



Child-related noise in apartment buildings: a systematic review

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ABSTRACT

With the acceleration of urbanization and the popularization of apartment living, noise from neighbours has become an increasingly prominent issue. In particular, noise generated by children's activities such as crying, shouting, jumping, running, etc. has emerged as one of the more challenging concerns, raising ethical questions about balancing children's right to activities with residents' right to quiet. To achieve this balance and to develop fair and inclusive architectural acoustics standards, it is essential to assess the current approaches to managing child-related noise in apartment buildings. This study used the PRISMA method to systematically review English-language journal articles published between 2000 and 2025. 21 empirical studies on child-related noise within apartments were selected based on inclusion and exclusion criteria after screening titles, abstracts and full-texts. This study is the first systematic review of methods for measuring and assessing child-related noise in apartments. It identifies two main approaches: objective methods (field measurements and acoustic stimuli) and subjective assessments (social surveys and psychoacoustic experiments). Based on this, an assessment model integrating acoustic, individual, social, and contextual factors is proposed to support accurate noise evaluation, improved acoustic design, and effective management of child-related noise.

1 INTRODUCTION

With urban development, an increasing number of people choose to live in apartments. While this mode of living offers convenience, it also brings new challenges to neighbourhood relations, among which noise from neighbours is one of the most prominent issues (Niemann et al. 2006). Compared to other types of noise from neighbours, child-related noise tends to be more complex: on one hand, it occurs more frequently, has higher noise levels, and often causes greater annoyance (Park 2017, Jeon et al. 2010); on the other hand, people's responses to child-related noise tend to be highly subjective and socially influenced (Kim et al. 2023). Therefore, child-related noise is not only an acoustic issue but also involves individual and social background factors. Balancing adults' need for quiet with children's need for play has become a pressing issue in apartment living.

2 METHODS

This study adopts a systematic review approach, aiming to summarize the main research methods and findings used in existing research to analyse child-related noise in apartment buildings. Unlike general literature reviews, systematic reviews follow a clear retrieval process and selection criteria, allowing for a more comprehensive and objective presentation of the distribution and characteristics of existing knowledge, and helping identify future research priorities (Page et al. 2021).

The PRISMA framework (Page et al. 2021) was used to guide the review process. First, literature satisfying the selection criteria was retrieved from the Web of Science and Scopus databases, and before limited to peer-reviewed journal articles published in English since 2000. Titles, abstracts, and full texts were then screened by focusing on empirical studies that investigate measurement, assessment or impact of child-related noise in the apartments or multi-unit housing.

3 RESULTS

An initial database search yielded 11,098 articles. After screening, 13 articles were included in the systematic review. A snowballing method was applied to review the references cited in these 13 studies, resulting in 8 additional articles. In total, 21 articles were included in the review.

The studies show that research methods for child-related noise are diverse. Broadly speaking, these studies can be categorized into two groups: one group focuses on the noise itself, such as measuring noise levels or spectral characteristics of particular child-related noises, such as walking, jumping, and running; the other group focuses on investigating human responses, using tools like surveys, interviews, or psychoacoustic experiments to examine residents' perceptions and attitudes. Some studies attempt to combine objective measurements of the acoustic characteristics of child-related noise with subjective assessments (such as annoyance, attitudes toward noise, or emotions) in order to gain a more comprehensive understanding. Each research method has its own strengths and limitations, and thus it is unsurprising that there are differences in some findings. For example, differences have been observed between participants' short-term exposure to noise from neighbours in controlled laboratory settings and their long-term experiences captured through surveys: one study reported that annoyance levels rose more quickly in laboratory experiments (Jeon et al. 2010), while another found stronger correlations between individual and social factors and annoyance with floor impact noise in survey data (Kim et al. 2023).

Beyond diverse methods, the reviewed studies also show clear geographical and thematic concentration. Most of the existing research has been conducted in East Asian apartment settings, with a primary focus on structure-borne impact noise from children's activities, such as walking, jumping, and running, whereas other common airborne child-related sounds, including voices and toy noises, remain relatively underexplored. These regional and thematic patterns indicate that current findings are influenced by specific housing and cultural contexts, highlighting the need for future research to consider a broader range of child-related noise sources, housing types, and sociocultural environments.

4 CONCLUSION

This review highlights that although research on child-related noise in apartments has used a variety of methods, it remains geographically and thematically limited, which reduces the broader applicability of current findings. Future studies should extend to different types of multi-unit buildings, sociocultural contexts, as well as a wider range of child-related noise sources and also place greater emphasis on methodological integration. In particular, combining qualitative and quantitative approaches within evaluation frameworks that connect objective acoustic measurements with subjective assessments, while considering individual characteristics, social context, and environmental factors, will help build a more comprehensive understanding of the characteristics of child-related noises and their effects on residents. Such work can provide stronger evidence to inform housing design and management and promote apartment environments that are more inclusive and child-friendly.

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