

## A Review on the Effects of the Earthquake on Preschool Children: An Elaboration of Certain Psychological and Social Concepts

### Depremiñ Okul Öncesi Çocuklar Üzerindeki Etkileri Üzerine Bir İnceleme: Belirli Psikolojik ve Sosyal Kavramların Detaylandırılması

Burak Can KORKMAZ<sup>1</sup>  Mustafa Gökhan ALTINSOY<sup>2</sup> 

<sup>1</sup> Family and Social Services, Ankara University Educational Psychology Department PhD Candidate, Ankara, Turkey.

<sup>2</sup> General Directorate of Mineral Research and Exploration, Ankara University Geological Engineering Department PhD Candidate, Ankara, Turkey.

#### Abstract

Earthquakes have become a popular research area because they have recently caused numerous problems in many countries. Also, they significantly impact preschool children. Children in the preschool age group, which is a critical period, are at risk due to the earthquakes as they are a vulnerable group. Specifically, investigating the effects of the earthquake on preschool children is crucial in solving the problems they experience and putting forward policy recommendations. Several studies in the literature examined the effects of earthquakes on different age groups. However, there is no review study investigating different fields with a holistic approach specifically for the preschool age group. Therefore, this study aims to examine the effects of the earthquake on preschool children. The effects of the earthquake, which takes place in a wide range, on preschool children are gathered, especially in the fields of social, psychological, health, and education. In this study, the social and psychological effects of the earthquake were investigated through certain concepts. Challenges experienced by parents, difficulties in meeting basic needs, complex psychological problems, and changes such as migration are some of the critical issues preschool children experience after earthquakes. At this point, meeting basic needs such as clean water and food in the earthquake zone should be the priority for policymakers. Continuity of education after earthquakes is another issue that policymakers should pay attention to, and the use of technological opportunities may be helpful in this regard.

**Keywords:** Preschool, Earthquake, Trauma, Education, Health

#### Özet

Son zamanlarda popüler bir araştırma alanı haline gelen ve birçok ülkede büyük sorunlar yaratan depremler okul öncesi çocuklar üzerinde büyük bir etkiye sahiptir. Kritik bir dönem olan okul öncesi yaş grubunda bulunan çocuklar dezavantajlı bir grup olmaları dolayısıyla depremler karşısında daha savunmasız ve risk altında kalmaktadırlar. Spesifik olarak depremin okul öncesi çocuklar üzerindeki etkilerinin incelenmesi yaşadıkları sorunların çözülmesi ve politika önerilerinin ortaya konması açısından önemlidir. Literatürde depremin farklı yaş grupları üzerindeki etkisinin incelendiği çalışmalar mevcuttur. Fakat okul öncesi yaş grubu özelinde bütüncül bir anlayışla farklı alanların birlikte incelenmiş olduğu herhangi bir derleme çalışması bulunmamaktadır. Bu sebeple, bu çalışma depremin okul öncesi çocuklar üzerindeki etkilerini incelemeyi amaçlamaktadır. Çok geniş bir

yelpazede yer alan depremin okul öncesi çocuklar üzerindeki etkileri özellikle sosyal, psikolojik, sağlık ve eğitim alanlarında toplanmaktadır. Bu çalışmada depremin sosyal ve psikolojik etkileri belirli kavramlar üzerinden incelenmiştir. Ebeveynlerin yaşadıkları zorluklar, temel ihtiyaçların karşılanmasındaki güçlükler, kompleks psikolojik problemler ve göç gibi yaşanan değişimler okul öncesi çocukların depremlerin ardından yaşadıkları önemli sorunlardan biridir. Bu noktada, deprem bölgesinde temiz su ve besin gibi temel ihtiyaçların karşılanması politika yapıcılar tarafından ilk öncelik olmalıdır. Depremlerin ardından eğitimin devamlılığı politika yapıcılarının dikkat etmesi gereken bir diğer husus olup teknolojik imkanların kullanımı bu hususta faydalı olabilir.

**Anahtar Kelimeler:** Okul Öncesi, Deprem, Travma, Eğitim, Sağlık

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## 1.Introduction

Natural disasters are a common problem in different countries of the world, such as Turkey, Bangladesh, and Colombia (Kumar et al., 2022; Rakib et al., 2022; Serrano-Rivera et al., 2023). In this regard, earthquakes are among the most hazardous natural disasters (Tehseen et al., 2020). For example, due to the 2023 Kahramanmaraş earthquake in Türkiye, over 40,000 people lost their lives, and its effects still linger in many areas (Yıldız et al., 2023). Earthquake survivors may continue to experience physical and psychological effects even years after earthquakes (Suneja et al., 2018). Thus, it is crucial to reveal the earthquake's effects on individuals and make necessary recommendations.

Individuals experience similar stress after an earthquake but their reactions differ significantly by age (Gurwitch et al., 1998). Preschool children are among the most vulnerable groups during earthquakes (Farooqui et al., 2017; Gibbs et al., 2021). In this sense, they experience different outcomes following the earthquake compared to the other age groups (McGuire et al., 2021). For this reason, it would be more beneficial to specifically address the impact of the earthquake on preschool children. Contrary to other review studies on this subject (Aral, 2023; Aydoğdu & Fofana, 2023; Blanc et al., 2020; Harada et al., 2015; Kar, 2009; Karabulut & Bekle, 2019; Ronoh et al., 2015; Sönmez, 2022; Yeon et al., 2020), this study focuses directly on preschool children.

Preschool children pass through a critical period, so they differ from other age groups in terms of challenging experiences, making them more vulnerable to psychological traumas (Wolmer et al., 2017). Children acquire basic skills in this period by showing rapid social, emotional, cognitive, and physical development (Genç & Tolan, 2021). Moreover, the lifestyle behaviors developed by preschool children also have an impact in the later stages of life (Lanigan et al., 2019). Most importantly, preschool children are more vulnerable to traumatic experiences than older people (Moner et al., 2022; Woolgar et al., 2022). Similarly, they show a higher rate of physical problems, like foodborne disease, compared to older age groups (Obande et al., 2023).

This age group is commonly evaluated from a developmental perspective because diagnosing preschool children with Post Traumatic Stress Disorder based on the usual criteria is quite challenging compared to older age groups (Blom & Oberink, 2012; Perrin et al., 2000). At this point, a detailed

evaluation of the earthquake's effects on preschool children sheds light on the problems the children experience by providing solutions. Seddighi et al. (2020) indicate that increasing preschool children's knowledge and risk perceptions is necessary to respond to earthquakes. However, there are concerns that the subject of environmental education in the preschool curriculum is insufficient (Resuloğlu, 2023). Therefore, the impact of earthquakes on preschool children can be more devastating.

The earthquake has proven to be devastating and has been covered in many studies. Thus, this study aims to investigate the effects of the earthquake on preschool children. For this group, the effects of the earthquake are grouped into four areas in the literature: social, psychological, health, and educational. Addressing these problems separately can be beneficial in terms of detailing specific issues and making more focused policy recommendations.

## **2. Social Problems**

It is evident that children cannot be isolated from their families' and community's reactions to the earthquake (Sugar, 1989). The immediate and distant environment of the preschool child is simultaneously affected by the earthquake. In this regard, the concept of societal trauma is critical as it means earthquake is related to all individuals (Şevik, 2023). At this point, social changes after an earthquake are inevitable. For example, after the 1995 Hanshin-Awaji earthquake in Japan, families in Fukushima chose to relocate because of the traumatic experience their children endured and the lack of physical resources (Niwa, 2014). Similarly, after the 2023 Kahramanmaraş earthquake in Türkiye, families in the region preferred to migrate to safer areas for various reasons (Marangoz & İzci, 2023). Similar to a first piece of a domino, the earthquake causes a series of changes that shape society until societal trauma is released. During the 1995 Hanshin-Awaji earthquake, families aimed to shield their young children from traumatic experiences by migrating (Niwa, 2014). On the other hand, during the 2023 Kahramanmaraş earthquake, families prioritized meeting their children's social needs, including school attendance, by considering migration (Marangoz & İzci, 2023). Thus, most families consider migration a solution after earthquakes. When parents feel a lack of security and basic needs in earthquake areas, they immediately take migration into consideration. Nonetheless, migration after earthquakes can often bring about adjustment problems for their children (Nair & Pandit, 2017). More importantly, very young children may already lose trust in their parents and have attachment problems following the traumatic event (Batista-Pinto Wiese, 2010). Parents experiencing problems regarding trust are likely to contribute to their children's trust issues as well (Siddiqui et al., 2021). From this point of view, the insecurity experienced by families in the earthquake zone may increase the insecurity experienced by preschool children. Therefore, the priority should be establishing a trustworthy environment in the earthquake zone. Moreover, a crisis plan should be ready so that the meeting of basic needs is not delayed, and the implementation of the plan, especially through municipalities and non-governmental organizations in the earthquake region, can ensure rapid and local implementation.

Earthquakes pose a significant threat to safety. Preschool children directly place their parents in safety-related schemes in the face of such threats (Pynoos et al., 1999). In the same manner, Gewirtz et al. (2008) indicate that the impact of such traumatic events on children is mediated by their impact

on parents. In other words, preschool children are exposed to similar influences as their parents. Preschool children are likely to be less affected by the earthquake if they receive support from their families. However, the devastating effects of the earthquake affect adults as well as preschool children in very different ways (Cheng et al., 2018). For example, after the Great East Japan Earthquake in 2011, increased suicide rates were reported in the affected areas (Orui, 2022). Experiencing parental loss at an early age increases the risk of both immediate and long-term mental health problems in children (Faedda et al., 2019; Lovato et al., 2018; Simbi et al., 2020). It may be beneficial to actively provide mental health services and encourage seeking help for individuals in earthquake regions. Parents who have physical and mental problems may cause preschool children to have problems (Leijdesdorff et al., 2017; Puchol-Martínez et al., 2023). In this sense, policymakers should not neglect the people close to them while focusing on vulnerable groups (Dlamini et al., 2023). In the context of preschool children, the close group is especially their parents. Therefore, supporting parents' mental and physical health as the primary caregivers of preschool children indirectly assists them through their parents.

Cultural factors, such as the meaning that society ascribes to earthquakes, are important in the trauma children experience after earthquakes (Kar, 2009). The experiences of the society that constitute the culture are often not independent from each other. In this regard, Kim et al. (2022) highlight the significance of enhancing community resilience after earthquakes. In this sense, the social support system is critical for the recovery of earthquake survivors (Eray et al., 2017; Warner et al., 2015). As an important mechanism, family support was found effective for the recovery of earthquake survivors (Alipour & Ahmadi, 2020). At this point, Bronfenbrenner's ecological systems theory gives a comprehensive understanding of interactions between the family and other settings (Bronfenbrenner, 1986). In this regard, Noffsinger et al. (2012) use the ecological systems theory to explain how disasters affect society. They show that the parent-child relationship within the microsystem is crucial for children's reaction to the disaster. Also, they state that the interaction of people related to children in the mesosystem affects the lives of children during disasters. Places such as hospitals, non-governmental organizations, and schools can be given as examples. In the exosystem, on the other hand, significant people in children's lives may have negative experiences as areas such as the workplaces and neighbourhoods of children's parents are affected. For example, at the time of the earthquake, the workplaces of the parents of these children may have been destroyed, their jobs may have been lost, and their colleagues may have died. As for the macrosystem, it can affect the lives of preschool children and their families with greater social, cultural, political, and economic impacts. In this sense, the country's social and economic developments facilitate the recovery of children by accelerating aid to families and enhancing conditions in earthquake areas with more resources (Aksu & İmrek, 2023). As a result, each layer of society is interconnected, and the fact that preschool children are more dependent on others due to being a sensitive group makes social and societal development and changes more critical for this group.

### 3. Psychological Problems

Literature on the mental health of children after earthquakes depicts controversial results. Resilience is expressed as a determining factor for mental health. In this sense, Meng et al. (2018) highlight that high resilience for young children, youth, and adults leads to fewer mental health problems and better functioning. Mohammadinia et al. (2017) emphasize that there is a visible difference between resilient and non-resilient children in disaster situations. Likewise, Jean-Thorn et al. (2023) indicate that resilient children experience less posttraumatic stress symptoms and emotional problems.

On the other hand, according to the differential susceptibility theory, some children are more susceptible to the impact of positive and negative environments. In other words, while some children benefit greatly from a positive environment compared to their peers, they experience a great collapse in the face of a negative environment (Crone et al., 2020). The differential susceptibility theory highlights the importance of environmental effects, so revealing the impact of the earthquake on preschool children may be beneficial. Also, numerous studies emphasize the vulnerability of children in the event of an earthquake (Çolak & Hoccoğlu, 2021; Özkan & Kutun, 2021; Takada, 2013).

Some studies have shown that children tend to suffer more mental health issues than adults in the aftermath of natural disasters like earthquakes (Özkan & Kutun, 2021). In this regard, Takada (2013) states that preschool children struggle to comprehend earthquakes and cannot deal with them effectively. Likewise, Çolak and Hoccoğlu (2021) express that preschool children cannot understand the deaths that occur around them. Children under magical thinking consider that the deceased can return. In addition, they claim that preschool children's self-centered thinking may cause them to see themselves as the causes of events. Similarly, Özkan and Kutun (2021) express that preschool children may see themselves as the reason behind the earthquake and its negative outcomes. Considering the self-centeredness that emerged in the preschool period, earthquakes and related deaths pose much more significant problems for children of this period. School-age children can better understand death and disasters, so they can cope with their negative experiences by using more effective coping strategies (Çolak & Hoccoğlu, 2021; Özkan & Kutun, 2021). Thus, post-earthquake psychoeducational programs and therapeutic interventions are of great urgency for preschool children. In this sense, cognitive behavioral therapy (Hidayati et al., 2023) and eye movement desensitization and reprocessing (EMDR) (Burkhart et al., 2023) are commonly used for disaster survivors. Likewise, trauma-focused cognitive behavioral therapy was found as effective, especially for the preschool age group (McGuire et al., 2021). Similarly, post-disaster psychosocial programs are beneficial for the recovery of children following natural disasters (Gibbs et al., 2021). The difficulties preschool children experience in making sense of death and earthquake require the use of age-appropriate techniques. In this regard, it was found effective to use play in the preschool period as a creative and age-appropriate technique (Cohen & Gadassi, 2018).

Natural disasters such as earthquakes offer opportunities to explore the diversity of children's responses to an acute stressor (La Greca, 2002; Proctor et al., 2007). The effects of the earthquake on children are post-traumatic stress disorder (Kılıç, 2003; Tural, 2004) and earthquake-related fears (Şalcioğlu & Başıoğlu, 2008), anxiety, depression (Uemoto, 2012; Liu et al., 2011), and the negative

impact of children's school performance (Şahin et al., 2007). A magnitude 7.4 earthquake occurred on August 17, 1999, at 3.02 am local time, at a distance of approximately 100 km from Istanbul, the epicenter of which was İzmit (Barka, 1999; Hubert-Ferrari, 2000; Michel & Avouac, 2002). The earthquake created a surface rupture of approximately 145 km, extending from the southwest of Düzce in the east to Hersek in the west (Barka et al., 2002), and about 45,000 people died (Marza, 2004). In the research conducted three months after this earthquake, it was observed that earthquakes negatively affected children's school performance (Şahin et al., 2007) as well as caused anxiety, depression, and post-traumatic stress disorder (Kılıç, 2003; Tural, 2004). Traumatic experiences of preschool children also lead to behavioral problems such as nail biting and thumb sucking (Şikel & Harmancı, 2022). After disasters, most children may have psychopathological responses (Kar, 2009; Sugar, 1989). Most importantly, preschool children's experiences and treatments are more complex. For example, numerous studies highlight that the diagnosis of post-traumatic stress disorder is appropriate for older age groups, while young children do not show visible symptoms predicted by post-traumatic stress disorder (Perrin et al., 2000; Wang et al., 2013). Therefore, it is critical to be more sensitive to the mental health of preschool children in earthquakes because they may show different and complex psychological needs compared to other age groups. After earthquakes, preschool children may face greater psychological problems due to impaired attention (Pfefferbaum et al., 2016). At this stage, providing activities to organize preschoolers' daily routines and shift their attention can be helpful. Thus, preschool children, whose needs and treatments are more complex after the earthquake, need additional psychological support such as plays and activities.

#### **4. Health Problems**

Preschool children often experience a variety of health issues following earthquakes. Furthermore, there are concerns that the problems created by earthquakes are mostly in the field of health. When examining the studies conducted after the 2010 earthquake in Haiti, it is found that most of the problems studies identified were in the health field (Dube et al., 2018). In this sense, Tuna (2023) states that excessive urbanization and the increasing population in cities make it challenging to reach necessary needs such as clean water and hygiene materials after earthquakes, which as a result causes an increase in infectious diseases. Moreover, Nouri et al. (2021) point out that various nutritional problems arise after earthquakes, especially for children and women. In this regard, Yin and Dong (2015) highlight that malnutrition that occurs after earthquakes directly causes an increase in mortality in young children. Therefore, during crisis situations like earthquakes, the priority should be meeting basic needs such as food and clean water. Young children are among the first groups that policymakers should focus on regarding health problems as they are more physically and psychologically vulnerable (Song et al., 2018; Uddin et al., 2021).

Proper nutrition for preschoolers is a critical concern after disasters (Ayer et al., 2023). For example, a study conducted with children who were survivors of the Marmara earthquake determined that they were at risk of weakness, the cessation of weight gain, and slowing of height growth (Güden & Borlu,

2023). More importantly, Suneja et al. (2018) state that the health problems that occur in the earthquake may become worse even after years. At this point, it may be beneficial to establish mechanisms that follow earthquake-affected preschool children developmentally, even years later. Also, providing a regular flow of data on these preschool children may facilitate intervention when necessary. Because parenting coordination is recommended for this type of situation (Deutsch et al., 2018), it may be beneficial to train parents to recognize possible future problems of their children.

Sleep disturbances in preschool children after the earthquake are another essential problem and physical activities play an important role in solving this problem (Tamer et al., 2023). Considering their developmental characteristics, creating opportunities for preschool children who need plays and activities is crucial. Because earthquakes adversely affect the sense of safety for children (Pacheco et al., 2022), it may be beneficial to focus on safety in activities and plays. One of the other health problems experienced by preschool children after earthquakes is stuttering, which occurs due to the fear and stress they experience (Jafari et al., 2019). Because therapies like speech therapy are recommended for stuttering (Humeniuk & Tarkowski, 2017), necessary services such as speech therapy should be provided to these children. Being in a sensitive period can be an advantage in enabling these children to change more quickly. Considering that the future lives of these children will be affected more by this sensitive period (Izett et al., 2021), each neglected problem will lead to more significant problems. Thus, it is crucial to evaluate all the risks for preschool children after the earthquake and start the intervention as soon as possible to minimize future problems.

## **5. Educational Problems**

The destructive effects of earthquakes can influence preschool children through damage to their homes and other structures where they spend time (Sulistyaningrum, 2017). Schools are where children spend most of their time outside their homes (Strieter et al., 2017). However, after the earthquake, children are deprived of educational institutions such as kindergartens for a certain period of time. For example, it was determined that thousands of kindergartens were damaged in the earthquake that occurred in Sichuan, China, in 2008. After that, studies focusing directly on early childhood programs have increased (Chen et al., 2017). Kindergarten is one of the most important places where children of this age group socialize (Hall, 2020). Preschool children who lack socialization and educational opportunities become dependent on their parents, with limited social resources. Social learning is a significant opportunity to provide a guide for preschool children's learning (Shutts et al., 2013). However, preschool children whose social environments are restricted, such as kindergarten, limit both their experiences and learning (De Figueiredo et al., 2021). Experiences and learning that are limited to the immediate environment, such as parents, may prevent the development of preschool children in accordance with their age. In this regard, Tatsuta et al. (2015) indicate that after the Great East Japan Earthquake, a decrease in the verbal intelligence scores of the children was determined, and this situation was attributed to the limited educational activities due to the earthquake. Similarly, Türk (2022) points out that one of the groups most affected by the cessation of educational activities in crises is preschool children. In this regard, policymakers

can use technological facilities for the continuity of education after earthquakes (Baytiyeh, 2018). After the earthquakes, preschool children's prompt reintegration into education should be a priority.

Following earthquakes, families try different ways to safeguard their children and ensure their ongoing development. In this sense, migration is often considered as a potential solution. For example, after the 2023 Kahramanmaraş Earthquake, enrolment in schools outside the disaster area was provided; therefore, families preferred migration (Marangoz & Izi, 2023). It is worth mentioning that preschool children are also affected by these changing conditions. In this sense, effective education management is helpful in crisis situations in terms of re-functioning education and removing barriers (Sarı & Sarı, 2020). Region-specific crisis plans can be created by local authorities in order to ensure that preschool children do not experience the difficulties of migration after earthquake trauma and continue their education where they live. In addition, predetermined crisis plans across the country are essential for parents who already have trust problems for themselves and their children to make optimal decisions and support their children effectively. Furthermore, it is necessary for preschool children to receive earthquake education in terms of increasing their awareness and preparedness (Izadkhah & Heshmati, 2015). For preschool children, their awareness is increased with education before the earthquake (Fetih & Gülay, 2020) and they are also recovered with education after the earthquake (Rahma et al., 2023). To put in other words, policymakers should use education for preschool children in terms of reducing the effects of the earthquake with the preparation. Also, education can be used to socialize preschool children after earthquakes, facilitating their recovery.

## **6. Conclusion and Recommendation**

The effects of earthquakes are diverse and can continue for many years, impacting individuals in various ways (Suneja et al., 2018). This study focused on certain psychological and social concepts regarding the effects of the earthquake on preschool children. For these children, earthquakes have a negative impact on their future lives (Gibbs et al., 2021). At this point, early intervention is of vital importance for the problems experienced by preschool children after the earthquake. The disaster literature highlights the significance of the resilience of earthquake survivors. Because resilient children experience fewer psychological problems, psychosocial programs mainly focus on improving resilience skills. There are studies in the literature on resilience and coping interventions after earthquakes, but there is a need to develop these skills before the earthquake. Hence, focusing on resilience and coping skills in pre-disaster psychoeducation programs for preschool children may be beneficial in terms of overcoming traumatic experiences more easily.

Trauma-focused cognitive behavioral therapy is recommended for preschool children showing psychiatric symptoms. However, studies investigating the effectiveness of therapeutic interventions have mostly focused on older children, while preschool children have been neglected (McGuire et al., 2021), so future studies examining different therapies should consider preschool-age children as well. A multidisciplinary team should support preschool children following the earthquake in a wide range of problem situations. In order to provide more focused solutions and interventions, it is important to address and evaluate each problem that each preschool children experience separately, specifically in

the area where the earthquake occurs. According to the literature, the effects of the earthquake on preschool children are in the social, psychological, health, and educational areas.

Family is crucial for preschool children. In this regard, earthquakes destroy the preschool child's support as they affect the whole family at the same time. Parents who feel insecure cause preschoolers to feel the same and their psychological well-being decreases together. Moreover, the parents of preschool children who migrate due to the shortage of resources and fear experience a change in their social environment. Additionally, the family members of a preschool child may experience death, unemployment or poor psychological health. Thus, the earthquake affects the preschool child by taking away the various functions of the family members, which are the most needed social support.

Meeting basic needs is essential for preschool children in order to continue age-appropriate development. However, earthquakes greatly hinder the fulfilment of basic needs. The lack of access to clean water and nutritional problems has an effect on all individuals in the earthquake zone. Nonetheless, all these problems especially affect preschool children because their height growth and weight gain stop and even higher mortality rates occur compared to older age groups. After the earthquake, it is urgently necessary to meet the basic needs of this age group. Therefore, it is essential to prioritize preschool children as a vulnerable group in the delivery of aid and focus on meeting basic needs in local or national crisis plans.

The limited perception of preschool children increases the adverse effects of the earthquake even more. Preschool children have more difficulty perceiving earthquakes and death than school children, making their experiences more complex. The closure of kindergartens, where they socialize and heal, causes these children to become more dependent on technological devices and their parents. Thus, plays and activities that help to organize their daily routines are necessary for this challenging period.

Some groups are more vulnerable to earthquakes; so, policymakers and researchers should pay attention to these specific groups much more than others. At this point, preschool children are more affected by earthquakes and experience more negative outcomes than other age groups. Previously, studies have neglected age-related issues by considering all ages of children as the same. Also, the literature on post-earthquake studies has gained popularity in recent years yet there are few studies in this area. The devastating effects of major earthquakes, such as the 2023 Kahramanmaraş earthquake, may accelerate studies in this area. Particularly vulnerable groups need to be studied in the context of earthquakes. In this sense, future studies should directly focus on people with disabilities, elderly people, and women in order to understand the nature of their experiences to suggest solutions and make policy recommendations. Since the complex nature of the earthquake may cause various effects on different groups, the specification of the sample groups can provide more accurate findings and valid interpretations.

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