Drawing Test was administered to the children and evaluated by two child psychologists.

To ensure inter-rater reliability, two trained child psychologists who were familiar with the standardized scoring system (based on the official test guidelines) independently coded and analyzed the drawings. After independent assessments, Cohen's κ coefficient was calculated for the indicators of anxiety and aggression, yielding values of 0.81 and 0.79, respectively. These figures indicate a high level of agreement between the raters.[30] In cases of disagreement, the evaluators discussed the drawings in a joint session and finalized the codes by consensus.

At the beginning of data collection, participating parents completed a demographic questionnaire that included information on marital status, educational level, household income, experience of severe family conflict, and recent stressful life events. Sampling was conducted in such a way that children who had experienced parental divorce, the death of a family member, or a major family crisis within the past 6 months were excluded from the study. In the final analysis, socio-economic status was treated as a background variable, and no significant differences were found between the groups in this regard. Thus, efforts were made to minimize the influence of confounding variables. Data were analyzed using SPSS software, version 24 (IBM, Armonk, NY, USA).

Results

This study was conducted on 90 children from single-child, two-child, and multi-child families. The results in Table 1 indicate significant differences between the groups in terms of the frequency of anxiety-related drawing components (including orderliness, omission of self or family members, faint lines, drawing at the bottom of the page, adding a baby, excessive spacing, rationalized lines, and inclusion of non-family figures). All observed differences were statistically significant at the $p \leq 0.01$ level.

To further explore these group differences, follow-up chi-square comparisons were conducted, as shown in Table 2. As reported in Table 2, significant differences were found between children from single-child families and those from two-child and multi-child families in most anxiety-related indicators. Specifically, children from two-child and multi-child families demonstrated higher levels of anxiety components in their family drawings compared to those from single-child families ($p \leq 0.01$). However, there were no significant differences between children from two-child and multi-child families.

The chi-square test results (Table 3) show statistically signifi-

Table 1. Chi-square results for anxiety components among children from one-child, two-child, and multi-child families.

Anxiety indicator	Single-child (%)	n	Two-child (%)	n	Multi-child (%)	n	df	χ^2	p
Orderliness	33.3	10	56.7	17	76.7	23	2	11.430	0.003
Omission of self/others	16.7	5	40.0	12	56.7	17	2	10.305	0.006
Faint lines	50.0	15	83.3	25	66.7	20	2	7.500	0.024
Drawing at bottom of page	10.0	3	26.7	8	43.3	13	2	8.520	0.014
Addition of a baby	3.3	1	23.3	7	46.7	14	2	15.280	0.001
Excessive spacing	26.7	8	50.0	15	73.3	22	2	13.060	0.001
Rationalized lines	16.7	5	43.3	13	63.3	19	2	13.580	0.001
Non-family figures included	6.7	2	33.3	10	53.3	16	2	15.340	0.001

cant differences in aggression-related indicators across the three family structure groups. These indicators include adding an animal to the drawing, eliminating rivals, devaluing a rival, and omitting the child from the drawing. All differences were significant at the $p \leq 0.01$ level.

Post-hoc chi-square comparisons were conducted to examine pairwise differences among the groups. The results are presented in Table 4. The data in Table 4 indicate that children from two-child and multi-child families show significantly higher frequencies of aggression indicators in their family drawings compared to single-child families ($p \leq 0.01$). However, no significant differences were observed between the two-child and multi-child groups.

Table 2. *Post-hoc* chi-square comparisons of anxiety indicators between groups.

Anxiety indicator	Group comparison	χ^2	p
Orderliness	Single-child * Two-child	0.233	0.003
	Single-child * Multi-child	0.433	0.002
	Two-child * Multi-child	0.200	0.314
Omission of self/others	Single-child * Two-child	0.233	0.002
	Single-child * Multi-child	0.400	0.004
	Two-child * Multi-child	0.166	0.503
Faint lines	Single-child * Two-child	0.333	0.002
	Single-child * Multi-child	0.326	0.003
	Two-child * Multi-child	0.166	0.124
Drawing at bottom of page	Single-child * Two-child	0.215	0.004
	Single-child * Multi-child	0.153	0.002
	Two-child * Multi-child	0.166	0.211
Addition of a baby	Single-child * Two-child	0.267	0.002
	Single-child * Multi-child	0.145	0.001
	Two-child * Multi-child	0.148	0.211
Excessive spacing	Single-child * Two-child	0.178	0.004
	Single-child * Multi-child	0.311	0.001
	Two-child * Multi-child	0.277	0.219
Rationalized lines	Single-child * Two-child	0.209	0.003
	Single-child * Multi-child	0.218	0.001
	Two-child * Multi-child	0.319	0.128
Non-family figures included	Single-child * Two-child	0.218	0.001
	Single-child * Multi-child	0.218	0.001
	Two-child * Multi-child	0.411	0.167

Table 3. Chi-square results for aggression indicators among children from different family structures.

Aggression indicator	Single-child (%)	n	Two-child (%)	n	Multi-child (%)	n	χ^2	p
Adding an animal	3.3	1	10.0	3	33.3	10	11.335	0.001
Eliminating rivals	0	0	36.7	11	76.7	23	37.532	0.001
Devaluation of rival	0	0	33.3	10	70.0	21	35.575	0.001
Drawing without the child	6.7	2	53.3	16	30.0	9	15.550	0.001

Table 4. *Post-hoc* chi-square comparisons of aggression indicators among groups.

Aggression indicator	Group comparison	χ^2	p
Adding an animal	Single-child * Two-child	0.129	0.001
	Single-child * Multi-child	0.165	0.002
	Two-child * Multi-child	0.132	0.254
Eliminating rivals	Single-child * Two-child	0.188	0.001
	Single-child * Multi-child	0.145	0.001
	Two-child * Multi-child	0.112	0.301
Devaluation of rival	Single-child * Two-child	0.241	0.002
	Single-child * Multi-child	0.192	0.001
	Two-child * Multi-child	0.119	0.155
Drawing without the child	Single-child * Two-child	0.318	0.001
	Single-child * Multi-child	0.288	0.001
	Two-child * Multi-child	0.243	0.113

Discussion

The findings revealed significant differences in levels of anxiety and aggression among children from single-child, two-child, and multi-child families, as assessed through the Family Drawing Test. Specifically, children from two-child and multi-child families exhibited higher levels of anxiety and aggression compared to children from single-child families. However, there were no significant differences between the two-child and multi-child groups.

These findings are consistent with previous studies by Iliyat *et al*.,[25] Taher and Montazeri,[22] Athari *et al*.,[4] Derafshi *et al*.,[31] Kavianfar *et al*.,[9] Moradi *et al*.,[17] Shakerian *et al*.,[27] and Burkitt and Barnett.[21]

From a developmental and psychological perspective, birth order and the number of siblings play a vital role in shaping children's personality, emotional characteristics, and behavioral patterns. Parental interactions differ depending on whether they are raising one, two, or several children, which leads to variations in the emotional and behavioral traits of the children. Single children often value interpersonal relationships more and reflect this in their drawings through the inclusion of emotionally expressive elements and positive family interactions. These children typically experience a sense of support and security from adults, which manifests as warmth and harmony in their artwork.

In contrast, children with siblings, especially in two-child or multi-child families, may face greater instances of rivalry, exclusion, or comparison within the family or peer groups. These experiences can result in emotional insecurity, aggression, and anxiety, which are evident in their drawings. In such cases, children are more likely to depict individuals as isolated or distant from one another.[23] Emotional bonds within the family also play a significant role in a child's psychological development. Parents serve as secure attachment figures. Typically, girls report stronger emotional bonds with fathers and boys with mothers. In single-child families, all parental attention is focused on one child, enhancing feelings of emotional security. However, in multi-child families, this attention is divided, potentially triggering feelings of jealousy or competition. These emotional dynamics are clearly reflected in children's drawings. For instance, single children often draw smiling parents, indicating emotional contentment. In contrast, children with siblings are less likely to depict such emotionally expressive elements, possibly due to the rivalry for parental attention.[9,24] As a result, children from multi-child families may experience higher levels of aggression and anxiety, stemming from the competitive family atmosphere.[23,26]

The first person drawn by a child in a drawing is a sign of the child's highest attention to that individual. This attention can indicate whether the child has a good or bad relationship with that person, which has made them play an important role in the child's mind and life, and the child has had the opportunity to express this during the drawing process. In single-child families, children's mental focus is on their parents because they spend more time with them and consider them their role models. In contrast, children in families with siblings are more focused on the current situation within the family group.[26] Therefore, a child does not worry or feel anxious about losing their parents' attention because they are the first and only child in their parents' lives, and there is no competition to gain their parents' attention. Their parents will be the first and most valuable individuals in the life of a single child, and the distance between people in their drawings will not be very far, indicating low anxiety and minimal tension, and warm relationships. The order and lines in the drawing are rational, and the drawing is placed in the center of the page, which suggests minimal anxiety.

In multi-child families, parents may delegate the responsibility of caring for younger siblings and other children to the older children. When parents expect their children to take care of their younger siblings without providing enough time and attention, it will add to the children's burnout, depression, and anxiety.[31] Some children may not have enough time to fantasize about their own interests and future. The lower part of the page represents the area of basic instincts for self-preservation and is also the chosen area for those who are weary, emotionally distressed, drained, depressed, or anxious. Depressed and anxious individuals who only draw in the lower part of the page may be children who are deprived of any type of fantasizing about better situations (due to external or internal censorship).[21]

The greater frequency of drawings in the lower part of the page among children with siblings compared to single children may be because having siblings makes these children feel more impatient, and due to the frustration of being part of a multi-child family and not having all the attention of their parents for themselves, they experience more anxiety and depression. They may even add another person to their drawing, representing their wish to have someone else as a father or mother, other than their biological parents.[32]

Aggressive outbursts are often linked to deep feelings of guilt and wrongdoing that the child has for eliminating a sibling or parent. The child bears this feeling as a punishment and fears that their parents will find out about their secret thoughts and punish them by depriving them of the love and support they need to live and value themselves. As a result, the child may fall into depression.[29]

In single-child families, it seems that children value interpersonal relationships more, which they also display in their drawings. These children find positive emotions and support from their family members in these relationships, so they view relationships with others as logical and positive. In contrast, children from multi-child families, who are often neglected or rejected by their family and friends, and whose relationships with others are often marked by violence and aggression, tend to have fewer connections with others. This is reflected in their drawings, where relationships are limited or individuals are drawn separately from each other.

According to Kerman, sometimes a child's hostile traits may be represented as an aggressive animal. In such cases, the child may not draw themselves but instead project their entire self-image onto the animal in the drawing. This way, they can satisfy their wild aggression with minimal guilt.[21] Most children in two-child and multi-child families in the study drew themselves and expressed their hostile traits through other symbolic elements in the drawings. When a sibling arouses jealousy in the child, it may cause intense anxiety, and the child defends their self-image by denying the existence of the rival sibling, *i.e*., by not drawing them in the picture.[21]

The most common cases involve children who forget to draw one of their siblings in their family drawings. One can be sure that this individual is someone with whom the child has the worst relationship. A family member who is not drawn or is devalued is not just someone the child dislikes or wants to exclude; it is also someone they cannot and do not wish to identify with. It is as if the child is saying, "I don't know this one; I don't want to have any relationship with them".[21]

The frequency of erasing or excluding a sibling in the drawings was higher among children with siblings. This might be because these children identify less with their siblings compared to single children. Due to competition for parental attention, they have less healthy interactions with their siblings. These situations make the child unwilling to resemble their sibling, or in other words, to identify with them, and thus they unconsciously express their desire to exclude their sibling in their drawings.[9] Moreover, apart from the time difference parents spend with their children, there is also a behavioral difference based on the child's gender.[32] A child with a

sibling who is more favored by the parents may feel hatred towards that sibling and compete with them to gain parental attention and admiration. This competition and hatred often manifest in the child's drawings by devaluing the sibling.

One of the limitations of the present study is the lack of control over children's physical health conditions, as well as their social, economic, and hygienic status, and the cultural background and emotional climate of their families. In addition, in the interpretation of the Family Drawing Test, each feature in the drawing may carry different meanings. Therefore, the researcher may have been subject to subjective bias. The family drawing can also be influenced by the child's momentary emotional and situational state. That is, depending on what the child has experienced in the previous day and their current condition, the content and emotional tone of the drawing may vary. Thus, a single administration of the drawing task may not be sufficient to confidently generalize the findings.

Moreover, in the present study, participants were not homogenized in terms of gender, age, intelligence, birth order, or other individual variables that may influence outcomes. Therefore, caution is needed when generalizing the results to broader populations. Similar to other studies conducted with children, we also encountered challenges related to limited cooperation and concentration during the assessment process. Furthermore, since the sample was drawn from a few schools located only in the provinces of Gilan and Mazandaran, the generalizability of the findings to children in other cities and regions is limited.

It is recommended that future studies control and match participants based on physical, social, economic, and health conditions, as well as cultural background. To ensure more valid interpretations of clinical indicators, it is also suggested to use objective tests (as criterion measures) alongside projective tools. Furthermore, researchers are encouraged to gather background information through interviews with parents to confirm the child's emotional state and context before conducting the drawing task. Future studies should also aim to match participants based on gender, age, intelligence, birth order, and other potentially influential variables. Finally, conducting similar studies on larger and more diverse samples is strongly recommended.

Another inherent limitation of projective tools such as the Family Drawing Test lies in their interpretative nature, which may be prone to subjective bias. To minimize this risk, two trained raters were employed in this study. They analyzed the drawings based on standardized scoring guidelines and pre-defined objective indicators. Inter-rater agreement was calculated using Cohen's κ coefficient, which indicated a high level of consistency between raters.[33] Nevertheless, interpreting symbolic elements in such drawings requires caution, cultural sensitivity, and consideration of the child's broader psychosocial context. Accordingly, the findings of this study were interpreted within the framework of a qualitative, semi-structured tool, and it is recommended that future studies incorporate additional methods (*e.g.*, structured interviews with parents or teachers and standardized assessments) to strengthen the validity of interpretations.

Conclusions

The present study demonstrated that family size significantly affects children's anxiety and aggression levels, with children from one-child families exhibiting lower anxiety and aggression compared to those from two-child and multiple-child families. No significant difference was found between two-child and multiple-child families. These findings suggest that family structure and birth order play important roles in children's emotional and behavioral development. Additionally, the Family Drawing Test was validated as an effective, non-threatening method for assessing children's internal emotional states.

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