DISSERTATION | DOCTORAL THESIS

Titel | Title

Enhancing a Sense of Belonging Among Classmates During School Transition: Development and Evaluation of a Theory- and Early Adolescents-Informed Digital Social Game

verfasst von | submitted by

Ina Krammer BSc MSc

angestrebter akademischer Grad | in partial fulfilment of the requirements for the degree of

Doktorin der Naturwissenschaften (Dr.rer.nat.)

Wien | Vienna, 2026

Studienkennzahl lt. Studienblatt | Degree programme code as it appears on the student record sheet:	UA 796 605 298
Dissertationsgebiet lt. Studienblatt | Field of study as it appears on the student record sheet:	Psychologie
Betreut von | Supervisor:	Univ.-Prof. Dr. Urs Markus Nater | Dr. Beate Schrank

Content

Acknowledgement ii
1. Introduction 1
1.1. Thesis Outline 5
2. Summary of Articles 9
2.1. Article I – Children's Perspective on Fears Connected to School Transition and Intended Coping Strategies 9
2.2. Article II – Early Adolescents' Perspectives on Factors that Facilitate and Hinder Friendship Development with Peers at the Time of School Transition 10
2.3. Article III – LINA: An Augmented Reality Social Game Enhancing Sense of Belonging Among Classmates: An Uncontrolled Pre-Post Evaluation Study 11
3. Discussion 12
3.1. Summary of Results 12
3.2. Integration of Results 13
3.2.1. The Need for Belonging: From Social Fears to Facilitating Factors of Contact 13
3.2.2. Translation of the Need for Belonging and Facilitating Factors of Contact into a Comprehensive LINA Design 16
3.2.3. Positive Effects of the Integrative Approach 17
3.3. Implications and Future Directions 18
3.4. Strengths and Limitations 19
3.5. Conclusion 20
3.6. Declarations of AI Use 20
4. References 21
A Articles 30
A I. Article I – Children's Perspective on Fears Connected to School Transition and Intended Coping Strategies 30
A II. Article II – Early Adolescents' Perspectives on Factors that Facilitate and Hinder Friendship Development with Peers at the Time of School Transition 66
A III. Article III – LINA: An Augmented Reality Social Game Enhancing a Sense of Belonging Among Classmates: An Uncontrolled Pre-Post Evaluation Study 87
B Summary 101
English Abstract 101
German Abstract 102

Acknowledgement

Vielen Dank an meinen Betreuer Universitätsprofessor Dr. Urs Nater. Vielen Dank Urs, dass du mich als externe PhD Studentin in meinem Vorhaben unterstützt und mir das Doktoratsstudium an der Universität Wien ermöglicht hast. Danke für deine stets raschen Antworten auf meine Fragen, die unkomplizierte Kommunikation und die Möglichkeiten auch ein Teil des Teams und der Arbeit an der Universität Wien zu sein.

Danke an mein multidisziplinäres und internationales Team in der Forschungsgruppe D.O.T. – die offene Tür. Danke, dass ich so viele unterschiedliche Persönlichkeiten mit so unterschiedlichen Kompetenzen kennenlernen und mit euch zusammenarbeiten durfte. Ihr habt mich alle auf unterschiedliche Weise geprägt, mich herausgeordert und gefördert. Danke, dass ich so viel von euch und über mich lernen konnte. Danke an das Kernteam Beate, Kate, Adam, Joao, Marija, Gloria, Kathi und Isa. Danke Beate, für die Ko-Supervision meiner Dissertation, die vielen Gespräche und Überlungen, die wir zu den Studien geführt haben. Du hast mir vieles zu wissenschaftlichem Schreiben und Denken gelehrt. Mein großer Dank geht vor allem an Kate, die mich auch noch nach der Arbeit bei DOT unterstützt hat Publikationen einzureichen und voranzutreiben. Du hast mich so ehrlich, wertschätzend und kompetent behandelt, dafür bin ich dir unendlich dankbar.

Vielen, vielen Dank an meine PhD Kolleginnen, mit denen ich so viele Momente voller Freude, Leid, Frust und Erfolg geteilt habe und die Freundschaften, die daraus entstanden sind. Danke Gloria, Marija, Kathi und Isa für unsere gemeinsamen Arbeitsstunden, Reisen und Konferenzen, die wir nicht nur mit Arbeitsthemen, sondern auch Privatem füllen konnten. Vielen, vielen Dank an Kathi und Isa, mit denen ich so viele Workshops gemacht habe, Unklarheiten diskutiert und gemeinsame Lösungen finden konnte. Mit euch konnte ich so vieles Teilen, ihr habt immer meinen Rücken gestärkt, mich bestärkt weiter zu machen, mir meine Fähigkeiten vor Augen geführt und mich so wertschätzend behandelt haben. Ich danke euch so sehr dafür! Ohne euch wäre meine Arbeit nicht so erfüllend und positiv gewesen! Danke Kathi, dass du dir die Zeit genommen hast meine Dissertation zu lesen, mir Feedback zu geben und dabei immer ehrliche und wertschätzende Worte gefunden hast.

Danke auch meiner großen Familie, meinen Eltern und Schwiegereltern, die mich immer gestärkt haben und mir den Raum gegeben haben Zeit für mich und meine Arbeit zu finden. Ich bin so dankbar, dass ihr so liebevoll auf meine Kinder aufpasst, sie begleitet und liebt wie sie sind. Diese Sicherheit, dass sie bei euch Freude, Glück und Geborgenheit erfahren, erlauben es mir Zeit für mich zu nehmen und meine Energie wieder aufzutanken. Ich danke euch von Herzen.

Danke meinen lieben Eltern Eva und Günther, die mich schon ein Leben lang liebevoll und stärkend begleiten, durch meine Kindheit, Jugend, Schulzeit, Studienzeit und jetzt im Erwachsenenleben. Mit eurer Unterstützung konnte ich meine Studien- und Lebensziele verwirklichen. Ihr habt mir so vieles Gelernt, die Welt gezeigt und mir Freiheit geschenkt. Ihr habt mir vermittelt alles

zu schaffen, was ich möchte und mir gezeigt, dass es immer einen Weg gibt um ans Ziel zu kommen und glücklich zu sein. Ich danke euch für eure Begleitung, Offenheit und Stütze, die ihr mir bietet. Danke meinen lieben Geschwistern Pia und Leonie, die immer ein offenes Ohr für mich haben, und mit denen ich eine so wunderbare Kindheit mit gemeinsamen Aktivitäten, Spaß, Konflikten und Versöhnung hatte. Ihr seid so wunderbare Menschen und ich bin dankbar, dass wir auch jetzt auf unseren unterschiedlichen Wegen trotzdem immer wieder zusammenkommen und unsere gemeinsame Zeit schätzen.

Größter Dank gilt an meinen lieben Mann und besten Freund Andi, der mich schon so lange und auf so vielen Wegen begleitet und gestärkt hat, und einfach immer für mich da ist. Der mich liebt wie ich bin, mich motiviert und das Beste aus mir herausholt und gleichzeitig immer das Beste in mir sieht. Ich bin so dankbar für unsere Beziehung und unsere Freundschaft, die mich auch zu dem Menschen macht, der ich bin. Du bist schon so lange ein so großer Teil in meinem Leben und ich bin so dankbar dich zu haben! Du stützt mich, wenn ich nicht mehr kann. Du bringst mich zum Lachen, wenn ich es gerade nicht kann. Du weinst mit mir, wenn ich das gerade brauche. Danke, dass es dich gibt! Ich liebe dich so sehr! Ich bin auch so dankbar für unsere gemeinsamen zwei (bald drei) wunderbaren Kinder, die ich während des Doktoratsstudiums bekommen habe und die wir gemeinsam auch in schwierigen Zeiten – stets bemüht – so liebevoll begleiten. Ich bin so dankbar für meine Kinder Josefine und Louis, die mich noch stärker gemacht haben. Ihr habt mir, mit neuem Blick, so vieles Aufgezeigt, Gelernt und Vorgelebt. An euch und mit euch bin ich gewachsen und auch ihr habt mir die Kraft und Motivation gegeben diese Doktorarbeit fertig zu schreiben und abzuschließen. Ihr seid so tolle Menschen und ich freue mich jeden Tag aufs Neue euch durchs Leben begleiten zu dürfen.

Danke an meine lieben Freunde, die mir ein so großes Netzwerk an Unterstützung und Rückhalt bieten. Das habe ich vor allem als Mama und auch als arbeitende Mama sehr stark gebraucht. Ich bin so dankbar, dass ich meine Sorgen, meinen Frust, meine Freude und mein Glück mit euch teilen darf, und ihr mich liebt wie ich bin. Danke auch für den besonderen Urlaub in Griechenland, den ich für mich und gleichzeitig mit Freunden machen darf, in meiner letzten Phase dieser Dissertation und Schwangerschaft. Hier habe ich die Ruhe und Kraft gefunden, um meine Arbeit abzuschließen. Dieser magische Ort in Mitten duftender Natur und Meeresluft wird mir mit unseren gemeinsamen Momenten und dem Einreichen meiner Arbeit in sehr besonderer Erinnerung bleiben. Danke!

1. Introduction

Belonging is widely considered a basic psychological need that must be satisfied for healthy development, as emphasised across several theories, including the belongingness hypothesis (Baumeister & Leary, 1955), Maslow's hierarchy of needs (1954), and self-determination theory (Deci & Ryan, 2000). The need to belong motivates human beings to engage in frequent social interactions and build supportive and caring relationships with individuals and groups (Allen, et al., 2021; Baumeister & Leary, 1995). Empirical studies show the positive impact of supportive social relationships on physical and mental health throughout life (Burke et al., 2017; Howick et al., 2019; Schmidt et al., 2019), whereas the lack of social relationships, which can manifest in loneliness, low social support, or social isolation, can lead to mental illness and poor life satisfaction (Richardson et al., 2017; Wang et al., 2018). The protective role of social relationships for mental health became even more evident during the COVID-19 pandemic with people who reported having supportive social relationships also showing better mental health, whereas loneliness was clearly associated with more mental health problems (Ashworth et al., 2022; Loades et al., 2020). Promoting and supporting the establishment of social relationships is clearly of major importance, which might be particularly relevant for early adolescents and their peer relationships.

Social relationships are meaningful, recurring interactions that can be perceived as positive or negative between people (August & Rook, 2013). Peer relationships specifically define interactions with people of similar age within the same social network or community, such as schools (Naylor, 2011). Peer relationships can exist in dyads and on a group level, and can have positive (e.g., support) and negative (e.g., bullying) characteristics. While positive peer interactions during early adolescence link to peer acceptance, inclusion, peer support, friendship quality and number of friends (Kingery et al., 2011; Lezhnieva et al., 2018; Mitic et al., 2021; van Rijsewijk et al., 2020), negative peer interactions are associated with bullying, peer rejection and victimisation experiences (Curson et al., 2019; Sotardi, 2017; Sumter et al., 2012). While a supportive peer relationship might include a connection between classmates who like each other, like spending time together, and manage conflicts when doing school-related work together, friendship holds a deeper layer of intimacy (Roach, 2019).

During early adolescence, a pivotal transitional period that typically includes ages 10 to 14, peer relationships become increasing important as time spent with peers, both supervised and unsupervised, increases, and school becomes a central social environment (Blum et al., 2014; Lam et al., 2014). Developmental theories emphasise the reciprocal interplay between individuals and their social contexts, highlighting how peer experiences actively shape personal development (Bronfenbrenner, 1979; Vygotsky, 1978). Through interactions with peers, young people acquire experiences that shape psychological adjustment and overall well-being (Rubin et al., 2006). Empirical research demonstrates that peer interactions during this period have far-reaching implications for cognitive, behavioural, and emotional functioning (Gross-Manos, 2014; Parker et al., 2015). Supportive peer relationships, both in

dyads and on group level, serve as a critical protective factor against poor mental health and promote resilience, sometimes compensating for less supportive parent–child relationships (Laible et al., 2000; Roach, 2018; Rubin et al., 2004; van Harmelen et al., 2017). In contrast, negative peer experiences, such as bullying and victimisation, are associated with enduring psychological, academic, and health-related difficulties, including depression, anxiety, reduced school engagement, and even long-term impairments in physical health extending into adulthood (Arseneault, 2018; Halliday et al., 2021; Scott & Manczak, 2021). In addition, experiences of social isolation during early adolescence are strongly linked to adverse mental health outcomes, including symptoms of depression and anxiety (Laursen & Hartl, 2013; Loades et al., 2020). Prevalence rates of these mental disorders in early adolescence are notably high, with estimates exceeding 20% in Austrian populations (Wagner et al., 2017). In this context, supportive peer connections on dyadic and group level represent key protective factors, as they have been shown to buffer against the emergence of depressive and anxiety-related difficulties (Klineberg et al., 2006; Mitic et al., 2021; Rueger et al., 2016).

So far, we know that supportive peer relationships on dyadic and on group level are important for developmental trajectories and mental health during early adolescence. Yet, during early adolescence an additional major social challenge occurs – school transition. School transition from primary to secondary school is a period of life pupils often perceive as a challenge and a threat (Jindal-Snape et al., 2020; Sirsch, 2003). While some pupils move to the new school without any difficulties, others encounter difficulties and negative experiences, which can result in short- and long-term consequences, such as higher levels of depression or lower self-esteem (Lester & Cross, 2015; West et al., 2010). Overall, pupils mostly have to deal with new class compositions after the transition which has an impact on peer relationships (Rice et al., 2011; Weller, 2007) since the negotiation of group affiliations and friendships with classmates restart (Weller, 2007). Thus, major concerns about school transition centre on their new classroom environment, for example, moving to a new school with old friends and making new friends (van Rens et al., 2018b). While for many students fears about losing old friends and making new friends lessen after the transition, around one in ten students have persistent fears about their relationships with classmates throughout the first two years of secondary school (Jindal-Snape, et al., 2019). They also have concerns about victimisation and social exclusion (Zeedyk et al., 2003), which are indeed common social experiences during this time (Marchante et al., 2022; Monachino et al., 2021). Existing research has not yet adequately determined the particular factors that provoke fear in certain children or the coping mechanisms they use to manage these difficulties (Clark et al., 2020). The lack of research on students' perspectives of their fears and the ways they cope with these during this period (van Rens et al., 2018a; Clark et al., 2020) also limits the ability to design targeted support programs that effectively respond to early adolescents' specific needs (Halliday et al., 2019). Facilitating supportive interactions between classmates and providing opportunities for positive interactions, might be especially critical for friendship development and support from classmates for students who stay in the same class across several years after a school transition.

Experiencing peer support, maintaining friendships, and reducing feelings of loneliness within the school environment are also key contributors to the development of a strong sense of belonging (Allen et al., 2018; Quintana, 2021). While it is known that a sense of school belonging positively relates to academic achievement, positive perceived learning environment, positive self-perceptions, psychological well-being, and strong social functioning (Arslan, 2019; Arslan & Coşkun, 2023; Korpershoek et al., 2020), limited research focuses on this sense of belonging among classmates, which has been shown to be of great importance for students who are embedded in the same class across several years, as is the case for many European countries, such as Austria.

The limited research, which focuses on peer relationships on classroom level, shows that both high classmate support and more friends within the classroom, can act as protective factors against negative peer experiences (Košir et al., 2020). Moreover, feeling supported by classmates is associated with greater school satisfaction, well-being, and quality of life, whereas loneliness and negative peer experiences are linked to poorer outcomes (Huebner et al., 2014; Oberle et al., 2011; Gempp & Gonzalez-Carrasco, 2021). Supportive peer environments in classrooms also strengthen students' capacity to manage stress and improve academic performance by enhancing motivation and engagement (Burke & Sass, 2013; Hoferichter et al., 2022; Shao et al., 2024). Moreover, positive relationships with classmates contribute to better emotional functioning, including lower levels of depressive symptoms and higher positive affect (Franco et al., 2022; McGraw et al., 2008; Schmidt et al., 2019, 2020).

Theoretical and empirical research efforts have been made to foster peer relationships among children and adolescents, for example by decreasing prejudice and strengthening feelings of belonging. Several meta-analyses indicate that meaningful contact with marginalised or stigmatised individuals can significantly lessen negative attitudes and hostile behavioural intentions toward those perceived as outsiders, including peers from different ethnic backgrounds or those with mental health or behavioural challenges (Armstrong et al., 2017; Beelmann & Heinemann, 2014; Chae et al., 2018; Corrigan et al., 2012; Waqas et al., 2020). This meaningful contact comprises key elements proposed by Allport's Contact Theory (1954), that is, equal status, cooperative interaction, shared objectives, and authority support. Further research in school contexts shows that structured cooperative learning activities that require collaboration and shared goals hold the potential to enhance peer relationships and lower rates of victimisation (Van Ryzin & Roseth, 2018). More broadly, anti-stigma research highlights that positive, interdependent group experiences can increase mutual liking and counteract biases related to ability, gender, body weight, or ethnicity (Skinner & Meltzoff, 2019). Additionally, storytelling has proven to be an effective strategy in educational settings (Lindsay et al., 2013; Lucas & Soares, 2013), helping students develop a stronger sense of belonging while also encouraging empathy, perspective-taking, and more accepting attitudes toward others (Cameron & Rutland, 2006; Cameron et al., 2007; Skinner & Meltzoff, 2019).

Since early adolescents are highly willing to develop positive relationships with new classmates after school transition (Curson et al., 2019; Weller, 2007; Zeedyk et al., 2003), this time offers an ideal opportunity to increase a sense of belonging among classmates through improving relationships with classmates. As reviewed above, the relevance of supportive relationships with classmates is evident at the time of school transition, yet early adolescents receive limited instruction on how to establish these relationships (van Rens et al., 2018a). Early adolescents express a desire to discuss friendships and to take part in health promotion activities that foster and strengthen peer relationships in school and classroom settings (Kostenius & Öhrling, 2008; Persson et al., 2016). However, there is a clear gap in interventions, trainings, or social games that foster relationships between classmates in its own rights (Pollak et al., 2023). Considering the possibilities of digitalisation, within these support programs digital aspects are missing.

Augmented reality (AR) represents a promising digital technology that can be used in school settings for strengthening students' sense of belonging, as it can encourage peer interaction and teamwork (Brij & Belhadaoui, 2021), particularly when combined with gamified features (Ređep & Hajdin, 2021). Compared with traditional instructional materials, AR-based learning environments have been shown to enhance students' motivation and enjoyment while also supporting positive socio-emotional connections among participants (Redondo et al., 2020). So far, however, AR in education has largely been limited to enriching conventional academic subjects such as mathematics, science, arts, or cultural studies (Maas & Hughes, 2020; Zhang et al., 2022). Although some AR applications have aimed to foster social competencies, these interventions have mainly targeted autistic individuals and often focus on single-user experiences (Mittmann et al., 2023). Considering that early adolescents frequently use smartphones to socialise and play with peers, which also contributes to friendship development among classmates (Mittmann, Woodcock et al., 2022), an AR-supported digital social game designed to strengthen sense of belonging among classmates appears particularly suitable for this age group.

Early adolescents are often excluded from intervention development processes, despite being directly affected by such programs (van Rens et al., 2018a). Consequently, student voices remain underrepresented in literature (e.g., de Leeuw et al., 2018; Halliday et al., 2019). To overcome this limitation, research that is grounded in the transformative research paradigm, which prioritises social justice, empowerment, and the active inclusion of underrepresented groups in the research process (Mertens, 2007), is needed. Complementing this transformative framework, constructivist elements are also essential to understand the subjective experiences, expectations, and perspectives of early adolescents (Creswell & Poth, 2017). One of the primary challenges is how to study, design, and develop interventions that are both evidence-based and engaging for young people. The Participatory Design approach (Hagen et al., 2012) offers a useful framework for engaging students as co-designers in various research process. Since traditional research methods often limit young people's participation and fail to fully capture their perspectives, methods that allow for participation are required (Lundqvist, 2014). Such participatory methods include workshops, discussions, or visual techniques, which provide more

effective ways to explore early adolescents' lived experiences (Halliday et al., 2019; Lundqvist, 2014). These methods not only honour children's rights (United Nations, 1989) but also ensure that support programs are directly informed by their lived experiences, increasing their relevance and potential impact (Halliday et al., 2019). Although early adolescents have been included in research on health-related topics such as substance use, social skills, physical activity, and nutrition (Larsson et al., 2018; Rouncefield-Swales et al., 2021), there is still a notable gap in involving early adolescents in the co-design of AR social games addressing the enhancement of relationships with classmates.

To summarise, during early adolescence, supportive peer relationships play a vital role for developmental trajectories and can act as a protective factor for mental health. In particular, the time of school transition is a critical period affecting peer networks and peer experiences among classmates. Since the willingness to develop supportive relationships with classmates after a school transition is specifically high, this time offers an ideal opportunity to enhance these relationships. Yet, support programs that focus on sense of belonging among classmates are missing (Pollak et al., 2023). Since AR is a promising technology that can encourage peer interaction and teamwork, especially when combined with gamified features (Brij & Belhadaoui, 2021; Ređep & Hajdin, 2021), the development of an AR social game for classrooms seems particularly suitable to meet challenges of relationships among classmates. However, the limited understanding of early adolescents' fears and coping mechanisms during school transition (Clark et al., 2020) and inadequate instruction on how to establish supportive relationships with classmates (van Rens et al., 2018a) need to be better understood to design targeted support programs that effectively respond to early adolescents' specific needs. In order to create a theory- and early adolescents-informed design of an AR social game, student voices need to be integrated into research processes and their lived experiences need to be taken seriously to increase impact and relevance.

1.1. Thesis Outline

This thesis took a bottom-up approach by first exploring early adolescents' views on the transition from primary to secondary school, their fears and their experiences with classmates to challenge traditional adult-centric approaches and address critical psychosocial needs, such as improving peer relationships during school transitions. Then, in the course of this thesis project the AR social game LINA ('Lina is not alone') was developed in an interdisciplinary team and co-designed with and for early adolescents at the time of school transition, combining transformative and constructivist research paradigms. The intended use of LINA was to promote sense of belonging among classmates by stimulating positive contact via successful aspects of contact-based research (e.g., reduce social distance between peers, work towards a common goal; Allport, 1954; Beelmann & Heinemann, 2014; Pettigrew & Tropp, 2006; Pinfold et al., 2003). Thus, to develop the theory- *and* early adolescents-informed AR social game LINA, the initial aim was to better understand fears during school transition and the development of relationships among classmates during this time from the perspective of early

adolescents. In a next step, the aim was to integrate these findings into LINA design and development processes to evaluate the final prototype LINA that enhances sense of belonging among classmates. To pursuit these objectives two studies (Study 1 and 2), yielding three Articles (Article I – III), have been conducted. The following research questions and hypothesis were formulated:

1. What challenges do early adolescents face during the school transition from primary to secondary schools and how do they experience their peer relationships? (Study 1)
    1.1. What are specific fears during school transition and how do early adolescents cope with these fears? (Article I)
    1.2. What are facilitating and hindering factors for friendship development after school transition among classmates? (Article II)
2. How does engagement with the AR social game LINA affect sense of belonging among classmates in a sample of early adolescents in the first year of secondary schools and how does the target group evaluate gameplay experiences? (Study 2)
    2.1. Hypothesis: Early adolescents increase in sense of belonging among classmates after playing the AR social game LINA. (Article III)
    2.2. How do early adolescents evaluate the player experience (satisfaction, acceptability) and the translation of the comprehensive LINA design into user experiences? (Article III)

In alignment with these research questions, a qualitative study with participatory design elements (Study 1) and an uncontrolled pre-post evaluation study (Study 2) were conducted. Results have been published in three articles. Table 1 gives an overview of the three published articles and addressed research questions. Figure 1 gives an overview of the flowchart of this thesis.

Study 1 was a qualitative study also using participatory design elements, drawing inspiration from the Participatory Design framework outlined by Hagen et al. (2012). This framework emphasises how young people can be involved at different stages of intervention development. Following this approach, the aim was to involve early adolescents in the first two stages – identifying and defining the problem – to better understand fears and coping mechanisms during school transition as well as their relationships with classmates. Participatory workshops with an intervention development aim were designed and conducted across primary and secondary schools. Qualitative data was collected as part of the participatory workshops, yielding two qualitative papers (Article I and II).

Table 1

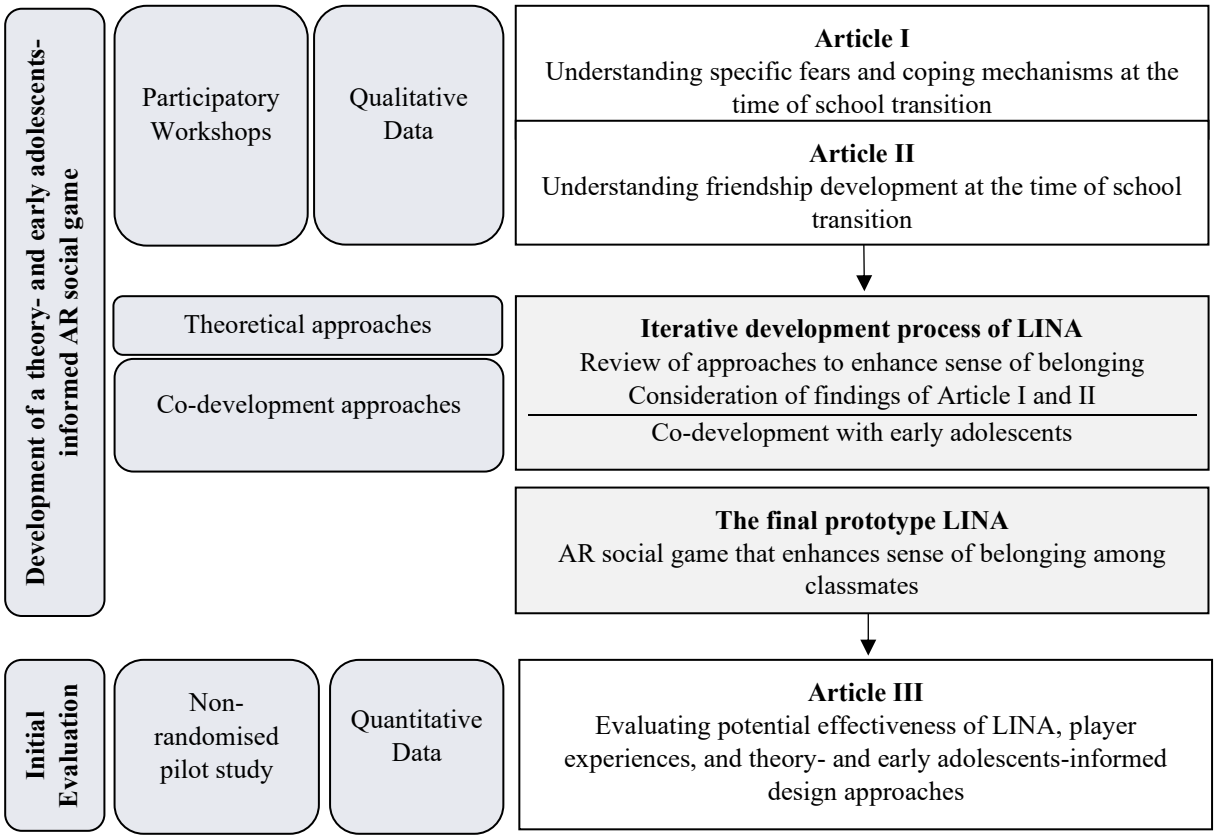
Overview of Articles Included in this Thesis

Article	Citation	Research question
1	Stiehl, K. A. M., Krammer, I., Schrank, B., Pollak, I., Silani, G., & Woodcock, K. A. (2023). Children's perspective on fears connected to school transition and intended coping strategies. *Social Psychology of Education, 26*, 603-637. https://doi.org/10.1007/s11218-023-09759-1	1.1
2	Krammer, I., Schrank, B., Pollak, I., Stiehl, K. A. M., Nater, U. M., & Woodcock, K. A. (2023). Early adolescents' perspectives on factors that facilitate and hinder friendship development with peers at the time of school transition. *Journal of School Psychology, 98*, 113-132. https://doi.org/https://doi.org/10.1016/j.jsp.2023.03.001	1.2
3	Krammer, I., Mittmann, G., Nater, U. M., Barnard, A., Martins, D., Dias, J., Schrank, B., & Woodcock, K. A. (2026). LINA: An augmented reality social game enhancing sense of belonging among classmates: An uncontrolled pre-post evaluation study. *School Mental Health, 18*, 218-230. https://doi.org/10.1007/s12310-025-09846-y	2.1 2.2

In a next step, findings from Study 1 were incorporated in theory-informed considerations of game development and the creation of game elements. The aim was to translate theory and early adolescents-informed design features into user experiences. By including early adolescents' voices in the design processes, we intended to develop a meaningful, effective, and contextually appropriate AR social game. After the development of the AR social game, which has been co-designed, tested and edited in an iterative process, Study 2 has been conducted. This study evaluates the final prototype LINA (i.e., final single session proof-of-concept) for its potential effectiveness, the player experience, and the translation of the comprehensive LINA design into user experiences in an uncontrolled pre-post evaluation study (Article III).

Figure 1

Flowchart of this Thesis



Description of the AR Social Game LINA

The AR social game LINA was developed in an interdisciplinary team and co-designed with and for early adolescents at the time of school transition. The idea was to create a social game played on smartphones, including a mystery-style interactive narrative with AR elements to immerse players (i.e., classmates and one teacher) and bring them closer together. LINA is played on smartphones, at first individually, then in pairs, finally in teams, using AR to unlock each stage of the game. Players need to cooperate to solve challenges. LINA allows members of the class to connect with each other in new ways, through shared experience, shared pursuit of common goals and structured personal interactions, breaking down barriers as they reflect on individual identities as well as supportive and hostile peer relationships addressed in the narratives of LINA. To our knowledge, LINA is the first multi-player mobile game that uses a combination of digital and face-to-face contact between classmates to create a unique experience and opportunity to initiate and further sense of belonging among classmates. A detailed description of the co-development process of LINA has been published by Mittmann, Barnard et al. (2022).

2. Summary of Articles

This chapter provides a summary of the three published articles included in this thesis. The full publications can be found in Appendix A.

2.1. Article I – Children's Perspective on Fears Connected to School Transition and Intended Coping Strategies

Stiehl, K. A. M., Krammer, I., Schrank, B., Pollak, I., Silani, G., & Woodcock, K. A. (2023). *Social Psychology of Education, 26*, 603-637. https://doi.org/10.1007/s11218-023-09759-1

Moving from primary to secondary school represents a significant life change for children. However, there is limited research that deeply explores young students' own views regarding their fears during this transition and the strategies they use to manage them. This qualitative study seeks to provide direct insight into children's fears and the coping approaches they intend to apply during the transition period.

Methods: Data were collected through 52 workshops involving 896 students in Lower Austria (*M age* = 10.40, *SD* = .839). During classroom sessions, pupils first collaborated in brainstorming activities to develop a vignette describing a child worried about moving to secondary school. They then engaged in small, self-selected group discussions to suggest possible coping strategies.

Results: A thematic analysis identified four main categories of fears: peer victimisation, being alone and not finding friends, victimisation by authority figures, and academic failure. Three additional themes described coping approaches, including seeking support from social networks, personal emotion regulation, and controlling behaviour. Additional themes addressed the outcomes of these strategies and students' reflections on their effectiveness or potential contradictions.

Discussion: The findings indicate that social fears were more prominent than academic fears. Although students were capable of identifying coping strategies, the presence of maladaptive responses and conflicting opinions suggests some uncertainty about their practical application. The findings provide useful knowledge to inform future support programs and specific teacher training that reflect early adolescents' fears, needs, and tailored coping strategies.

2.2. Article II – Early Adolescents' Perspectives on Factors that Facilitate and Hinder Friendship Development with Peers at the Time of School Transition

Krammer, I., Schrank, B., Pollak, I., Stiehl, K., Nater, U. M., & Woodcock, K. A. (2023). *Journal of School Psychology, 98*, 113-132. https://doi.org/10.1016/j.jsp.2023.03.001

Positive peer relationships play an essential role in supporting mental health and overall well-being. For this reason, friends and classmates become particularly important sources of support during the transition from primary to secondary school. However, current research offers limited innovative methods for examining friendship development in school contexts and for meaningfully involving early adolescents in studies concerning their own experiences. In this study, participatory research approaches were used, allowing early adolescents to actively engage in analysing the data they themselves generated. The aim was to explore their perspectives on factors that promote or hinder the formation of friendships during the transition between primary and secondary school.

Methods: A total of 916 students in Austria (*M age* = 10.44 years, range = 9-16) participated in 54 participatory workshops. Qualitative data collected from several workshop activities were analysed using reflexive thematic analysis, with participants also contributing to the interpretation of the data.

Results: The resulting themes were organised into personal, interpersonal, and external factors. Findings showed that early adolescents value peers who demonstrate kindness and provide a sense of safety, display supportive and empathetic behaviour, manage conflicts constructively, avoid harmful behaviours, spend time together, and maintain communication both offline and online. While shared behavioural norms can facilitate friendship formation, factors such as jealousy and the challenges of managing larger friendship groups may act as barriers. External factors (i.e., given circumstances), such as similarities between peers, physical closeness, and the length of acquaintance, were also identified, although participants considered them less significant.

Discussion: Overall, the findings add to the literature on peer relationships by highlighting the factors that adolescents themselves consider most important for developing friendships. Implications for school psychology practice are discussed, such as individual counselling for students, who may rely on a narrow set of strategies and lack diverse competencies for initiating friendship, or teachers, who aim to improve their students' relationships to positively affect well-being and academic performance at school.

2.3. Article III – LINA: An Augmented Reality Social Game Enhancing Sense of Belonging Among Classmates: An Uncontrolled Pre-Post Evaluation Study

Krammer, I., Mittmann G., Barnard, A., Dias, J., Nater, U., M., Schrank, B., & Woodcock, K. A. (2026). *School Mental Health, 18*, 218-230. https://doi.org/10.1007/s12310-025-09846-y

Supportive peer relationships are essential for the development of well-being. As early adolescents spend a substantial amount of time in school, particularly within their classrooms, a strong sense of belonging among classmates is critical for both mental health and academic success. However, support programs aimed at strengthening peer relationships and fostering belonging in classroom settings remain limited. Given the growing role of digital media in how adolescents build and maintain peer connections, digital social games offer promising opportunities to promote social interaction and collaboration, especially during the transition from primary to secondary school. LINA ('Lina Is Not Alone') is an innovative augmented reality social game designed for classroom use to enhance sense of belonging among classmates. An uncontrolled pre-post evaluation study was conducted to assess (a) user experience, (b) the extent to which the integrative design of LINA was reflected in user experience, and (c) potential effectiveness of LINA.

Methods: The study included 99 participants (*M age* = 10.94; range = 10-12; 51 girls, 48 boys) from two secondary schools in Austria. All participants played LINA in their classroom with their classmates, completing questionnaires some days before and directly after playing LINA.

Results: Findings indicated (a) high levels of satisfaction and acceptability, (b) successful implementation of theoretical design principles, and (c) significant improvements in sense of belonging among classmates over time.

Discussion: Overall, LINA created a safe environment for collaborative interaction on equal terms. LINA design combines theory-based principles with early adolescents' perspectives, likely contributing to its acceptance and effectiveness. Yet, further research with more rigorous methods is needed. Moreover, recommendations for future development of LINA, such as addressing additional factors relevant for classroom dynamics (e.g., teacher-student relationships) are discussed.

3. Discussion

Supportive peer relationships play a crucial role during early adolescence, particularly during the transition from primary to secondary school, which is a sensitive period for the development of supportive peer networks and a sense of belonging among classmates (Jindal-Snape, et al., 2019; van Rens et al., 2018a). Despite this, limited research has addressed early adolescents' specific needs during this transition or how to effectively foster belonging among classmates. In particular, support programs with digital solutions and participatory approaches are missing.

Against this background, the overall aim of this thesis was to develop and evaluate a theory- and early adolescents-informed AR social game (LINA) designed to enhance classmates' sense of belonging during this transition. To achieve this, a participatory approach was adopted, integrating early adolescents' perspectives into theoretical understanding and LINA design. Across two studies, yielding three articles, this approach enabled the exploration of early adolescents' needs and experiences during school transition, a theory- and early adolescents-informed development of LINA and its evaluation.

3.1. Summary of Results

Findings from **Article I** indicated that early adolescents experience multiple fears during the transition to secondary school. Social fears were much more prominent than academic fears, including experiences of peer victimisation and being alone in the new situation. Therefore, friendships and the ability to form new peer relationships appeared as a central fear to early adolescents' concerns during this period. In addition, early adolescents reported various coping strategies, including enacting supportive networks, personal emotion regulation, and controlling behaviour. However, participants also reported uncertainties and disagreements on how to find or form friendships, which might be one cause for the social fears. Overall, the findings highlighted the central role of social dynamics and peer relationships in shaping early adolescents' transition experiences, as well as the necessity to support friendship formation.

Findings from **Article II** extended this knowledge by demonstrating how early adolescents establish contact between classmates, presenting hindering and facilitating factors for friendship development. Key experiences included engaging in shared activities, experiencing positive emotions together, and interacting within a safe environment that facilitates communication. These factors were described as central to the development of friendships, particularly when they occur repeatedly over time. In addition, digital interactions, such as text messaging and online communication during gameplay, were identified as important components of friendship development. By systematically addressing facilitating factors of contact, peer relationships and friendship development can be supported.

Findings from **Article III** indicated that engagement with LINA was associated with increased levels of sense of belonging among classmates. In addition, early adolescents reported high levels of

player satisfaction, reflected in positive acceptability and usability ratings. Ratings across the six contact elements of the comprehensive LINA design further suggested that these components were experienced by participants during gameplay. The findings also indicated that LINA facilitated collaborative interactions among classmates that engaged them on equal footing within a safe social environment.

3.2. Integration of Results

Overall, the findings of this thesis provide a comprehensive understanding of how early adolescents' social experiences during the transition to secondary school can be meaningfully supported. By integrating early adolescents' perspectives on their fears, coping strategies, and peer relationships (Articles I and II) with a theory-based and participatory design approach, this thesis demonstrates that a sense of belonging among classmates can be actively fostered through structured social interactions embedded in a digital social game (Article III).

More specifically, findings of this thesis enabled the development of a comprehensive LINA design, integrating theory-informed and early adolescents-informed knowledge, which could only be achieved through the participatory approach. More generally, findings of the thesis can be used as to work toward a more generalised conceptual framework to adapt to other context and target groups.

3.2.1. The Need for Belonging: From Social Fears to Facilitating Factors of Contact

A central contribution of this thesis lies in highlighting the predominance of social fears during school transition. Further, findings from Article I demonstrate that from early adolescents' perspectives fears related to peer relationships, particularly fear of peer victimisation and fear of being alone and not finding friends outweigh academic concerns. In particular, early adolescents expressed strong concerns about exclusion, being made fun of, and not finding or maintaining friendships in our data, indicating that establishing social connections also represents a core developmental task during this period. Previous literature identifies fear of peer victimisation as the most prevalent concern – a pattern that remains consistent over time (Zeedyk et al., 2003). While victimisation is a common experience during the transition to secondary school (Marchante et al., 2022; Monachino et al., 2021), strong support from classmates and having a greater number of friends within the classroom can serve as protective factors against such stressful experiences (Košir et al., 2020). Consequently, the additional fear of being alone and not findings friends, as highlighted in our findings, present a logical complement. Given that even a single friendship can buffer the emotional and physiological impact of negative social experiences (Adams et al., 2011; Lessard & Juvonen, 2018), understanding how to actively foster supportive peer relationships is particularly critical. According to our findings, early adolescents have a strong awareness of their need for belonging, however, they seem to struggle how to establish and maintain meaningful connections with their peers. Taken together, our findings on social fears closely link to the need for belonging, which seems particularly relevant at the time of school transition. A systematic

literature review on school transition, corresponds with our conclusion, advocating that this wish to belong, to connect with peers and to make friends is central to facilitate a successful transition (van Rens et al., 2018a).

In Article I and II early adolescents frequently expressed uncertainty regarding key aspects of communication behaviour, particularly in relation to forming friendships (e.g., how much information sharing is considered ok, when does it become too much) and responding to victimisation (e.g., is verbally confronting a bully a good strategy or too dangerous). Given the importance of communication skills for early adolescents' social and emotional development (Reed & Trumbo, 2020), these findings suggest a need for more targeted support. Moreover, Article I and II show how key aspects of social behaviour develops in early adolescents. In particular, early adolescents identified supportive and empathic actions that can facilitate friendship development (e.g., practical assistance, help with schoolwork, talking about a difficult situation, sharing) or counteract victimisation experiences (e.g., defending each other). Yet, maladaptive actions are also considered to fulfil their need for belonging (e.g., changing look or style, adapting behaviour) or overcome victimisation (e.g., hitting back, simply ignoring bad things). Again, these specific insights of early adolescents' behaviour and coping strategies suggests how support programs can be tailored to their needs when designing social contact situations or designing narrative and content.

Article I and II provide important insights about specific facilitating factors through which peer relationships are established. The findings indicate that friendship development is facilitated by shared activities with their classmates, an aspect that has been further emphasised by involving participants in the interpretation of their own data (Article II). Specific helpful activities to connect with classmates range from group assignments during school lessons to playing (online) games and doing sports together. Social games in the first days after school transition were identified as particularly helpful to cope with social fears (Article I), and might provide effective low-threshold opportunities for social interactions right after a school transition. Most importantly, these shared experiences should elicit positive emotions (i.e., having fun together) and enable social interactions within a safe environment. Therefore, our findings suggest that fun and laughter, fostered by interactive and playful elements, help create a positive atmosphere and happiness, thereby fostering the formation of friendships. Although, enjoyment has also been identified as key component of friendships (Heinsch et al., 2020), this aspect has so far not been considered when developing support programs promoting peer relationships (e.g., Pollak et al., 2023). The use of digital technology, such as AR, can improve perceptions of fun through playful elements (Rađep & Hajdin, 2021), thereby increasing their suitability for use in support programs. To address the need and establish a feeling of safety during social interactions, mutual listening, trust and support need to be developed (Article II). Therefore, collaborative tasks that require listening, trusting and supporting each other, might be particularly suitable for use in support programs. These aspects of contact appear to be particularly effective when occurring repeatedly over time.

In Article I, early adolescents reported several reasons for peer difficulties, with appearance and ethnicity being the most prominent ones. These identified reasons for exclusion or friendlessness have been found in previous literature (Mischel & Kitsantas, 2020) and further points to the social complexity of entering a new peer environment. Designing shared collaborative experiences in LINA seem particularly relevant as these experiences challenge negative prejudice related to appearance or ethnicity and thereby may enhance likability (Skinner & Meltzoff, 2019). Overcoming negative attitudes and intentions toward perceived outsiders, which often include individuals from different ethnic backgrounds, those with mental health or behavioural challenges (Armstrong et al., 2017; Beelmann & Heinemann, 2014; Chae et al., 2018; Corrigan et al., 2012; Waqas et al., 2020), are guided by Contact Theory (Allport, 1954). Therefore, using Contact Theory as theoretical foundation of LINA seems appropriate to overcome the identified social fears and reasons for exclusion or friendlessness.

Digital forms of interaction were identified as integral components of early adolescents' social lives. In particular, common activities (e.g., digital gameplay) and communication (e.g., through text messaging) were most relevant factors to initiate and maintain contact selected in the participatory data analysis by early adolescents themselves. Thus, friendship development increasingly takes place across both physical and digital contexts. These findings are consistent with previous work, showing that online communication via smartphones appears to play a particularly important role during the transition to secondary school, helping adolescents stay connected with peers (Davis, 2012; Mittmann, Woodcock et al., 2022). Moreover, digital interactions can support initiating peer contact and further strengthen offline relationships (Mittmann, Woodcock et al., 2022; Reich et al., 2012), as online interactions are often an extension of their offline relationships (Yau & Reich, 2018). Together these findings indicate that the combination of both can be particularly effective to establish contact among classmates.

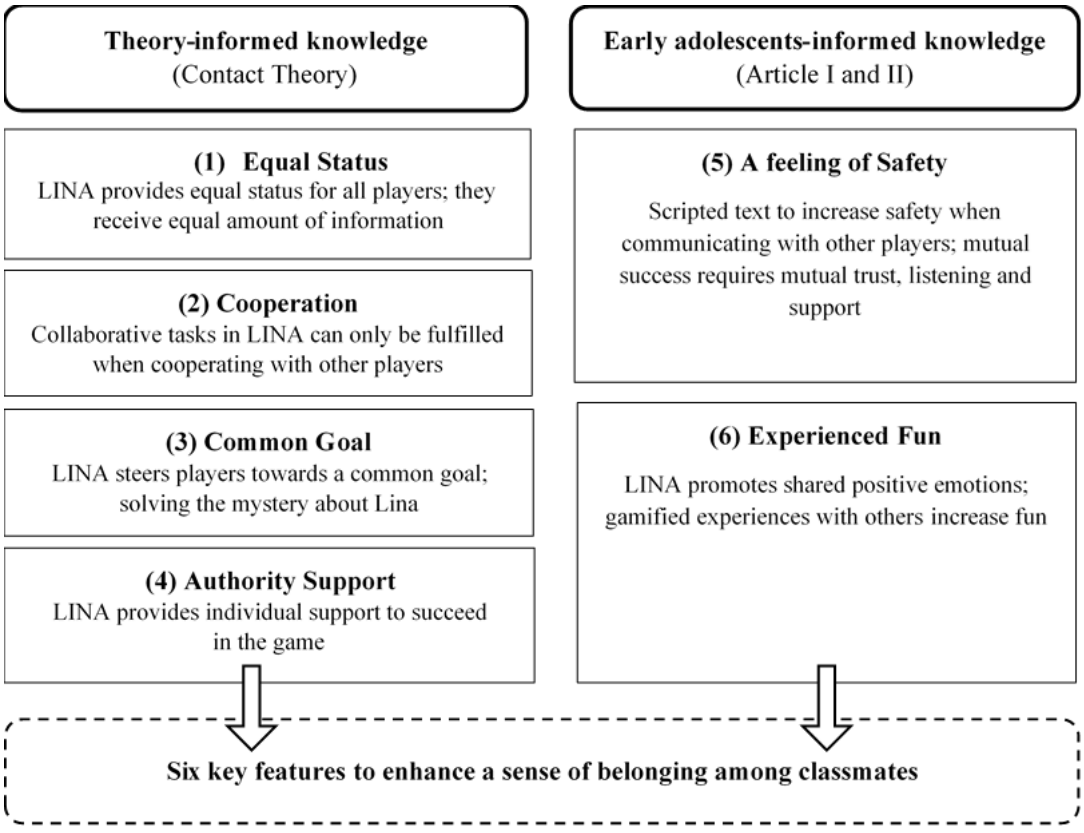
Overall, the findings of Article I and II provide a comprehensive understanding of how early adolescents' social needs during the transition to secondary school can be meaningfully supported. Importantly, our results from Article I and II suggest that peer relationships do not emerge incidentally, but are shaped by specific facilitating factors of contact that promote meaningful interactions between early adolescents. This understanding provides clear implications for the design of support programs. In particular, playful opportunities for collaboration and positive shared experiences that enable social communication within a safe environment seem to reduce social barriers and support a sense of belonging among classmates. The identified importance of communication, social support, and shared activities highlights the need for environments that actively guide early adolescents' interactions. The relevance of digital communication points toward the potential of hybrid approaches that combine face-to-face and digital interaction formats. Supporting this need for belonging among classmates after a transition is particularly relevant as positive peer interactions can enhance students' ability to cope with stress, motivation and engagement, contributing to improved academic outcomes (Burke & Sass, 2013; Hoferichter et al., 2022; Shao et al., 2024), as well as improved emotional and mental wellbeing (Lester & Cross, 2015).

3.2.2. Translation of the Need for Belonging and Facilitating Factors of Contact into a Comprehensive LINA Design

Insights from Article I and II were directly translated into the development of the AR social game LINA, implementing appropriate game design elements and narrative style of LINA. Grounded in Contact Theory (Allport, 1954), the digital social game was designed to facilitate (1) equal status interactions, (2) cooperation, (3) shared goals, and (4) authority support. Importantly, the findings from Articles I and II extended this theoretical framework by incorporating two additional elements: (5) a feeling of safety and (6) experienced fun, which were identified as highly relevant by early adolescents. This resulted in a comprehensive LINA design comprising six contact elements that integrate theory- and early adolescents-informed knowledge summarised in Figure 2.

Figure 2

Comprehensive LINA Design



The design of LINA incorporates these principles in multiple ways. To provide (1) **equal status** interactions, all players in LINA start with equal access to information. As the game includes not only classmates, but also one teacher, this was also used to ensure that students and educators meet on equal grounds, reducing imbalances. (2) **Cooperation** was a central part of game design. In particular, advancement depends on collaboration and face-to-face communication. Without these aspects of contact players cannot achieve the (3) **common goal**, which is finding out what happened to

the fictional character Lina, who mysteriously left the class in the middle of a school year. Thereby, the storyline promotes joint problem-solving to progress and develop common understanding and empathy for the fictional character. Addressing aspects of (4) **authority support**, LINA includes structured support, such as hints, to guide players throughout the game.

Structured collaborative tasks were key design features implemented to create low-threshold opportunities for interaction, enabling students to engage in shared activities and initiate communication with classmates (Article I and II). These tasks were designed to support cooperation in pairs, small groups and finally the entire class, allowing participants to gradually build connections, thereby accounting for repeated social interactions among classmates.

In addition, structured communication and opportunities for social support were embedded in collaborative tasks to reflect adolescents' reported strategies for building and maintaining friendships (Article I and II). Elements such as introducing oneself, listening to others, sharing information, and encouraging peers were incorporated to facilitate supportive interactions. Scripted text for all players, particularly at the beginning of collaborative tasks, ensured that players stick to specific rules of communication, aiming to create (5) **a feeling of safety**.

Furthermore, the design aimed to foster (6) **experienced fun**, which was identified as central facilitating factor of contact (Article I and II). Shared positive experiences were achieved by designing playful game elements in collaborative tasks and individual AR experiences (e.g., discovering an AR object in one's own classroom that can be further playfully explored to discover hints to further progress in the game). By combining face-to-face interaction with digital gameplay elements, LINA created a hybrid social environment that reflects adolescents' everyday communication practices (Article II), also eliciting fun and positive emotions during social communication. Further information and visual examples about how players experience LINA and how face-to-face and digital connections are merged can be found in Mittmann, Barnard et al., (2022).

Narrative elements, such as the gradual self-disclosure of the fictional character Lina (e.g., revealing personal information about herself and her life at home little by little), was used to promote understanding and empathy by the players. It also reflects that a feeling of safety gradually develops after moving to a new class, and echoes that saying the truth helps to gain trust, which can lead to disclosing secrets little by little (Article I and II). Moreover, the narrative presents the fictional character Lina with a positive inner attitude, including positive thinking, breathing, and creating art when feeling overwhelmed, which address and establish positive personal emotion regulation strategies as identified by early adolescents to overcome fears (Article I).

3.2.3. Positive Effects of the Integrative Approach

A key strength of this thesis lies in its integrative approach. By involving early adolescents throughout the research and design process, the thesis moves beyond adult-centric perspectives. This

approach ensured that the AR social game reflects both theoretical principles and context-specific, early adolescent-informed knowledge, which likely contributed to its acceptance and effectiveness.

High levels of player satisfaction, including positive acceptability and usability ratings, in combination with a high level of experienced fun, indicate that LINA was engaging for early adolescents. In particular, high satisfaction with the narratives, enjoyment, and social connectivity (Article III) reflects that LINA tells a story in an appealing and comprehensible way, elicits positive emotions and gently supports social interactions between players, suggesting that it provides a highly positive multi-player experience. A comparison of satisfaction and experienced fun with other educational activities and a serious game about wellbeing (Tisza & Markopoulos, 2021; Tisza et al., 2021; Schorer & Protopsaltis, 2021) highlights the very high player experience scores of LINA. In addition to this positive evaluation of player experience, classmates' sense of belonging also significantly increased over time, a finding that remained robust even after controlling for peer victimisation experiences (Article III).

Taken together, the positive evaluation results of Article III can be understood in light of this integrative approach (i.e., theory- *and* early adolescents-informed). By closely aligning theoretical principles with the target group's lived experiences, successful implementation of support programs can be achieved.

3.3. Implications and Future Directions

This thesis contributes to the empirical, theoretical, methodological, and technological advancement of peer relationship research in several ways, also touching on practical implications.

On an empirical and theoretical level, the evaluation study (Article III) provides promising results on the effectiveness of LINA. Despite LINA being only a single session proof-of-concept, a sense of belonging among classmates was increased. This thesis provides a comprehensive basis for LINA that supports its continued development. Since effective peer relationship programs typically involve repeated sessions over time (Sanchez et al., 2017; Pollak et al., 2023), extending LINA beyond a single session may improve its impact. Furthermore, more research is needed to implement LINA on a larger scale with more schools and classes, also using more rigorous research methods to replicate the positive results. In future, the design and playing experience of LINA could be extended to consider more factors that were identified in Article I and II (e.g., teacher-student relationships).

This thesis describes a comprehensive LINA design, showing how theory-informed contact elements can be extended with early adolescent-informed contact elements by including student voice in early participatory research processes. Overall, LINA provides a sound theoretical basis for similar developments. Despite being developed for classroom contexts in collaboration with early adolescents, LINA may have broader applicability and could be adapted to settings such as holiday camps to facilitate supportive peer interactions. Moreover, other practical fields that benefit from supportive social

interactions, such as collaboration in the workplace, at universities, or in conference settings, may also draw inspiration from the concepts presented in this thesis.

Methodologically, assessing early adolescents' perspectives before intervention development is a promising approach to capture the relevant needs of the target group. Workshops based on participatory design literature (e.g., Foster et al., 2018; Lundqvist, 2014) proved to be particularly appealing for engaging early adolescents in classroom settings and led to specific results that can inform future interventions (Article I and II). These findings can encourage other researchers to explore the use of innovative data collection methods in future research.

More generally, the positive findings and integrative approach of this thesis can be used as a blueprint for effective intervention development. In particular, this thesis shows how participatory design approaches and findings can be integrated into the development of tailored support programs. In addition, this multidisciplinary thesis project (including psychologists, an arts director, and software engineers) suggests that interdisciplinary teams might be particularly relevant for the design and intervention development process.

Technologically, the AR social game LINA seems unique in different ways. On the one hand, using AR in education has been limited to traditional subjects (e.g., science, arts; Maas & Hughes, 2020; Zhang et al., 2022). On the other hand, AR applications are often restricted to single-player experiences, and psychological support programs have mainly targeted autistic individuals rather than general populations (Mittmann et al., 2023). This thesis suggests that support programs including AR can be used in multi-player experiences and are particularly appealing for engaging early adolescents in classroom settings, thereby enhancing acceptability.

On a practical level, the findings of Article I and II can improve awareness among educators of the importance of peer relationships and friendships during school transition, which is often overlooked (Pratt and George 2005). By conducting digital support programs like LINA at school, educators' and school psychologists' knowledge can be enhanced, providing long-lasting support beyond and above LINA. For example, the findings of this thesis can help school psychologists identify and support students with friendship difficulties by promoting effective behaviours and addressing barriers. Teachers can support friendship development by establishing clear classroom norms that promote safety and kindness, and by organising shared activities that create opportunities for peer interaction early in the school year. Additionally, shared activities offer an opportunity to discuss effective coping strategies related to personal emotion regulation, communication, and social skills in the classroom.

3.4. Strengths and Limitations

Although Study 1 used a variety of inquiry methods and allowed participants to contribute in different ways, which is a key strength of this study, our participatory workshop activities were novel and have not been used before. Thus, replications of our study or the application of similar workshop

methods for other research purposes would increase knowledge about their applicability. Moreover, participatory workshops were practical and engaging for large groups (such as school classes); however, they did not allow for the exploration of gender-specific effects or other individual differences.

AR and modern digital technology offer new opportunities for social interactions that can be translated into digital social games, such as LINA. Yet, the development of digital social multi-player games requires substantial financial resources for successful implementation. Due to financial limitations of this thesis project, LINA only reached prototype status and was only ready for evaluation after a considerable time delay. Moreover, in 2022, Austria held strict COVID-19 restrictions and access to schools was limited, which made the planning and conduct of Study 2 extremely challenging. As a result, schools from existing social networks had to be recruited, resulting in a convenience sample without a control group, which also limits the interpretation of the quantitative results (Article III). Despite all these challenges, an initial evaluation study was conducted, showing promising results and encouraging further development of LINA.

Finally, the findings of this thesis provide valuable insights but are limited by their context-specific nature, as the studies were conducted within the Austrian school system. Future research should replicate and extend these results across diverse populations to improve generalisability.

3.5. Conclusion

The findings of this thesis provide a comprehensive understanding of how early adolescents' social needs during the transition to secondary school can be effectively addressed. The results indicate that peer relationships do not develop by chance but are shaped by specific facilitating factors that encourage meaningful interaction. These insights have important implications for the design of support programs. In particular, creating playful, collaborative opportunities for positive shared experiences within a safe environment appears to reduce social barriers and foster a sense of belonging among classmates. A key strength of this thesis is its integrative, participatory approach, which incorporates early adolescents' perspectives throughout the research and design process. This enabled the development of the AR social game LINA grounded in both theory and context-specific knowledge, likely enhancing its acceptance and effectiveness. This thesis advances peer relationship research across empirical, theoretical, methodological, and technological domains, while also offering relevant practical implications.

3.6. Declarations of AI Use

Use of Artificial Intelligence: ChatGPT 5.3 (OpenAI, 2026) was used to revise the language of the manuscript.

4. References

Adams, R. E., Santo, J. B., & Bukowski, W. M. (2011). The presence of a best friend buffers the effects of negative experiences. *Developmental Psychology*, *47*, 1786–1791. https://doi.org/10.1037/a0025401

Allen, K.-A., Gray, D. L., Baumeister, R. F., & Leary, M. R. (2021). The need to belong: A deep dive into the origins, implications, and future of a foundational construct. *Educational Psychology Review, 34*(2), 1133–1156. https://doi.org/10.1007/s10648-021-09633-6

Allen, K., Kern, M. L., Vella-Brodrick, D., Hattie, J., & Waters, L. (2018). What schools need to know about fostering school belonging: A meta-analysis. *Educational Psychology Review, 30*, 1–34. https://doi.org/10.1007/s10648-016-9389-8

Allport, G. (1954). *The nature of prejudice*. Addison-Wesley.

Armstrong, M., Morris, C., Abraham, C., & Tarrant, M. (2017). Interventions utilising contact with people with disabilities to improve children's attitudes towards disability: A systematic review and meta-analysis. *Disability and Health Journal, 10*(1), 11–22. https://doi.org/10.1016/j.dhjo.2016.10.003

Arseneault, L. (2018). Annual research review: The persistent and pervasive impact of being bullied in childhood and adolescence: Implications for policy and practice. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 59*(4), 405–421. https://doi.org/10.1111/jcpp.12841

Arslan, G. (2019). School belonging in adolescents: Exploring the associations with school achievement and internalising and externalising problems. *Educational and Child Psychology, 36*, 22–33. https://doi.org/10.53841/bpsecp.2019.36.4.22

Arslan, G., & Coşkun, M. (2023). School belongingness in academically at-risk adolescents: Addressing psychosocial functioning and psychological well-being. *Journal of Happiness and Health, 3*(1), 1–13. https://doi.org/10.47602/johah.v3i1.9

Ashworth, E., Putwain, D. W., McLoughlin, S., Saini, P., Chopra, J., Rosser, B., & Eames, C. (2022). Ordinary magic in extraordinary circumstances: Factors associated with positive mental health outcomes for early adolescents during the COVID-19 pandemic. *Adversity and Resilience Science*, *3*(1), 65–79. https://doi.org/10.1007/s42844-022-00054-0

August, K. J., & Rook, K. S. (2013). Social relationships. In M. D. Gellman & J. R. Turner (Eds.), *Encyclopedia of behavioral medicine* (pp. 1838–1842). Springer. https://doi.org/10.1007/978-1-4419-1005-9_59

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*(3), 497–529. https://doi.org/10.1037/0033-2909.117.3.497

Beelmann, A., & Heinemann, K. S. (2014). Preventing prejudice and improving intergroup attitudes: A meta-analysis of child and adolescent training programs. *Journal of Applied Developmental Psychology, 35*(1), 10–24. https://doi.org/10.1016/j.appdev.2013.11.002

Blum, R. W., Astone, N. M., Decker, M. R., & Mouli, V. C. (2014). A conceptual framework for early adolescence: a platform for research. *International Journal of Adolescent Medicine and Health, 26*(3), 321–331. https://doi.org/10.1515/ijamh-2013-0327

Brij, Y., & Belhadaoui, H. (2021). Virtual and augmented reality in school context: A literature review. *E3S Web of Conferences, 297*, Article 01027. https://doi.org/10.1051/e3sconf/202129701027

Bronfenbrenner, U. (1979). *The ecology of human development*. Harvard University Press.

Burke, M. A., & Sass, T. R. (2013). Classroom peer effects and student achievement. *Journal of Labor Economics, 31*(1), 51–82. https://doi.org/10.1086/666653

Burke, T., Sticca, F., & Perren, S. (2017). Everything's gonna be alright! The longitudinal interplay among social support, peer victimization, and depressive symptoms. *Journal of Youth and Adolescence, 46*(9), 1999–2014. https://doi.org/10.1007/s10964-017-0653-0

Cameron, L., & Rutland, A. (2006). Extended contact through story reading in school: Reducing children's prejudice toward the disabled. *Journal of Social Issues, 62*(3), 469–488. https://doi.org/10.1111/j.1540-4560.2006.00469.x

Cameron, L., Rutland, A., & Brown, R. (2007). Promoting children's positive intergroup attitudes towards stigmatized groups: Extended contact and multiple classification skills training. *International Journal of Behavioral Development, 31*(5), 454–466. https://doi.org/10.1177/0165025407081474

Chae, S., Park, E. Y., & Shin, M. (2018). School-based interventions for improving disability awareness and attitudes towards disability of students without disabilities: A meta-analysis. International *Journal of Disability Development and Education, 66*(4), 1–19. https://doi.org/10.1080/1034912x.2018.1439572

Clark, H., Coll-Seck, A. M., Banerjee, A., Peterson, S., Dalglish, S. L., Ameratunga, S., Balabanova, D., Bhan, M. K., Bhutta, Z. A., Borrazzo, J., Claeson, M., Doherty, T., El-Jardali, F., George, A. S., Gichaga, A., Gram, L., Hipgrave, D. B., Kwamie, A., Meng, Q., & Costello, A. (2020). A future for the world's children? A WHO–UNICEF–Lancet Commission. *The Lancet, 395*, 605–658. https://doi.org/10.1016/S0140-6736(19)32540-1

Corrigan, P. W., Morris, S. B., Michaels, P. J., Rafacz, J. D., & Rüsch, N. (2012). Challenging the public stigma of mental illness: A meta-analysis of outcome studies. *Psychiatric Services, 63*(10), 963–973. https://doi.org/10.1176/appi.ps.201100529

Curson, S., Wilson-Smith, K., & Holliman, A. J. (2019). Exploring the experience of students making the transition from primary school to secondary school: An interpretative phenomenological analysis of the role of friendship and family support. *Psychology Teaching Review, 25*(1), 30–41. https://doi.org/10.53841/bpsptr.2019.25.1.30

Creswell, J. W., & Poth, C. N. (2017). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). SAGE Publications.

Davis, K. (2012). Friendship 2.0: Adolescents' experiences of belonging and self-disclosure online. *Journal of Adolescence, 35*(6), 1527–1536. https://doi.org/10.1016/j.adolescence.2012.02.013

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

de Leeuw, R. R., de Boer, A. A., & Minnaert, A. E. M. G. (2018). Student voices on social exclusion in general primary schools. *European Journal of Special Needs Education, 33*(2), 166–186. https://doi.org/10.1080/08856257.2018.1424783

Foster, L. J. J., Deafenbaugh, L., & Miller, E. (2018). Group metaphor map making: Application to integrated arts-based focus groups. *Qualitative Social Work, 17*(2), 305–322. https://doi.org/10.1177/1473325016667475

Franco, K., Baumler, E., Torres, E. D., Lu, Y., Wood, L., & Temple, J. R. (2022). The link between school climate and mental health among an ethnically diverse sample of middle school youth. *Current Psychology, 42*(22), 18488–18498. https://doi.org/10.1007/s12144-022-03016-y

Gempp, R., & Gonzalez-Carrasco, M. (2021). Peer relatedness, school satisfaction, and life satisfaction in early adolescence: A non-recursive model. *Frontiers in Psychology, 12*, Article 641714. https://doi.org/10.3389/fpsyg.2021.641714

Gross-Manos, D. (2014). The role of peers in children's lives and their contribution to child well-being: Theory and research. In A. Ben-Arieh, F. Casas, I. Frønes, & J. E. Korbin (Eds.), *Handbook of child well-being: Theories, methods and policies in global perspective* (pp. 1843–1863). Springer. https://doi.org/10.1007/978-90-481-9063-8_176

Hagen, P., Collin, P., Metcalf, A., Nicholas, M., Rahilly, K., & Swainston, N. (2012). *Participatory design of evidence-based online youth mental health promotion, prevention, early intervention and treatment*. Young and Well Cooperative Research Centre. https://www.westernsydney.edu.au/ics/research/publications/shared-media/young-and-well-crc-im-pd-guide.pdf

Halliday, A. J., Kern, M. L., Garrett, D. K., & Turnbull, D. A. (2019). The student voice in well-being: A case study of participatory action research in positive education. *Educational Action Research, 27*(2), 173–196. https://doi.org/10.1080/09650792.2018.1436079.

Halliday, S., Gregory, T., Taylor, A., Digenis, C., & Turnbull, D. (2021). The impact of bullying victimization in early adolescence on subsequent psychosocial and academic outcomes across the adolescent period: A systematic review. *Journal of School Violence*, *20*(3), 351–373. https://doi.org/10.1080/15388220.2021.1913598

Heinsch, M., Agllias, K., Sampson, D., Howard, A., Blakemore, T., & Cootes, H. (2020). Peer connectedness during the transition to secondary school: A collaborative opportunity for education and social work. *The Australian Educational Researcher, 47*(2), 339–356. https://doi.org/10.1007/s13384-019-00335-1

Hoferichter, F., Kulakow, S., & Raufelder, D. (2022). How teacher and classmate support relate to students' stress and academic achievement. *Frontiers in Psychology*, *13*, Article 992497. https://doi.org/10.3389/FPSYG.2022.992497/BIBTEX

Howick, J., Kelly, P., & Kelly, M. (2019). Establishing a causal link between social relationships and health using the Bradford Hill Guidelines. *SSM - Population Health*, *8*, Article 100402. https://doi.org/https://doi.org/10.1016/j.ssmph.2019.100402

Huebner, E. S., Hills, K. J., Jiang, X., Long, R. F., Kelly, R., Lyons, M. D., Ben-Arieh, A., Frønes, I., Casas, F., & Korbin, J. E. (2014). Schooling and children's subjective well-being. In Ben-Arieh, A., Casas, F., Frønes, I., Korbin, J. (Eds), *Handbook of child well-being* (pp. 797–819). Springer. https://doi.org/10.1007/978-90-481-9063-8_26

Jindal-Snape, D., & Cantali, D. (2019). A four-stage longitudinal study exploring pupils' experiences, preparation and support systems during primary–secondary school transitions. *British Educational Research Journal, 45*(6), 1255–1278. https://doi.org/10.1002/berj.3561

Jindal-Snape, D., Hannah, E. F. S., Cantali, D., Barlow, W., & MacGillivray, S. (2020). Systematic literature review of primary–secondary transitions: International research. *Review of Education, 8*(2), 526–566. https://doi.org/10.1002/rev3.3197

Kingery, J. N., Erdley, C. A., & Marshall, K. C. (2011). Peer acceptance and friendship as predictors of early adolescents' adjustment across the middle school transition. *Merrill-Palmer Quarterly*, *57*, 215–243. https://doi.org/10.1353/mpq.2011.0012

Klineberg, E., Clark, C., Bhui, K. S., Haines, M. M., Viner, R. M., Head, J., … Stansfeld, S. A. (2006). Social support, ethnicity and mental health in adolescents. *Social Psychiatry and Psychiatric Epidemiology, 41*, 755–760. https://doi.org/10.1007/s00127-006-0093-8

Korpershoek, H., Canrinus, E. T., Fokkens-Bruinsma, M., & de Boer, H. (2020). The relationships between school belonging and students' motivational, social-emotional, behavioural, and academic outcomes in secondary education: a meta-analytic review. *Research Papers in Education, 35*(6), 641–680. https://doi.org/10.1080/02671522.2019.1615116

Košir, K., Klasinc, L., Špes, T., Pivec, T., Cankar, G., & Horvat, M. (2020). Predictors of self-reported and peer-reported victimization and bullying behavior in early adolescents: The role of school, classroom, and individual factors. *European Journal of Psychology of Education, 35*(2), 381–402. https://doi.org/10.1007/s10212-019-00430-y

Kostenius, C., & Öhrling, K. (2008). 'Friendship is like an extra parachute': Reflections on the way schoolchildren share their lived experiences of well-being through drawings. *Reflective Practice, 9*(1), 23–35. https://doi.org/10.1080/14623940701816634

Laible, D. J., Carlo, G., & Raffaelli, M. (2000). The differential relations of parent and peer attachment to adolescent adjustment. *Journal of Youth and Adolescence*, *29*(1), 45–59. https://doi.org/10.1023/A:1005169004882/METRICS

Lam, C. B., Mchale, S. M., & Crouter, A. C. (2014). Time with peers from middle childhood to late adolescence: Developmental course and adjustment correlates. *Child Development*, *85*(4), 1677–1693. https://doi.org/10.1111/CDEV.12235

Larsson, I., Staland-Nyman, C., Svedberg, P., Nygren, J. M., & Carlsson, I.-M. (2018). Children and young people's participation in developing interventions in health and well-being: A scoping review. *BMC Health Services Research, 18*(1), Article 507. https://doi.org/10.1186/s12913-018-3219-2

Laursen, B., & Hartl, A. C. (2013). Understanding loneliness during adolescence: Developmental changes that increase the risk of perceived social isolation. *Journal of Adolescence, 36*(6), 1261–1268. https://doi.org/10.1016/j.adolescence.2013.06.003

Lessard, L. M., & Juvonen, J. (2018). Friendless adolescents: Do perceptions of social threat account for their internalizing difficulties and continued friendlessness? *Journal of Research on Adolescents, 28*(2), 277–283. https://doi.org/10.1111/jora.12388

Lester, L., & Cross, D (2015). The relationship between school climate and mental and emotional wellbeing over the transition from primary to secondary school. *Psychology of Well-Being, 5*, Article 9. https://doi.org/10.1186/s13612-015-0037-8

Lezhnieva, N., Fredriksen, P. M., & Bekkhus, M. (2018). Peer relationships and quality of life in 11–12-year-old children: The Health Oriented Pedagogical Project (HOPP). *Scandinavian Journal of Public Health*, *46*(21_suppl), 74–81. https://doi.org/10.1177/1403494818767788

Lindsay, S., McPherson, A. C., Aslam, H., McKeever, P., & Wright, V. (2013). Exploring children's perceptions of two school-based social inclusion programs: A pilot study. *Child & Youth Care Forum, 42*(1), 1–18. https://doi.org/10.1007/s10566-012-9183-9

Loades, M. E., Chatburn, E., Higson-Sweeney, N., Reynolds, S., Shafran, R., Brigden, A., Linney, C., McManus, M. N., Borwick, C., & Crawley, E. (2020). Rapid systematic review: The impact of

social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19. *Journal of the American Academy of Child and Adolescent Psychiatry, 59*(11), 1218–1239. https://doi.org/10.1016/j.jaac.2020.05.009

Lucas, C. V., & Soares, L. (2013). Bibliotherapy: A tool to promote children's psychological well-being. *Journal of Poetry Therapy, 26*(3), 137–147. https://doi.org/10.1080/08893675.2013.823310

Lundqvist, J. (2014). A Review of research in educational settings involving children's responses. *Child Indicators Research, 7*(4), 751–768. https://doi.org/http://dx.doi.org/10.1007/s12187-014-9253-7

Maas, M. J., & Hughes, J. M. (2020). Virtual, augmented and mixed reality in K–12 education: A review of the literature. *Technology Pedagogy and Education, 29*(2), 231–249. https://doi.org/10.1080/1475939X.2020.1737210

Marchante, M., Coelho, A., V., & Maria Romão, A. (2022). The influence of school climate in bullying and victimization behaviors during middle school transition. *Contemporary Educational Psychology, 71*, Article 102111. https://doi.org/10.1016/j.cedpsych.2022.102111

Maslow, A. (1954). *Motivation and personality*. Harper & Brothers.

McGraw, K., Moore, S., Fuller, A., & Bates, G. (2008). Family, peer and school connectedness in final year secondary school students. *Australian Psychologist, 43*(1), 27–37. https://doi.org/10.1080/00050060701668637

Mertens, D. M. (2007). Transformative paradigm: Mixed methods and social justice. *Journal of Mixed Methods Research, 1*(3), 212–225. https://doi.org/10.1177/1558689807302811

Mischel, J., & Kitsantas, A. (2020). Middle school students' perceptions of school climate, bullying prevalence, and social support and coping. *Social Psychology of Education, 23*(1), 51–72. https://doi.org/10.1007/s11218-019-09522-5

Mitic, M., Woodcock, K. A., Amering, M., Krammer, I., Stiehl, K. A. M., Zehetmayer, S., & Schrank, B. (2021). Toward an integrated model of supportive peer relationships in early adolescence: A systematic review and exploratory meta-analysis. *Frontiers in Psychology*, *12*, Article 589403. https://doi.org/10.3389/fpsyg.2021.589403

Mittmann, G., Barnard, A., Krammer, I., Martins, D., & Dias, J. (2022). LINA – A social augmented reality game around mental health, supporting real-world connection and sense of belonging for early adolescents. *PACM on Human-Computer Interaction, 6*, CHI PLAY, Article 242. https://doi.org/10.1145/3549505

Mittmann, G., Woodcock, K., Dörfler, S., Krammer, I., Pollak, I., & Schrank, B. (2022). "TikTok is my life and snapchat is my ventricle": A mixed-methods study on the role of online communication tools for friendships in early adolescents. *The Journal of Early Adolescence, 42*(2), 172–203. https://doi.org/10.1177/02724316211020368

Mittmann, G., Zehetner, V., Hoehl, S., Schrank, B., Barnard, A., & Woodcock, K. (2023). Using augmented reality toward improving social skills: Scoping review. *JMIR Serious Games, 11*, Article e42117. https://doi.org/10.2196/42117

Monachino, C., Splett, J. W., Shen, Z., Cornett, S., Halliday, C. A., & Weist, M. D. (2021). Patterns and pathways of peer victimization across the transition to middle school. *School Psychology Review, 50*(2–3), 420–440. https://doi.org/10.1080/2372966X.2021.1904792

Naylor, J. M. (2011). Peer relationships. In S. Goldstein & J. A. Naglieri (Eds.), *Encyclopedia of child behavior and development* (pp. 1075–1076). Springer. https://doi.org/10.1007/978-0-387-79061-9_2098

Oberle, E., Schonert-Reichl, K. A., & Zumbo, B. D. (2011). Life satisfaction in early adolescence: Personal, neighborhood, school, family, and peer influences. *Journal of Youth and Adolescence, 40*(7), 889–901. https://doi.org/10.1007/s10964-010-9599-1

OpenAI. (2026). ChatGPT-5.3 [Software]. https://www.openai.com/chatgpt

Parker, J. G., Rubin, K. H., Erath, S. A., Wojslawowicz, J. C., & Buskirk, A. A. (2015). Peer relationships, child development, and adjustment: A developmental psychopathology perspective. In *Developmental psychopathology* (pp. 419–493). https://doi.org/https://doi.org/10.1002/9780470939383.ch12

Persson, L., Haraldsson, K., & Hagquist, C. (2016). School satisfaction and social relations: Swedish schoolchildren's improvement suggestions. *International Journal of Public Health, 61*(1), 83–90. https://doi.org/10.1007/s00038-015-0696-5

Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of Personality and Social Psychology, 90*(5), 751–783. https://doi.org/10.1037/0022-3514.90.5.751

Pinfold, V., Toulmin, H., Thornicroft, G., Huxley, P., Farmer, P., & Graham, T. (2003). Reducing psychiatric stigma and discrimination: evaluation of educational interventions in UK secondary schools. *British Journal of Psychiatry, 182*, 342–346. https://doi.org/10.1192/bjp.182.4.342

Pollak, I., Mitic, M., Birchwood, J., Dörfler, S., Krammer, I., Rogers, J. C., Schek, E. J., Schrank, B., Stiehl, K. A. M., & Woodcock, K. A. (2023). A systematic review of intervention programs promoting peer relationships among children and adolescents: Methods and targets used in effective programs. *Adolescent Research Review, 8*(3), 297–321. https://doi.org/10.1007/s40894-022-00195-4

Pratt, S., & George, R. (2005). Transferring friendship: Girls' and boys' friendships in the transition from primary to secondary school. *Children & Society, 19*(1), 16–26. https://doi.org/10.1002/chi.830

Quintana, R. (2021). Who belongs in school? Using statistical learning techniques to identify linear, nonlinear and interactive effects. *The Quantitative Methods for Psychology, 17*(3), 312–328. https://doi.org/doi:10.20982/tqmp.17.3.p312

Ređep, T., & Hajdin, G. (2021). Use of augmented reality with game elements in education – Literature review. *Journal of Information and Organizational Sciences, 45*(2), 473–494. https://doi.org/10.31341/jios.45.2.7

Redondo, B., Cózar-Gutiérrez, R., González-Calero, J. A., & Sánchez Ruiz, R. (2020). Integration of augmented reality in the teaching of English as a foreign language in early childhood education. *Early Childhood Education Journal, 48*(2), 147–155. https://doi.org/10.1007/s10643-019-00999-5

Reed, V. A., & Trumbo, S. (2020). The relative importance of selected communication skills for positive peer relations: American adolescents' opinions. *Communication Disorders Quarterly, 41*(3), 135-150. https://doi.org/10.1177/1525740118819684

Reich, S. M., Subrahmanyam, K., & Espinoza, G. (2012). Friending, IMing, and hanging out face-to-face: Overlap in adolescents' online and offline social networks. *Developmental Psychology, 48*(2), 356–368. https://psycnet.apa.org/doi/10.1037/a0026980

Rice, F., Frederickson, N., & Seymour, J. (2011). Assessing pupil concerns about transition to secondary school. *British Journal of Educational Psychology, 81*(2), 244–263. https://doi.org/doi:10.1348/000709910X519333

Richardson, T., Elliott, P., & Roberts, R. (2017). Relationship between loneliness and mental health in students. *Journal of Public Mental Health, 16*(2), 48–54. https://doi.org/10.1108/JPMH-03-2016-0013

Roach, A. (2018). Supportive peer relationships and mental health in adolescence: An integrative review. *Issues in Mental Health Nursing*, *39*(9), 723–737. https://doi.org/10.1080/01612840.2018.1496498

Roach, A. (2019). A concept analysis of adolescent friendship. *Nurs Forum, 54*, 328–335. https://doi.org/10.1111/nuf.12332

Rouncefield-Swales, A., Harris, J., Carter, B., Bray, L., Bewley, T., & Martin, R. (2021). Children and young people's contributions to public involvement and engagement activities in health-related research: A scoping review. *PLoS One, 16*(6), Article e0252774. https://doi.org/10.1371/journal.pone.0252774

Rubin, K. H., Bukowski, W., & Parker, J. (2006). Peer interactions, relationships and groups. In N. Eisenberg (Ed.), *Handbook of child psychology: Social, emotional, and personality development* (Vol. 6, pp. 571–645). Wiley.

Rubin, K. H., Dwyer, K. M., Booth-LaForce, C., Kim, A. H., Burgess, K. B., & Rose-Krasnor, L. (2004). Attachment, friendship, and psychosocial functioning in early adolescence. *The Journal of Early Adolescence, 24*(4), 326–356. https://doi.org/10.1177/0272431604268530

Rueger, S. Y., Malecki, C. K., Pyun, Y., Aycock, C., & Coyle, S. (2016). A meta-analytic review of the association between perceived social support and depression in childhood and adolescence. *Psychological Bulletin*, *142*(10), 1017–1067. https://doi.org/10.1037/BUL0000058

Sanchez, R., Brown, E., Kocher, K., & DeRosier, M. (2017). Improving children's mental health with a digital social skills development game: A randomized controlled efficacy trial of adventures aboard the S.S. GRIN. *Games for Health Journal, 6*(1), 19–27. https://doi.org/10.1089/g4h.2015.0108

Schmidt, A., Dirk, J., & Schmiedek, F. (2019). The importance of peer relatedness at school for affective well-being in children: Between- and within-person associations. *Social Development*, *28*(4), 873–892. https://doi.org/https://doi.org/10.1111/sode.12379

Schmidt, A., Dirk, J., & Schmiedek, F. (2020). The power of everyday peer relatedness in predicting subjective well-being after school transition. *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie, 52*(3–4), 64–74. https://doi.org/10.1026/0049-8637/a000220

Schorer, A., & Protopsaltis, A. (2021). Learners' user experience assessment of a serious game for social innovation education. *European Conference on Games Based Learning, 2021*, 622–630. https://doi.org/10.34190/GBL.21.051

Scott, S. R., & Manczak, E. M. (2021). Peripheral immune correlates of childhood and adolescent peer relationships: A systematic review. *Developmental Psychobiology, 63*(5), 985–996. https://doi.org/10.1002/dev.22119

Shao, Y., Kang, S., Lu, Q., Zhang, C., & Li, R. (2024). How peer relationships affect academic achievement among junior high school students: The chain mediating roles of learning motivation and learning engagement. *BMC Psychology, 12*(1), 278–212. https://doi.org/10.1186/s40359-024-01780-z

Sirsch, U. (2003). The impending transition from primary to secondary school: Challenge or threat? *International Journal of Behavioral Development, 27*(5), 385–395. https://doi.org/10.1080/01650250344000082

Skinner, A. L., & Meltzoff, A. N. (2019). Childhood experiences and intergroup biases among children. *Social Issues and Policy Review, 13*(1), 211–240. https://doi.org/10.1111/sipr.12054

Sotardi, V. A. (2017). Exploring school stress in middle childhood: Interpretations, experiences, and coping. *Pastoral Care in Education, 35*(1), 13–27. https://doi.org/10.1080/02643944.2016.1269360

Sumter, S. R., Baumgartner, S. E., Valkenburg, P. M., & Peter, J. (2012). Developmental trajectories of peer victimization: Off-line and online experiences during adolescence. *Journal of Adolescent Health, 50*(6), 607–613. https://doi.org/10.1016/j.jadohealth.2011.10.251

Tisza, G., & Markopoulos, P. (2021). Understanding the role of fun in learning to code. International *Journal of Child-Computer Interaction, 28*, Article 100270. https://doi.org/10.1016/j.ijcci.2021.100270

Tisza, G., Zhu, S., & Markopoulos, P. (2021). Fun to enhance learning, motivation, self-efficacy, and intention to play in DGBL. In J. Baalsrud Hauge, J. C. S. Cardoso, L. Roque, & P. A. Gonzalez Calero (Eds), *Entertainment Computing – ICEC 2021 Cham* (pp. 28–45). Springer International Publishing AG. https://doi.org/10.1007/978-3-030-89394-1_3

United Nations. (1989). *Convention on the rights of the child*. https://www.ohchr.org/Documents/ProfessionalInterest/crc.pdf

van Harmelen, A. L., Kievit, R. A., Ioannidis, K., Neufeld, S., Jones, P. B., Bullmore, E., Dolan, R., Fonagy, P., & Goodyer, I. (2017). Adolescent friendships predict later resilient functioning across psychosocial domains in a healthy community cohort. *Psychological Medicine*, *47*(13), 2312–2322. https://doi.org/10.1017/S0033291717000836

van Rens, M., Haelermans, C., Groot, W., & Maassen van den Brink, H. (2018a). Facilitating a successful transition to secondary school: (How) Does it work? A Systematic literature review. *Adolescent Research Review, 3*(1), 43–56. https://doi.org/10.1007/s40894-017-0063-2

van Rens, M., Haelermans, C., Groot, W., & Maassen van den Brink, H. (2018b). Girls' and boys' perceptions of the transition from primary to secondary school. *Child Indicators Research, 12*(4), 1481–1506. https://doi.org/10.1007/s12187-018-9591-y

van Rijsewijk, L. G. M., Snijders, T. A. B., Dijkstra, J. K., Steglich, C., & Veenstra, R. (2020). The interplay between adolescents' friendships and the exchange of help: A longitudinal multiplex social network study. *Journal of Research on Adolescence*, *30*(1), 63–77. https://doi.org/10.1111/JORA.12501

Van Ryzin, M. J., & Roseth, C. J. (2018). Cooperative learning in middle school: A means to improve peer relations and reduce victimization, bullying, and related outcomes. *Journal of Educational Psychology, 110*(8), 1192–1201. https://doi.org/10.1037/edu0000265

Vygotsky, L. S. (1978). *Mind in society: Development of higher psychological processes*. Harvard University Press.

Wagner, G., Zeiler, M., Waldherr, K., Philipp, J., Truttmann, S., Dur, W., … Karwautz, A. F. K. (2017). Mental health problems in Austrian adolescents: A nationwide, two-stage epidemiological study applying DSM-5 criteria. *European Child & Adolescent Psychiatry, 26*(12), 1483–1499. https://doi.org/10.1007/s00787-017-0999-6

Wang, J., Mann, F., Lloyd-Evans, B., Ma, R., & Johnson, S. (2018). Associations between loneliness and perceived social support and outcomes of mental health problems: A systematic review. *BMC Psychiatry, 18*, Article 156. https://doi.org/10.1186/s12888-018-1736-5

Waqas, A., Malik, S., Fida, A., Abbas, N., Mian, N., Miryala, S., Amray, A. N., Shah, Z., & Naveed, S. (2020). Interventions to reduce stigma related to mental illnesses in educational institutes: A systematic review. *Psychiatric Quarterly, 91*(3), 887–903. https://doi.org/10.1007/s11126-020-09751-4

Weller, S. (2007). 'Sticking with your mates?' Children's friendship trajectories during the transition from primary to secondary school. *Children & Society, 21*, 339–351. https://doi.org/10.1111/j.1099-0860.2006.00056.x

West, P., Sweeting, H., & Young, R. (2010). Transition matters: Pupils' experiences of the primary–secondary school transition in the West of Scotland and consequences for well-being and attainment. *Research Papers in Education, 25*(1), 21–50. https://doi.org/10.1080/02671520802308677

Yau, J. C., & Reich, S. M. (2018). Are the qualities of adolescents' offline friendships present in digital interactions? *Adolescent Research Review*, *3*(3), 339–355. https://doi.org/10.1007/s40894-017-0059-y

Zeedyk, M. S., Gallacher, J., Henderson, M., Hope, G., Husband, B., & Lindsay, K. (2003). Negotiating the transition from primary to secondary school: Perceptions of pupils, parents and teachers. *School Psychology International, 24*(1), 67–79. https://doi.org/10.1177/0143034303024001010

Zhang, J., Li, G., Huang, Q., Feng, Q., & Luo, H. (2022). Augmented reality in K-12 education: A systematic review and meta-analysis of the literature from 2000 to 2020. *Sustainability, 14*, Article 9725. https://doi.org/10.3390/su14159725

A Articles

A I. Article I – Children's Perspective on Fears Connected to School Transition and Intended Coping Strategies

Stiehl, K. A. M., Krammer, I., Schrank, B., Pollak, I., Silani, G., & Woodcock, K. A. (2023). *Social Psychology of Education, 26*, 603-637. https://doi.org/10.1007/s11218-023-09759-1

Social Psychology of Education (2023) 26:603–637
https://doi.org/10.1007/s11218-023-09759-1

Children's perspective on fears connected to school transition and intended coping strategies

Katharina A. M. Stiehl[1,2] · Ina Krammer[1,2] · Beate Schrank[1,3] · Isabella Pollak[1] · Giorgia Silani[2] · Kate A. Woodcock[4]

Received: 7 December 2021 / Accepted: 4 January 2023 / Published online: 22 January 2023
© The Author(s) 2023

Abstract

The transition from primary to secondary school comes with major changes in the lives of children. There is a shortage of in-depth analyses of young people's perspectives concerning their fears and strategies to address these. This qualitative study aims to gain first-hand understanding of children's fears and the intended coping strategies used during school transition. Data from 52 workshops were analysed, with a total of 896 students ($M\ age = 10.40$, $SD = .839$) in lower Austria. First, in the classroom setting, a vignette story about a child facing fears about school transition from primary to secondary school was developed with pupils in a brainstorming session. This was followed by self-selected small group discussions, where pupils proposed strategies to help cope with these fears. A thematic analysis was carried out. Major thematic clusters distinguished between four types of fears: peer victimisation, being alone, victimisation by authority figures, and academic failure. Three additional thematic clusters described strategies for countering the fears: enacting supportive networks, personal emotion regulation, and controlling behaviour. In addition to these connected clusters, two further themes were identified: strategy outcomes and consequences, i.e., personal experiences with using specific strategies, and the discussion of participants about contradictions and questionable usefulness of identified strategy outcomes. In conclusion, the children in our study reported more social fears as compared to academic fears. Children seem reasonably competent at naming and identifying strategies; however, maladaptive strategies, as well as controversies within the described strategies may indicate a lack of certainty and competence at engaging with these strategies on a practical level.

Keywords Early adolescence · Fears · Coping strategies · Qualitative analysis · School transition · Victimization

✉ Katharina A. M. Stiehl
Katharina.stiehl@kl.ac.at

Extended author information available on the last page of the article

1 Introduction

1.1 Background

During late childhood and early adolescence, the potential start of puberty coincides with the transition from primary to secondary school, which comprises many challenging situations (Seifert & Schulz, 2007; van Rens et al., 2018). Maturing children must navigate changes in expectations and social norms, which often lead to confrontation and can subsequently influence restructuring of self-perception and identity (Mendle et al., 2007). Brain development during this time forms the basis for the development of critical cognitive and social-emotional skills, which impact immediate and future health and well-being (Patton et al., 2016; Ross et al., 2019). A key factor that influences this developmental process is related to children's interactions with their social environment (Patton et al., 2016), which can be especially challenging in the new secondary school environment. During this time, social fears become particularly differentiated (Bokhorst et al., 2008) and an important foundation is laid for the development of adaptive or maladaptive coping styles and strategies, which often stay with an individual throughout their lifetime (Compas et al., 2001; Valiente et al., 2015). Various reasons are proposed for the differentiation of social fears. Among these, (1) the increased capacity to verbalise fears due to their increasing cognitive abilities; (2) their increasing ability to take the perspective of others (i.e., teachers, parents, and peers) and being able to discern these different ways of thinking; (3) the shift and emphasis towards peer relationships and peer evaluations becoming more important and differentiated from the evaluations of adults, such as teachers and parents, and; (4) the increased academic demand from the new school environment can lead to fears of achievement evaluations (Bokhorst et al., 2008).

Many educators, families, and policymakers believe that school transitions from primary to secondary school can only be fully successful if the new environment matches the developmental abilities and needs of the children (Eskelä-Haapanen et al., 2017). However, even if these needs and abilities are matched, school transition is considered to be one of the most challenging periods for early adolescents (Evans et al., 2018; Lester et al., 2019), as students are confronted with a variety of challenges. New friendships must be established, friend groups have to be managed, and students must cope with a new school environment and requirements (van Rens et al., 2018). Further, early adolescents have to adapt to a new system of rotating classrooms and teachers, and the former oldest students in primary school have to cope with their status reverting to being the youngest members in the new secondary school environment (Grills-Taquechel et al., 2010). On top of this, socially anxious children report struggling with everyday school tasks (e.g., reading aloud in front of their peers, seeking help from the teacher, participating in physical education classes, and test-taking). It is therefore important to gain a better understanding of children's perspectives around fears which can be pertinent to the school move in order to facilitate a school environment that furthers social-emotional well-being, especially for children with fears (Coyle et al., 2021).

There is no consensus on how children experience the transition from primary to secondary school. Most children appear to overcome this transition with little difficulty, for others, it appears to be stressful (van Rens et al., 2018). Longitudinal studies have shown that children who anticipate issues with the transition or feel less prepared, feel more anxious about it and appear to experience poorer transitions and more problems in secondary school (Jindal-Snape and Cantali, 2019; West et al., 2010). Failure to cope with challenges arising from school transitions can have long-lasting negative impacts on academic success (Coelho & Romão, 2016), as well as physiological and psychological well-being (Evans et al., 2018; ter Bogt et al., 2010). Short- and long-term repercussions can include poor school adjustment and performance (Coelho & Romão, 2016), a decrease in self-esteem (Evans et al., 2018), a general sense of well-being (Copeland et al., 2013; Eskelä-Haapanen et al., 2017) and can ultimately result in mental health problems (Copeland et al., 2013). Failure to cope does not only affect the immediate school life but can lead to long-lasting negative consequences into adulthood (e.g., Evans et al., 2018; Lester et al., 2019; Vassilopoulos et al., 2018). However, if these challenges are overcome in a positive and constructive way, it can represent an opportunity for growth (Mowat, 2019). To ensure that this period becomes an opportunity where positive behaviour can be established that improves well-being throughout life (Clark et al., 2020), a better understanding of children's perspective on fears and the ways they intend to cope with these is needed in order to inform relevant interventions.

One factor that influences a positive school transition could be the availability of internal resources, such as verbal skills, emotion regulation skills for effective and adequate coping (Markovic et al., 2013), and external resources, such as social support from teachers and parents (Jindal-Snape et al., 2019). Adequate coping strategies facilitate positive adjustment and support in dealing with the many challenges children face in the new context, such as peer conflicts or finding new friends (Markovic et al., 2013; Voight & Nation, 2016). Coping can be described as "conscious volitional efforts to regulate emotion, cognition, behaviour, physiology, and the environment in response to stressful events or circumstances" (Compas et al., 2001, p. 89). The range of available coping strategies and the consequent reaction to stressors differ between individuals and can impact the success of the outcome (Brouzos et al., 2020). The type of coping strategy chosen in a certain context depends on the specific situation (Murray-Harvey et al., 2012) as well as on the individual's cognitive, biological, emotional, and social development (Compas et al., 2001). Thus, coping describes a person's specific approach to managing emotional triggers provoked by context-specific stressors. To gain a better understanding of the consequences of stress on mental health and well-being, as well as possible physiological consequences, understanding the structure of coping is essential (Stanisławski, 2019). The lack of agreement concerning this structure and coping nomenclature, with at least 100 different scientific classifications and additional 400 subcategories described in the literature (Skinner et al., 2003), hinders concrete classification. Due to this dissent, we refrained from committing to one concrete classification but used a combination of classifications to better reflect our data and gain a better understanding of the children's perspective on fears and the intended coping

strategies described to overcome these. This appears especially necessary considering the potentially stressful event of school transition.

Individual differences in social-emotional development in late childhood and early adolescence influence individual availability of resources to cope. Data show important shifts towards more active coping for children between the age of 9 and 11 years (Eschenbeck et al., 2018), which coincide with school transitions in most countries. These active coping styles, such as seeking social support, adopting a positive frame of mind, or problem-oriented coping (Zammuner, 2019), rapidly develop as children strive for greater independence from caregivers, and are confronted with a wide range of difficult situations and possible stressors (Valiente et al., 2015). Compared to active coping styles, avoidant coping, which includes strategies such as denial, behavioural, and mental disengagement from stressors, has been linked to lower emotional well-being (Zammuner, 2019). Understanding which coping strategies children report and intend to use to deal with fears at school transition will provide valuable insight when planning future interventions. This is especially relevant when planing interventions, as coping strategies, compared to other individual difference variables, such as temperament, can be altered through interventions (Compas et al., 2001). A meta-analysis has shown that early adolescence is a promising time to set social interventions, as this is a time when more complex social skills, especially skills related to peer interactions, are learned at a fast rate and are recognised as important by early adolescents themselves (January et al., 2011). Thus, a better understanding of the specific contexts requiring the engagement of coping strategies, and of which coping strategies are intended to be used by children is needed (Lazarus & Folkman, 1984; Murray-Harvey et al., 2012; Quy et al., 2019).

There has been a lack of in-depth analysis of children's perspectives on what they fear, how these fears manifest, and their strategies to cope and overcome these (Jindal-Snape & Miller, 2008). Taking into account the situational component of coping strategies, the lack of qualitative data exploring students' personal perspectives withholds important information, useful to inform future interventions (McKeering & Hwang, 2019; Quy et al., 2019). Without a better understanding of the pupils' own knowledge related to transition, intervention attempts for this period can only be considered incomplete and shallow (Bagnall et al., 2020). Qualitative research has the potential to uncover and expand knowledge of varying life circumstances of children during late childhood and early adolescence by focussing on different cultural and social environments (Aitken & Herman, 2009). As children and early adolescents spend large amounts of time in their school environment (Pooley et al., 2008), and since the subtle nuance accompanying interpersonal relationships of children during late childhood and early adolescence ought to be better understood, qualitative research in schools and classrooms is essential (Patton et al., 2016).

1.2 Research question

In this study, a qualitative approach is applied, with the aim of developing an in-depth understanding of children's perspective on fears related to school transitions; and find which kind of coping strategies children during late childhood and early

adolescence intend to apply to overcome these fears. In the future, we hope this knowledge can be used to develop interventions that support a smooth transition to try and increase children's social-emotional competencies and ultimately their well-being.

2 Methods

2.1 Study participants

Overall, 54 workshops in 29 Lower Austrian schools (26 public, three private schools) were conducted with a total of 916 students. Of those, 52 workshops from 27 schools with a total of 896 students ($M\ age = 10.40$, $SD = 0.839$; 45.6% girls and 51.9% boys) produced data used in this study. In the sample, 2.5% of students did not provide information on age and gender. Due to the lack of school transition in two schools for students with special education needs, the data from these workshops were not used. The overall sample included 23% primary schools and 74% secondary schools. In the Austrian school system, children have different choices as to how to continue after primary school. These choices include secondary schools (Neue Mittelschule or NMS) or grammar schools (Allgemeinbildende Höhere Schule or AHS; Weiß & Tritscher-Archan, 2011). Children with special education needs can continue their education in schools for students with special needs at the secondary school level. Therefore, 74% of secondary schools are split between 58% in secondary schools, 15% in grammar schools, and 4% in schools for students with special education needs on a secondary school level. Overall, 48% of the schools were in rural areas and 52% in urban areas.

2.2 Recruitment

The aim was to include various schools to reflect a wide spectrum of views and experiences. Hence, the sampling frame included all school types, rural and urban areas, sociodemographic backgrounds, and different percentages of pupils with immigrant backgrounds. Schools' participation was voluntary. Some schools signalling interest were referred directly by the department of education in Lower Austria ($N = 47$). The project also attracted schools' participation through flyer distribution, media presence, and contacts made with teachers during training events. Interested head teachers and teachers received written information about the study. If the school agreed to participate, parents received detailed information about the study objectives, workshop content, and subsequent data management. If parents agreed to their child's participation, parents provided written informed consent. Children were informed about the study in the classroom and provided workshop leaders with verbal consent. In the final sample, 29 schools participated. The study received ethical approval from the ethics committee of the University of Music and Performing Arts in Vienna (EK-Nr. 10/2018) and all data were anonymised for analysis.

2.3 Workshops

To collect data in a safe environment and to allow all children to participate, a school-based data-collecting workshop was created. The workshop aimed to determine the knowledge and views around several aspects of social and emotional well-being. All workshops were conducted by two main workshop leaders, who were joined by between two and four supporting team members, depending on class size, cognitive abilities, and special education needs of the class (determined by pre-interviews conducted with the teachers). The responsibilities of the supporting team members included observation and note-taking using structured surveillance sheets, as well as leading and documenting small group discussions.

2.3.1 Methodological background and workshop development

The methods of linking experiences or advice to fictional characters have their roots and a longstanding tradition in the therapeutic setting. It is used to elicit information about subjective experiences, objectifying issues or problems, and thereby safeguard against adverse effects (Butler et al., 2009; Davis et al., 2021; Papouli, 2019). By using a third-person stimulus, refraining from actual occurrences, the participants can assume a distanced perspective, which allows a certain level of detachment from potentially difficult situations and ensures a layer of protection (Frost, 2011), whilst still allowing to reflect on their own experiences separate from the self (Barbosa et al., 2017). Distancing is therefore considered to be a productive perspective, as it allows for safe communication of negative experiences (Barbosa et al., 2017). The use of a narrative allows sharing of negative feelings, without implicating oneself (Barbosa et al., 2017; Ruini et al., 2014). This method of questioning was designed to encourage participants to provide honest and genuine answers (Anderson, 2010); after the establishment of trust, children were asked to remember their experiences and how they could be shared by use of the imaginary character.

To maximise fidelity and limit the influence on data collection (Bahn & Barratt-Pugh, 2013), a comprehensive workshop manual was developed based on participatory design literature (e.g., Horgan, 2017; Jackson Foster et al., 2018), and researchers' personal experience from previous workshops, and was refined in collaboration with adult stakeholders (Austrian teachers, psychological practitioners, and education workshop facilitators). The equipment, time schedule, procedure, aims, methods, and wording of questions were defined in the manual to ensure consistent workshops and data collection (Krammer et al., 2021b). Workshops were consequently tested and refined with children. To maximise fidelity, all workshops were supervised and overseen by at least one of two members of the manual's core development team. Workshop leaders and team members were trained and supervised on a regular basis.

2.3.2 Workshop procedure

The data collected and analysed for this study includes pupils' perspectives on fears at school transition (i.e., brainstorming data and observation sheets) and the

connected strategies, which they intend to use to overcome these fears (i.e., letter and verbatim quotes). Using a vignette stimulus (comic picture and introduction), the team leader and the entire class discussed fears. This vignette story was used to collect data on children's perspectives on fears at school transition (Krammer et al., 2021a). For this exercise, a stimulus card was used, a concealed card was chosen at random revealing a comic-style picture of a child. The team leaders asked the children to choose a name and then continued to explain the task: "The character has just changed from primary to secondary school and is now joining a new class. S/he is a bit scared. What could s/he be scared of?" (Krammer et al., 2021b). The main fears were written on a flip chart by the workshop leaders while supporting team members wrote down comments in the structured surveillance sheets.

Following the vignette stimulus, the workshop leaders introduced the next exercise, instructing the participants to advise the character on how to overcome the earlier gathered fears, drawing on their own experiences. This advice was gathered, jointly by all group members, in the form of a letter to the stimulus character. For this, pupils were instructed to gather in self-selected small groups of three to six. Each group was led by a team member, who would repeat the instructions and answer any questions. The children's advice was written down by the small group facilitators, as well as verbatim quotes (Krammer et al., 2021a). If the children struggled with the letter, the discussants were instructed to ask non-leading questions, address the fears from the previous exercise, and note all the children's ideas in verbatim quotes.

2.4 Analysis

Qualitative data from both exercises were separately analysed with QSR International's NVivo 12 qualitative data analysis software. Thematic analysis (Braun & Clarke, 2006) was used to analyse the data, enriched with methods drawn from grounded theory, in particular line-by-line coding, eliciting explicit negative cases, iterative inductive and constant comparative coding, using memos throughout the coding process, and the keeping of a summary table to organise clusters (Willig, 2013). Themes and clusters were found to be stable throughout workshops conducted in different classes and school types (Anderson, 2010). To achieve familiarisation, the data set was carefully read before starting the coding process. In an inductive, data-led manner, line-by-line coding was used to extract as much information as possible. No pre-existing coding structure was used (Braun & Clarke, 2006), making this analysis an inductive, data-driven process. These specific themes and categories (Simons et al., 2008), as well as similarities and differences (i.e., negative cases) in the manifest data, were iteratively identified and clustered accordingly (Neale, 2016). After the first round of line-by-line coding, the identified coding frame was discussed with four trained team members, reframed, and expanded where necessary. Following this, the data were reread and restructured according to the discussed coding frame. During this process, coding was continuously discussed with trained team members until full consensus was reached. The analysis was carried out by a researcher familiar with the proceedings, however not present at most

data collection workshops, and guided by the theoretical background and exploratory analysis of children's perspective on fears at school transition. Generated codes and themes were continuously discussed with at least one researcher present at the data collection workshops.

The sample consisted of children who visited the last year of primary school, about to face the transition to secondary school, as well as secondary school children who just experienced the transition. The sample, therefore, included slightly different voices, as well as different biases present in the slightly different age groups. Primary school students may fantasise about the upcoming change and their possible fears, whereas secondary school children may display memory biases. The different data sets were compared and no differences between expected and experienced fears, or strategy knowledge were found. The data sets were therefore combined.

As described earlier, exercise one produced data describing children's perspectives on fears at school transition, and exercise two aimed to gather information on participants' intended strategies to overcome these fears. As the data covered different topics and different methods for the collection were used, the two exercises were analysed separately to provide a better overview. Due to the methodological change reflected in the data, the first 16 workshops for the second exercise were excluded, leaving 137 small group discussions from 36 workshops subject to the second part of the analysis. Data included are letters written to the character including verbatim quotes from children.

After a first rough grouping and discussions, identified codes were reread and grouped according to their underlying fears (see Fig. 1, Table 1). After a thorough discussion with the trained team members, the lowest level of analysis comprised specific experiences that participants were fearful of (e.g., hitting, not being liked, not keeping secrets, and being singled out; see Fig. 1, Table 1). These were grouped into clusters

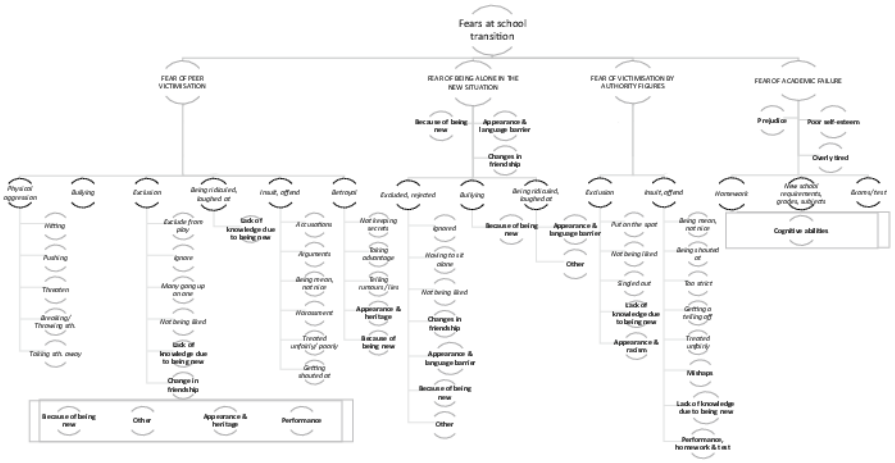


Fig. 1 Fears at school transition. Block capitals equal higher level/general fears, what adolescents are afraid of; cursive represent lower level, more specific aspects, what adolescents are afraid of; the dotted lines show main clusters; bold print are reasons why general fears or fear evoking behaviour are assumed to happens – all reasons in boxes relate to all of the specific aspects directly above

Table 1 Coding structure–fears

Higher level themes (general fears)	Mid-level cluster	Lowest level coding (experiences)
Fear of peer victimisation	e.g., physical aggression; being ridiculed/laughed at; insult/ offend	e.g., hitting, pushing, threatened; accusations; getting shouted at
Fear of being alone in the new situation	e.g., exclusion/rejection; ridiculed; bullying	e.g., being ignored, having to sit alone; being made fun of;
Fear of victimisation by authority figures	e.g., exclusion; insult/offend	e.g., being put on the spot; being shouted at
Fear of academic failure	e.g., new school requirements; homework	e.g., too much homework, exams too difficult

according to the associated *type* of underlying fear (e.g., physical aggression, exclusion, betrayal; see Fig. 1, Table 1). These fear types were then further grouped into four *general*, higher-level themes of fears (i.e., the fear of victimisation, fear of being alone in a new situation, fear of victimisation by authority figures, and fear of academic failure; see Fig. 1, Table 1). Although not specifically asked, participants volunteered reasons why certain fears or fear-evoking behaviour would occur. These reasons were grouped separately and analysed alongside the fears. Thus, reasons could pertain to both fear types and general fears (e.g., because of being new, cognitive abilities; see Fig. 1). For a quantitative overview, the occurrence or absence of higher-level themes within workshops was counted.

In the second exercise, three levels of analysis were identified, low-level coding of strategies, combined into mid-level clusters and high-level themes (for themes and examples, see Table 2). The lowest level of analysis consisted of low-level coding of strategies described mainly on a behavioural level by the participants. These lowest levels of intended strategies could be divided into seven mid-level clusters (see Table 2). Due to the structure of the questions within the exercises and low-level coding of strategies within these mid-level clusters, strategies mainly related to specific objectives and were linked to specific fears. However, most strategies (e.g., emotion regulation, social support, and communication) were described in connection with several of the fears mentioned in exercise one (see Fig. 2). Thus, grouping these mid-level clusters directly with corresponding fears leads to repetition and overlaps. Therefore, five higher-level themes were identified for the second exercise. These include three thematic themes distinguished between different types of strategies identified by pupils as being relevant to the fears (i.e., enacting supportive networks, personal emotion regulation, and controlling behaviour). In addition to these connected themes, two further themes were identified broadly related to children's use of strategies. One consists of strategy outcomes and consequences, that is, personal experiences with using specific strategies, and the last theme encompasses the discourse around contradictions and questionable usefulness of identified strategy outcomes, which encompass the negative cases identified in the data. We differentiated between the first three mentioned strategies, which were named without application, and the latter two themes, where children self-disclosed the actual use of strategies or discussed different views regarding used strategies in the small groups with their peers.

By collecting brainstorming data on spreadsheets and notepads in different settings (full class and self-selected small groups), the data set consisted of single words, shorter and longer phrases, as well as short conversations between participants. Although these data are limited in depth at the individual participant level, in the large sample the information power is large and provided a holistic understanding of children's fears of school transition and their strategies to overcome them.

Table 2 Coding Structure – Intended Strategies

Higher level themes (strategy outcomes)	Mid-level cluster Activities	Lowest level coding (intended strategies)
Enacting social networks	Activities and reach; communication; social support; avoidance	e.g., saying hello, asking for hobbies; lending things; not get involved in other people's business
Personal emotion regulation		e.g., ignore hurtful comments, think positive thoughts, distract yourself
Controlling behaviour	Demeanour; planning and preparation; physical defence	e.g., be nice not mean; always do your homework; go to fitness studio and hit back
Strategy outcomes and consequences		e.g., it is easier if you change school with friends; receiving a letter from the teacher
Discourse – contradictions and questionable usefulness of identified strategy outcomes		e.g., at the start talk a lot, no you need to be quiet and have a look first; hit back

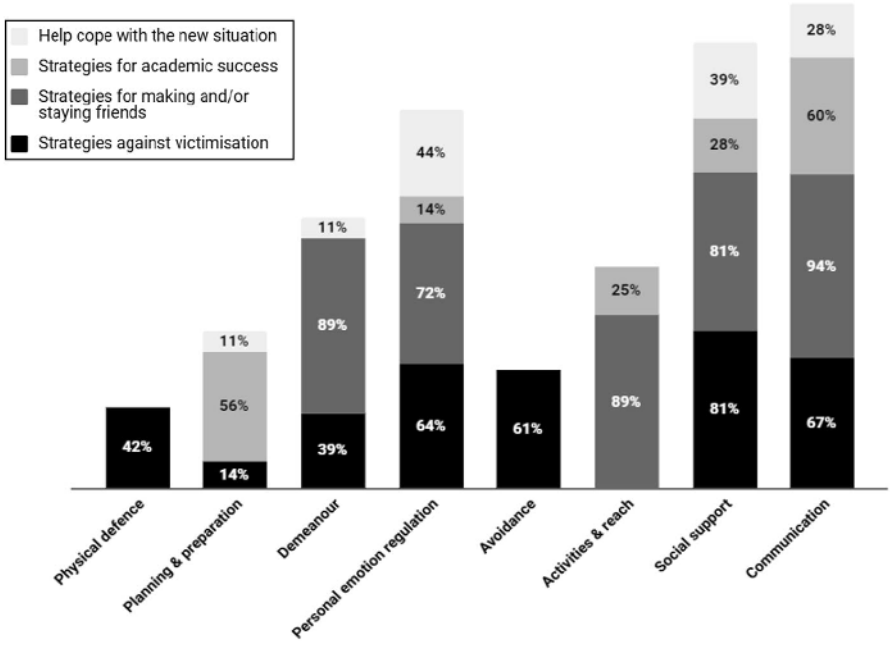


Fig. 2 Strategies used to combat specific fears. Percentages describe the amount of mentions on a workshop level

3 Results

3.1 Fears at school transition

For the higher-level fears, four general fears were identified (in order of most to least mentioned): (1) fear of peer victimisation; (2) fear of being alone in the new situation; (3) fear of victimisation by authority figures and (4) fear of academic failure (see Table 1; Fig. 1).

3.1.1 Fear of peer victimisation

Fear of peer victimisation was mentioned in all 52 workshops. The behaviour most frequently mentioned leading to peer victimisation was exclusion. Participants described the action of "being excluded" or "excluding" someone in itself, but also the feeling of "not being wanted" was reported. The word "bullying" was used as an umbrella term and if asked to specify, the participants responded by listing all other victimisation behaviours, for example, "being ridiculed", "made fun of", "hit", "being laughed about", "saying something bad about someone else" but also the frequency, that "this happens on one day and then also the next" and possible group dynamics, that "several target one". Participants described specific insults, among others concerning appearance, being "ugly", "too small", "too big", as well as ability, being "useless" and/or "stupid", but also described the fear of the "insults" and

"verbal attacks" themselves. Physical aggression was mainly described as the fear of being "hit" or "pushed" by others, such as "classmates" or "older children". Participants also described the fear of being ridiculed and laughed at by others. Reasons volunteered by the participants relating to these behaviours were "appearance", "stupid name" or "skin colour". Finally, the participants reported a fear of betrayal which contains behaviours such as not "keeping a secret", but also "pretending to be someone's friend", "taking advantage" and "using someone".

According to participants, the two main reasons that lead to peer victimisation have to do with appearances, such as "looking different" or being perceived as "ugly" and because the child is "new", "unknown" and therefore "unwanted".

3.1.2 Fear of being alone in a new situation

The fear of being alone in the new situation was mentioned in 39 of the 52 workshops. This fear encompasses several aspects. Participants described that a new situation can be daunting due to the uncertainty associated with the unknown situation and the unknown people with whom they shared it. The not knowing "how it is going to be", arriving at the "new class, everything is new" and not knowing "who the others are and how they are going to be". This "scary" situation is magnified if it must be managed with "no friends" or "not knowing anybody". However, even if the transition is or was undertaken with friends, the status of the friendship could change, one party could find new friends, abandoning or "excluding" the old friend. "Not finding any friends" or "losing old friends" are connected to adverse consequences, such as becoming an easy target that "others gang up" on or "laugh at", because they "have no friends". Similarly, to the reasons for victimisation, the reasons for not "finding friends" were connected to appearance, "because of her looks" and again merely because of "being new" and "unknown".

3.1.3 Fear of victimisation by authority figures

The "fear of victimisation by authority figures" was mentioned in 34 of the 52 workshops. Participants expressed this fear by describing the unknown entity that encompasses teachers and the head teacher. These could potentially be "very" or "too strict", or "mean and not nice". More specifically participants described that the teacher might be "against" the students, "insult" or "shout at them". This behaviour was described with and without context. The context in which teachers could react adversely were possible mistakes, such as not "bringing anything" to class, "being late" or related to unrealistic expectations towards pupils' abilities, for example, "tests that are too hard" or "too much homework".

3.1.4 Fear of academic failure

The fear of academic failure was mentioned in 23 of the 52 workshops. Participants reported that the unknown academic requirements of the new school could be fear-evoking as they could be too "difficult" and "complicated" in general. More specifically the "new subjects", "workload" and "homework" could be "too difficult", "too

much to cope with" or children would have to "study much more" in order to keep up. These were coupled with accounts of the fear of receiving "bad grades". The fear of failure was also connected to the fear of possibly "not being smart enough" or being perceived as the "most stupid" in class.

3.2 Strategies to overcome fears

Strategies derived from exercise two related largely to the fears identified in exercise one. However, here fears were grouped according to the overlap of the strategies described. The strategies pertaining to the fear of being alone in the new situation warranted a split into two separate clusters, that is, strategies to cope with the new situation and strategies for making or staying friends. The lack of strategies to combat the fear of victimisation by authority figures and their overlap with strategies to cope with peer victimisation warranted a combination of these two clusters, that is, strategies against victimisation (see Fig. 2). Figure 2 shows the overlap of strategies, as well as the number of mentions connected to specific fears in the workshops. For example, communication as a strategy (e.g., saying stop; asking them, why they do it) was mentioned in 67% of the workshops as a strategy against victimisation. Thus, grouping these mid-level clusters directly with corresponding fears led to repetition and overlaps. Therefore, five higher-level themes were identified for the second exercise. Three thematic themes distinguished between different types of strategies identified by pupils as relevant to the fears (i.e., enacting supportive networks, personal emotion regulation, controlling behaviour; see Table 2). In addition to these connected themes, two further themes were identified. One consists of strategy outcomes, that is, personal experiences with using specific strategies, and the second theme encompasses the discourse around contradictions and questionable usefulness of identified strategy outcomes (see Table 2).

3.2.1 Enacting supportive networks

The intended coping activity of enacting supportive networks contains: (i) communication strategies, (ii) seeking social support, (iii) outreach strategies, and (iv) avoidance of negative contacts. Although there is an obvious overlap between communication and the seeking of social support, as communication is a need to provide or receive social support. We have separated communication from seeking social support, as in our data communication refers to all forms of communication (e.g., saying hello, instigating a conversation), whereas the seeking of social support aims at acts and/or communication in relation to help provide support or help-seeking endeavours. Effective communication must therefore be considered a core element of strategies combatting a range of fears. Participants perceived communication as both facilitating the receipt of social support for themselves, as well as it being a way to provide social support to others. Alongside appropriate communication, the opportunity to spend time with someone engaging in activities that represent shared interests is a way to engage in positive contact and can ultimately lead to friendship among peers. On the other hand,

avoidance of negative social interactions, mainly in the context of victimisation, was also seen as necessary, perhaps reducing any unsupportive social ties. These components facilitate the enaction of supportive networks that help early adolescents overcome fears, worries, and adverse situations.

3.2.1.1 Communication As a key strategy, communication was mentioned as useful to combat all the above mentioned fears. The participants described rules of conversation, such as to "listen first and then talk", and "tell the truth, don't lie". It is a strategy to engage with others and to find friendships by "introducing oneself", "telling them about your hobbies", "asking about others' hobbies", and "exchanging information" in general, but also to "arrange playdates". It can also be used to create a light atmosphere by "telling jokes" or "complimenting someone". If there was a conflict it is important to "apologise", which can make the friendship stronger and maybe become "best friends".

Communication is used to self-disclose issues, such as fearing the "new situation", "tests", or "getting bullied". Intentions behind self-disclosure varied, sometimes it appeared that "talking about it already helps", but also actively asking for help from "teachers", "parents", or "their friend" when "struggling with the new situation" or when being "victimised". "By admitting fears to other children, they might then better understand". Further, communication was reported to being used to ask for "additional help", "practice sheets", upcoming "tests", and "test questions" when struggling with schoolwork.

Communication as a strategy to cope with victimisation, to stand up, engage, or challenge bullies, by asking them "why they are mean", "why they pick" on them, or tell them – teachers and peers who bully – "to be nice" or to "stop being mean". Participants also described strategies to appeal to children's perspective-taking when asking them to "cut it out" as "it wouldn't be nice for them either if they would be laughed at".

3.2.1.2 Social support Participants described communication as a strategy to facilitate the receipt of social support, by "talking about a difficult situation" or actively "asking for help". In the context of communication, support can be given in different forms, such as "tips". Parents and teachers can reassure children who fear the new school environment or requirements "that this is normal", that they "don't need to be scared", "it will be ok", and "other children will be nice". Parents can also comfort their children by assuring them that the teacher will be "nice" and not "too strict". Parents can encourage their children by telling them "that they will be fine" and that "they can do it".

Support can be shown through small acts of kindness, such as "sharing", "lending something", "sitting together", and "hugging". If a child is scared of a "test" or "homework", "friends" could "study together", or "cheer them up before the test", by telling them "you can do this". Children could also "tell a joke" to distract others from their fears. Receiving or providing social support without necessarily being asked is "a way to become friends" and this is why children have "to be very helpful at the start". For example, if distress is observed, "if

someone cries", children "should comfort" them, "for example, hugging and asking why that someone is crying and then maybe helping to solve the problem". Social support can be provided by including children, for example by "greeting them", "introducing" them to "their friends", "voting [them] into the sports team first" and "not avoiding" them. Participants advised children to "ask for help" or "tell someone" about being victimised. Social support strategies against victimisation included "defending each other", "settling", or "interrupting" an ongoing argument between others. Participants suggested the advantage of strength in numbers, such as belonging to a "friend group" that outnumbered the "group of bullies", or working on a "good class community" that can then "collectively stand up to the bullies".

Different sources of social support, that is, "friends", "families", and "teachers" were described in connection to specific fear-evoking situations. Figure 3 shows the frequency of the sources relating to those situations. In a school setting, participants reported that they depended most on their peers for social support in general, with the new situation, to help with academic success, as well as when finding or staying friends. Teachers are named as the most common source of social support when it comes to victimisation.

3.2.1.3 Activities and reach The cluster *activities and reach* includes suggestions about which children were a good choice to spend time with, where and when to spend time together, and what to do during this time. Participants advised others to approach or talk to specific groups of children that match their interests, personality, or status. These include "nice students", "someone who is also alone", "someone who is similar to you ", that is, also "anxious", also gets "bullied" or to try those who are "not so cool". If children cannot find friends in their own class, they might want to consider joining a "club", a "WhatsApp group", looking in a "different class", hanging out with "old friends", or with friends "made online", for example, while gaming.

To make friends, the participants recommended that after "getting to know each other", the children "increase contact". Time could be spent "in school", by "sitting next to each other"—"during class", "during breaks", or outside of school, but also

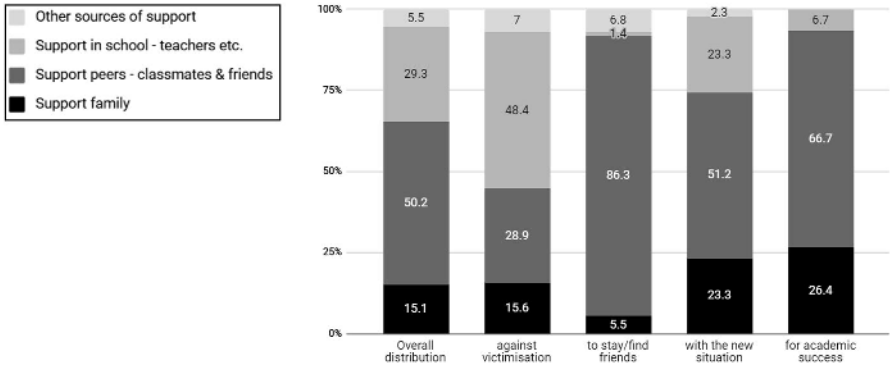


Fig. 3 Distribution of sources of social support for different strategy objectives

writing via "WhatsApp". Participants suggested to "find something in common" or generically describing "playing together". They also mentioned more specific activities, such as "sports", for example, "football", "hiking", or "cycling", as well as "playing on a computer", "listening to music", watching "YouTube videos together", "going out for a meal", or "shopping". Participants also mentioned the importance of "having fun" and "laughing together". Lastly, they also suggested "doing homework" or "studying together".

3.2.1.4 Avoidance This cluster encompasses recommendations on how to avoid negative social interactions or "bad people", such as "bullies", "mean classmates", or "older mean children". This can be done by "avoiding" the situation by trying not to run into "them" in the "hallway", the "classroom", the "yard" or "on the way to school", by for example "changing their route to school". Children are also advised to "stay away and not get involved in the fights" of others. For severe problems, children recommended more extreme forms of avoidance, such as "staying away from others altogether", "calling in sick", or ultimately "changing schools".

3.2.2 Personal emotion regulation

Emotion regulation can be interpersonal (McRae & Gross, 2020) and is highly interconnected with social support. However, we were able to clearly differentiate strategies in our data that describe the advice for children on how they could influence fears, worries, and external stressors. We term these strategies *personal emotion regulation*. Interpersonal emotion regulation was coded under *enacting supportive networks*. Among others, participants describe methods on how to influence their thinking or attitude, how to avoid, suppress, and change certain behaviour through emotion regulation, how to alter certain thoughts and accept seemingly unchangeable circumstances. These personal emotion regulation tips were given in order to achieve a mindset that allows children to cope with all the previously mentioned fears and worries and better their chances of making friends, coping with the new situation, academic requirements, and victimisation.

Participants described ways to influence emotions in connection with specific situations, but also in more general terms. The participants recommended regulating by avoiding "overthinking", "worrying too much", or "being scared". Participants described these behaviours in connection to several situations, such as "being scared of the teacher", of the "new situations", and being "shy" towards other children, but also in connection to victimisation. In order to achieve a more "relaxed" inner attitude, participants advised to give "it time", "wait and see", and "think positive". If a child does not make "friends immediately" participants recommended "not to worry" and be aware that it "takes time". Additionally, to boost "self-confidence", which participants highlighted as important in combating fears, participants consider it helpful if children would tell themselves that they are "going to do alright in the exam" or imagine a "good outcome". Humour was described as a way to regulate feelings; participants recommend trying to "see the funny side" of things if, for example, "something embarrassing happened" to them. In relation to victimisation, participants recommended regulating emotions and not letting "others get to them".

Children should rather "listen to their gut", "decide what is true" for themselves, "rise above" the insults, and not take things "too seriously". "You can be angry on the inside, but don't show it", under no circumstances should children "cry", otherwise they are perceived as "a weakling", proving the bully right. Instead, they must "keep it together" and "get on with things". If things get too much, participants advised children to "breath" and "distract themselves", for example, by playing with a "fidget spinner", with their "mobile phone", or doing "homework".

3.2.3 Controlling behaviour

Strategies related to children controlling their own behaviour address the manner and demeanour in which children 'should' behave around others in specific situations to combat several fears. It also incorporates actions around preparation and planning, most pertinent to securing academic success and physical defence, which only combats victimisation.

3.2.3.1 Demeanour—generous and polite By describing someone's demeanour, participants repeatedly identified behaviours that should be avoided, such as being "naughty", "bad", and "disrespectful", but also being "shy". Participants pointed out that if someone "is mean to others, one could understand why the others are mean" to them. Participants perceived children who are "too shy" in danger of not finding friends. Instead, they advise children to be "good", "nice", "kind", "friendly", "brave", and "open to new experiences". These behaviours could lead to gaining others' "trust", becoming "popular", and making others feel "comfortable" with them, but also becoming "more self-confident" themselves. If someone is "shy" the participants advised children to ask "someone if they want to be friends" or "say yes, not no", if asked to "join their game". Children should even "be nice" to those who "are mean" to them, in the hope that they will match this behaviour and "will be nice" to them in return. When asked to specify "being nice", participants described behaviours, such as "always smiling" and "helping others" by, for example, "lending things". Participants also included recommendations for what not to do, such as "lying", "giving telling offs", "making a sad face", "being sad", or "telling on others". In the classroom context participants advised to "always raise their hand" when they want to say something, not "shout out the answer". Participants also recommended "giving gifts" to "classmates" and "teachers" to get on their good side and make the teachers more amenable to them. The participants advised that another way to improve the relationship with their teacher is if the children always do their "homework and only get excellent grades". However, if a"mistake happens", the participants recommended "apologising" to the teacher and telling them that they "will get it right" next time.

3.2.3.2 Planning and preparation Planning ahead and preparing accordingly is recommended by participants. Children can do this by "acquiring information" about the new "school", their "teacher", and the "other children". To be on time, participants recommended "downloading a bus app". Participants considered it important to have

their things in order, for example, bring "their pencil case", as it is "irritating" if children always forget something and others "have to lend" them things. Preparation and planning are further considered essential to, for example, cope with academic requirements. Participants mentioned the need to "continuously study" and "practice", by, for example, "always doing their homework". Children should also find out about different study styles, by looking at "how other children study". Participants also recommended asking the teacher about upcoming "tests", specifically "when" they will be and "what questions" will be asked. If studying and information fail or prove insufficient, participants also described the possibility of getting "tutoring", asking classmates "to study with them", or finding "study games online". If children are getting victimised, participants recommend "gathering evidence", by, for example, "filming what happened" and then presenting it to the "teacher" or "head teacher".

3.2.3.3 Physical defence This cluster includes recommendations on how to physically defend oneself. Participants recommend "going to the fitness studio" to "gain muscles" or learning "self-defence" to "hit back". Hitting back is both mentioned as a preventive measure, to avoid a future victimisation, by establishing a certain standing, as well as a strategy to "not put up with" being victimised and to not being perceived as weak.

3.2.4 Strategy outcomes and consequences

In this section, strategies that have already been experienced by participants and that were described as helpful are depicted. These strategies reportedly eased the transition process for participants.

The elimination of unknown factors, by, for example, transitioning with friends, having information about the new school and the new teacher, as well as being supported in getting to know the new classmates are described. When asked, what helped or could help with the school transitions, one repeated reply was "friends". Some transitioned with friends, others tried to actively "convince" friends to go to the same school or selected their new school "because of their friends". Getting to know the school, by visiting their "open house" before starting was described as helpful. The same concept seems to apply to the main teacher. Participants reported it as helpful when they received a "letter from the teacher" before the start of the school year, as they then knew that (s)he was "nice". Starting the "first day" with a group assignment that facilitated and supported the children in getting to know everyone was described as "very nice". Teachers changing the seating arrangement was also described as helpful, as this gives pupils the chance of getting to know others within their class.

Creating classroom rules, defining which behaviour is expected, and establishing a framework for support appear to help settle in the class setting. The establishment of "classroom rules" was mentioned as helpful against victimisation. Participants described the existence of peer "arbiters", who offer low-threshold support with difficult situations before having to approach a teacher also as helpful. Another way to discuss problems was the establishment of a "post-box" where children could

deposit problems. The post-box should be "emptied once a week" and consequent "meetings" to discuss these are "arranged".

3.2.5 Discourse—contradictions and questionable usefulness of identified strategy outcomes

The classification of strategies described above relates to *what* participants suggest can or should be done to combat fears. However, the data also includes direct references to the usefulness and feasibility of these strategies. Furthermore, contradictory perspectives on strategy use are apparent from negative cases within the data and when participants were asked to further elaborate on specific strategies, this sometimes led to self-contradictions, which call into question strategies' usefulness or feasibility.

Participants generally agreed on the importance of communication. However, they disagreed on the pace at which to approach others and the boundaries of conversation. Some participants recommended "finding friends fast" and "talking a lot". However, other participants advised to "not talk too much" or "take time", "listen first and then decide" who is nice and who to be friends with. "Having fun together" and "laughing together" was described as helpful, however, the perception differed between the importance of making others laugh, by behaving like the "class clown" and being perceived as "ridiculous" and being "laughed at" and not "laughed with". Friends are named as a main source of social support; others described friends as a hindrance when trying to make new friends or described the betrayal when "losing friends" because they are "taken away" by other children. Participants described situations in which peer support can only go so far, even though getting "comforted" by a friend is nice, sometimes the only thing that helps is changing the reason why a child is getting bullied, for example, by buying new "glasses".

Participants described ways to engage or confront bullies verbally, by being "brave" and asking bullies questions concerning "why they are mean" or telling them "to stop". Other participants however recommend "not confronting" bullies, as this can be "too dangerous" or that "defending oneself" could make the situation "even worse". To minimise danger, participants recommended verbalising the need for support, by "asking"—peers, teachers, or parents—"for help". This however might lead to further "exclusions" as they could be perceived as a "tell-tale". Although participants suggested that children could tell their parents and teachers who could subsequently solve their problems, when asked to specify what teachers could do, participants responded with "teachers don't help", they "don't do anything", and that some "don't take problems seriously". Parents as a source of support are also described as questionable, as they sometimes "make it even worse" when they get involved. Participants described it as helpful if their peers or friends would just recognise victimisation and "react" in a supportive manner, without necessarily being asked. Children could, for example, approach the victim and tell them that they "shouldn't listen to what everyone was saying" or tell the bullies "to stop". Social support, such as "being kind" and "lending" things to others was named as a strategy for finding friends. However, if children are perceived as too disorganised and "constantly forget" something and need

the support of others, this is perceived as "annoying" and ultimately could hinder friendship. Unorganised children are also more likely to get into trouble and "shouted at" by teachers.

Instead of communication, some participants recommended "learning self-defence", "threaten", or physically "hitting" or "hitting back" when being victimised. However, when asked if "hitting" was a good strategy, participants acknowledged that it wasn't, while others advised against physical "fights" from the start. Further, instead of addressing victimisation, participants recommended "always staying close to a teacher", "calling in sick", "not going to school", or trying to "change school". Participants mentioned that it would be possible to "avoid others altogether", however, they also remarked that this would make it impossible "to find friends" and leave them "all alone".

There are conflicting reports concerning children's personal emotion regulation strategies. For example, when it comes to children's inner attitude towards challenging situations. Some participants recommended, "thinking good thoughts", "imagining the outcome" they "want", and avoiding "bad thoughts". Other participants recommended "always expect the worst", as then children could "be happy" if something "turns out better than expected". To cope with conflict, for example, when a child has been acting in a "nasty" way or an argument between friends, some participants mentioned, that it was important "not to endlessly harp on about it" and just "forget it". Other participants reported that it is hard to "forget everything" after a fight and to rather "sit down together" and "talk about what happened". Further participants reported that they are told – by teachers and parents – to ignore victimisation, however, participants explained that to "ignore something really bad" is often not possible.

Participants disagreed whether children should try and find lots of friends, by "saying who they are", "saying what they think", and "not changing for others", or to create a persona, by "adapting" behaviours and looks "to fit in". Some participants mentioned that children should "say what the others say", as "saying the wrong thing", "being the only one who doesn't like something", or "having the wrong haircut" could lead to a loss of "friendship" or that a child could "become an outsider". However, others mentioned that they needed to find friends "who like them as they are". Further, children should change, by, for example, "buying new clothes", "make up", "changing their hair colour", "having an operation", looking "stylish", and wearing "nice" age appropriate "clothes", which are not "childish"- "don't be ugly". It was described as important that children "always smile", always "be happy", and "not make a sad face". Participants further described that children should come across as "cool" and "show off" to make friends, at the same time others adviced to not overdo the "showing off" and "not act too cool" as that could put people off. Children should "study" and be "good in school", but also get "bad grades" on purpose and "cheat on tests", otherwise other children might laugh at them and they might be perceived as "eager beavers".

Some participants recommended trying to approach the "good students" first, however other participants advised being careful not to be friends with the "teacher's pet", as this could increase their chances for victimisation.

4 Discussion

In this study, a qualitative approach is applied, aiming to develop an in-depth understanding of early adolescents' perspective on fears in connection to school transitions and find which kind of coping strategies early adolescents intend to apply to overcome these prospective fears. In our opinion, this knowledge is highly relevant for the development of future interventions that aim at supporting a smooth transition, to try and increase early adolescents' social-emotional competencies and ultimately their well-being. So far, there is a shortage of in-depth analyses of young people's perspectives concerning fears and intended strategies to cope with these fears during school transition. In the present research, we collected qualitative data in 52 workshops with 896 students participating to examine early adolescents' perspectives on fears at school transition and their intended coping strategies to overcome these. We found four major fears among participants, that is, the fear of peer victimisation, the fear of being alone in the new situation, the fear of victimisation by authority figures, and the fear of academic failure. Connected to these fears three clusters of coping strategies identified by children were derived, that is, those that lead to the enaction of supportive networks, those that pertain to personal emotion regulation, and those that pertain to controlling one's own behaviour. Distinct from these strategies was a theme that identified strategy outcomes and consequences, encompassing personal experiences that were described as helpful. Finally, a cluster consisting of discourse around contradictions and questionable usefulness of identified strategy outcomes.

Transitions in general often cause emotional restructuring and most transitions are accompanied by fears (van Rens et al., 2018). Research has shown that children who were involved in bullying incidents previous to their transition from primary to secondary school, worried about the new school requirement (e.g., varying teachers), or worried about how and if they will find friends in the new class, experienced transition as more difficult (Evangelou et al., 2008). Similar to other studies, our results show that, although participants mention the fear of academic failure, the frequency of these mentions is lower compared to the more prevalent social fears, such as the fears of peer victimisation and being alone in the new situation (Zeedyk et al., 2003). Therefore, social fears, especially the fear of victimisation, which was mentioned in every workshop, appear to outweigh academic fears. Similar to other research, children believed that reasons for bullying are related to appearance and ethnicity (Mischel & Kitsantas, 2020). This may raise a concern for minority groups distinguished by their appearance, such as those with an immigrant background. Therefore, it may be essential to address prejudice in future anti-bullying interventions (Caravita et al., 2020). Literature has shown that being a bully, a victim, or both has a major negative and adverse impact on physical and psychological health (Moore et al., 2017), as well as on academic achievement and economic outcomes (Biswas et al., 2020), which can continue into adulthood (Brendgen & Poulin, 2018; Copeland et al., 2013). Most children who experienced and feared bullying subsequently struggled to make

or expand their circle of friends, which in turn had negative consequences for their self-esteem and confidence (Evangelou et al., 2008). Thus, a main focus of future interventions has to be on preventing bullying and breaking the cycle, by, for example, creating a supportive class environment that promotes acceptance and tolerance (Hajovsky et al., 2020), as well as supporting children not to be bystanders, but interfere in bullying (Voight & Nation, 2016).

The fear of being alone and not finding any friends was a fear also mentioned in every workshop. Supporting the relevance of our findings, a recent literature review has described the importance of positive relationships with peers during the transition to secondary school (Jindal-Snape et al., 2019). Further, our data highlights the critical role of peer relationships for young adolescents (Lyell et al., 2020; Mitic et al. 2021) in coping with adverse circumstances such as bullying or coping with a new situation. Just one friend, even if this friend is later lost, acts as protection against negative physiological and emotional repercussions caused by adverse social experiences (Adams et al., 2011; Lessard & Juvonen, 2018). Our findings underline the importance of good peer bonds, as they appear to increase resilience towards change, which contrasts the increased mental health issues and lower educational achievements that have been reported if the transition and bonding are experienced as negative (Jindal-Snape et al., 2019). Thus, a main focus of future interventions has to be the support of children to experience a positive transition process, by facilitating positive relationships (Boulton et al., 2011; Jindal-Snape et al., 2019). In our data, children reported that low threshold interventions, such as starting the school year with a group assignment, was helpful, facilitated and supported the children in getting to know their peers.

Participants did not only report the fear of peer victimisation, but also the fear of victimisation by authority figures. In the PISA assessment of students' well-being by the OECD (2017), one in five students reported several occasions in which they were treated unfairly by their teachers during the course of a month. Similar to our study, participants reported that teachers would ridicule or offend pupils in front of others and that they were worried about harsh discipline. There are very few recommendations on what children or parents can do if children experience victimisation by teachers. Research has shown that teachers' social and emotional skills and own well-being are directly linked to classroom atmosphere and teacher-student relationships, which consequently influences students' social, emotional, and academic outcomes (Jennings, 2015). As teachers are essential in helping children find their place by providing a positive environment (Coffey, 2013), it is essential to support and train teachers to work on their own social-emotional skills, their own well-being (Jennings, 2015), and learn to understand their own impact and the consequences of their actions through the eyes of their pupils (van Rens et al., 2018).

As reported earlier, the fear of academic failure was mentioned by participants, however, these mentions were far fewer than those describing social fears. Similar to other studies participants reported worries concerning cognitive adequacy, workload, and time needed to cope with the new workload, as well as subsequent fears of negative evaluations, feelings of inadequateness, and bad grades (van Rens et al., 2018). When considering the theory of social comparison (Festinger, 1954), which describes peoples' inert desire to evaluate their abilities relative to those of others,

it is not surprising that, especially in the school context, low academic achievement has been connected to lower self-worth and low self-esteem, which in turn is linked to internalising problems (Metsäpelto et al., 2020). Studies have shown that school transition is commonly followed by an academic dip, however, some pupils are in danger of poor academic progression and consequent disengagement (McGee 2004; van Rens et al., 2018). These findings are important, as children still appear to be ill-equipped when it comes to learning strategies and therefore should be supported in acquiring self-determined study approaches and self-directed learning (Kamenetz, 2010).

Young people's fears might be paramount for the development of adequate and effective coping strategies (Lucey & Reay, 2000). Adequate and effective coping strategies are of great importance when wanting to overcome obstacles connected to school transition constructively (Voight & Nation, 2016; Zammuner, 2019). Inadequate coping mechanisms are associated with detrimental consequences for future mental health and well-being (e.g., Copeland et al., 2013; Gini et al., 204), as well as poorer academic achievements (Pandey et al., 2018) and may lead to far-reaching adverse repercussions into adult life (McGee , 2004; Moore et al., 2017).

In order to gain a better understanding of the consequences of stress on mental health, well-being, and possible physiological repercussions, a comprehension of the structure of coping is essential (Stanisławski, 2019). The lack of agreement concerning this structure and coping nomenclature, with at least 100 different scientific classifications and additional 400 sub-categories described in the literature (Skinner et al., 2003), hinders concrete classifications. Due to this dissent, in the present study, we refrained from committing to one concrete classification but used a combination of classifications to better reflect our data. Participants were asked to describe intended coping strategies in the context of addressing the fears linked to school transition. However, participants voiced controversy and uncertainty about the usefulness of some of the intended strategies. The type of coping strategy chosen in a certain context depends on the specific situation (Murray-Harvey et al., 2012) as well as on the individual's cognitive, biological, emotional, and social development (Compas et al., 2001). Some of this dissent may be attributed to personal preferences or characteristics. Such differences have however been connected to difficulties in forming positive peer relationships and in coping with challenges associated with the new school system (West et al., 2010). The dissent identified in our data may indicate that, although children appear to possess some knowledge of and are capable of articulating specific strategies, they may still lack the ability to practically apply the named strategies adequately. In the following, strategies, controversies, and implications are discussed.

Participants described strategies on how to enact supportive networks. This cluster of strategies consisted of communication, social support, activities and reach, as well as avoidance of negative contacts. Communication skills were mentioned repeatedly, which have been described as essential for children's everyday life, as they influence social success and the quality of peer relationships during adolescents (Reed & Trumbo, 2020). Similar to other research, participants described the use of communication skills to convey ideas and described the ability to listen as important (Mancuso, 2008). Further, skills pertaining to friendship formation described in our

data were in accordance with friendship skills named in literature (e.g., introducing oneself, sharing and exchanging information; McGinnis & Goldstein, 1997; Öztürk & Kutlu, 2017). However, participants also repeatedly voiced uncertainties in connection with specific aspects concerning communication skills, especially in the context of friendship formation (e.g., how much information sharing is considered ok, when does it become too much) and victimisation (e.g., is verbally confronting a bully a good strategy or too dangerous). Therefore, in the context of victimisation instead of communication, participants advised avoiding bullies or situations in which bullying could happen. Considering the importance of communication skills for the social and emotional success of adolescence (Reed & Trumbo, 2020), these findings indicate that better communication strategies and individualised training in basic communication skills to support early adolescents to form positive relationships and feel able to negotiate in adverse situations may be needed (Tuttle et al., 2006). School-based mentoring relationships have been shown to have many benefits for the mentees, as well as the mentors. Youth mentors and mentees report to profit from the relationship, it furthers prosocial behaviour, communication skills, and better connections with school and teachers (Coyne-Foresi & Nowicki, 2021).

Similar to other studies, providing and receiving social support from different sources (i.e., peers, friends, family, and authority figures) was described as important in our data (van Rens et al., 2018; Voight & Nation, 2016). Participants appear aware of the positive consequences of peer support, as it was described to be a way to form friendships, as helpful against victimisation, to generally help cope with the new situation, as well as helpful for academic success – whereas the absence of friendship was connected to fear. Participants were vague when asked about specific support strategies (providing or receiving), which hints at awareness and ability to name and identify strategies. However, children seem less competent at engaging with these strategies on a practical level. This uncertainty might influence children's ability to interfere or help in bullying situations. Results of a previous study showed that almost half of the participating pupils stated that they would not interfere with ongoing bullying (Wachs et al., 2018). Further, the feeling of lacking the ability to cope with victimisation themselves may be a reason why pupils said they relied on support from others (e.g., teachers or parents) when confronted with victimisation. However, when further asked, this strategy appears also flawed in the participants' minds. As similar to other studies, participants were uncertain concerning the helpfulness of teachers' support (de Leeuw et al., 2018) or voiced worries about potential adverse consequences of parents' involvement when being victimised by peers or teachers (Camara et al., 2017). Therefore, adult intervention might only prove helpful, if the consulted adult is well-trained and has the ability to intervene in an effective way (Bauman et al., 2020). These findings could indicate that children lack confidence in their own support skills or question the abilities of their peers, teachers, or parents to support them. Hence, better training for teachers and parents on how to effectively support children (Bauman et al., 2020), as well as interventions for children on strengthening their own competencies to support their peers are urgently needed (Voight & Nation, 2016).

Participants mentioned self-regulation strategies as a way to cope with all of the fears mentioned in our data. This appears beneficial as a systematic review and

meta-analysis described positive effects of self-regulation-based interventions on health and behavioural outcomes, as well as a positive influence on academic outcomes in children and adolescents (Pandey et al., 2018). Further, greater competencies in self-regulation are connected to better social skills, healthier behaviour, better physical and mental health, and improved academic achievement, including math, literacy, letter naming, reading, and vocabulary, as well as fewer behavioural problems, conduct disorders, suspensions from school, and less substance abuse (Pandey et al., 2018). However, participants' comments revealed uncertainties concerning the use and effectiveness of self-regulation strategies. Participants reported strategies, such as changing school or hitting back when being victimised, which might indicate a lack of adequate coping strategies. Further, participants were critical of simplistic adult advice, (e.g., to just ignore victimisation). Such advice might even be connected to the earlier mentioned feeling of not receiving support from adults when experiencing victimisation (Bauman et al., 2020). Considering the positive impact of good personal emotion regulation strategies, instead of merely advising children to ignore or avoid adverse situations, children should be supported in developing better personal emotion regulation skills (Hinduja & Patchin, 2017; Pandey et al., 2018).

Participants described strategies aiming to control their behaviour to avoid negative outcomes, such as victimisation by teachers or their peers. As described by the social ecological theory (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006), the classroom context is of great importance during this time, as time spend in this context has a major effect on adolescents' adjustments, development, and health risks. Thus, similar to other studies our data shows that positive and negative interactions with peers and teachers influence adolescents' social and personal evaluations (Bjärehed et al., 2021; Gini et al., 2014, 2018). Further, our data underlines adolescents' wish to fit in, belong to a peer group, and make friends at the time of school transition (van Rens et al., 2018). Some of the strategies mentioned in our data, such as the importance of always being nice or to always do what the other person wants, were connected to the fear of otherwise being rejected or losing friends. Further, adolescents describe ways to cope with negative evaluations, such as appearance teasing, (i.e., name calling or appearance-based rejection), which were identified to be common in this age group by other researchers (Schmidt & Martin, 2019). The strategies named in connection with changing their look and behaviour were voice the necessity of showing off, behaving like the class clown, getting a new haircut or colour, or buying new clothes and make up to better fit in. These suggestions may be linked to adolescents' focus of gaining and protecting a positive identity since adolescents consider it acceptable to refuse inclusion in their social group due to someone's perceived unattractiveness, especially in connection to their appearance (Leets & Sunwolf, 2005). Considering these findings, suggestions in our study advising "unattractive" children to have an operation in order to better fit in are unsurprising. The lack of strategies becomes further obvious when children advocate hitting, pushing, and fighting the bully to avoid future bullying. These findings are important, as they underline the preponderance of maladaptive coping strategies during this time of uncertainty during children's identity formation (Bauman et al., 2020; Leets & Sunwolf, 2005). It is therefore of great importance to support

children in developing personal and social skills, which can develop resilience (Gillison et al., 2008) and increase acceptance and tolerance. By improving the class climate (Voight & Nation, 2016), negative social and personal evaluations and possible moral disengagement could be reduced (Bjärehed et al., 2021).

Some of the strategies mentioned aiming to fit in with peers directly contradict participants' strategies to cope with the experience or fear of being treated unfairly by teachers (Gini et al., 2018). The strategies to create a positive teacher-student relationship included unrealistic suggestions such as always being on their best behaviour, always doing their homework, and always getting good grades. Children appear to struggle to reconcile the role of being a good student, avoiding confrontation with teachers, and the need to fit in with their peer group. Thus, raising teachers' awareness of children's struggles and individual differences (Evans et al., 2018), as well as supporting teachers and pupils in establishing positive relationships, could enhance the overall class climate and consequently create a sense of school belonging (Hajovsky et al., 2020). Such a feeling of support and belonging has been linked to students' persistence and engagement towards their academic work, and has been shown to reduce bullying, victimisation (Hajovsky et al., 2020; Voight & Nation, 2016), and loneliness among students (Morin, 2020). Better socio-emotional skills have many benefits for the current class climate and children's achievements (Pandey et al., 2018) and are linked to well-being and economic success in later life (Biswas et al., 2020; Brendgen & Poulin, 2018).

4.1 Strengths and limitations

An important strength of the present study was that our methods increased participants' willingness to engage and provided a holistic picture regarding fears and intended strategies via the triangulation of the different inquiry methods that were used in child-friendly workshops. Collecting brainstorming data on spread sheets and notepads in different settings (full class and self-selected small groups) was appealing and engaging for the participants. The methods of linking experiences or advice to fictional characters has its roots and a longstanding tradition in the therapeutic setting and are used to elicit information about subjective experiences, objectifying the issues or problems, and thereby safeguarding against adverse effects (Butler et al., 2009; Davis et al., 2021; Papouli, 2019). By using a third person stimulus, the participants can assume a distanced perspective, which allows to reflect on their own experiences separate from the self. Distancing is a productive perspective, as it allows for safe communication of negative experiences (Barbosa et al., 2017). The use of a narrative allows sharing of negative feelings without implicating oneself (Barbosa et al., 2017; Ruini et al., 2014). Self disclosure, large groups may hinder the elicitation of entirely honest reflections, as peer influences within the groups may skewer responses. Although the small, self-selected groups were intended to further open communication, this setting does not guarantee that all participants share personal experiences and opinion and therefore might be unable to capture all views.

We recognise that the directions provided in the workshop, that the character in the story "is a bit scared", was a leading question. However, as one aim of the study was to identify and understand prospective fears of the target population, we framed it like this. We are aware, that this question might suggest that all children experience fears, and although we understand that not all participants experience "own" fears around the time of school transition, we recognise school as a social context, in which it is very likely that participants without own fears will have witnessed fears among their peers. We find the perspective and advice of participants without fears relevant, especially considering their input in the strategies section, on how to avoid and cope with prospective fears, as well as on how to support peers who experience fears.

The sample consisted of children visiting the last year of primary school, as well as secondary school children, who just experienced the transition. We wanted to include different voices, as we are aware of different biases present in the slightly different age groups. Primary school students may fantasise about the upcoming change and their possible fears, whereas secondary school children may display memory biases. We did compare the different data sets but did not find differences between the expected and experienced fears or the strategy knowledge, and therefore combined the data sets.

The described methods led to a data set consisting of single words, shorter and longer phrases, as well as short conversations between participants – which has limited depth at an individual participant level. The way data was collected did not allow a gender specific effect or effects of other individual differences to be examined, but instead provided a holistic understanding of early adolescents' fears of school transition and their strategies to overcome these. Lastly, although the depth of responses was limited by the methods, the methods also allowed us to sample from a very large number of young people, increasing our confidence that the issues identified are important for young people of this age in Austria.

4.2 Conclusion

In conclusion, children in our study reported more social fears compared to academic fears about changing schools. Children seem reasonably competent at naming and identifying strategies, however, maladaptive strategies, as well as the controversies and uncertainties within the described strategies may indicate less competence in engaging with these strategies on a practical level. As these competencies are important for children's social-emotional well-being, physical and psychological health, as well as for their academic success, future interventions need to support children in learning how to enact effective coping strategies, considering their individual predispositions and preferences.

Acknowledgements The D.O.T. (Die Offene Tür—The Open Door) team of co-investigators—Adam Barnard (playwright and theatre director), João Dias (computer scientist), Marija Mitic (medical doctor), Beate Schrank (practicing & research psychiatrist) and Kate Woodcock (research psychologist)—grew during a sandpit event organised by the Open Innovation Center of Ludwig Boltzmann Society and facilitated by Know Innovation. The team would like to thank these organisations for their role in its formation. D.O.T team work is jointly conceived and led by the co-investigators. The team sees this

as a fully meaningful interdisciplinary collaboration. The authors would also like to acknowledge Sylvia Dörfler and Anna-Lena Mädge for supporting the data collection procedures and organisational collaboration with schools. We want to thank all workshop assistants, Lower Austrian schools, children and adult stakeholders who supported the workshop activities.

Funding Open access funding provided by Karl Landsteiner Privatuniversität für Gesundheitswissenschaften. This research was supported by the Ludwig Boltzmann Society Open Innovation for Science and Karl Landsteiner University of Heath Sciences.

Data availability Data analytic methods are available in the results section of the manuscript, including identified themes and subthemes, sample citations and coding tree. The original data and workshop manual are availabe at a repository (https://osf.io/avtw2/ and https://osf.io/2u7r4/).

Declarations

Conflict of interest We have no conflicts of interest to disclose.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

References

Adams, R. E., Santo, J. B., & Bukowski, W. M. (2011). The presence of a best friend buffers the effects of negative experiences. *Developmental Psychology, 47*(6), 1786–1791. https://doi.org/10.1037/a0025401

Aitken, S. C., & Herman, T. (2009). Literature review on qualitative methods and standards for engaging and studying independent children in the developing world.*Innocenti Working Papers,* 2009–5. https://doi.org/10.18356/c393993c-en

Anderson, C. (2010). Presenting and evaluating qualitative research. *American Journal of Pharmaceutical Education, 74*(8), 141. https://doi.org/10.5688/aj7408141

Bagnall, C. L., Skipper, Y., & Fox, C. L. (2020). 'You're in this world now': Students', teachers', and parents' experiences of school transition and how they feel it can be improved. *British Journal of Educational Psychology, 90*(1), 206–226. https://doi.org/10.1111/bjep.12273

Bahn, S., & Barratt-Pugh, L. (2013). Getting reticent young male participants to talk: Using artefact-mediated interviews to promote discursive interaction. *Qualitative Social Work: Research and Practice, 12*(2), 186–199. https://doi.org/10.1177/1473325011420501

Barbosa, E., Amendoeira, M., Ferreira, T., Teixeira, A. S., Pinto-Gouveia, J., & Salgado, J. (2017). Immersion and distancing across the therapeutic process: Relationship to symptoms and emotional arousal. *Research in Psychotherapy Psychopathology Process and Outcome, 20*(2), 110–121. https://doi.org/10.4081/ripppo.2017.258

Bauman, S., Yoon, J., Iurino, C., & Hackett, L. (2020). Experiences of adolescent witnesses to peer victimization: The bystander effect. *Journal of School Psychology, 80*, 1–14. https://doi.org/10.1016/j.jsp.2020.03.002

Biswas, T., Scott, J. G., Munir, K., Thomas, H. J., Huda, M. M., Hasan, Md. M., David de Vries, T., Baxter, J., & Mamun, A. A. (2020). Global variation in the prevalence of bullying victimisation amongst adolescents: Role of peer and parental supports. *EClinicalMedicine, 20*, 100276. https://doi.org/10.1016/j.eclinm.2020.100276

Bjärehed, M., Thornberg, R., Wänström, L., & Gini, G. (2021). Moral disengagement and verbal bullying in early adolescence: A three-year longitudinal study. *Journal of School Psychology, 84*, 63–73. https://doi.org/10.1016/j.jsp.2020.08.006

Bokhorst, C. L., Westenberg, P. M., Oosterlaan, J., & Heyne, D. A. (2008). Changes in social fears across childhood and adolescence: Age-related differences in the factor structure of the fear survey schedule for children-revised. *Journal of Anxiety Disorders, 22*(1), 135–142. https://doi.org/10.1016/j.janxdis.2007.01.014

Boulton, M. J., Don, J., & Boulton, L. (2011). Predicting children's liking of school from their peer relationships. *Social Psychology of Education, 14*(4), 489–501. https://doi.org/10.1007/s11218-011-9156-0

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Brendgen, M., & Poulin, F. (2018). Continued bullying victimization from childhood to young adulthood: A longitudinal study of mediating and protective factors. *Journal of Abnormal Child Psychology, 46*(1), 27–39. https://doi.org/10.1007/s10802-017-0314-5

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.

Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In R. M. Lerner & W. Damon (Eds.), Handbook of child psychology: *Theoretical models of human development* (pp. 793–828). John Wiley & Sons.

Brouzos, A., Vassilopoulos, S. P., Vlachioti, A., & Baourda, V. (2020). A coping-oriented group intervention for students waiting to undergo secondary school transition: Effects on coping strategies, self-esteem, and social anxiety symptoms. *Psychology in the Schools, 57*(1), 31–43. https://doi.org/10.1002/pits.22319

Butler, S., Guterman, J. T., & Rudes, J. (2009). Using puppets with children in narrative therapy to externalize the problem. *Journal of Mental Health Counseling, 31*(3), 225–233.https://doi.org/10.17744/mehc.31.3.f255m86472577522

Camara, M., Bacigalupe, G., & Padilla, P. (2017). The role of social support in adolescents: Are you helping me or stressing me out? *International Journal of Adolescence and Youth, 22*(2), 123–136. https://doi.org/10.1080/02673843.2013.875480

Caravita, S. C. S., Stefanelli, S., Mazzone, A., Cadei, L., Thornberg, R., & Ambrosini, B. (2020). When the bullied peer is native-born vs. immigrant: A mixed-method study with a sample of native-born and immigrant adolescents. *Scandinavian Journal of Psychology, 61*(1), 97–107. https://doi.org/10.1111/sjop.12565

Clark, H., Coll-Seck, A. M., Banerjee, A., Peterson, S., Dalglish, S. L., Ameratunga, S., Balabanova, D., Bhan, M. K., Bhutta, Z. A., Borrazzo, J., Claeson, M., Doherty, T., El-Jardali, F., George, A. S., Gichaga, A., Gram, L., Hipgrave, D. B., Kwamie, A., Meng, Q., & Costello, A. (2020). A future for the world's children? A WHO–UNICEF–Lancet Commission. *The Lancet, 395*(10224), 605–658. https://doi.org/10.1016/S0140-6736(19)32540-1

Coelho, V. A., & Romão, A. M. (2016). Stress in Portuguese middle school transition: A multilevel analysis, 19, E61. *TheSpanish Journal of Psychology*. https://doi.org/10.1017/sjp.2016.61

Coffey, A. (2013). Relationships: The key to successful transition from primary to secondary school? *Improving Schools, 16*(3), 261–271. https://doi.org/10.1177/1365480213505181

Compas, B. E., Connor-Smith, J. K., Saltzman, H., Thomsen, A. H., & Wadsworth, M. E. (2001). Coping with stress during childhood and adolescence: Problems, progress, and potential in theory and research. *Psychological Bulletin, 127*(1), 87–127. https://doi.org/10.1037//0033-2909.127.1.87

Copeland, W. E., Wolke, D., Angold, A., & Costello, E. J. (2013). Adult psychiatric outcomes of bullying and being bullied by peers in childhood and adolescence. *JAMA Psychiatry, 70*(4), 419–426. https://doi.org/10.1001/jamapsychiatry.2013.504

Coyle, S., Malecki, C. K., & Emmons, J. (2021). Keep your friends close: Exploring the associations of bullying, peer social support, and social anxiety. *Contemporary School Psychology, 25*(2), 230–242. https://doi.org/10.1007/s40688-019-00250-3

Coyne-Foresi, M., & Nowicki, E. (2021). Building connections and relationships at school: Youth reflect on mentoring their younger peers. *The Journal of Early Adolescence, 41*(2), 332–362. https://doi.org/10.1177/0272431620912472

Davis, C. H., Gaudiano, B. A., McHugh, L., & Levin, M. E. (2021). Integrating storytelling into the theory and practice of contextual behavioral science. *Journal of Contextual Behavioral Science, 20*, 155–162. https://doi.org/10.1016/j.jcbs.2021.04.004

de Leeuw, R. R., de Boer, A. A., & Minnaert, A. E. M. G. (2018). Student voices on social exclusion in general primary schools. *European Journal of Special Needs Education, 33*(2), 166–186. https://doi.org/10.1080/08856257.2018.1424783

Eschenbeck, H., Schmid, S., Schröder, I., Wasserfall, N., & Kohlmann, C.-W. (2018). Development of coping strategies from childhood to adolescence: Cross-sectional and longitudinal trends. *European Journal of Health Psychology, 25*(1), 18–30. https://doi.org/10.1027/2512-8442/a000005

Eskelä-Haapanen, S., Lerkkanen, M.-K., Rasku-Puttonen, H., & Poikkeus, A.-M. (2017). Children's beliefs concerning school transition. *Early Child Development and Care, 187*(9), 1446–1459. https://doi.org/10.1080/03004430.2016.1177041

Evangelou, M., Taggart, B., Sylva, K., Melhuish, E., Sammons, P., & Siraj-Blatchford, I. (2008). *Effective pre-school, primary and secondary education 3–14 Project (EPPSE 3–14): What makes a successful transition from primary to secondary school?* Department for Children, Schools and Families

Evans, D., Borriello, G. A., & Field, A. P. (2018). A review of the academic and psychological impact of the transition tosecondary education. *Frontiers in Psychology,9*. https://doi.org/10.3389/fpsyg.2018.01482

Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7*(2), 117–140. https://doi.org/10.1177/001872675400700202

Frost, N. (2011). *Qualitative research methods in psychology: Combining core approaches*. Open University Press McGraw-Hill Education.

Gillison, F., Standage, M., & Skevington, S. (2008). Changes in quality of life and psychological need satisfaction following the transition to secondary school. *British Journal of Educational Psychology, 78*(1), 149–162. https://doi.org/10.1348/000709907X209863

Gini, G., Pozzoli, T., Lenzi, M., & Vieno, A. (2014). Bullying victimization at school and headache: A meta-analysis of observational studies. *Headache the Journal of Head and Face Pain, 54*(6), 976–986. https://doi.org/10.1111/head.12344

Gini, G., Marino, C., Pozzoli, T., & Holt, M. (2018). Associations between peer victimization, perceived teacher unfairness, and adolescents' adjustment and well-being. *Journal of School Psychology, 67*, 56–68. https://doi.org/10.1016/j.jsp.2017.09.005

Grills-Taquechel, A. E., Norton, P., & Ollendick, T. H. (2010). A longitudinal examination of factors predicting anxiety during the transition to middle school. *Anxiety, Stress & Coping, 23*(5), 493–513. https://doi.org/10.1080/10615800903494127

Hajovsky, D. B., Chesnut, S. R., & Jensen, K. M. (2020). The role of teachers' self-efficacy beliefs in the development of teacher-student relationships. *Journal of School Psychology, 82*, 141–158. https://doi.org/10.1016/j.jsp.2020.09.001

Hinduja, S., & Patchin, J. W. (2017). Cultivating youth resilience to prevent bullying and cyberbullying victimization. *Child Abuse & Neglect, 73*, 51–62. https://doi.org/10.1016/j.chiabu.2017.09.010

Horgan, D. (2017). Child participatory research methods: Attempts to go 'deeper.' *Childhood, 24*(2), 245–259. https://doi.org/10.1177/0907568216647787

Jackson Foster, L. J., Deafenbaugh, L., & Miller, E. (2018). Group metaphor map making: Application to integrated arts-based focus groups. *Qualitative Social Work Research and Practice, 17*(2), 305–322. https://doi.org/10.1177/1473325016667475

January, A. M., Casey, R. J., & Paulson, D. (2011). A meta-analysis of classroom-wide interventions to build social skills: Do they work? *School Psychology Review, 40*(2), 242–256. https://doi.org/10.1080/02796015.2011.12087715

Jennings, P. A. (2015). Early childhood teachers' well-being, mindfulness, and self-compassion in relation to classroom quality and attitudes towards challenging students. *Mindfulness, 6*(4), 732–743. https://doi.org/10.1007/s12671-014-0312-4

Jindal-Snape, D., & Cantali, D. (2019). A four-stage longitudinal study exploring pupils' experiences, preparation and support systems during primary–secondary school transitions. *British Educational Research Journal, 45*(6), 1255–1278. https://doi.org/10.1002/berj.3561

Jindal-Snape, D., Cantali, D., MacGillivray, S., & Hannah, E. (2019). *Primary-secondary transitions: A systematic literature review*. Scottish Government Social Research.

Kamenetz, A. (2010). *DIY U: Edupunks, edupreneurs, and the coming transformation of higher education*. Chelsea Green Pub.

Krammer, I., Pollak, I., Dörfler, S., Woodcock, K., Schrank, B., Barnard, A., Dias, J., Mitic, M., & Stiehl, K. (2021a). Data. https://osf.io/avtw2/

Krammer, I., Woodcock, K., Pollak, I., Reynard, S., Barnard, A., Dörfler, S., Schrank, B., Mitic, M., & Dias, J. (2021b). Materials. https://osf.io/2u7r4/

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer Publishing Company.

Leets, L., & Sunwolf. (2005). Adolescent rules for social exclusion: When is it fair to exclude someone else? *Journal of Moral Education, 34*(3), 343–362. https://doi.org/10.1080/03057240500211618

Lessard, L. M., & Juvonen, J. (2018). Friendless adolescents: Do perceptions of social threat account for their internalizing difficulties and continued friendlessness? *Journal of Research on Adolescence, 28*(2), 277–283. https://doi.org/10.1111/jora.12388

Lester, K. J., Lisk, S. C., Carr, E., Patrick, F., & Eley, T. C. (2019). Associations between attentional bias and interpretation bias and change in school concerns and anxiety symptoms during the transition from primary to secondary school. *Journal of Abnormal Child Psychology 47*(9), 1521–1532. https://doi.org/10.1007/s10802-019-00528-3

Lucey, H., & Reay, D. (2000). Identities in transition: Anxiety and excitement in the move to secondary school. *Oxford Review of Education, 26*(2), 191–205. https://doi.org/10.1080/713688522

Lyell, K. M., Coyle, S., Malecki, C. K., & Santuzzi, A. M. (2020). Parent and peer social support compensation and internalizing problems in adolescence. *Journal of School Psychology, 83*, 25–49. https://doi.org/10.1016/j.jsp.2020.08.003

Mancuso, J. M. (2008). Health literacy: A concept/dimensional analysis. *Nursing & Health Sciences, 10*(3), 248–255. https://doi.org/10.1111/j.1442-2018.2008.00394.x

Markovic, A., Rose-Krasnor, L., & Coplan, R. J. (2013). Shy children's coping with a social conflict: The role of personality self-theories. *Personality and Individual Differences, 54*(1), 64–69. https://doi.org/10.1016/j.paid.2012.08.002

McGee, C. (2004). *Transition to secondary school: A literature review*. University of Waikato. ISBN: 978-0-478-18797-7.

McGinnis, E., & Goldstein, A. P. (1997). *Skillstreaming the elementary school child (revised edition)*. Research Press. ISBN: 9780878226559.

McKeering, P., & Hwang, Y.-S. (2019). A systematic review of mindfulness-based school interventions with early adolescents. *Mindfulness, 10*(4), 593–610. https://doi.org/10.1007/s12671-018-0998-9

McRae, K., & Gross, J. J. (2020). Emotion regulation. *Emotion, 20*(1), 1–9. https://doi.org/10.1037/emo0000703

Mendle, J., Turkheimer, E., & Emery, R. E. (2007). Detrimental psychological outcomes associated with early pubertal timing in adolescent girls. *Developmental Review, 27*(2), 151–171. https://doi.org/10.1016/j.dr.2006.11.001

Metsäpelto, R.-L., Zimmermann, F., Pakarinen, E., Poikkeus, A.-M., & Lerkkanen, M.-K. (2020). School grades as predictors of self-esteem and changes in internalizing problems: A longitudinal study from fourth through seventh grade. *Learning and Individual Differences, 77*, 101807. https://doi.org/10.1016/j.lindif.2019.101807

Mischel, J., & Kitsantas, A. (2020). Middle school students' perceptions of school climate, bullying prevalence, and social support and coping. *Social Psychology of Education, 23*(1), 51–72. https://doi.org/10.1007/s11218-019-09522-5

Mitic, M., Woodcock, K. A., Amering, M., Krammer, I., Stiehl, K. A. M., Zehetmayer, S., & Schrank, B. (2021). Toward an integrated model of supportive peer relationships in early adolescence: A systematic review and exploratory meta-analysis. *Frontiers in Psychology, 12*.https://doi.org/10.3389/fpsyg.2021.589403

Moore, S. E., Norman, R. E., Suetani, S., Thomas, H. J., Sly, P. D., & Scott, J. G. (2017). Consequences of bullying victimization in childhood and adolescence: A systematic review and meta-analysis. *World Journal of Psychiatry, 7*(1), 60. https://doi.org/10.5498/wjp.v7.i1.60

Morin, A. H. (2020). Teacher support and the social classroom environment as predictors of student loneliness. *Social Psychology of Education, 23*(6), 1687–1707. https://doi.org/10.1007/s11218-020-09600-z

Mowat, J. G. (2019). Supporting the socio-emotional aspects of the primary–secondary transition for pupils with social, emotional and behavioural needs: Affordances and constraints. *Improving Schools, 22*(1), 4–28. https://doi.org/10.1177/1542305018817850

Murray-Harvey, R., Skrzypiec, G., & Slee, P. T. (2012). Effective and ineffective coping with bullying strategies as assessed by informed professionals and their use by victimised students. *Australian Journal of Guidance and Counselling, 22*(1), 122–138. https://doi.org/10.1017/jgc.2012.5

Neale, J. (2016). Iterative categorization (IC): A systematic technique for analysing qualitative data: Systematic technique for analysing qualitative data. *Addiction, 111*(6), 1096–1106. https://doi.org/10.1111/add.13314

Öztürk, N., & Kutlu, M. (2017). The impact of friendship skills psycho-education on the friendship quality of 9–12 year-old students. *Egitim Ve Bilim Ankara, 42*(191), 397–413.

Pandey, A., Hale, D., Das, S., Goddings, A.-L., Blakemore, S.-J., & Viner, R. M. (2018). Effectiveness of universal self-regulation–based interventions in children and adolescents: A systematic review and meta-analysis. *JAMA Pediatrics, 172*(6), 566. https://doi.org/10.1001/jamapediatrics.2018.0232

Papouli, E. (2019). Diversity dolls: A creative teaching method for encouraging social work students to develop empathy and understanding for vulnerable populations. *Social Work Education, 38*(2), 241–260. https://doi.org/10.1080/02615479.2018.1515904

Patton, G. C., Sawyer, S. M., Santelli, J. S., Ross, D. A., Afifi, R., Allen, N. B., Arora, M., Azzopardi, P., Baldwin, W., Bonell, C., Kakuma, R., Kennedy, E., Mahon, J., McGovern, T., Mokdad, A. H., Patel, V., Petroni, S., Reavley, N., Taiwo, K., & Viner, R. M. (2016). Our future: A Lancet commission on adolescent health and wellbeing. *The Lancet, 387*(10036), 2423–2478. https://doi.org/10.1016/S0140-6736(16)00579-1

Pooley, J. A., Breen, L., Pike, L. T., Cohen, L., & Drew, N. M. (2008). Critiquing the school community: A qualitative study of children's conceptualizations of their school. *International Journal of Qualitative Studies in Education, 21*(2), 87–98. https://doi.org/10.1080/09518390701207517

Quy, K., Gibb, J., Neil, L., & Smith, M. (2019). Development and preliminary validation of a self-report coping response measurein a community sample of children in middle childhood. *Journal of Personality Assessment, 102*(5), 628−640. https://doi.org/10.1080/00223891.2019.1606003

Reed, V. A., & Trumbo, S. (2020). The relative importance of selected communication skills for positive peer relations: American adolescents' opinions. *Communication Disorders Quarterly, 41*(3), 135–150. https://doi.org/10.1177/1525740118819684

Ross, K. M., Kim, H., Tolan, P. H., & Jennings, P. A. (2019). An exploration of normative social and emotional skill growth trajectories during adolescence. *Journal of Applied Developmental Psychology, 62*, 102–115. https://doi.org/10.1016/j.appdev.2019.02.006

Ruini, C., Masoni, L., Ottolini, F., & Ferrari, S. (2014). Positive narrative group psychotherapy: The use of traditional fairy tales to enhance psychological well-being and growth. *Psychology of Well-Being, 4*(1), 13. https://doi.org/10.1186/s13612-013-0013-0

Schmidt, J., & Martin, A. (2019). Appearance teasing and mental health: Gender differences and mediation effects of appearancebased rejection sensitivity and dysmorphic concerns. *Frontiers in Psychology, 10*. https://doi.org/10.3389/fpsyg.2019.00579

Seifert, T., & Schulz, H. (2007). The effects of pubertal timing and school transition on preadolescents' Well-Being. *Canadian Journal of School Psychology, 22*(2), 219–234. https://doi.org/10.1177/0829573507302674

Simons, L., Lathlean, J., & Squire, C. (2008). Shifting the focus: Sequential methods of analysis with qualitative data. *Qualitative Health Research, 18*(1), 120–132. https://doi.org/10.1177/1049732307310264

Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin, 129*(2), 216–269. https://doi.org/10.1037/0033-2909.129.2.216

Stanisławski, K. (2019). The coping circumplex model: An integrative model of the structure of coping with stress. *Frontiers in Psychology, 10*, 694. https://doi.org/10.3389/fpsyg.2019.00694

ter Bogt, T. F. M., Engels, R. C. M. E., Bogers, S., & Kloosterman, M. (2010). "Shake it baby, shake it": Media preferences, sexual attitudes and gender stereotypes among adolescents. *Sex Roles, 63*(11–12), 844–859. https://doi.org/10.1007/s11199-010-9815-1

Tuttle, J., Campbell-Heider, N., & David, T. M. (2006). Positive adolescent life skills training for high-risk teens: Results of a group intervention study. *Journal of Pediatric Health Care, 20*(3), 184–191. https://doi.org/10.1016/j.pedhc.2005.10.011

Valiente, C., Eisenberg, N., Fabes, R. A., Spinrad, T. L., & Sulik, M. J. (2015). Coping across the transition to adolescence: Evidence of interindividual consistency and mean-level change. *The Journal of Early Adolescence, 35*(7), 947–965. https://doi.org/10.1177/0272431614548068

van Rens, M., Haelermans, C., Groot, W., & Maassen van den Brink, H. (2018). Facilitating a successful transition to secondary school: (How) does it work? A Systematic Literature Review. *Adolescent Research Review, 3*(1), 43–56. https://doi.org/10.1007/s40894-017-0063-2

Vassilopoulos, S. P., Diakogiorgi, K., Brouzos, A., Moberly, N. J., & Chasioti, M. (2018). A problem-oriented group approach to reduce children's fears and concerns about the secondary school transition. *Journal of Psychologists and Counsellors in Schools, 28*(1), 84–101. https://doi.org/10.1017/jgc.2018.1

Voight, A., & Nation, M. (2016). Practices for improving secondary school climate: A systematic review of the research literature. *American Journal of Community Psychology, 58*(1–2), 174–191. https://doi.org/10.1002/ajcp.12074

Wachs, S., Bilz, L., Fischer, S., Schubarth, W., & Wright, M. (2018). Students' willingness to intervene in bullying: Direct and indirect associations with classroom cohesion and self-efficacy. *International Journal of Environmental Research and Public Health, 15*(11), 2577. https://doi.org/10.3390/ijerph15112577

Weiß, S., & Tritscher-Archan, S. (Eds.). (2011). *The Austrian education system*. Institut für Bildungsforschung der Wirtschaft. https://www.bic.at/downloads/en/brftipps/0_1_bildungssystem_en.pdf

West, P., Sweeting, H., & Young, R. (2010). Transition matters: Pupils' experiences of the primary–secondary school transition in the West of Scotland and consequences for well-being and attainment. *Research Papers in Education, 25*(1), 21–50. https://doi.org/10.1080/02671520802308677

Willig, C. (2013). *Introducing qualitative research in psychology* (3rd ed.). Open Univ Press.

Zammuner, V. L. (2019). Adolescents' coping strategies influence their psychosocial well-being. *Current Journal of Applied Science and Technology, 36*(3), 1–17. https://doi.org/10.9734/cjast/2019/v36i330232

Zeedyk, M. S., Gallacher, J., Henderson, M., Hope, G., Husband, B., & Lindsay, K. (2003). Negotiating the transition from primary to secondary school: Perceptions of pupils, parents and teachers. *School Psychology International, 24*(1), 67–79. https://doi.org/10.1177/0143034303024001010

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Katharina A.M. Stiehl is a PhD candidate at the University of Vienna, Austria. Her main research interests concern positive youth development and mental health literacy research with a focus on empathy, prosocial behaviours, and bullying.

Ina Krammer is a PhD candidate at the University of Vienna, Austria. Her main research interests include positive youth development, peer relationships, stress, and mental health service research.

Beate Schrank is a consultant psychiatrist and trained psychotherapist, with a clinical position the Department of Psychiatry at the University Clinic Tulln. Her main research interests concern the intersection between psychology and social psychiatry, as well as mental health service research.

Isabella Pollak is a PhD candidate at the University of Birmingham, UK. Her main research interests include positive youth development, peer relationships and mental health service research with a focus on outbalancing risk factors concerning social and emotional development.

Giorgia Silani an associate Professor and the deputy Head at the Department of Clinical and Health Psychology at the University of Vienna. Her research concerns neural foundations of social cognition and social emotions, especially empathy and prosocial behaviours, as well as neurobiological mechanisms behind social reward. The focus of her research is both in normal developing and clinical population (especially autism and alexithymia).

Kate A. Woodcock is a Reader at the School of Psychology, University of Birmingham, UK. In her research, she explores how to best support young people in need, i.e., due to neurodevelopmental disorders, neurodiversity, transient or ongoing adversity, socioeconomic or family background.

Authors and Affiliations

Katharina A. M. Stiehl[1,2] · Ina Krammer[1,2] · Beate Schrank[1,3] · Isabella Pollak[1] · Giorgia Silani[2] · Kate A. Woodcock[4]

Ina Krammer
Ina.Krammer@kl.ac.at

Beate Schrank
Beate.Schrank@kl.ac.at

Isabella Pollak
Isabella.Pollak@kla.ac.at

Giorgia Silani
Giorgia.Silani@univie.ac.at

Kate A. Woodcock
papers@katewoodcock.com

1 D.O.T. Research Group for Mental Health of Children and Adolescents, Ludwig Boltzmann Society, Karl Landsteiner University of Health Sciences, Dr.-Karl-Dorrek-Straße 30, 3500 Krems On the Danube, Austria

2 Department of Health and Clinical Psychology, University of Vienna, Vienna, Austria

3 Department of Psychiatry and Psychotherapy, University Hospital Tulln, Tulln an der Donau, Austria

4 Centre for Applied Psychology, School of Psychology, University of Birmingham, Birmingham, UK

A II. Article II – Early Adolescents' Perspectives on Factors that Facilitate and Hinder Friendship Development with Peers at the Time of School Transition

Krammer, I., Schrank, B., Pollak, I., Stiehl, K., Nater, U. M., & Woodcock, K. A. (2023). Journal of *School Psychology, 98*, 113-132. https://doi.org/10.1016/j.jsp.2023.03.001

Journal of School Psychology 98 (2023) 113–132

Contents lists available at ScienceDirect

Journal of School Psychology

journal homepage: www.elsevier.com/locate/jschpsyc

Early adolescents' perspectives on factors that facilitate and hinder friendship development with peers at the time of school transition

Ina Krammer [a,b,*], Beate Schrank [a,c], Isabella Pollak [a], Katharina A.M. Stiehl [a,b], Urs M. Nater [b], Kate A. Woodcock [d]

[a] D.O.T. Research Group for Mental Health of Children and Adolescents, Ludwig Boltzmann Society at Karl Landsteiner University of Health Sciences, Krems on the Danube, Austria
[b] Department of Health and Clinical Psychology, University of Vienna, Vienna, Austria
[c] Department of Psychiatry and Psychotherapy, University Hospital Tulln, Tulln, Austria
[d] Centre for Applied Psychology, Institute for Mental Health, School of Psychology, University of Birmingham, Birmingham, United Kingdom

ARTICLE INFO

Editor: Craig A. Albers
Action Editor: Desireé Vega

Keywords:
Early adolescence
Friendship
Participatory research
Qualitative analysis
School transition
Peer relationship

ABSTRACT

Supportive peer relationships are fundamental for mental health and well-being. Hence, peers and friends are a valuable resource, especially at the time of transition from primary to secondary school. Yet, current literature lacks both novel approaches to studying friendship development and how to involve early adolescents in research that is being conducted about them. Within the present study we used novel participatory research methods involving early adolescents who were active in the analysis of their own generated data. We aimed to better understand their perspectives on factors that facilitate and hinder friendship development with peers during the time of school transition between primary and secondary schools. A total of 916 pupils (M_{age} = 10.44 years, range = 9–16) participated in 54 participatory workshops that were conducted in Austria. We used reflexive thematic analysis to analyze qualitative data from portions of a large series of participatory workshop activities. Moreover, we actively involved participants in the analysis of their own generated data. Themes were structured into personal, interpersonal, and external factors. We found that early adolescents valued kind peers that (a) give them a feeling of safety, (b) show supportive and empathic actions, (c) manage conflicts, (d) avoid negative behavior, (e) spend time with them, and (f) communicate in the offline and online environments. Although shared norms of behavior can support friendship development, friendship jealousy and tolerating bigger friendship groups were identified as important potential barriers. Additionally, external factors (i.e., given circumstances), such as similarities, physical proximity, and duration of acquaintance were included in our data but were perceived as less important by early adolescents. Our results supplement the existing peer relationship literature by showing which factors early adolescents themselves chose as most relevant for friendship development. We conclude with a discussion regarding the implications for school psychology practice and future research.

* Corresponding author at: D.O.T. Research Group for Mental Health of Children and Adolescents, Ludwig Boltzmann Society at Karl Landsteiner University of Health Sciences, Dr.-Karl-Dorrek-Straße 30, 3500 Krems on the Danube, Austria.
E-mail addresses: ina.krammer@dot.lbg.ac.at, ina.krammer@kl.ac.at (I. Krammer), beate.schrank@kl.ac.at (B. Schrank), isabella.pollak@kl.ac.at (I. Pollak), katharina.stiehl@kl.ac.at (K.A.M. Stiehl), urs.nater@univie.ac.at (U.M. Nater), papers@katewoodcock.com (K.A. Woodcock).

https://doi.org/10.1016/j.jsp.2023.03.001
Received 5 February 2021; Received in revised form 27 September 2022; Accepted 3 March 2023
Available online 1 April 2023
0022-4405/© 2023 The Authors. Published by Elsevier Ltd on behalf of Society for the Study of School Psychology. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

The fundamental motivation for social relationships and belonging is an essential part of healthy human development (Allen et al., 2022; Baumeister & Leary, 1995). Social relationships are linked to better health, which reduces the risk of heart disease, depression, and mortality (Howick et al., 2019). Social isolation, loneliness, and low social support have correspondingly negative effects that predict increases in severity of symptoms of ill health, development of mental illnesses, and mortality (Holt-Lunstad et al., 2015; Richardson et al., 2017; Wang et al., 2018). Thus, understanding factors that facilitate and hinder the development of social relationships is vitally important for promoting health and well-being. This article focuses on individuals who were at the transition from primary to secondary school, hereafter referred to as early adolescents.

1.1. Early adolescence, social isolation, and mental health

During early adolescence, friends and peers are significantly relevant for social, emotional, and cognitive development (Lamblin et al., 2017; Rubin et al., 2015). Early adolescents spend a large amount of time with peers at school and outside of school, which increases their separation from parents and boosts their autonomy and identity exploration (Hazen et al., 2008; Larson & Richards, 1991). Yet, the multiple developmental changes in early adolescence (e.g., development of autonomy, perspective taking, physical maturation) are challenging and can increase the risk of social isolation and loneliness (Laursen & Hartl, 2013). Social isolation and loneliness that occur during early adolescence, in turn, are associated with poor mental health outcomes, such as depression and anxiety (Loades et al., 2020). The lifetime prevalence rates for depressive and anxiety disorders during early adolescence is alarmingly high, reaching 21.77% in Austria (Wagner et al., 2017). Two related and important protective factors against the development of poor mental health outcomes during early adolescence include friendships and supportive peer relationships, which have been found to reduce the risk for depression and anxiety disorders (Klineberg et al., 2006; Mitic et al., 2021).

1.2. Friendships and supportive peer relationships

Early adolescents spend a lot of time at school, which makes the educational environment an important social environment for friendship development with peers. In a recent review, Roach (2019) pooled existing literature from different disciplines on adolescents' definitions of friendship, concluding that friendship encompasses attributes of support, intimacy, affection, trust, ability to manage conflict, and time. These attributes of friendship persist in digital interactions as well, making the online environment as relevant as the offline environment (Yau & Reich, 2018). Compared to friends, peers at school might get along well and spend a lot of time and do group activities together, but conversations are primarily school-related and lack attributes of intimacy and support (Roach, 2019). Nonetheless, early adolescents spend most of the time at school among peers, which makes peers, in addition to friends, a valuable resource. Accordingly, friendships and supportive peer relationships predict both mental health and well-being (Heinsch et al., 2020; Lester & Cross, 2015). Thus, this study aimed to better understand factors that facilitate and hinder friendship development.

1.3. School transition from primary to secondary school

Having supportive peers one can turn to in stressful times may help to overcome the difficulties they are experiencing and lead to health benefits (Kendrick et al., 2012; Lyell et al., 2020). During the transition from primary to secondary school, support from friends is a relevant predictor for well-being and school satisfaction across cultures (Oriol et al., 2017). However, school transition often leads to changes in the school environment, including, for example, bigger schools, more subjects and teachers, and new peers (Symonds & Galton, 2014). This period is marked with unstable and fractured peer networks (Ng-Knight et al., 2019). Although some friendships endure because early adolescents transit to the same school, stay connected via digital media channels (e.g., chat services, social network sites, online games), or because pre-existing family connections keep them close, other friendships rupture due to being assigned to different schools or classes (Mittmann et al., 2021; Weller, 2007). After transition, pupils must deal with new class compositions at school, which necessitates the negotiation of group affiliations and friendships with classmates (Rice et al., 2011). Making friends, belonging to a group of peers, and fitting in are some of the primary concerns that early adolescents mention at the time of their school transition (Curson et al., 2019; Pratt & George, 2005; Weller, 2007). Experiencing inclusion in the peer group and school belonging significantly relates to friendship (Mitic et al., 2021). Early adolescents without friends experience their school environment as more threatening and unsafe (Lessard & Juvonen, 2018). In fact, friendlessness, clique isolation, and loneliness during early adolescence have negative long-term consequences, such as internalizing difficulties (i.e., depressive symptoms, social anxiety, and low self-esteem; Lessard & Juvonen, 2018; Loades et al., 2020; Qualter et al., 2013; Witvliet et al., 2010) and deficits in social skills (Schinka et al., 2013). Thus, understanding factors that facilitate and hinder friendship development at the time of school transition from primary to secondary schools is an important aspect within school psychology.

1.4. Digital media

The use of digital media among adolescents significantly increases during the school transition from primary to secondary schools and many early adolescents extensively use their smartphone to communicate and stay connected with their friends and peers (Davis,

2012; Mittmann et al., 2021). Digital gaming, as well as casual and intimate online communication, are new ways to increase belonging and improve offline peer relationships (Davis, 2012; Mittmann et al., 2021). For example, after the school transition when peers need to form new friendships and get to know their classmates, discovering a common identity as digital gamer makes the development of offline peer relationships 1.5 times more likely (Eklund & Roman, 2017). Consequently, digital media has an impact on early adolescents' relationships with peers and friends and might be particularly relevant during the school transition.

1.5. Negative effects of peer victimization and rejection

Although friends and peers can be a supportive resource and can make school and life more fun (Kostenius & Öhrling, 2008; Persson et al., 2016; Sotardi, 2017), early adolescents also face challenges with peers in their offline and online social environments. For example, conflicts, bullying, and victimization (Curson et al., 2019; Sotardi, 2017; Sumter et al., 2012) often occur during this time. Across American, European, and Asian countries the prevalence rates of any kind of victimization (traditional and/or cybervictimization) reaches 20%–30% during early adolescence (Chudal et al., 2022; Hasan et al., 2023; Li et al., 2020). At the time of school transition, early adolescents look forward to making new friends, yet they have concerns about victimization and social exclusion (Curson et al., 2019; Zeedyk et al., 2003). Early adolescents who experience bullying in primary school are particularly at risk for facing similar experiences in secondary school (Fujikawa et al., 2021). Several studies with diverse populations across childhood and adolescence have shown that different kinds of victimization (e.g., physical, verbal, cyber bullying) are significantly associated with maladaptive functioning, depression, and loneliness (Baier et al., 2019; Halliday et al., 2021; Hawker & Boulton, 2000; Sumter et al., 2012; Wang et al., 2012). Furthermore, peer rejection and (cyber) victimization during childhood and early adolescence can have negative long-term consequences persisting into adolescence and adulthood (e.g., depression, anxiety disorders, criminal justice system involvement; Bettencourt et al., 2023; Copeland et al., 2013; Halliday et al., 2021; Lev-Wiesel et al., 2006; McDougall & Vaillancourt, 2015). Yet, with the transition to secondary school, the prevalence of bullying declines (Fujikawa et al., 2021), which makes school transition a promising time to promote and emphasize supportive peer relationships at school.

1.6. Positive effects of friendships and supportive peer relationships

A recent systematic literature review identified friendships and peer relationships as facilitating factors for successful school transition and concluded that early adolescents should be supported in the development of friendships with peers at school (van Rens et al., 2018a). In qualitative studies, early adolescents have reported on the personal importance of friendships for enhancing self-esteem, confidence, and mental health when facing challenging times and feeling vulnerable (Curson et al., 2019; Pratt & George, 2005; Weller, 2007). In addition, quantitative studies show that supportive peer relationships can explain psychological well-being and reduce vulnerability to depressive symptoms (Buchanan & Bowen, 2008; Burke et al., 2017; Maunder & Monks, 2019). Overall, both feeling accepted by peers and getting along well with peers have protective long-term effects on self-esteem across early adolescence and young adulthood (Birkeland et al., 2014). Thus, friends and peers are a vital resource for personal and health development in early adolescence, particularly in challenging times, such as during the school transition between primary and secondary schools.

Although the relevance of friends and peers is evident during this school transition, early adolescents report receiving limited instruction on *how* to establish friendships with peers (van Rens et al., 2018b). In fact, early adolescents have reported the wish to talk about friendships and the desire to receive health promotion activities that build and strengthen peer relationships (Kostenius & Öhrling, 2008; Persson et al., 2016). Hence, understanding factors that facilitate and hinder friendship development with peers during early adolescence and school transition is of particular interest to inform future interventions and school psychology practice.

1.7. Participatory research approach

From an ecological perspective, as postulated in Bronfenbrenner's ecology of human development (Bronfenbrenner, 1979), the school environment is an essential context when aiming to understand early adolescents' peer relationships. Friendships typically exist between one's own classmates (George & Hartmann, 1996), which makes classrooms an important social environment for studying the development of supportive peer relationships. This is especially true for Austria because pupils at the same grade levels are usually split into classes, where they stay together for several years.

Although most studies employ quantitative methods (e.g., questionnaires, social network analysis, peer nominations) to study peer relationships and friendships (Gifford-Smith & Brownell, 2003), research in educational settings that involves younger populations needs to adapt traditional methods to enhance involvement and scientific output (Lundqvist, 2014). Innovative data collection methods, such as visualizations (e.g., drawings) and informal discussions (e.g., workshops), are essential for gaining insights from early adolescents' lives (Lundqvist, 2014). These innovative approaches can not only benefit research, but also promote new social experiences and open interactions among participants themselves (Halliday et al., 2019; Lundqvist, 2014). We think that early adolescents are experts by experience and can best describe their perspectives and needs when involved adequately in participatory, as opposed to traditional, data collection methods. Thus, we wanted to give early adolescents a voice and make their needs visible to respect the fundamental rights of children and adolescents (United Nations, 1989). Yet, only a few studies have considered students' voices in their research (e.g., de Leeuw et al., 2018; Halliday et al., 2019). The present study aimed to close this gap by employing innovative data collection methods (i.e., participatory workshop activities) to understand factors that facilitate and hinder early adolescents' friendship development.

Although early adolescents have been involved in different research processes addressing health-related topics, such as substance

abuse, social skills, physical activity, or nutrition (Larsson et al., 2018; Rouncefield-Swales et al., 2021), to our knowledge, this is the first study on friendship development that actively engaged participants in a decision-making process around data they have generated themselves over the course of data collection. We acknowledge early adolescents as active participants in research about them with a right to be heard and taken seriously (Lansdown et al., 2014; United Nations, 1989). Our participatory data collection methods increased the likelihood that early adolescents were able to share their feels and thereby inform researchers and school psychology practitioners about their perspectives on factors that facilitate and hinder friendship development. Overall, our integrative approach can serve as a baseline for early adolescents-informed intervention development on how to make friends.

The research aim of the present study was to understand factors that facilitate and hinder friendship development during the transition between primary and secondary school levels. Specifically, we attempted to identify those factors that early adolescents self-selected as most relevant by involving them in a decision-making process around data that they generated. Given that digital media use significantly increases during this school transition, we also aimed to understand its possible role in friendship development.

2. Method

2.1. Research design

We conducted a qualitative study that employed a reflexive thematic analysis (Braun & Clarke, 2006, 2019). The aim of this approach was to achieve a rich description of narrative comments from 916 students and from observations of 54 participatory workshops that were conducted to understand factors that facilitated and hindered friendship development among participants in our sample. Qualitative data were collected as part of participatory workshops with the aim of understanding friendship development, the experience of school transition, the role that social media plays during school transition, and peer relationships. Overall, the participatory workshops were designed to understand early adolescents' needs to facilitate and develop meaningful interventions within this area.

This study also employed a participatory research approach, inspired by the participatory design approach (Hagen et al., 2012) that provides a framework for the involvement of young people at various stages of intervention development. In particular, the first two steps (i.e., identifying and defining the problem), from the perspectives of early adolescents, were included in the participatory workshop activities. We examined guidelines for public and patient involvement, engagement, and youth involvement to identify an appropriate level of involvement for early adolescents (e.g., Kaisler & Missbach, 2019; Kirby, 2004). The level of engagement that we utilized was selected to allow for the involvement of a large number of adolescents so that broadly held perspectives potentially important in universal intervention development could be identified.

2.2. Participatory workshop design

The participatory workshop (90 min) was conceived by a European interdisciplinary research team (D.O.T. Research Group; https://dot.lbg.ac.at/). The workshop's structured content included seven different participatory workshop activities focusing on three main topics, including (a) peer relations, (b) school transition, and (c) digital media. Participatory workshop methods were based on participatory and arts-based methods literature (e.g., Colucci, 2007; Foster et al., 2018; Lundqvist, 2014) and practical experience from multiple disciplines (e.g., psychology, psychiatry and therapy, child theatre arts). The participatory workshop manual is available in a data repository (see osf.io/2u7r4) to increase clarity, transparency, and reproducibility of our participatory workshop methods.

The participatory workshops were designed to provide information that could be used in intervention development. The main purpose of these workshops was to involve early adolescents in research by giving them a voice to express different views regarding the school tranistion as a way to better understand what content they deemed as essential for future interventions focused on peer relations, school transition, and digital media. The aim was to better understand (a) how early adolescents develop friendships with peers, (b) how they expected to or actually experienced their school transition, and (c) what role social media played during their school transition and with their peer relationships. The methods of delivery allowed pupils to voice their opinion in different ways, thereby creating a safe space for expressing and listening to each others' views. Although the participatory workshops were not an intervention in itself, they were designed to heighten participants' awareness of their peer relationships during the primary to secondary school transition and the corresponding role of digital media during this time.

Feasibility and acceptability of the workshop activities were tested in two pilot participatory workshops conducted in September 2018. After these pilot workshops, the participatory workshops were adapted and optimized. For example, based on the pilot workshops, a story task was modified into a focus group discussion because the activitiy as originally designed resulted in participants telling fantastical stories that were unsuitable to inform intervention development. Following optimization, all participatory workshops included in this study were conducted between October and December 2018. The participatory workshops were led by two main workshop leaders (including at least one member of the D.O.T. Research Group) and supported by 1–4 workshop assistants depending on the overall group size. Workshop leaders and assistants participated in a full-day training that included discussions of theoretical and practical componets that was led by two members of the D.O.T. Research Group (first and third author). Participatory workshop manuals were distributed, followed by a discussion regarding the theoretical background and aims of the workshop activities. Workshop leaders and assistants role-played each activity themselves and offered time to reflect and provide feedback where appropriate. Workshop leaders and assistants were undergraduate students in the fields of psychology, movement pedagogy, and music therapy, and all were experienced in working with children. Workshop leaders and assistants received continuous supervision throughout the duration of the participatory workshops. To maximize fidelity, participatory workshops were conducted according to a

detailed written manual defining mandatory workshop components, as well as flexible activities (e.g., movement games, body percussion) that could be used to respond to specific group needs, such as restlessness (see osf.io/2u7r4 for materials available in the data repository). The present study only analyzed data from two (i.e., Peer Support and Establish a Friendship) of the seven total participatory workshop activities.

2.2.1. Description of the Peer Support Participatory Workshop Activity

In the Peer Support activity (5–10 min), the workshop leaders created a big poster with the entire class (containing 6–25 pupils) all sitting in a circle around it. The workshop leaders led the discussion by asking how the pupils could support classmates or other children of the same age, for example, when feeling sad, alone, or uncomfortable, and what kind of support they would wish to receive from their peers when feeling this way themselves. Students' ideas were collected on post-it notes (written by the workshop leaders) in the group setting and then were attached to the poster. This procedure was repeated several times. Following this, all students received their own post-it note and were encouraged to write down any additional ideas that they could think of that were not already mentioned or that they did not want to say aloud in the group setting. The workshop assistants observed this activity and used their structured observation sheet to record verbatim quotes of mentioned ideas and further relevant information on, for example, dialogues occurring between participants that referred to an idea to record on the post-it notes. In two participatory workshops the Peer Support activity was not conducted because of insufficient time, resulting in 52 workshops being included for the final analysis.

2.2.2. Description of the Establish a Friendship Participatory Workshop Activity

The Establish a Friendship activity (10–15 min) was conducted in smaller groups that consisted of 3–6 students led by one workshop leader or assistant. To maximize willingness to engage and disclose information, the formation of the small groups was part of a dynamic group game that occurred earlier in the participatory workshop and resulted in self-chosen working groups. The aim of the activity was to write down as many ideas as possible relating to the following questions: "Why are you (best) friends with someone and what helps to make friends?" (written on green post-it notes), "What stops a friendship?" (written on red post-it notes), and "Why are you not (best) friends with someone?" (written on red post-it notes). Students were also encouraged to share other personal experiences of friendship.

Students then engaged in a decision-making process about their own generated data (Task 2). Students were asked to review their self-generated ideas that were already written on post-it notes and decide on the most important facilitating (written on green post-it notes) and hindering (written red post-it notes) aspects in a friendship. The self-selected most important facilitating and hindering ideas were collected on a poster and photographed so that researchers could identify this subset of ideas for a later analysis. All pupils participated in the Establish a Friendship activity.

2.3. Participant recruitment

The Lower Austrian Department of Education supported recruitment and provided a list of schools potentially interested in participating. In addition, we recruited schools via flyer distribution, postings in social media networks, and networking with teachers. After initial school contact via electronic mail, we established direct contact with principals and teachers via phone calls or in-person meetings. Schools interested in participating needed to be located across Lower Austria. Eligibility criteria for student participation included being (a) enrolled in the last year of primary school, (b) enrolled in the first year of secondary school, or (c) a pupil who recently experienced the transition from primary to secondary levels (e.g., students with special needs). Although schools participated on a voluntary basis, they were purposefully chosen to represent a wide range of (a) school types (i.e., primary schools, secondary schools, and special needs schools; distribution of schools presented below in "Participating Sample") and (b) school sites to reach schools of different sizes and pupils with urban or rural backgrounds (see below in description of "Participating Sample"). No personal relationships existed between principals or pupils of eligible schools and researchers and thus could not impact on the results.

2.4. Participating sample

A total of 916 pupils (a) from the last year of primary, (b) from the first year of secondary schools, or (c) who otherwise recently experienced a transition from primary to secondary levels participated in the study. Before participation, parents of participants provided written informed consent and participants received verbal information regarding the project that included an emphasis on voluntary participation; participants then provided verbal assent if they wished to continue with the project. The study received ethical approval by the ethics committee of the University of Music and Performing Arts in Vienna (EK-Nr. 10/2018) and all data were de-identified for analysis.

Participants' mean age was 10.44 years (range = 9–16; $SD = 0.912$; 52% male, 44.5% female; 3.5% missing data). Of note, the mean age and standard deviation of ages reflects our focus on recruiting participants from the years immediately before and immediately following the school transition in Austria. However, because we deliberately did not exclude special need schools so as to represent the broad range of pupils who experience transitions between primary and secondary levels, the oldest participants were 16 years old ($n = 17$ students were 13 years; $n = 8$ students between ages 14–16 years). Age was gathered in a questionnaire that was distributed at the end of the participatory workshop. In Austria, pupils typically experience the primary to secondary school transition up to age 12 years. Key teachers selected these older participants as being eligible because they recently experienced a school transition or repeated a school year and were therefore in the eligible school year. In sum, 54 participatory workshops were conducted that included 29 different schools (26 public, 3 private schools; 45% rural, 55% urban area) across Lower Austria.

In Austria, children complete 4 years of primary school and then move to secondary schools. Two distinct school types for secondary education exist, including (a) new secondary schools (in Austria called *Neue Mittel Schule* [NMS]) and (b) academic secondary schools (in Austria called *Allgemeinbildende Höhere Schule* [AHS]). NMS are attended by 10–14-year-olds, whereas AHS can be attended by 10–18-year-olds; upon completion of the AHS, a certificate that allows admission to a university is awarded. Additionally, special needs schools exist; these schools cover 9 years of compulsory education for children with diverse cognitive and physical disabilities, learning difficulties, and behavioral difficulties (Bundesministerium für Bildung, 2022). In the present study, the distribution of school types was 22% primary schools, 71% secondary schools (56% NMS, 15% AHS), and 7% special needs schools.

Table 1
Excerpt of themes and subthemes with example codes and examples of interpersonal factors that facilitate friendship development.

Theme	Subtheme	Example codes	Examples
Interpersonal factors			
Feeling of safety	Truthfulness	• Say truth • Be truthful	"say the truth" [WS 21], "keep secrets" [WS 5]
	Continuity & protection	• Provide continuous support	"be there for her, if she is not doing well - go through thick and thin with her" [WS 39], "one can always rely on friends" [WS 49]
	Disclosure	• Personal secrets • Keep secrets	"discuss secrets that you cannot discuss with others, e.g., be in love with sb" [WS 19], "being able to tell secrets and to keep them" [WS 31]
	Reciprocity	• Work as team • Mutuality	"teamwork" [WS 6], "listen to one another" [WS 54],
	Common ground	• Be on good terms	"get along well with each other" [14 mentions, e.g. WS 17], "if you like someone" [WS 29]
Supportive & empathic actions	General support strategies	• Help • Console	"help" [49 mentions], "console" [46 mentions]
	Empathic actions	• Model function • Perspective taking	"play with children who get excluded and show the others that you can play with them as well" [WS 22], "try to put yourself in the position of others" [WS 45]
	Practical assistance	• Help out • Practical support	"when I broke my clavicle, friends carried my backpack for me" [WS 33], or "when I forget my pens at home, someone in my class lend me one" [WS 51]
	Make presents	• Make presents	"make somebody a present" [WS 7], "bring a birthday cake, when it's someone's birthday" [WS 9]
	Help with schoolwork	• Help with homework • Help at school	"help with homework, if he doesn't know what to do" [WS 2], "if someone is new in school, show him everything" [WS 25]
	Encouraging words	• Motivate • Encourage	"tell things that someone has done well in life" [WS 37], "everything will be alright" [WS 33]
	Caring hug	• Physical closeness	"hug best friend" [WS 53], "cuddle" [WS 26]
	Emergency help	• Help when hurt	"if someone falls, you get help" [WS 23], "I once fell off a tree and my friend got help immediately" [WS 52]
	Help to find friends	• Help to find friends	"help someone to find a friend" [WS 14], "another child or adult can help, if you don't have friends" [WS 41]
Conflict management	Avoiding negative behavior	• Not annoy • Not insult	"not annoy someone" [WS 27], "don't insult" [10 mentions, e.g., WS 8]
	Acceptance & tolerance	• Accept more friends	"do not exclude someone if he has other friends as well" [WS 51], "if you look for new friends, do not abandon old friends" [WS 54]
	Overcoming conflicts	• Apologize • Accept apologies	"If something happens by accident, you still always have to apologize" [WS 31], "accept an apology or apologize, if you argue" [WS 52]
	Knowing & accepting boundaries	• Accept small badinages • Be yourself	"sometimes we annoy each other" [WS 26], "not have everything in common, because you don't need to have the same things to be friends" [WS 48]
	Defense	• Defend	"if people bully you, that others don't join in, but are on my side" [WS 40], "if people get excluded that you help" [WS 22]
Establish contact & spend time with peers	Common activities	• Play together • Spend time together	"play together" [45 mentions, e.g., WS 2], "spend time together, e.g., play, swim, go to a spa, play football" [WS 21]
	Communication	• Talk	"when people say 'let's be friends'" [WS 10], "ask if he had a nice weekend" [WS 28]
	Shared positive emotions	• Have fun • Share positive emotions	"have fun together" [35 mentions, e.g., WS 5], "tell jokes to each other to become happier" [WS 24]
	Invitations & visits	• Invite • Visit	"invite to birthday party" [WS 10], "invite people home" [WS 32]
	Frequency	• Regular meetings	"when people do everything together" [WS 20], "keep in touch, even if you don't see each other, use your phone" [WS 51]

2.5. Data sources

Data were generated as part of the participatory workshop activities and collected on post-it notes and/or structured observation sheets. While workshop leaders gathered data on post-it notes and summarized ideas and responses, workshop assistants took notes on structured observation sheets and wrote down pupils' responses verbatim. Thus, structured observation sheets functioned as transcripts of pupils' responses; behavioral indicators were not of interest. Members of the D.O.T. Research Group (first and third author) regularly monitored the data quality and provided individual and/or group feedback to workshop leaders and assistants. The present study analyzed data from two (i.e., Peer Support and Establishing a Friendship) out of the seven total participatory workshop activities.

2.6. Data analysis

2.6.1. Overall analytic approach

A reflexive thematic analysis (Braun & Clarke, 2006, 2019) was conducted with a realist approach designed to describe and therefore understand meanings and the reality of the participants (Braun & Clarke, 2006). Given that the views of participants were not known, we aimed to produce a rich description of the narrative comments from 916 students and observations of 54 participatory workshops (Braun & Clarke, 2006). Utilizing this approach, we analyzed the dataset for patterns of shared meaning which allowed us to generate themes. Themes are interpretive stories about the data (Braun & Clarke, 2019), and as such, our analytic narrative goes beyond description and we fully acknowledge our active role in theme generation. Additionally, this analytic approach allowed us to analyze the prevalence of themes across the data of 54 participatory workshops (Braun & Clarke, 2006), providing an indication of the extent to which they represent the perspectives of our whole sample of participants. Note that the reflexive thematic analysis was conducted by researchers only without involving early adolescents in the theme development. Instead, early adolescents were involved in data analysis during the workshops through the decision-making process by examining what they deemed as the most important facilitating or hindering aspects for friendship development. This subset of important data, self-selected by early adolescents, informed the scope of an additional analysis of prevalence to make those factors visible that early adolescents chose as most relevant for themselves.

2.6.2. Data preparation and initial analysis

Structured observation sheets were digitalized and post-it notes were transferred into Microsoft Word documents; electronic documents were imported and analyzed in the QSR International's NVivo 12 qualitative data analysis software. Data were coded on a semantic level to summarize surface meaning of the data. The process of coding was data-driven; therefore, themes were identified following an inductive approach (Braun & Clarke, 2006). Only the first author coded and structured data in the NVivo qualitative data analysis software. However, several authors (including the second, fourth, and sixth authors) were involved in discussions as part of the analytic process, that is, discussing the coherence of themes in collaboration to develop well differentiated reading of the data. This collaborative approach is a standard procedure when conducting reflexive thematic analysis in teams (Braun & Clarke, 2019). First, the first author familiarized herself with the data. Then, in an iterative process, the first author generated codes, identified themes, and reviewed the coherence of themes with her team (including the first, second, fourth, and sixth authors). This analytic process ended when data were organized into coherent, consistent, and distinct themes that resulted in clear definitions and names for each theme (Braun & Clarke, 2006). Table 1 illustrates themes, subthemes, example codes, and examples of the qualitative data to illustrate the analytic process. The initial coding structure was based on data from structured observation sheets (i.e., notes taken during the activity Peer Support) because written verbatim notes on structured observation sheets yielded richer insights into conversations and dialogues between workshop leaders and participants. After structured observation sheets from 32 participatory workshops were coded, no new codes were identified. As coding was considered as repetitive, the decision was made that code saturation was achieved (Hennink et al., 2017). This coding structure served as a basis for coding themes from the obtained post-it notes. Given that the themes from post-it notes corresponded to those obtained in the structured observation sheets, data from structured observation sheets were not included in any further analysis.

2.6.3. Analysis of prevalence

The final set of themes were analyzed for prevalence, according to Braun and Clarke (2006), to facilitate reporting and interpretation of the entire dataset. Prevalence was counted at the participatory workshop level (i.e., Did a theme appear anywhere in each participatory workshop?) and expressed as a percentage. Prevalence was not counted at the participant level (i.e., how many participants mentioned a theme) because participants could be primed or influenced by previous remarks due to the specific approach of inquiry of this study (i.e., group discussions instead of one-on-one interviews).

First, the entire dataset was analyzed for prevalence to assess the relevance of factors reported to facilitate and hinder friendship development. We termed this the *overall prevalence analysis*. Second, we conducted another prevalence analysis on the final set of themes (as developed by the researchers); however, this time the most important facilitating and hindering factors self-selected by early adolescents (as explained in the participatory workshop activity Establish a Friendship [Task 2]) informed the scope of the prevalence analysis. Given that early adolescents' decision-making processes were the participatory component in Task 2, we termed this *participatory prevalence analysis*.

Third, to determine the relevance of digital media as a facilitating or hindering factor for the development of supportive peer relationships, content that explicitly referred to digital media received an additional code termed "digital media". Hence, an analysis of prevalence was conducted to identify themes that included digital media content.

2.6.4. Researcher positionality statement

Several white middle-class researchers (early career and senior) and graduate students contributed to this project. All early career researchers (including the first, third, and fourth authors) received graduate level education covering qualitative research methods and a 2-day NVivo training. These early career researchers were doctoral students in the D.O.T. Research Group and held a master's degree in psychology. All senior researchers (including the second, fifth, and sixth authors) had experience in qualitative and quantitative research, the development and evaluation of interventions, and were in some form involved in the doctoral supervision of the first author. The second author was a consultant psychiatrist and trained psychotherapist. Her research has focused on the interface between psychology and (social) psychiatry. The fifth and sixth authors were research psychologists. The fifth author has focused on stress research, whereas the sixth author has focused on young people who are in need. The first author's close linkage between participatory workshop delivery and data analysis required high self-reflective skills and structured working, which could be achieved via a manualized workshop, supervision from senior researchers, and reflective group discussions. However, given the nature of the data (verbatim quotes of students consisting of single words and short phrases), the first author was able to use the experiences gained and direct contact with early adolescents in classrooms to enrich the understanding of the collected data.

2.6.5. Trustworthiness

We followed recommendations for conducting rigorous thematic analysis by Nowell et al. (2017) and Smith and McGannon (2018) to increase trustworthiness of our qualitative research. We engaged in peer debriefing, researcher triangulation, and regular team meetings to reach consensus on themes. Reflexive thematic analysis is an approach that values researcher subjectivity as a resource and argues against testing inter-rater reliability (Braun & Clarke, 2019). Instead, we established "critical friends", who vetted the clarity of themes, and offered critical feedback on theme development as suggested by Smith and McGannon (2018). Our critical friends were external (fifth author) and internal researchers (second, fourth, and sixth authors) who challenged the first author's analytical process and theme development in regular meetings, resulting in intensive discussions.

To further increase trustworthiness and transparency of our data, transcripts of post-it notes and structured observation sheets are available in an open data repository (see osf.io/avtw2). In the Results section we link qualitative data to the original data source to increase transparency. For example, "You must help your friends all the time" (WS 31) indicates that this data originated from Participatory Workshop 31.

2.6.6. General Coding Structure

To facilitate reporting and interpretation of results, we structured the data into two strands based on an overview of initial generated codes. Strand A describes factors that were reported to facilitate friendship development, which includes data from the Peer Support activity and the Establishing a Friendship activity (green post-it notes). Strand B describes factors reported to hinder friendship development, which includes data from the activity Establish a Friendship (red post-it notes). Strand A and B were further organized into three main clusters, including (a) personal, (b) interpersonal, and (c) external factors. Personal factors included descriptions of personal and emotional characteristics. Interpersonal factors comprised different behavioral aspects or strategies, which involved or required the participation of at least two people. External factors encompassed specific circumstances or aspects that could not be influenced or readily changed by early adolescents themselves. Table 1 provides examples of codes generated within this structure.

3. Results

Table 2 summarizes the general coding structure and presents the main themes. Overall, factors that facilitated friendship

Table 2
Coding structure – corresponding themes on opposite sites.

Strand A - Factors That Facilitate Friendship Development		Strand B - Factors That Hinder Friendship Development
Personal Factors		
Attractive personal characteristics Attractive emotional patterns	↔	Unattractive personal characteristics Unattractive emotional patterns
Interpersonal Factors		
Feeling of safety Supportive and empathic actions Conflict management Establishing contact & spending time with peers	↔	Absence of safety Malicious and deceitful actions Bad conflict management Lack of shared time & communication
External Factors		
Given supportive circumstances	↔	Given hindering circumstances

development often corresponded to the opposite factors that hindered friendship development (see Table 2). For example, the theme "supportive and empathic actions" encompassed a variety of positive actions for friendship development, whereas the theme "malicious and deceitful actions" encompassed a variety of hindering actions for friendship development.

3.1. Strand A: Factors that facilitate friendship development

Fig. 1 depicts factors that participants reported as being facilitative for friendship development, ordered by prevalence according to the overall prevalence analysis. Fig. 1 also illustrates the participatory component of the data analysis, emphasizing subthemes that became most relevant according to the participatory prevalence analysis.

In general, the relevance of subthemes in the participatory prevalence analysis corresponded well to that of the overall prevalence analysis. However, minor discrepancies arose in the theme "feeling of safety". Although "truthfulness" was still given the highest priority, "reciprocity", "disclosure", and "continuity and protection" changed in the order of relevance. In the overall prevalence analysis, these three subthemes appeared equally important (they share an almost identical percentage), whereas the participatory prevalence analysis suggested a clearer order with "reciprocity" appearing before "disclosure" and with "disclosure" coming before "continuity and protection". Furthermore, within the external factors cluster, "local proximity" was second in the overall prevalence analysis, with the participatory prevalence analysis indicating that "duration of acquaintance" was the second most important external factor. Overall, the participatory prevalence analysis indicated that "kindness" was self-selected by early adolescents as the most important factor for friendship development, followed by "truthfulness", "common activities", and "general support strategies" (see Fig. 1).

3.1.1. Personal factors

Attractive personal characteristics. Friendship development was facilitated by having an attractive personality. Such a personality comprises a subjective sense of treating each other well alongside specific features – which may vary across individuals – that engender dependability and respect. In over 90% of participatory workshops (see Fig. 1), early adolescents described supportive peers using words that conveyed a subjective impression of a person who treats others well. We termed this "kindness" as early adolescents described supportive peers as "nice", "kind", "friendly", and "helpful" persons. The personal characteristic "kindness" was linked with supportive interpersonal behavior that facilitated friendship development. For example, kind peers "console others" (WS 5), "lend things or make presents" (WS 27; subtheme "supportive and empathic actions"), "don't rant, don't hit" (WS 42; subtheme "avoiding negative behavior"), do "not touch *my* books" (WS 32; subtheme "knowing and accepting boundaries"), and "ask if *you* are alright

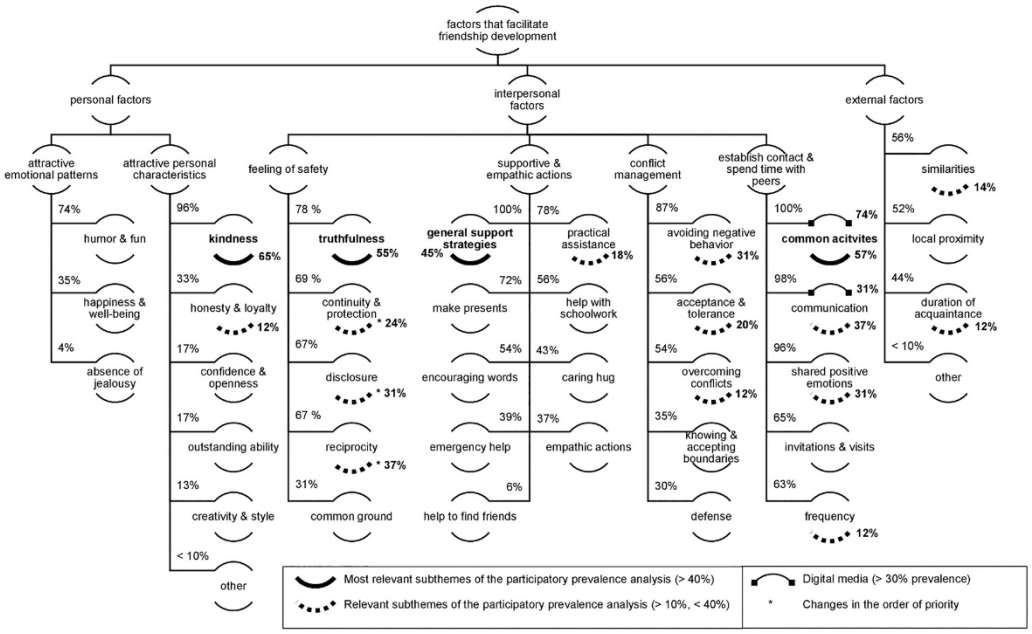


Fig. 1. Factors reported to facilitate friendship development and prevalence of themes expressed as a percentage.
Note. Subthemes in bold became most relevant according to the participatory prevalence analysis.

when being ill, […] do things together" (WS 54; subthemes "communication" and "common activities"). Moreover, being dependable (subtheme "honesty and loyalty") or having the courage to "be brave, for example, when you want to get to know somebody, you immediately reach out to that person" (WS 34; subtheme "confidence and openness") can directly support friendship formation alongside engendering respect. Standing out from the crowd because you are perceived as "cool" or "crazy" (subtheme "creativity and style") was reported to facilitate friendship development, just like being athletic or a nerd or not a nerd (subtheme "outstanding ability"), depending on whether this is admired.

Attractive emotional patterns. An attractive personality further comprises emotionally attractive characteristics, engendering positivity and light-heartedness. Early adolescents described supportive peers as people who created a positive atmosphere by being "funny" or "humorous", "not serious", or "not boring" (subtheme "humor and fun"). Furthermore, perceiving a positive mood in peers, such as "joy" or "happiness", facilitated friendship development (subtheme "happiness and well-being"). The opposite was noted for being unhappy, such as "When someone is unhappy, you're less likely want to be friends with that person" (WS 24). Also, the "absence of jealousy" was reported as promoting friendship development, which might directly affect the subjective impression of a light-hearted atmosphere.

3.1.2. Interpersonal factors

Feeling of safety. To establish friendships, peers need to feel safe and understood in their peer environment. Aspects of "protection", "disclosure", "reciprocity", and "truthfulness" defined the theme of safety. Early adolescents wished to know that there was someone they could turn to who would "simply be there for him, so that he does not feel alone" (WS 44) and assure continuous support, such as "When your friends always help you!" (WS 10) and "You must help your friends all the time" (WS 31). "Talking about problems together" (WS 28) and "sharing emotions" (WS 48; subtheme "disclosure") was reported to facilitate cooperation and trust, thereby engendering a feeling of safety.

Supportive and empathic actions. The theme "supportive and empathic actions" summarizes different layers relevant for peer support. Although the subtheme "general support strategies" included broad terms of support, such as "help", "support", "console", "cheer up", and "distract", the subtheme "empathic actions" describes skills that relate to the concept of empathy and perspective taking. Accordingly, you should "play with children who get excluded and show the others that you can play with them as well" (WS 22) or "try to put yourself in the position of others" (WS 45). All other subthemes included more specific social acts of peer support that clustered around topics such as "schoolwork", "practical assistance", and "emergency help" (example quotations are provided in the Supplementary Materials). Interestingly, supportive actions were not only present in offline interactions, but also in the online environment. For example, "healing together in Fortnite" (WS 24; subtheme "emergency help") or "giving away skins (outfits for in-game avatars in Fortnite)" (WS 16; subtheme "making presents") were identified as supportive digital actions. Overall, in the participatory prevalence analysis, "general support strategies" were self-selected by early adolescents as most relevant for friendship development, followed by "practical assistance" (see Fig. 1).

Conflict management. The theme "conflict management" contains strategies, norms, and values that were relevant when dealing with conflict situations among peers. The subtheme "acceptance and tolerance" included concepts of respect, consideration, and fairness, including, for example, "sometimes you should simply leave people alone, if they say so" (WS 28), "accept people as they are" (WS 31), and "let others join in" (WS 18). These concepts were particularly pertinent in the context of bigger or several friendship groups. An example of this included "You can say I am your friend. You should not say I am your better friend. You should treat friends equally." (WS 17). Supportive peers "avoid negative behavior" because such behavior can lead to conflict. Thus, disputes, exclusions, insults, or attacks were identified as undesirable behaviors for friendship development. Furthermore, "knowing and accepting boundaries" was identified as an important part of conflict management, such as "leaving him alone and don't repeatedly ask 'what is it', if someone does not want to share a secret" (WS 43) or "not do everything your friend says" (WS 7). Appropriate digital media use was found to be acceptable; however, it was recognized that a boundary existed outside which such use would hinder friendship development, such as early adolescents should "not sit in front of the television the whole day but do other things as well" (WS 20). Positive conflict management was reported to require skills relevant for "overcoming conflicts" and ending arguments. These skills included "apologizing" (WS 42), finding a compromise, and "solving the dispute together" (WS 5). Yet, you can also "argue and be friends again" (WS 22) because "disputes are part of every relationship" (WS 20). Furthermore, in certain situations "Some lies are ok. For surprises you need to lie, for example, one should not say that he has a present" (WS 17). Supportive peers defend "when people get bullied, you go there and say that they should stop" (WS 52) or "If two people argue, one should go there and say something" (WS 51; subtheme "defense"). Settling peer conflicts might also involve physical defense, for example, "in bullying situations, interfere and shove as well" (WS 24). For early adolescents, "avoiding negative behavior" was identified as the most important factor for friendship development, coming before "tolerance and acceptance" and "overcoming conflicts" (see Fig. 1).

Establish contact and spend time with peers. The theme "establish contact and spend time with peers" encompassed (a) what early adolescents do when spending time together, (b) how they communicate and arrange meetings, (c) the role of shared positive emotions, and (d) the frequent contact peers long for. The subtheme "common activities" included not only general information on spending time together, but also on specific activities that early adolescents enjoy, such as playing games, going on trips, doing sports together, or eating together. "Common activities" was identified as the most important aspect for friendship development that was self-selected by the participants (see Fig. 1). In over 70% of participatory workshops, "common activities" with peers involved some kind of digital media. A PlayStation, smartphone, or a computer seemed indispensable, and the desire to "play Fortnite" (WS 48) with peers was as relevant as "playing football" (WS 5). Interestingly, fighting each other was identified as a positive shared activity in certain situations because some participants reported that they enjoyed "pushing each other for fun" (WS 37). Others even become friends because of fighting, as "First we hated each other, then we got in a fight, and via beating we became friends" (WS 32). Additionally, it

was reported that fighting on the same side and "insulting others together" (WS 20) were considered facilitating activities for friendship development.

The subtheme "communication" collated general terms, such as "talking", "listening", or verbal and text-based communication. More specific strategies were also included, including for example, asking questions (WS 25; "ask if you want to be friends") or expressing politeness (WS 31; "say please and thank you"). Thus, learning about other people's preferences (WS 22; "start slowly, talk to each other, you have to understand what the other person likes") and showing interest (WS 28; "ask if he had a nice weekend") were identified as starting points for further contact. Interestingly, some early adolescents expected that friendships develop "when people say 'let's be friends'" (WS 10). Text messaging, calling peers, or talking online during gameplay again emphasized the importance of digital media for early adolescents. "Communication" was the second most important factor for friendship development according to the participatory prevalence analysis. Connecting with peers also meant experiencing "shared positive emotions", such as "having fun together" (WS 9), "telling jokes" (WS 2), or "making somebody laugh" (WS 13). The aspect of inviting and visiting peers was identified as essential for friendship development and should occur repeatedly (subtheme "frequency").

3.1.3. *External factors*

Given supportive circumstances. Early adolescents mentioned at least one external factor as relevant for friendship development in almost 90% of the participatory workshops. Overall, three themes repeatedly were mentioned, including "similarities", "local proximity", and "duration of acquaintance". In contrast, an additional five themes were mentioned in less than 10% of workshops (see Fig. 1). All external factors should be understood as existing on a continuum of changeability, ranging from not changeable to more changeable. The theme "similarities" included shared interests and values that varied on the described continuum. For example, a shared favorite TV series or a keen interest in online games might not be unchangeable, but it can be stable over a certain period. In contrast, cultural similarities (e.g., a shared religion or language) are rather immutable in early adolescence. The theme "local proximity", which identifies circumstances where people are at the same place during the same time, thereby providing adolescents with time and opportunities for social interactions (e.g., attending the same nursery or school) and increases opportunities for common school trips, group work, or the same routes home. Knowing each other for a long time and thus knowing each other very well marks the theme "duration of acquaintance". Other rarely mentioned topics refer to personal looks, attractive possessions, or family relationships. Example quotations of all generated themes and subthemes that were reported to facilitate friendship development are provided in the Supplementary Materials.

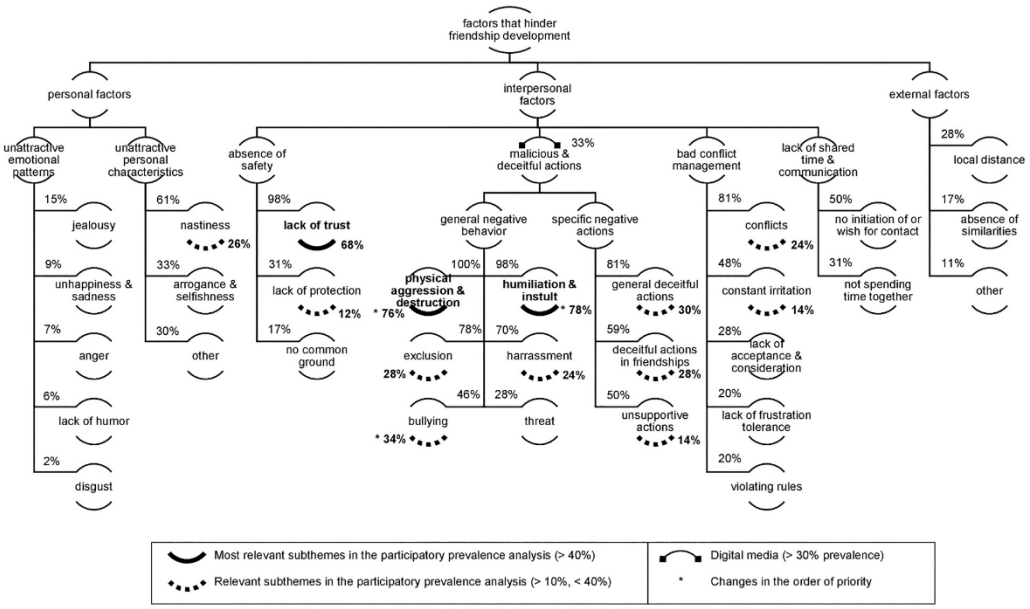


Fig. 2. Factors that were reported to hinder friendship development and prevalence of themes expressed as a percentage.
Note. Subthemes in bold became most relevant according to the participatory prevalence analysis.

3.2. Strand B: Ffactors that hinder friendship development

Fig. 2 depicts factors reported to hinder friendship development, ordered by prevalence. Again, the relevance of the subthemes according to the participatory prevalence analysis corresponded well to that of the overall prevalence analysis. Minor discrepancies arose in the theme "malicious and deceitful actions". Specifically, "humiliation and insult" changed places with "physical aggression and destruction". Yet, the two subthemes appeared equally important because they shared an almost identical percentage in both the participatory prevalence analysis and the overall prevalence analysis. Interestingly, in the participatory prevalence analysis, "bullying" was self-selected by participants as the third worst behavior for friendship development, falling above "exclusion" and "harassment".

3.2.1. Personal factors

Unattractive personal characteristics. Just as an attractive personality can support friendship development, the subjective perception of an unattractive personality can hamper the formation of friendships. In over 70% of participatory workshops, early adolescents were reluctant to consider peers as friends if they experienced them as "nasty", "mean", "aggressive", or "unkind" persons. We termed this "nastiness", which marks the negative counterpart of the positive subtheme "kindness". Again, early adolescents described an evil, nasty, and unkind person in terms of interpersonal factor themes, including someone who "pushes, mocks, uses swear words, [or] excludes" (WS 49; theme "malicious and deceitful actions"), "argue(s)" with others (WS 22; theme "bad conflict management"), and is untrustworthy (WS 52; "when people say they give you something, but then they don't"). Although "kindness" was the most important self-selected aspect for friendship development (see Fig. 1), "nastiness" was a relevant hindering factor, but with much less emphasis (see Fig. 2). Results from Strand A show that exceptional abilities or uniqueness were characteristics that peers respected. However, if these characteristics were conveyed through bragging and selfishness, they were perceived as unattractive. Thus, modesty was identified as an additional supportive personality aspect for friendship development.

Unattractive emotional patterns. Unattractive emotional characteristics matched the descriptions mentioned in the positive theme in reverse; for example, "trust", "happiness", and "humor" versus "jealousy", "sadness", and "lack of humor". Additionally, early adolescents appeared to directly link the inability to regulate negative emotions, such as anger and rage, to an unsupportive personality.

3.2.2. Interpersonal factors

Absence of safety. The theme of safety reoccurred in the negative strand and directly linked back to the former identified aspects of "protection", "disclosure", "reciprocity", and "truthfulness" with opposing features. Although early adolescents reported that they share secrets and talk openly with supportive peers, they mistrust peers who tell lies about them, do not keep secrets, or abandon them. Within the participatory prevalence analysis, "lack of trust" was the most relevant hindering aspect for friendship development (see Fig. 2). "Lack of trust" and "lack of protection" were reported as leading to dislike and hatred between peers, engendering "absence of safety". The reappearance of the topics "trust" and "protection" in Strand B, along with the high prevalence across participatory workshops and the high prevalence in the participatory prevalence analysis in both strands (see Figs. 1 and 2), underpin the feeling of safety as a central basis for friendship development.

Malicious and deceitful actions. Although participating early adolescents described "supportive and empathic actions" as facilitators for friendship development, the theme "malicious and deceitful actions" represented the negative equivalent. Descriptions at two levels were identified, including (a) general negative behavior and (b) more specific negative actions.

In accordance with the subtheme "avoiding negative behavior" from Strand A, early adolescents repeated their description of "general negative behavior" in Strand B, although in an even more precise manner. Overall, peers who "exclude", "humiliate", "insult", or "hit" were not considered supportive behaviors. Although "fighting" was reported to be a supportive common activity that can lead to friendships (as mentioned under Strand A "establish contact and spend time with peers"), "hitting – when it's really serious" (WS 34), such as "hitting till one bleeds" (WS 18), stops friendship development. Furthermore, peers that "play tricks" (WS 24) on you, "borrow things but not give it back" (WS 43), "pretend to be your friend, but then talk behind your back" (WS 30), or do "not share" (WS 14; subtheme "specific negative actions") were reported to have difficulties making friends. Just as supportive actions were reported to be present in the offline and online environments, negative behavior was reported to be present in both contexts as well, such as "When someone writes swearwords in WhatsApp" (WS 23) or peers "take a weird picture and post it on the internet" (WS 51); thus, digital experiences appear to affect peer relationships, as do face-to-face actions. Overall, the participatory prevalence analysis indicated that early adolescents considered physically aggressive, humiliating, or insulting behaviors to be the biggest hindrances for friendship development (see Fig. 2). A key component for friendship development is the layer of group dynamics (see also Strand A "acceptance and tolerance"), which again occurred in Strand B. Here, individuals subjectively experienced that peers "steal" or "take away" friends, further emphasizing the difficulties experienced when forming bigger friendship groups.

Bad conflict management. Deceitful and malicious behaviors were reported as leading to conflicts; participating early adolescents considered disputes with peers as highly risky for friendship development (mentioned in over 80% of participatory workshops; see Fig. 2). Supportive peers know when to stop and accept personal boundaries and differences (as mentioned in the positive theme "conflict management"). Conversely, not being able to apologize and not feeling heard or accepted were reported as hindering friendship development. Worse still, being "constantly" criticized or even victimized also were reported to hinder friendship development. Furthermore, conflicts that resulted in blaming others or unleashing anger on peers (subtheme "lack of frustration tolerance") were considered as unacceptable.

Lack of shared time and communication. Frequently spending time together was reported as promoting peer relationships (as identified in Strand A); in contrast, "when you don't do things together anymore" (WS 7) or "when he never has time for me" (WS 54;

subtheme "not spending time together"), friendship development was reported as being more difficult. Although inviting peers, asking questions, and saying hello were reported to be good strategies for initiating contact, opposing behaviors were reported to lead to social isolation (subtheme "no initiation of or wish for contact"). However, spending time together and using digital media were supportive for friendship development (see Stand A), but "meeting in the main menu in Fortnite is not enough" (WS 50). An additional example indicating hampered communication was "when a friend visits you, but then only sits in front of his phone" (WS 49).

3.2.3. *External factors*

Given hindering circumstances. Hindering external circumstances can be understood as reverse themes compared to those identified in Strand A. Thus, "absence of similarities" and "local distance" between peers were reported to complicate friendship development, just as "similarities" and "local proximity" were reported to support it. School transition and "not knowing anyone yet" (WS 3) in the new school engenders local distance between old friends and a sense of not belonging to a new group, which poses an age specific challenge. Although culture, looks, or family relationships can positively affect friendship development (as mentioned in Strand A), the reverse might be true for others. Example quotations of all generated hindering themes and subthemes are provided in the Supplementary Materials.

4. Discussion

The positive impact of friendships and supportive peer relationships on mental health and well-being is well documented (e.g., Heinsch et al., 2020; Lester & Cross, 2015). Particularly during the school transition between primary and secondary levels, support from friends is a relevant predictor for well-being and school satisfaction across cultures (Oriol et al., 2017). Yet, early adolescents receive limited instruction on *how* to establish friendships with peers (van Rens et al., 2018b). Also, the existing peer relationship literature lacks novel approaches to involve early adolescents in research about them and making their needs visible, thereby inhibiting intervention developers and school psychology practice (Gifford-Smith & Brownell, 2003; Lansdown et al., 2014). The present study employed participatory workshops to give early adolescents a voice and involve them in the analysis of their own generated data. This novel approach aimed to understand factors that facilitate and hinder friendship development in the eyes of early adolescents. We conducted a reflexive thematic analysis and clustered our results in terms of personal, interpersonal, and external factors, which are conceptually separable but interrelated in the roles they play in friendship development.

Overall, our results emphasize the components of friendship quality that are important to early adolescents, including support, intimacy, affection, trust, ability to manage conflict, and time together as identified in previous literature (Roach, 2019). Furthermore, the results highlight basic requirements for feeling safe and understood in the peer environment, which include truthfulness, reciprocity, disclosure, continuity, and protection. More specifically, we found that early adolescents linked personal characteristics (e.g., kindness, nastiness) and interpersonal behaviors when explaining friendship development. Although early adolescents reported valuing kindness as the most important factor that facilitated friendship development, some individuals indicated that friendliness could incorporate behavior that could be objectively described as antisocial for others. Thus, shared norms of behavior were reported to facilitate friendship development. Supportive and empathic actions appear to be essential interpersonal competencies that facilitate friendship development. Furthermore, spending time together and experiencing supportive communication and fun seems to provide the basis for contact establishment in both the offline and online environments. Conversely, friendship jealousy and the influence of peers in new classrooms were reported to pose additional challenges for friendship development.

4.1. *Links between personal characteristics and interpersonal behavior*

These results indicated that most early adolescents reported feeling attracted to peers that they considered as kind and humorous. Within the participatory prevalence analysis, early adolescents reported kindness as the most important characteristic for a desirable friend. The opposite was true for undesirable friends who were typically characterized as nasty. Yet, early adolescents offered several descriptions for kind peers on an interpersonal level, encompassing supportive and empathic actions such as "lending things or giving presents", avoiding negative behavior, knowing and accepting boundaries, and "asking if you are alright when being ill, […] do things together". These findings are consistent with the belongingness hypothesis, which emphasizes that conflict and negative affect hampers a sense of belonging in a relationship, whereas a certain stability and continuity in relationships, accompanied by affective concerns about each other, are essential (Baumeister & Leary, 1995). Contrary to kind peers, nasty peers showed malicious and deceitful actions because they "hit, mock, [use] swear words, exclude", "argue" with others, and were untrustworthy.

In parallel with desirable characteristics, early adolescents drew inferences about the undesirable personal characteristic of "nastiness" by describing multiple unsupportive interpersonal interactions that they have observed or experienced. In accordance with the social cognition literature, early adolescents appear to be attributing behavior to personal attributes to make sense of the complex social world (Greifeneder et al., 2017). Yet, inferring from negative social behavior to stable personal characteristics without considering situational factors can manifest in misconceptions, which is a phenomenon termed *fundamental attribution error* (Ross, 1977). For example, an early adolescent who uses swear words or hits others might quickly be perceived as nasty and unwanted as friend. Yet, repeated experiences of peer victimization or unsuccessful attempts to join in a game might result in using maladaptive strategies that induce such behavior. Indeed, peers with social, emotional, and behavioral difficulties who get victimized or socially excluded tend to solve social problems through externalizing behaviors or distancing. However, they wished for peers to stand up for them and show more supportive reactions (de Leeuw et al., 2018).

4.2. Shared norms of behavior and similarities can facilitate relationships

Although early adolescents reported valuing kind behavior, their own behavior towards other peers might be antisocial, such as "insulting others together", but still facilitating for friendships. In general, early adolescents agreed that nasty peers show malicious and deceitful actions, yet pushing and hitting for fun can also be part of a supportive peer relationship. Thus, early adolescents' perceptions of supportive or unsupportive interpersonal behavior varied between individuals depending on individual levels of acceptability. Indeed, friends tend to be similar in levels of aggression and prosocial behavior (McDonald et al., 2013). Joining a peer group that holds aggressive or prosocial norms even predicts increases in the respective behavior 1 year later (Berger & Rodkin, 2012).

Our findings also show that having something in common (e.g., sharing a hobby) facilitated friendship development. Indeed, shared interests are repeatedly identified as one indicator for the formation of peer relationships (Heinsch et al., 2020; Liberman & Shaw, 2019; Selfhout et al., 2009). The attraction of similarity is a well-documented phenomenon termed *homophily* in relationship research, which emphasizes that people tend to connect with others who are like themselves (Laursen & Veenstra, 2021; McPherson et al., 2001).

4.3. The importance of perceived supportive and empathic actions

Participating early adolescents emphasized the importance of perceived supportive and empathic actions for friendship development. In particular, early adolescents reported that peers who provide emotional or practical support are desired as friends. Consistent with our results, previous literature has indicated that socio-emotional competencies are important for friendships and peer relationships. Both a recent meta-analysis (Slaughter et al., 2015) and a systematic review (Derksen et al., 2018) indicated that socio-emotional competencies are linked with peer acceptance. Thus, children with advanced theory of mind understanding are better liked by their peers, receive higher social status, and show increased prosocial behavior (Derksen et al., 2018; Slaughter et al., 2015). Longitudinally, a poor theory of mind understanding has been associated with *friendlessness* over the course of 2 years (Fink et al., 2015). Furthermore, higher perspective taking skills directly link with prosocial behavior, which might lead to increased peer acceptance (Oberle, 2018). Additionally, the negative association between number of friends and loneliness appears to be mediated by social competence (Zhang et al., 2014). Our qualitative data supplement previous literature and provide insights into early adolescents' concepts of social support and specific strategies that they consider supportive (e.g., ways to practically assist others, making presents, helping with schoolwork).

4.4. The relevance of spending time together, fun, and supportive communication

The participatory prevalence analysis indicated that spending time together was one of the most important factors that facilitated friendship development. Hanging out together or carrying out specific activities, such as playing computer games, doing sports, or going on trips together were reported as popular leisure time activities. Moreover, the emotional component of fun and laughter is highly relevant when spending time with peers. Consistent with this, pleasure and common interests have been reported as key factors in friendships (Heinsch et al., 2020). Moreover, frequent contact helps to develop closeness because "when you like each other, then you spend more time together and you get to know each other better". Similar results have been reported for adult populations in that increased hours spent together during leisure time (e.g., hanging out, watching TV, gaming together) corresponds with a higher relationship level that develops from a casual acquaintance and leads to a best friend (Hall, 2019). Moreover, in an experimental study, Liberman and Shaw (2019) showed that choosing to spend time together was a more important indicator of friendship than various similarities between individuals (i.e., same gender or same interest). We can draw similar conclusions from our qualitative data. Although early adolescents considered common activities across all participatory workshops as relevant for friendships, similarities were only mentioned in half of the participatory workshops. The participatory prevalence analysis coherently indicated that spending time together was far more relevant than having similarities (see Fig. 1). Communication was another identified factor reported to facilitate friendship development, which included asking questions, showing interest, listening, and being polite. Consistent with this, certain forms of everyday conversations, such as catching up, checking in, or joking around were identified as factors that facilitated friendship development in adult samples (Hall, 2019).

4.5. The online environment facilitates and hinders friendship development

Our data revealed that establishing contact and spending time together can also occur online, for example, by playing computer games or sending text messages (see Fig. 1). Longitudinal and experimental studies have shown that early adolescents who frequently communicate online not only have supportive friendships, but also use it as a means of stress relief (Dolev-Cohen & Barak, 2013; Lee, 2009). Against the widely held view that digital media use causes mental health problems, a recent review that synthesized data from systematic reviews, meta-analyses, large-scale studies, and longitudinal studies concluded that studies were mainly correlational and produced inconsistent results (i.e., small positive, negative, or null effects; Odgers & Jensen, 2020). A recent Ecological Momentary Assessment study indicated that spending more time together using digital media did not decrease mental well-being; additionally, more daily online communication also resulted in the experience of better feelings (Jensen et al., 2019). The online environment often is used to strengthen offline peer relationships, thereby increasing opportunities to stay connected (Mittmann et al., 2021; Reich et al., 2012).

Yet, our data also suggested that online interactions can sometimes threaten a friendship (e.g., "publishing embarrassing photos")

and elicit feelings of exclusion by "blocking someone on WhatsApp". Our data show that malicious and deceitful actions were highly present and hindering for friendship development in offline and online environments. This is not surprising because peer conflicts and victimization are not restricted to the offline environment, as these also occur online (Sumter et al., 2012; Troop-Gordon, 2017; Yau & Reich, 2018). Early adolescents who experience offline victimization are more likely to experience online victimization as well, which affects reductions in life satisfaction and health (Sumter et al., 2012; Wang et al., 2010). Victimization is particularly high during early adolescence; for example, this can be explained due to contextual and social changes, such as the school transition affecting re-negotiations of social hierarchies, with aggression being an effective way to establish power and popularity (Troop-Gordon, 2017; Wang et al., 2010).

4.6. *Friendship jealousy as potential barrier for friendship development*

Finally, our findings suggest that jealousy and challenges in tolerating bigger friendship groups is an important potential barrier to friendship development. Early adolescents reported experiencing peers who "steal" or "take away" friends, engendering a feeling of betrayal. This phenomenon might be particularly present among peers who have a low status of liking and who are trying to maintain the few friends they have (Kraft & Mayeux, 2018). Given that the school transition from primary to secondary levels intensifies the desire to belong to a group (Pratt & George, 2005), observing that some peers have more friends or are part of various cliques might trigger friendship jealousy.

4.7. *Practice implications and future directions*

Overall, our results provide a solid early adolescents' informed basis for school psychologists to develop tailored interventions that address factors that facilitate and consider factors that hinder friendship development. Because early adolescents identified kindness as the most important factor that facilitated friendship development, future interventions should discuss how "kind" peers behave and how this desired behavior can be established among peers in a classroom. A basic requirement is also the establishment of a feeling of safety, which could be implemented with an activity that addresses classroom rules. For example, in a successful anti-bullying program that is implemented during the time of school transition, such rules of behavior were created to emphasize supportive peer relationships where everyone feels safe and antisocial behavior is not tolerated (Wójcik & Hełka, 2018). Based on our findings, these rules should demonstrate why it is important to tell the truth and protect each other, and that this agreement should be based on reciprocity. Friendship development interventions should also cover components addressing social skills, conflict management skills, and communication skills. For social skills training, our results indicate that precise supportive and empathic actions that early adolescents deem as relevant for friendship development should be included (e.g., practical assistance, make presents, help with schoolwork; example quotations are provided in the Supplementary Materials). Although our results show that early adolescents think that avoiding negative behavior is crucial for friendship development, their mentioned strategies to overcome conflicts were limited, which can be a specific target for future interventions. Additionally, given that communication takes place in the offline and online environments, future interventions should address both communication channels or might include the use of digital media (i.e., smartphones) in a meaningful way. Moreover, interventions need to provide time for common activities that allow for shared positive emotions. Considering today's early adolescents' favorite hobbies, it might not be possible to go out for ice cream or on a hiking trip during an intervention, but these examples can provide suggestions for early adolescents who lack ideas when planning leisure activities with other peers or to provide precise homework as didactic activities.

Our results can also supplement individual counseling for students who struggle making friends. The present study provides a detailed picture of the specific behaviors and strategies that participating early adolescents applied when interacting with peers while aiming to make friends. Although very simple strategies such as saying "let's be friends" might be a useful security check to clarify whether one should further invest in a potential friendship or not, it might also be an unsuccessful strategy if one lacks other facilitating competencies. Thus, school psychologists could use our results to assess and offer support to individuals who are struggling to make friends; this support would be designed to facilitate behaviors and actions of friendship development, as well as identifying hindering factors to friendship development.

School psychologists can also inform teachers about factors that facilitate and hinder friendship development in the classroom and how teachers can implement friendship development activities at the time of school transition. It is evident that teachers can benefit from implementing friendship development activities at the start of the school year because friendships and supportive peer relationships are related to academic outcomes, academic motivation, classroom engagement, and school belonging (Kiefer et al., 2015; Wentzel et al., 2018). Again, establishing classroom rules and routines that create a feeling of safety and that define kind behavior might be successful ways to facilitate an appropriate atmosphere for friendship development. Also, planning common activities that offer time for peer interactions, such as going on a hiking trip with the whole class, are relevant for facilitating friendship development early in the academic year.

The ongoing COVID-19 pandemic emphasizes the importance of friends and peer relationships at school to reduce loneliness, social isolation, and accompanied negative health effects, such as depressive symptoms (Ashworth et al., 2022; Branje & Morris, 2021; Loades et al., 2020). The extraordinary circumstances of the COVID-19 pandemic have revealed the need for research like ours described here because knowing how to facilitate and support friendship development at school is more important than ever. Early adolescents have reported that not going to school negatively affected their friendships, which was especially true for pupils who were at the time of the school transition between primary and secondary levels (Lockyer et al., 2022). Consistent with our results, early adolescents longed for face-to-face interactions with their friends, regular contact, and more than just contact via phone, video calling,

social media, or texting (Lockyer et al., 2022). Friendship development interventions, counseling when struggling to make friends, or offering common activities at school are practical actions that school practitioners can offer early adolescents who had limited social interaction opportunities due to COVID-19 pandemic.

4.8. Strengths and limitations

This study aimed to understand factors reproted to facilitate and hinder friendship development by using different inquiry methods to gain a holistic picture of early adolescents' perspectives. Employing these distinct inquiry methods allowed early adolescents to contribute in different ways (Lundqvist, 2014). Our participatory workshop activities were conducted primarily with the full class or in small groups, yet, individual post-it note writing also allowed pupils to express their perspectives without being pressured to explain their thoughts in the group (Morgan et al., 2002). Thus, we expect that our data include a variety of different perspectives from early adolescents, which corroborates our holistic approach and aim of the study. Yet, our participatory workshop methods were novel and have only been used in our study. We encourage other researchers to conduct similar participatory workshops in other countries to examine how our present results correspond to the perspectives of early adolescents in other countries. Given that school transitions differ in nature and timing across countries, it is likely that there will be both similarities and differences in the perspectives of early adolescents from different countries, which is essential to consider when designing interventions for international implementation.

Early adolescents were involved in the decision-making process around the data that they generated, thereby presenting novel results regarding participants' perspectives and thus supplementing the existing literature. Although the decision-making process was conducted in small groups vulnerable to group influences (Morgan et al., 2002), we expect that our large sample size minimized potential biases. However, to fully exclude group influences, the decision-making process should be repeated in an individual or anonymous setting.

Following recommendations in literature, and consistent with our aim to conduct child-friendly participatory workshops that created a pleasant atmosphere and increased willingness to participate, we reduced the hierarchical adult-child relationship by (a) using first names only, (b) conducting warm-up activities where facilitators and children participated at the same time, and (c) sitting in a circle on the floor, meeting as equals (Morgan et al., 2002). Collecting data on post-it notes in different settings (i.e., full class, small groups, and individually) was appealing and engaging, but also led to a data set including snippets of conversations, short phrases, or single words. Hence, the nature of the data did not allow for in-depth analysis of individual students' perspectives. Instead, a more holistic understanding of factors that facilitated and hindered friendship development was achieved. However, data collection procedures did not allow for gender specific analyses of early adolescents' responses, although the importance of factors that facilitate and hinder friendship development could differ between girls and boys. For example, girls have scored higher on self-disclosure, empathy, and prosocial behavior than boys (Rose & Rudolph, 2006), which might make these aspects more relevant for girls. Moreover, girls have reported to value the avoidance of negative behavior and keeping secrets as more important than boys, whereas in contrast, boys tend to rate similarities as more important for friendships than girls (Kitts & Leal, 2021). Thus, gender specific factors that facilitate and hinder friendship development need further investigation in future research.

We acknowledge that our large sample size is unusual for qualitative studies. However, this was deemed important due to our participatory methods (e.g., collecting data on post-it notes) that led to unusual qualitative data (i.e., verbatim quotes of students consisting of single words and short phrases), our study aim (i.e., to understand early adolescents' needs in order to develop meaningful universal interventions), and the diversity of the sample (i.e., including a broad range of pupils experiencing school transition from different school types in rural and urban areas; Braun & Clarke, 2021).

5. Conclusion

This study supplements the existing peer relationship literature by using participatory methods to study friendship development and actively involving early adolescents in the analysis of their own generated data. We identified factors that facilitated and hindered friendship development at the time of the school transition between primary and secondary levels and emphasized those factors that early adolescents themselves identified as most relevant. Overall, the participatory prevalence analysis revealed that "kindness" was the most identified important factor for friendship development. In our sample, early adolescents valued kind peers who give them a feeling of safety, showed supportive and empathic actions, managed conflicts, spent time with them, and communicated in the offline and online environments. Yet, early adolescents might only use one strategy and lack other competencies or ideas in how to make friends. In sum, our study can inform school psychology practice and future research regarding how to facilitate friendship development, and thus mental health and well-being at school, by considering early adolescents' perspectives.

Funding

This work was supported by Ludwig Boltzmann Society Open Innovation for Science, Karl Landsteiner University of Health Sciences, and Lower Austrian Research and Education Association (NFB). We acknowledge support by Open Access Publishing Fund of Karl Landsteiner University of Health Sciences, Krems, Austria.

Declaration of Competing Interest

None.

Acknowledgements

The D.O.T. (Die Offene Tür - The Open Door) team of co-investigators - Adam Barnard (playwright and theatre director), João Dias (computer scientist), Marija Mitic (medical doctor), Beate Schrank (practicing & research psychiatrist), and Kate Woodcock (research psychologist) - grew during a sandpit event organized by the Open Innovation Center of Ludwig Boltzmann Society and facilitated by Know Innovation. The team would like to thank these organizations for their role in its formation. The D.O.T team's work is jointly conceived and led by the co-investigators. The team sees this as a fully meaningful interdisciplinary collaboration.

The authors would also like to acknowledge Sylvia Dörfler and Anna-Lena Mädge for supporting the data collection procedures and organizational collaboration with schools. We want to thank all workshop assistants, Lower Austrian schools, children, and adult stakeholders who supported the workshop activities.

Data references

Krammer, I., Pollak, I., Dörfer, S., Woodcock, K., Schrank, B., Barnard, A., Dias, J., Mitic, M., & Stiehl, K. (2021). *Data*. https://osf.io/avtw2/

Krammer, I., Woodcock, K., Pollak, I., Reynard, S., Barnard, A., Dörfer, S., Schrank, B., Mitic, M., & Dias, J. (2021). *Materials*. https://osf.io/2u7r4/

Appendix A. Supplementary materials

Supplementary materials for this article can be found online at https://doi.org/10.1016/j.jsp.2023.03.001.

References

Allen, K.-A., Gray, D. L., Baumeister, R. F., & Leary, M. R. (2022). The need to belong: A deep dive into the origins, implications, and future of a foundational construct. *Educational Psychology Review, 34*, 1133–1156. https://doi.org/10.1007/s10648-021-09633-6.

Ashworth, E., Putwain, D. W., McLoughlin, S., Saini, P., Chopra, J., Rosser, B., & Eames, C. (2022). Ordinary magic in extraordinary circumstances: Factors associated with positive mental health outcomes for early adolescents during the COVID-19 pandemic. *Adversity and Resilience Science, 3*(1), 65–79. https://doi.org/10.1007/s42844-022-00054-0.

Baier, D., Hong, J. S., Kliem, S., & Bergmann, M. C. (2019). Consequences of bullying on adolescents' mental health in Germany: Comparing face-to-face bullying and cyberbullying. *Journal of Child and Family Studies, 28*(9), 2347–2357. https://doi.org/10.1007/s10826-018-1181-6.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497–529. https://doi.org/10.1037/0033-2909.117.3.497.

Berger, C., & Rodkin, P. C. (2012). Group influences on individual aggression and prosociality: Early adolescents who change peer affiliations. *Social Development, 21*(2), 396–413. https://doi.org/10.1111/j.1467-9507.2011.00628.x.

Bettencourt, A. F., Clary, L. K., Ialongo, N., & Music, R. J. (2023). Long-term consequences of bullying in involvement in first grade. *Journal of School Psychology, 97*, 63–76.

Birkeland, M. S., Breivik, K., & Wold, B. (2014). Peer acceptance protects global self-esteem from negative effects of low closeness to parents during adolescence and early adulthood. *Journal of Youth and Adolescence, 43*(1), 70–80. https://doi.org/10.1007/s10964-013-9929-1.

Branje, S., & Morris, A. S. (2021). The impact of the COVID-19 pandemic on adolescent emotional, social, and academic adjustment. *Journal of Research on Adolescence, 31*(3), 486–499. https://doi.org/10.1111/jora.12668.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa.

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health, 11*(4), 589–597. https://doi.org/10.1080/2159676X.2019.1628806.

Braun, V., & Clarke, V. (2021). To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales. *Qualitative Research in Sport, Exercise and Health, 13*(2), 201–216. https://doi.org/10.1080/2159676X.2019.1704846.

Bronfenbrenner, U. (1979). *The ecology of human development*. Harvard university press.

Buchanan, R. L., & Bowen, G. L. (2008). In the context of adult support: The influence of peer support on the psychological well-being of middle-school students. *Child and Adolescent Social Work Journal, 25*(5), 397–407. https://doi.org/10.1007/s10560-008-0143-z.

Bundesministerium für Bildung, W. u. F. (2022, May). Die Schularten. In *Bundesministerium für Bildung, Wissenschaft und Forschung*. https://www.bmbwf.gv.at/Themen/schule/schulsystem/sa.html.

Burke, T., Sticca, F., & Perren, S. (2017). Everything's gonna be alright! The longitudinal interplay among social support, peer victimization, and depressive symptoms. *Journal of Youth and Adolescence, 46*(9), 1999–2014. https://doi.org/10.1007/s10964-017-0653-0.

Chudal, R., Tiiri, E., Brunstein Klomek, A., Ong, S. H., Fossum, S., Kaneko, H., … Sourander, A. (2022). Victimization by traditional bullying and cyberbullying and the combination of these among adolescents in 13 European and Asian countries. *European Child & Adolescent Psychiatry, 31*(9), 1391–1404. https://doi.org/10.1007/s00787-021-01779-6.

Colucci, E. (2007). "focus groups can be fun": The use of activity-oriented questions in focus group discussions. *Qualitative Health Research, 17*(10), 1422–1433. https://doi.org/10.1177/1049732307308129.

Copeland, W. E., Wolke, D., Angold, A., & Costello, E. J. (2013). Adult psychiatric outcomes of bullying and being bullied by peers in childhood and adolescence. *JAMA Psychiatry, 70*(4), 419–426. https://doi.org/10.1001/jamapsychiatry.2013.504.

Curson, S., Wilson-Smith, K., & Holliman, A. J. (2019). Exploring the experience of students making the transition from primary school to secondary school: An interpretative phenomenological analysis of the role of friendship and family support. *Psychology Teaching Review, 25*(1), 30–41.

Davis, K. (2012). Friendship 2.0: Adolescents' experiences of belonging and self-disclosure online. *Journal of Adolescence, 35*(6), 1527–1536. https://doi.org/10.1016/j.adolescence.2012.02.013.

Derksen, D. G., Hunsche, M. C., Giroux, M. E., Connolly, D. A., & Bernstein, D. M. (2018). A systematic review of theory of mind's precursors and functions. *Zeitschrift für Psychologie, 226*(2), 87–97. https://doi.org/10.1027/2151-2604/a000325.

Dolev-Cohen, M., & Barak, A. (2013). Adolescents' use of instant messaging as a means of emotional relief. *Computers in Human Behavior, 29*(1), 58–63. https://doi.org/10.1016/j.chb.2012.07.016.

Eklund, L., & Roman, S. (2017). Do adolescent gamers make friends offline? Identity and friendship formation in school. *Computers in Human Behavior, 73*, 284–289. https://doi.org/10.1016/j.chb.2017.03.035.
Fink, E., Begeer, S., Peterson, C. C., Slaughter, V., & de Rosnay, M. (2015). Friendlessness and theory of mind: A prospective longitudinal study. *British Journal of Developmental Psychology, 33*(1), 1–17. https://doi.org/10.1111/bjdp.12060.
Foster, L. J. J., Deafenbaugh, L., & Miller, E. (2018). Group metaphor map making: Application to integrated arts-based focus groups. *Qualitative Social Work, 17*(2), 305–322. https://doi.org/10.1177/1473325016667475.
Fujikawa, S., Mundy, L. K., Canterford, L., Moreno-Betancur, M., & Patton, G. C. (2021). Bullying across late childhood and early adolescence: A prospective cohort of students assessed annually from grades 3 to 8. *Academic Pediatrics, 21*(2), 344–351. https://doi.org/10.1016/j.acap.2020.10.011.
George, T. P., & Hartmann, D. P. (1996). Friendship networks of unpopular, average, and popular children. *Child Development, 67*(5), 2301–2316. https://doi.org/10.2307/1131624.
Gifford-Smith, M. E., & Brownell, C. A. (2003). Childhood peer relationships: Social acceptance, friendships, and peer networks. *Journal of School Psychology, 41*(4), 235–284.
Greifeneder, R., Bless, H., & Fiedler, K. (2017). *Social cognition: How individuals construct social reality*. Taylor & Francis. https://books.google.at/books?id=PNorDwAAQBAJ.
Hagen, P., Collin, P., Metcalf, A., Nicholas, M., Rahilly, K., & Swainston, N. (2012). Participatory design of evidence-based online youth mental health promotion, prevention, early intervention and treatment. https://www.westernsydney.edu.au/__data/assets/pdf_file/0005/476330/Young_and_Well_CRC_IM_PD_Guide.pdf.
Hall, J. A. (2019). How many hours does it take to make a friend? *Journal of Social and Personal Relationships, 36*(4), 1278–1296. https://doi.org/10.1177/0265407518761225.
Halliday, A. J., Kern, M. L., Garrett, D. K., & Turnbull, D. A. (2019). The student voice in well-being: A case study of participatory action research in positive education. *Educational Action Research, 27*(2), 173–196. https://doi.org/10.1080/09650792.2018.1436079.
Halliday, S., Gregory, T., Taylor, A., Digenis, C., & Turnbull, D. (2021). The impact of bullying victimization in early adolescence on subsequent psychosocial and academic outcomes across the adolescent period: A systematic review. *Journal of School Violence, 20*(3), 351–373. https://doi.org/10.1080/15388220.2021.1913598.
Hasan, M. M., Fatima, Y., Cleary, A., McDaid, L., Munir, K., Smith, S. S., … Mamun, A. (2023). Geographical variations in the prevalence of traditional and cyberbullying and its additive role in psychological and somatic health complaints among adolescents in 38 European countries. *Journal of Psychosomatic Research, 164*, Article 111103. https://doi.org/10.1016/j.jpsychores.2022.111103.
Hawker, D. S., & Boulton, M. J. (2000). Twenty years' research on peer victimization and psychosocial maladjustment: A meta-analytic review of cross-sectional studies. *Journal of Child Psychology and Psychiatry, 41*(4), 441–455. https://www.ncbi.nlm.nih.gov/pubmed/10836674.
Hazen, E., Schlozman, S., & Beresin, E. (2008). Adolescent psychological development: A review. *Pediatrics in Review, 29*(5), 161–167. https://doi.org/10.1542/pir.29-5-161.
Heinsch, M., Agllias, K., Sampson, D., Howard, A., Blakemore, T., & Cootes, H. (2020). Peer connectedness during the transition to secondary school: A collaborative opportunity for education and social work. *The Australian Educational Researcher, 47*(2), 339–356. https://doi.org/10.1007/s13384-019-00335-1.
Hennink, M. M., Kaiser, B. N., & Marconi, V. C. (2017). Code saturation versus meaning saturation: How many interviews are enough? *Qualitative Health Research, 27*(4), 591–608. https://doi.org/10.1177/1049732316665344.
Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: A meta-analytic review. *Perspectives on Psychological Science, 10*(2), 227–237. https://doi.org/10.1177/1745691614568352.
Howick, J., Kelly, P., & Kelly, M. (2019). Establishing a causal link between social relationships and health using the Bradford Hill guidelines. *SSM - Population Health, 8*, Article 100402. https://doi.org/10.1016/j.ssmph.2019.100402.
Jensen, M., George, M., Russell, M., & Odgers, C. (2019). Young adolescents' digital technology use and mental health symptoms: Little evidence of longitudinal or daily linkages. *Clinical Psychological Science, 7*(6), 1416–1433. https://doi.org/10.1177/2167702619859336.
Kaisler, R., & Missbach, B. (2019). Patient and public involvement and engagement in research - a "how to" guide for researchers. *Zenodo.*, 1–38. https://doi.org/10.5281/zenodo.3578321.
Kendrick, K., Jutengren, G., & Stattin, H. (2012). The protective role of supportive friends against bullying perpetration and victimization. *Journal of Adolescence, 35*(4), 1069–1080. https://doi.org/10.1016/j.adolescence.2012.02.014.
Kiefer, S. M., Alley, K. M., & Ellerbrock, C. R. (2015). Teacher and peer support for young adolescents' motivation, engagement, and school belonging. *RMLE online: Research in Middle Level Education, 38*, 18. https://doi.org/10.1080/19404476.2015.11641184.
Kirby, P. (2004). A guide to actively involving young people in research: For researchers, research commissioners, and managers. *INVOLVE*. https://www.invo.org.uk/wp-content/uploads/2012/01/InvolvingYoungPeople2004.pdf.
Kitts, J. A., & Leal, D. F. (2021). What is(n't) a friend? Dimensions of the friendship concept among adolescents. *Social Networks, 66*, 161–170. https://doi.org/10.1016/j.socnet.2021.01.004.
Klineberg, E., Clark, C., Bhui, K. S., Haines, M. M., Viner, R. M., Head, J., … Stansfeld, S. A. (2006). Social support, ethnicity and mental health in adolescents. *Social Psychiatry and Psychiatric Epidemiology, 41*, 755–760. https://doi.org/10.1007/s00127-006-0093-8.
Kostenius, C., & Öhrling, K. (2008). 'Friendship is like an extra parachute': Reflections on the way schoolchildren share their lived experiences of well-being through drawings. *Reflective Practice, 9*(1), 23–35. https://doi.org/10.1080/14623940701816634.
Kraft, C., & Mayeux, L. (2018). Associations among friendship jealousy, peer status, and relational aggression in early adolescence. *The Journal of Early Adolescence, 38*(3), 385–407. https://doi.org/10.1177/0272431616670992.
Lamblin, M., Murawski, C., Whittle, S., & Fornito, A. (2017). Social connectedness, mental health and the adolescent brain. *Neuroscience & Biobehavioral Reviews, 80*, 57–68. https://doi.org/10.1016/j.neubiorev.2017.05.010.
Lansdown, G., Jimerson, S. R., & Shahroozi, R. (2014). Children's rights and school psychology: Children's right to participation. *Journal of School Psychology, 52*(1), 3–12. https://doi.org/10.1016/j.jsp.2013.12.006.
Larson, R., & Richards, M. H. (1991). Daily companionship in late childhood and early adolescence: Changing developmental contexts. *Child Development, 62*(2), 284–300. https://doi.org/10.1111/j.1467-8624.1991.tb01531.x.
Larsson, I., Staland-Nyman, C., Svedberg, P., Nygren, J. M., & Carlsson, I.-M. (2018). Children and young people's participation in developing interventions in health and well-being: A scoping review. *BMC Health Services Research, 18*(1), 507. https://doi.org/10.1186/s12913-018-3219-2.
Laursen, B., & Hartl, A. C. (2013). Understanding loneliness during adolescence: Developmental changes that increase the risk of perceived social isolation. *Journal of Adolescence, 36*(6), 1261–1268. https://doi.org/10.1016/j.adolescence.2013.06.003.
Laursen, B., & Veenstra, R. (2021). Toward understanding the functions of peer influence: A summary and synthesis of recent empirical research. *Journal of Research on Adolescence, 31*(4), 889–907. https://doi.org/10.1111/jora.12606.
Lee, S. J. (2009). Online communication and adolescent social ties: Who benefits more from internet use? *Journal of Computer-Mediated Communication, 14*(3), 509–531. https://doi.org/10.1111/j.1083-6101.2009.01451.x.
de Leeuw, R. R., de Boer, A. A., & Minnaert, A. E. M. G. (2018). Student voices on social exclusion in general primary schools. *European Journal of Special Needs Education, 33*(2), 166–186. https://doi.org/10.1080/08856257.2018.1424783.
Lessard, L. M., & Juvonen, J. (2018). Friendless adolescents: Do perceptions of social threat account for their internalizing difficulties and continued friendlessness? *Journal of Research on Adolescents, 28*(2), 277–283. https://doi.org/10.1111/jora.12388.
Lester, L., & Cross, D. (2015). The relationship between school climate and mental and emotional wellbeing over the transition from primary to secondary school. *Psychological Well-Being, 5*(1), 9.
Lev-Wiesel, R., Nuttman-Shwartz, O., & Sternberg, R. (2006). Peer rejection during adolescence: Psychological long-term effects—A brief report. *Journal of Loss and Trauma, 11*(2), 131–142. https://doi.org/10.1080/15325020500409200.

Li, R., Lian, Q., Su, Q., Li, L., Xie, M., & Hu, J. (2020). Trends and sex disparities in school bullying victimization among U.S. youth, 2011-2019. *BMC Public Health, 20*(1), 1583. https://doi.org/10.1186/s12889-020-09677-3.
Liberman, Z., & Shaw, A. (2019). Children use similarity, propinquity, and loyalty to predict which people are friends. *Journal of Experimental Child Psychology, 184*, 1–17. https://doi.org/10.1016/j.jecp.2019.03.002.
Loades, M. E., Chatburn, E., Higson-Sweeney, N., Reynolds, S., Shafran, R., Brigden, A., … Crawley, E. (2020). Rapid systematic review: The impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19. *Journal of the American Academy of Child & Adolescent Psychiatry, 59*(11), 1218–1239.e1213. https://doi.org/10.1016/j.jaac.2020.05.009.
Lockyer, B., Endacott, C., Dickerson, J., & Sheard, L. (2022). Growing up during a public health crisis: A qualitative study of born in Bradford early adolescents during Covid-19. *BMC Psychology, 10*(1), 140. https://doi.org/10.1186/s40359-022-00851-3.
Lundqvist, J. (2014). A review of research in educational settings involving children's responses. *Child Indicators Research, 7*(4), 751–768. https://doi.org/10.1007/s12187-014-9253-7.
Lyell, K. M., Coyle, S., Malecki, C. K., & Santuzzi, A. M. (2020). Parent and peer social support compensation and internalizing problems in adolescence. *Journal of School Psychology, 83*, 25–49. https://doi.org/10.1016/j.jsp.2020.08.003.
Maunder, R., & Monks, C. P. (2019). Friendships in middle childhood: Links to peer and school identification, and general self-worth. *British Journal of Developmental Psychology, 37*(2), 211–229. https://doi.org/10.1111/bjdp.12268.
McDonald, K. L., Dashiell-Aje, E., Menzer, M. M., Rubin, K. H., Oh, W., & Bowker, J. C. (2013). Contributions of racial and sociobehavioral homophily to friendship stability and quality among same-race and cross-race friends. *The Journal of Early Adolescence, 33*(7), 897–919. https://doi.org/10.1177/0272431612472259.
McDougall, P., & Vaillancourt, T. (2015). Long-term adult outcomes of peer victimization in childhood and adolescence: Pathways to adjustment and maladjustment. *American Psychologist, 70*(4), 300–310. https://doi.org/10.1037/a0039174.
McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology, 27*(1), 415–444. https://doi.org/10.1146/annurev.soc.27.1.415.
Mitic, M., Woodcock, K. A., Amering, M., Krammer, I., Stiehl, K. A. M., Zehetmayer, S., & Schrank, B. (2021). Toward an integrated model of supportive peer relationships in early adolescence: A systematic review and exploratory meta-analysis [systematic review]. *Frontiers in Psychology, 12*(47). https://doi.org/10.3389/fpsyg.2021.589403.
Mittmann, G., Woodcock, K., Dörfler, S., Krammer, I., Pollak, I., & Schrank, B. (2021). "TikTok is my life and snapchat is my ventricle": A mixed-methods study on the role of online communication tools for friendships in early adolescents. *The Journal of Early Adolescence, 42*(2), 172–203. https://doi.org/10.1177/0272431621102036.
Morgan, M., Gibbs, S., Maxwell, K., & Britten, N. (2002). Hearing children's voices: Methodological issues in conducting focus groups with children aged 7-11 years. *Qualitative Research, 2*(1), 5–20. https://doi.org/10.1177/146879410200200163.
Ng-Knight, T., Shelton, K. H., Riglin, L., Frederickson, N., McManus, I. C., & Rice, F. (2019). 'Best friends forever'? Friendship stability across school transition and associations with mental health and educational attainment. *British Journal of Educational Psychology, 89*(4), 585–599. https://doi.org/10.1111/bjep.12246.
Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods, 16*(1), 1609406917733847 https://doi.org/10.1177/1609406917733847, 1609406917733847.
Oberle, E. (2018). Social-emotional competence and early adolescents' peer acceptance in school: Examining the role of afternoon cortisol. *PLoS One, 13*(2), e0192639. https://doi.org/10.1371/journal.pone.0192639.
Odgers, C. L., & Jensen, M. R. (2020). Annual research review: Adolescent mental health in the digital age: Facts, fears, and future directions. *Journal of Child Psychology and Psychiatry, 61*(3), 336–348. https://doi.org/10.1111/jcpp.13190.
Oriol, X., Torres, J., Miranda, R., Bilbao, M., & Ortúzar, H. (2017). Comparing family, friends and satisfaction with school experience as predictors of SWB in children who have and have not made the transition to middle school in different countries. *Children and Youth Services Review, 80*, 149–156. https://doi.org/10.1016/j.childyouth.2017.06.053.
Persson, L., Haraldsson, K., & Hagquist, C. (2016). School satisfaction and social relations: Swedish schoolchildren's improvement suggestions. *International Journal of Public Health, 61*(1), 83–90. https://doi.org/10.1007/s00038-015-0696-5.
Pratt, S., & George, R. (2005). Transferring friendship: Girls' and boys' friendships in the transition from primary to secondary school. *Children & Society, 19*(1), 16–26. https://doi.org/10.1002/chi.830.
Qualter, P., Brown, S. L., Rotenberg, K. J., Vanhalst, J., Harris, R. A., Goossens, L., … Munn, P. (2013). Trajectories of loneliness during childhood and adolescence: Predictors and health outcomes. *Journal of Adolescence, 36*(6), 1283–1293. https://doi.org/10.1016/j.adolescence.2013.01.005.
Reich, S. M., Subrahmanyam, K., & Espinoza, G. (2012). Friending, IMing, and hanging out face-to-face: Overlap in adolescents' online and offline social networks. *Developmental Psychology, 48*(2), 356–368. https://doi.org/10.1037/a0026980.
van Rens, M., Haelermans, C., Groot, W., & Maassen van den Brink, H. (2018a). Facilitating a successful transition to secondary school: (how) does it work? A systematic literature review. *Adolescent Research Review, 3*(1), 43–56. https://doi.org/10.1007/s40894-017-0063-2.
van Rens, M., Haelermans, C., Groot, W., & Maassen van den Brink, H. (2018b). Girls' and boys' perceptions of the transition from primary to secondary school. *Child Indicators Research, 12*(4), 1481–1506. https://doi.org/10.1007/s12187-018-9591-y.
Rice, F., Frederickson, N., & Seymour, J. (2011). Assessing pupil concerns about transition to secondary school. *British Journal of Educational Psychology, 81*(2), 244–263. https://doi.org/10.1348/000709910X519333.
Richardson, T., Elliott, P., & Roberts, R. (2017). Relationship between loneliness and mental health in students. *Journal of Public Mental Health, 16*(2), 48–54.
Roach, A. (2019). A concept analysis of adolescent friendship. *Nursing Forum, 54*(3), 328–335. https://doi.org/10.1111/nuf.12332.
Rose, A. J., & Rudolph, K. D. (2006). A review of sex differences in peer relationship processes: Potential trade-offs for the emotional and behavioral development of girls and boys. *Psychological Bulletin, 132*(1), 98–131. https://doi.org/10.1037/0033-2909.132.1.98.
Ross, L. (1977). The intuitive psychologist and his shortcomings: Distortions in the attribution process. *Advances in Experimental Social Psychology, 10*, 173–220.
Rouncefield-Swales, A., Harris, J., Carter, B., Bray, L., Bewley, T., & Martin, R. (2021). Children and young people's contributions to public involvement and engagement activities in health-related research: A scoping review. *PLoS One, 16*(6), Article e0252774. https://doi.org/10.1371/journal.pone.0252774.
Rubin, K., Coplan, R., Chen, X., Bowker, J., McDonald, K., & Heverly-Fitt, S. (2015). Peer relationships in childhood. In M. H. Bornstein, & M. E. Lamb (Eds.), *Developmental science: An advanced textbook* (pp. 591–649). Psychology Press.
Schinka, K. C., van Dulmen, M. H., Mata, A. D., Bossarte, R., & Swahn, M. (2013). Psychosocial predictors and outcomes of loneliness trajectories from childhood to early adolescence. *Journal of Adolescence, 36*(6), 1251–1260. https://doi.org/10.1016/j.adolescence.2013.08.002.
Selfhout, M. H. W., Branje, S. J. T., Ter Bogt, T. F. M., & Meeus, W. H. J. (2009). The role of music preferences in early adolescents' friendship formation and stability. *Journal of Adolescence, 32*, 107. https://doi.org/10.1016/j.adolescence.2007.11.004.
Slaughter, V., Imuta, K., Peterson, C., & Henry, J. (2015). Meta-analysis of theory of mind and peer popularity in the preschool and early school years. *Child Development, 86*(4), 1159–1174. https://doi.org/10.1111/cdev.12372.
Smith, B., & McGannon, K. R. (2018). Developing rigor in qualitative research: Problems and opportunities within sport and exercise psychology. *International Review of Sport and Exercise Psychology, 11*(1), 101–121. https://doi.org/10.1080/1750984X.2017.1317357.
Sotardi, V. A. (2017). Exploring school stress in middle childhood: Interpretations, experiences, and coping. *Pastoral Care in Education, 35*(1), 13–27. https://doi.org/10.1080/02643944.2016.1269360.
Sumter, S. R., Baumgartner, S. E., Valkenburg, P. M., & Peter, J. (2012). Developmental trajectories of peer victimization: Off-line and online experiences during adolescence. *Journal of Adolescent Health, 50*(6), 607–613. https://doi.org/10.1016/j.jadohealth.2011.10.251.
Symonds, J. E., & Galton, M. (2014). Moving to the next school at age 10-14 years: An international review of psychological development at school transition. *The Review of Education, 2*(1), 1–27.
Troop-Gordon, W. (2017). Peer victimization in adolescence: The nature, progression, and consequences of being bullied within a developmental context. *Journal of Adolescence, 55*, 116–128. https://doi.org/10.1016/j.adolescence.2016.12.012.

United Nations. (1989). Convention on the rights of the child. https://www.ohchr.org/Documents/ProfessionalInterest/crc.pdf.
Wagner, G., Zeiler, M., Waldherr, K., Philipp, J., Truttmann, S., Dur, W., … Karwautz, A. F. K. (2017). Mental health problems in Austrian adolescents: A nationwide, two-stage epidemiological study applying DSM-5 criteria. *European Child & Adolescent Psychiatry, 26*(12), 1483–1499. https://doi.org/10.1007/s00787-017-0999-6.
Wang, J., Iannotti, R. J., & Luk, J. W. (2012). Patterns of adolescent bullying behaviors: Physical, verbal, exclusion, rumor, and cyber. *Journal of School Psychology, 50*(4), 521–534. https://doi.org/10.1016/j.jsp.2012.03.004.
Wang, J., Iannotti, R. J., Luk, J. W., & Nansel, T. R. (2010). Co-occurrence of victimization from five subtypes of bullying: Physical, verbal, social exclusion, spreading rumors, and cyber. *Journal of Pediatric Psychology, 35*(10), 1103–1112. https://doi.org/10.1093/jpepsy/jsq048.
Wang, J., Mann, F., Lloyd-Evans, B., Ma, R., & Johnson, S. (2018). Associations between loneliness and perceived social support and outcomes of mental health problems: A systematic review. *BMC Psychiatry, 18*(1), 156. https://doi.org/10.1186/s12888-018-1736-5.
Weller, S. (2007). Sticking with your mates?' Children's friendship trajectories during the transition from primary to secondary school. *Children & Society, 21*, 339–351. https://doi.org/10.1111/j.1099-0860.2006.00056.x.
Wentzel, K. R., Jablansky, S., & Scalise, N. R. (2018). Do friendships afford academic benefits? A meta-analytic study. *Educational Psychology Review, 30*, 1241–1267.
Witvliet, M., Brendgen, M., van Lier, P. A. C., Koot, H. M., & Vitaro, F. (2010). Early adolescent depressive symptoms: Prediction from clique isolation, loneliness, and perceived social acceptance. *Journal of Abnormal Child Psychology, 38*(8), 1045–1056. https://doi.org/10.1007/s10802-010-9426-x.
Wójcik, M., & Hełka, A. M. (2018). Meeting the needs of young adolescents: ABBL anti-bullying program during middle school transition. *Psychological Reports, 122*(3), 1043–1067. https://doi.org/10.1177/0033294118768671.
Yau, J. C., & Reich, S. M. (2018). Are the qualities of adolescents' offline friendships present in digital interactions? *Adolescent Research Review, 3*(3), 339–355. https://doi.org/10.1007/s40894-017-0059-y.
Zeedyk, M. S., Gallacher, J., Henderson, M., Hope, G., Husband, B., & Lindsay, K. (2003). Negotiating the transition from primary to secondary school: Perceptions of pupils, parents and teachers. *School Psychology International, 24*(1), 67–79. https://doi.org/10.1177/0143034303024001010.
Zhang, F., You, Z., Fan, C., Gao, C., Cohen, R., Hsueh, Y., & Zhou, Z. (2014). Friendship quality, social preference, proximity prestige, and self-perceived social competence: Interactive influences on children's loneliness. *Journal of School Psychology, 52*(5), 511–526. https://doi.org/10.1016/j.jsp.2014.06.001.

A III. Article III – LINA: An Augmented Reality Social Game Enhancing a Sense of Belonging Among Classmates: An Uncontrolled Pre-Post Evaluation Study

Krammer, I., Mittmann G., Barnard, A., Dias, J., Nater, U., M., Schrank, B., & Woodcock, K. A. (2026). *School Mental Health, 18*, 218-230. https://doi.org/10.1007/s12310-025-09846-y

School Mental Health (2026) 18:218–230
https://doi.org/10.1007/s12310-025-09846-y

ORIGINAL PAPER

LINA: An Augmented Reality Social Game Enhancing Sense of Belonging Among Classmates: An Uncontrolled Pre-post Evaluation Study

Ina Krammer[1,2] · Gloria Mittmann[1,3,4] · Urs M. Nater[2] · Adam Barnard[1] · Diogo Martins[1] · João Dias[1,5] · Beate Schrank[1,3,6] · Kate A. Woodcock[7]

Received: 14 March 2024 / Accepted: 4 December 2025 / Published online: 6 January 2026
© The Author(s) 2025

Abstract
Supportive peer relationships are fundamental in the development of well-being. Since early adolescents spend a lot of time at school, especially in their classroom, a sense of belonging among classmates plays a pivotal role for mental health and academic functioning. Programs that enhance sense of belonging among classmates through improving peer relationships in classrooms are rare. Given that early adolescents increasingly use digital media to establish and maintain relationships with classmates, there is potential in digital social games that enhance social connectivity and collaboration, especially during the difficult transition from primary to secondary school. LINA ('Lina Is Not Alone') is a novel social augmented reality game for classrooms that is designed to enhance sense of belonging among classmates through improving their relationships with classmates. We conducted an uncontrolled pre-post evaluation study to evaluate (a) player experience, (b) translation of the theory-led LINA design into user experience and (c) increases in sense of belonging after engagement with LINA. In total, data from 99 participants (M_{age} = 10.94; range=10–12; 51 girls, 48 boys) were included in this study. Our results provided evidence for (a) high satisfaction and acceptability of LINA, (b) a successful translation of theory-led design features into user experiences, and (c) increases in sense of belonging. We discuss practical implications and future development of LINA.

Keywords Augmented reality · Digital intervention · Feasibility study · Peer relationships · Sense of belonging

✉ Ina Krammer
ina.krammer@gmx.net; ina.krammer@kl.ac.at

Gloria Mittmann
gloria.mittmann@kl.ac.at

Urs M. Nater
urs.nater@univie.ac.at

Adam Barnard
adamacbarnard@gmail.com

Diogo Martins
dg.martins1@gmail.com

João Dias
jmdias@ualg.pt

Beate Schrank
beate.schrank@kl.ac.at

Kate A. Woodcock
papers@katewoodcock.com

1 D.O.T. Research Group for Mental Health of Children and Adolescents, Ludwig Boltzmann Society at Karl Landsteiner University of Health Sciences, Dr. Karl-Dorrek-Straße 30, 3500 Krems on the Danube, Austria

2 Department of Health and Clinical Psychology, University of Vienna, Vienna, Austria

3 Research Centre Transition Psychiatry, Karl Landsteiner University for Health Sciences, Krems, Austria

4 Department of Developmental and Educational Psychology, University of Vienna, Vienna, Austria

5 Faculdade de Ciências e Tecnologia, Universidade do Algarve and CCMAR and INESC-ID, Faro, Portugal

6 Division of Psychiatry and Psychotherapeutic Medicine, Karl Landsteiner University of Health Sciences, University Hospital Tulln, Tulln, Austria

7 Institute for Mental Health and Centre for Developmental Science, School of Psychology, University of Birmingham, Birmingham, UK

Introduction

The need to belong, fulfilled through meaningful relationships with individuals and groups, enhances mental health (Andersen et al., 2021; Baumeister & Leary, 1995). In accordance with this belongingness theory, supportive relationships with peers and friends at school clearly impact mental health and resilience (Moreira et al., 2021). For children and adolescents, the school environment marks a key setting to build these meaningful connections with peers. Feeling supported by peers and friends at school as well as overcoming loneliness are important factors in the development of a strong sense of belonging (Allen et al., 2018; Quintana, 2021). Yet, schools need to provide opportunities for supportive peer interactions so that children and adolescents feel included, meaningful relationships can thrive, and a sense of belonging can develop (Allen et al., 2021; Qvortrup & Qvortrup, 2018). Providing opportunities for supportive interactions between classmates might be especially important for pupils who stay together in that same class for several years or after a school transition. This study incorporates an uncontrolled pilot evaluation of the single-session proof-of-concept version of LINA ('Lina Is Not Alone'), an augmented reality (AR) social game that aims to increase a sense of belonging among classmates through improving relationships with classmates.

Good relationships with classmates have positive effects, impacting mental health and academic performance. For example, feeling supported by classmates contributes to satisfaction at school and subjective well-being, while feeling lonely and not experiencing a good time with classmates have opposing effects (Huebner et al., 2014; Oberle et al., 2011). In particular, good relationships with classmates directly impact school satisfaction, which further boosts students' subjective well-being and quality of life, highlighting the relevance of interventions which focus on relationships with classmates (Gempp & Gonzalez-Carrasco, 2021). Feeling supported by classmates also positively affects the ability to cope with stressful situations and enhance academic performance (Burke & Sass, 2013; Hoferichter et al., 2022). For example, fostering positive interactions between classmates can boost individual motivation and engagement, which in turn contributes to better academic performance (Shao et al., 2024). Additionally, good relationships with classmates have beneficial emotional effects, which manifest in fewer depressive symptoms (Franco et al., 2022; McGraw et al., 2008) and higher positive affect (Schmidt et al., 2019, 2020). Therefore, LINA was developed to provide gamified social interactions that increase positive experiences with classmates. Such positive experiences with classmates might be particularly relevant during school transition.

The transition period from primary to secondary school is marked by substantial changes and challenges in the peer network of early adolescents (Symonds & Galton, 2014). Former classmates often move to different schools and there is a need to form new peer relationships and friendships within the new classroom, which makes school transition a stressful social experience (Ng-Knight et al., 2019; Weller, 2007). During school transition, the fear of victimization and feeling alone in the new class are major social stressors for early adolescents (Stiehl et al., 2023). Indeed, victimization experiences are common during school transition (Marchante et al., 2022; Monachino et al., 2021). Yet, high classmate support and more friends within the classroom can act as protective factors against victimization experiences (Košir et al., 2020). At the same time, finding a sense of belonging among classmates during school transition is of major importance for early adolescents, marking their high willingness to develop positive relationships with classmates (Curson et al., 2019; Weller, 2007).

Research highlights several strategies that can reduce prejudice and promote a sense of belonging among children and adolescents. Meta-analytic studies in children and adolescents show that contact with discredited and excluded individuals, when incorporating specific positive elements in line with Contact Theory (Allport, 1954), significantly reduces negative attitudes and behavioral intentions towards those 'outsiders' (e.g., individuals with different ethnic origins, mental illnesses or behavioral problems) (Armstrong et al., 2017; Beelmann & Heinemann, 2014; Chae et al., 2018; Corrigan et al., 2012; Waqas et al., 2020). Similarly, cooperative learning at school, which includes carefully structured group-based experiences in the classroom, can improve classmate relations and reduce victimization (Van Ryzin & Roseth, 2018). Overall, anti-stigma research in children emphasizes that positive cooperative experiences involving interdependence between group members can enhance likability and challenge negative prejudice related to ability, gender, weight, or ethnicity (Skinner & Meltzoff, 2019). In addition, storytelling has emerged as a valuable tool for fostering a sense of belonging among children and adolescents in school settings (Lindsay et al., 2013; Lucas & Soares, 2013), with evidence of its potential to reduce prejudice (Cameron & Rutland, 2006; Cameron et al., 2007) and promote perspective-taking and empathy (Skinner & Meltzoff, 2019).

AR in the school context is an ideal technology to increase sense of belonging among classmates as it has the potential to facilitate social interactions and collaboration between players (Brij & Belhadaoui, 2021), especially when including game elements (Rađep & Hajdin, 2021). Using AR technology compared to traditional material in an educational context can improve not only motivation and enjoyment,

but also the socio-emotional relationship between players (Redondo et al., 2020). However, to date the focus of AR use in school has been restricted to supplementing traditional academic disciplines (e.g., math, physics, arts, culture) (Maas & Hughes, 2020; Zhang et al., 2022). AR applications have been used to promote social skills, but these have been primarily designed for autistic populations and single players (Mittmann et al., 2023a). Given that early adolescents use their smartphones on a daily basis to communicate or play games with peers and classmates, which also helps with initiating and developing new friendships (Krammer et al., 2023; Mittmann et al., 2022b), a digital social game that uses AR to enhance sense of belonging among classmates seems promising to engage the target group. Yet, programs or games that enhance sense of belonging through improving peer relationships during childhood and adolescence rarely use digital technology (Pollak et al., 2023) despite their mentioned advantages.

LINA 'Lina Is not Alone': Theory-Led LINA Design

To our knowledge, LINA is the first multi-player mobile game that uses a mystery-style interactive narrative with AR elements to immerse players. LINA is designed for school classes, developed for and in cooperation with early adolescents in iterative cycles (Mittmann et al., 2022a). Overall, the game elements and game design of LINA were developed with a theory-informed and early adolescents-informed integrative approach. The overarching objective of LINA is to increase a sense of belonging among players (i.e., classmates). An early evaluation study of LINA shows high acceptability (quantitative results) and qualitative indications of potential effectiveness (qualitative results) (Mittmann et al., 2022a). The current study uses a further developed version of LINA (i.e., the final single-session proof-of-concept) to evaluate player experience and provide an early-stage, uncontrolled indication of potential effectiveness. Furthermore, the study examined players' perception of LINA design, with a focus on whether its key features were successfully translated into user experience.

The design of LINA was primarily informed by Contact Theory (Allport, 1954), which argues that carefully structured contact involving (1) equal status, (2) cooperation, (3) a common goal and (4) authority support, enhances sense of belonging and minimizes division among individuals and groups. The design of LINA reflects these principles: (1) all players (i.e., classmates) begin with equal access to information; (2) progression requires cooperative gameplay and real-life communication; (3) the narrative encourages collective problem-solving to uncover the story; and (4) the experience provides structured guidance, including hints, to ensure players feel supported.

The theory-led LINA design was also informed by two qualitative studies, aiming to understand early adolescents' perspectives on school transition from primary to secondary school and their experiences with classmates in this period (Krammer et al., 2023; Stiehl et al., 2023). For example, early adolescents mentioned certain rules of communication (e.g., mutual listening, introducing oneself when encountering) and small acts of kindness that establish mutual trust and support (e.g., mutual sharing of information, encouragement for mutual success) as relevant factors for successful interactions with classmates. Thus, structured communication at the beginning of collaborative tasks in LINA were designed to ensure that players listen to and support each other, which aims to establish a feeling of safety during gameplay. Moreover, experienced fun with classmates was highlighted repeatedly for positive relationship development among classmates (Krammer et al., 2023; Stiehl et al., 2023). Thus, the design of LINA encompasses two additional contact elements, that is, a feeling of safety and experienced fun. In sum, the theory-led LINA design encompasses six key features, summarized in Fig. 1.

The Current Study

The current study is an uncontrolled pre-post evaluation study that evaluates the player experience, translation of the theory-led LINA design into user experience and potential effectiveness of LINA, an AR social game for school classes played on smartphones. The study is characterized as a feasibility study (Skivington et al., 2021), focusing on usability and providing an initial indication of potential effectiveness of LINA.

First, player experience was evaluated using a validated game user experience questionnaire. High satisfaction and acceptability ratings were expected without gender differences, based on results from a previous study using a less developed version of LINA (Mittmann et al., 2022a). Second, we evaluated player's perception of LINA design, with a focus on whether its six key features (1) equal status, (2) cooperation, (3) common goal, (4) authority support, (5) a feeling of safety, and (6) experienced fun were successfully translated into user experiences. High approval ratings were anticipated to demonstrate the successful translation of the theory-led LINA design into user experience. Third, in our main analysis we examined the potential effectiveness of LINA, hypothesizing that sense of belonging among classmates increases after engagement with LINA on participant level. Potential variation across classes was examined to account for nested data structure. To further inform robustness of the main analysis, we explored whether the change in sense of belonging differed for participants with low or high levels of peer victimization.

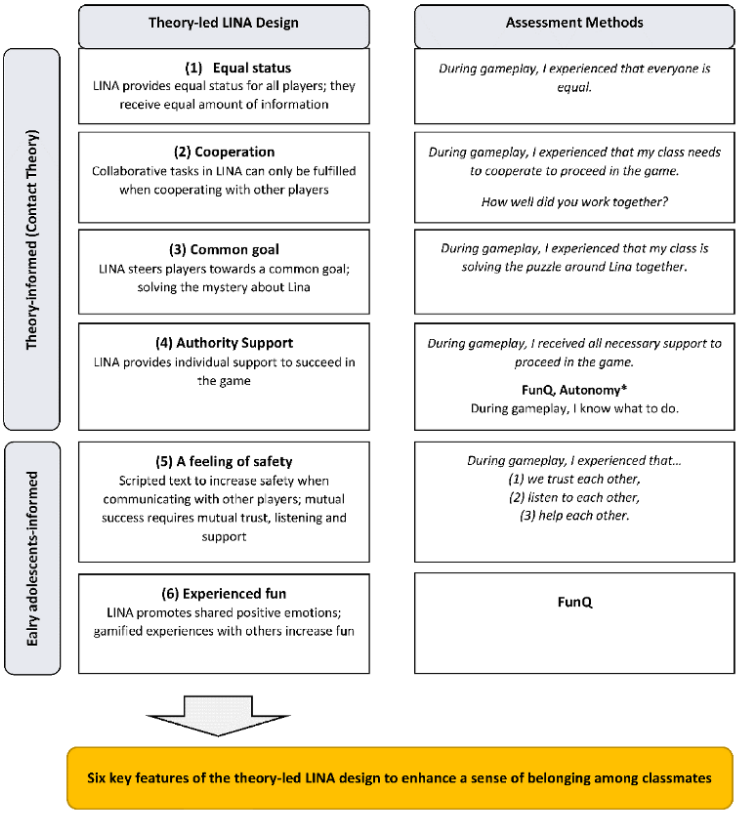


Fig. 1 Theory-led LINA design and related assessment methods. *Note* Newly developed items are in italics. *Single item of subscale was used

Method

LINA

LINA is a mobile AR social game for school classes, involving all students plus one teacher. All players play at the same time and are provided with one smartphone each. Players progress through the experience at first individually, then in pairs, then in small groups and finally as an entire class, discovering AR objects their fictional classmate Lina left behind after her mysterious disappearance. Players learn about Lina's life at school, at home, and her feelings. The game combines real-world experiences with digital ones. For example, the players have to collaborate in a face-to-face setting at school to solve a digital puzzle provided on their smartphone. Through successful collaboration, players can unlock a new AR object together that provides fresh information about Lina. The game was designed by an interdisciplinary European research group and professional practitioners (encompassing a playwright and creative director, psychologists, computer scientists, and graphic designers) and co-developed with early adolescents in iterative processes [blinded for review].

The storyline of LINA focusses on solving a mystery around the sudden disappearance of a girl who feels like she does not belong. She has difficulties trusting others, making friends and – it transpires – a difficult life at home, living with and caring for a mother who has a mental illness.

Game Characteristics

LINA was designed to attract boys and girls equally and support the identification with their character, thus, it incorporates a fictional class where players take the role of characters of the same sex as they are (Felnhofer et al., 2022; Kinzie & Joseph, 2008). LINA encompasses imaginative role-play (including enacted scenes where players receive instructions or dialogue via the phones), exploration

(exploring the classroom through the lens of the smartphone, exploring 2D and 3D objects), problem-solving (solving puzzles together), social interaction (in pairs or groups, to better understand the mystery about Lina), and an active play element (a sequence where players must find hidden AR objects within a set time), covering various game activity preferences of early adolescents (Kinzie & Joseph, 2008).

Recruitment

Two secondary schools in Austria were recruited via existing networks of the research group, thus resulting in a convenience sample. In Austria, pupils can attend two different school types for secondary education: (a) middle school (in Austria called Mittel Schule [MS]) and (b) grammar school (in Austria called Allgemeinbildende Höhere Schule [AHS]). While MS has four years of education and is typically attended by 10- to 14-year-olds, AHS includes eight years of education, ends with a qualification for university entrance and is typically attended by 10- to 18-year-olds. The research group contacted school directors of one AHS and one MS via e-mail with initial information on the project and then over the phone to provide time for additional information and open questions. We invited all first-year students and their main teachers to participate. Both schools agreed to participate. The main teachers then received detailed information on the study via e-mail and a preliminary meeting was scheduled to explain the purpose of the study and necessary preparations (e.g., sending and collecting informed consent to and from parents and students). In total three classes from the school type AHS and two from the school type MS were invited to participate (N=106 pupils). All students and their parents gave written informed consent before the study started. This study was approved by the Ethics Committee of the Karl Landsteiner University of Health Sciences (EK Nr: 1025/2020).

Participants

In total 106 participants and their parents gave informed consent; however, not all participants could be included in the study. Two participants were not present at the days of study conduct. Another four participants were excluded because they were not present when LINA was played in class. Additionally, one participant was excluded for further analyses due to answer patterns indicative of invalid responses (i.e., always the lowest score despite reversely coded items) in two questionnaires (i.e., GUESS-GA-18, FunQ). Thus, the final sample for data analysis comprised 99 participants.

Procedure

This study employed an uncontrolled pre-post design; therefore, all participants were assigned to one condition, that is, playing LINA. The study was conducted in May 2022 in the school setting during regular school hours.

Quantitative data were collected via online questionnaires on iPads at or smartphones at in the school setting. Assessment took place at two time points (i.e., T1 and T2). T1-assessments were administered by participating teachers on a preassigned date, one to two days before playing LINA. Participating teachers received precise information in a preliminary meeting conducted by one of two researchers over the phone, using a conversation guide to ensure all relevant information was discussed. Afterwards, teachers received a QR-Code via e-mail so that students could easily access the online questionnaires (i.e., scanning the QR-Code with their iPad, provided by their school). T2-assessment was conducted immediately after the participants played LINA, accessed via a QR-Code, provided by the research team that set up LINA in class. An overview of the data collection procedure and order of administered questionnaires is presented in Fig. 1.

Measures

Descriptive Data

Demographic data included information on sex, age, nationality and school type, assessed at T1. Additionally, we assessed smartphone possession (yes/no) and gaming behavior (i.e., how often they play games on their smartphone or computer ranging from 1 (*never*) to 5 (*very often*)) at T2.

Player Experience

Player experience was assessed with the German version of the Game User Experience Satisfaction Scale (GUESS-GA-18) for adolescents (Mittmann, Zehetner, Krammer et al., 2023b), a validated instrument measuring satisfaction and acceptability of digital games. The questionnaire consists of 18 items across nine subscales (Usability/Playability, Narratives, Play Engrossment, Enjoyment, Creative Freedom, Audio Aesthetics, Personal Gratification, Social Connectivity, and Visual Aesthetics). Answers are rated on a 5-point Likert scale ranging from 1 (*don't agree at all*) to 5 (*totally agree*), also including reversely coded items. A previous study shows good internal consistency, concurrent validity and a good model fit of the GUESS-GA-18 (Mittmann, Zehetner, Krammer et al., 2023b). The Cronbach's alpha coefficient for this study was α=0.88.

Translation of Theory-led LINA Design into User Experience

The six key features of the theory-led LINA design were assessed with newly developed items and the FunQ (Tisza & Markopoulos, 2021a). The FunQ is a validated multidimensional instrument to assess experienced fun of an activity. It consists of 18 items across six dimensions (autonomy, challenge, delight, immersion, loss of social barriers, and stress), which are rated on a 5-point Likert scale ranging from 1 (*never*) to 5 (*all the time*), again with reversely coded items. The instrument shows good internal consistency for this study (Cronbach's α=0.88). Since the FunQ is only available in English language, the questionnaire has been translated into German language and adopted for early adolescents in iterative co-development workshops with early adolescents. The level of collaboration between peers (in-game assessment) was assessed with one newly developed question (i.e., "How well did you work together?") immediately after each of two collaborative tasks involved in playing LINA. Collaborative task 1 was done in pairs, while task 2 was done in small groups of between three and four participants. The question fit gently into the gameplay experience. On a 5-point smiley face scale ranging from 1 (sad face) to 5 (happy face), participants indicated how they felt about their collaboration. Figure 1 provides an overview of the six key features of the theory-led LINA design and related assessment methods, which were assessed at T2.

Potential Effectiveness of LINA

Sense of belonging was assessed with the subscale social inclusion of the German version of the Perceptions of Inclusion Questionnaire (PIQ; Venetz et al., 2014). The subscale consists of 4 items (e.g., "I get along very well with my classmates"). Answers were provided on a sliding scale (1=*not at all true* to 101=*certainly true*). The original 4-point response scale (0=*not at all true*, 1=*rather not true*, 2=*somewhat true*, and 3=*certainly true*) was adapted to allow for a sensitivity analysis that required continuous data for each item. For the main analyses, continuous data was converted back to ordinal data (i.e., 1 thru 25=1; 26 thru 50=2; 51 thru 75=3; 76 thru 101=4). The questionnaire was completed at both time points, leading to T1-Sense of Belonging (SoB) and T2-SoB sum scores. In the validation research, the subscale had an internal consistency of Cronbach α=0.84 (Venetz et al., 2014). Cronbach's alpha coefficients for this study were α=0.69 and α=0.67 for T1 and T2, respectively.

The factor Social Isolation From Peers from the Chronic Stress in Childhood Questionnaire (CSiK; Richartz et al., 2009) was used to determine the students' level of chronic victimization within their class, assessed at T1. This variable on peer victimization was used for exploratory analyses[1]. On a 4-point Likert scale ranging from 1 (*never*) to 4 (*very often*), participants answered how often they experienced two statements (i.e., "Children in my class talk bad about me", "Children in my class don't let me join in") within the last weeks. Mean scores were calculated. The higher the mean score, the higher the level of chronic stress.

Data Analysis

Statistical analyses were conducted using IBM SPSS Statistics 27. We used p values < 0.05 to identify statistical significance for all analyses. To determine the player experience and the translation of the theory-led LINA design into user experience, we performed descriptive statistics to explore psychometric properties of the questionnaires GUESS-GA-18, FunQ, and items assessing the six key features of the theory-led LINA design, reporting means, SD, and range.

To investigate potential effectiveness of LINA, we conducted a paired t-test in the outcome variable sense of belonging over time. We expected that sense of belonging would increase from T1 to T2 and conducted a one-tailed test. According to the histogram, the differences between T1- and T2-SoB were normally distributed (Field, 2013). We looked at sex differences between T1- and T2-SoB, conducting a t-test for either time points.

Exploratory Analyses

To assess changes over time and potential class-related differences in the outcome variable, a 2 (time: pre vs. post) × 4 (class) mixed ANOVA was conducted. Time was treated as a within-subjects factor, and class as a between-subjects factor. The analysis tested for a main effect of time (i.e., overall change in the outcome variable), a main effect of class (i.e., class differences in outcome levels), and a time × class interaction (i.e., differences in change patterns across classes). The assumption of homogeneity of covariances was tested using Box's test. Estimated marginal means were used to visualize the interaction effect with 95% confidence intervals. Partial eta-squared was used to report effect sizes.

In an additional sensitivity analysis, we investigated whether the average change in T2-SoB differs between participants with low vs. high levels of peer victimization. A median split was applied to the variable peer victimization. The median in the full sample was $M=1.5$, and participants were categorized accordingly (0=low peer victimization, 1=high peer victimization). A difference score was calculated for each participant by subtracting T2-SoB from

[1] Variable warrants cautious interpretation due to low item intercorrelation.

T1-SoB. An independent samples t-test was conducted to compare the mean difference scores between the high- and low-peer victimization groups. Effect sizes were reported using Cohen's *d* with 95% confidence intervals.

Missing Data

Unfortunately, one class had several instances of missing data at T2 for variables assessing sense of belonging and translation of the theory-led LINA design into user experience. This occurred because workshop providers mistakenly used a QR code linked to an incomplete version of the questionnaire. As a result, the class only completed part of the final questionnaire designed for the study. Therefore, this one class could only be included in the analysis of player experience.

Aside from the above, we had only a small number of missing items (n=15) across eight participants. Three participants did not answer questions on the FunQ, gaming behavior, and smartphone possession because of time insufficiency. The small number of missing values led to the decision to exclude participants for analyses with missing data in the target variable, which explains the varying numbers of participants between analyses.

Results

Participants

In total, data from 99 participants (M_{age} = 10.94; age range=10–12; 51 girls, 48 boys) were included in this study. Ninety-two participants were born in Austria and seven in other countries (e.g., Germany). Forty-two participants attended MS and 57 AHS.

Overall, the vast majority (99%) possessed their own smartphone. While almost half of the girls (49%) played smartphone games often or very often, they rarely played computer games (16% played often or very often). In contrast, 80% boys played smartphone games often or very often and 64% also played computer games often or very often. In sum, boys played digital games more regularly than girls, but both showed a preference for playing games on smartphones over computers[2].

Since we had to exclude one class (n=19) due to missing data for all analyses, except determining player experience, we compared demographic data for this subsample with the overall sample. We did not detect any significant deviations regarding sex, age, or nationality. Hence, the subsample is not described further.

Table 1 *Psychometric properties of the GUESS-GA-18*

	n	M	SD	Range	
				Potential	Actual
GUESS-GA-18 score	96	35.73	5.54	9–45	14–44
Usability	96	3.83	0.95	1–5	1–5
Narratives	96	4.53	0.70	1–5	1–5
Play Engrossment	96	3.45	1.051	1–5	1–5
Enjoyment	96	4.51	0.74	1–5	2–5
Creative Freedom	96	3.36	1.06	1–5	1–5
Audio Aesthetics	96	3.99	1.12	1–5	1–5
Personal Gratification	96	3.69	0.98	1–5	1–5
Social Connectivity	96	4.34	0.76	1–5	1–5
Visual Aesthetics	96	4.02	0.96	1–5	1–5

Note. n_{girls} = 49; n_{boys} = 47; values range from 1 (*don't agree at all*) to 5 (*totally agree*); data assessed at T2

Player Experience

Table 1 presents psychometric properties of the questionnaire GUESS-GA-18, used to assess player experience. The overall satisfaction score was 35.73. The highest mean scores were reached in the subscales narratives (mean score=4.53), enjoyment (mean score=4.51), and social connectivity (mean score=4.34). No sex differences were found in the overall GUESS-GA-18 score, therefore, no further analyses regarding sex differences were conducted.

Translation of Theory-led LINA Design into User Experience

Table 2 reports the psychometric properties of the six key features of the theory-led LINA design. Players perceived that they met on equal terms, had to cooperate to solve a common goal, received appropriate support, felt safe during social interactions, and experienced fun throughout the activity. For both collaborative tasks, participants reported extremely good collaboration with their peers. 95% stated that they were happy or extremely happy with their collaboration in task 1 and task 2, respectively. Results point to a successful translation of the key features of the theory-led LINA design into user experience.

[a] single item of the FunQ (Tisza & Markopoulos, 2021a).

Potential Effectiveness of LINA

Table 3 shows a statistically significant increase in sense of belonging from T1 to T2 with a small effect Cohen's d=0.21 (Cohen, 1992). No significant sex differences were found on either time points ($t_1(77)$=1.760, p>.05; $t_2(77)$=1.645, p>.05).

[2] Percentages are calculated for n=78 due to missing data.

Table 2 *Psychometric properties of the six key features of the Theory-led LINA design*

Topic	*n*	M	SD	Range	
				Potential	Actual
Cooperation					
During gameplay, I experienced that my class needs to cooperate to proceed in the game	79	79.89	29.11	1-101	1-101
How well did you work together?					
Task1 – collaboration in pairs	99	4.56	0.70	1–5	1–5
Task2 – collaboration in small groups	99	4.74	0.55	1–5	3–5
Equal Status					
During gameplay, I experienced that everyone is equal	80	83.06	27.77	1-101	1-101
Common goal					
During gameplay, I experienced that my class is solving the puzzle around Lina together	80	93.06	16.76	1-101	1-101
Authority support					
During gameplay, I received all necessary support to proceed in the game	79	79.68	29.62	1-101	1-101
During gameplay, I know what to do[a]	93	3.87	1.09	1–5	1–5
A feeling of safety					
During gameplay, I experienced that…					
(1) we trust each other.	80	84.21	25.40	1-101	1-101
(2) listen to each other.	79	82.51	26.64	1-101	1-101
(3) help each other.	80	86.66	24.52	1-101	1-101
Experienced fun					
FunQ Score	93	73.19	11.45	18–90	33–90

Note. The variation in sample size is due to the variation in the number of excluded cases because of missing data. Data was assessed at T2. Higher mean scores indicate higher approval

Exploratory Analyses

The mixed ANOVA revealed a significant main effect of time, $F(1, 75)=6.693$, $p=.012$, partial $\eta^2 = 0.082$, indicating that the outcome variable sense of belonging significantly increased from T1 to T2 across all classes. The interaction effect between time and classroom was not statistically significant, $F(3, 75)=2.100$, $p=.107$, partial $\eta^2 = 0.077$. This suggests that the degree of change over time did not differ substantially between classes (further information in supplementary material).

In an additional sensitivity analysis, we examined whether the average change in sense of belonging differed between participants with low ($n=51$) versus high levels of peer victimization ($n=28$). Descriptively, those with higher peer victimization showed a slightly greater improvement in the outcome ($M=0.71$, $SD=2.48$) than those with lower levels ($M=0.43$, $SD=1.32$). However, this difference was small with a small effect (Cohen's $d=0.18$) and did not reach statistical significance ($p=.557$). Greater variability in the high-victimization group suggests more heterogeneous individual responses.

Discussion

The aim of this study was to evaluate player experience, the transition of the theory-led LINA design into user experience, and potential effectiveness of LINA. Overall, early adolescents had a great player experience with high satisfaction and acceptability ratings. In addition, high approval ratings on all six key features of theory-led LINA design demonstrate a successful translation of theory led features into user experience. Moreover, early adolescents not only enjoyed playing LINA, their sense of belonging also increased significantly following engagement with LINA (an effect that was robust across all classes). Results also seem to be robust for participants with high and low levels of peer victimization, as both subgroups benefitted equally from LINA.

Player Experience

The high overall satisfaction scores in the GUESS-GA-18 support an excellent player experience of LINA. Compared to an earlier evaluation of a less polished version of LINA at the end of the co-development phase in June 2021, the overall player experience further increased (Mittmann et al., 2022a). Comparing the satisfaction score to another serious game about well-being for adolescents that used the same evaluation instrument, LINA reached an even higher score (Schorer & Protopsaltis, 2021).

The highest scores in the subscale narratives, enjoyment and social connectivity, highlight the special emphasis that

Table 3 *T1 to T2 mean differences in sense of belonging*

	Time 1			Time 2					Cohen's d
	M (SD)	SE	Range	M (SD)	SE	Range	t (78)	*p*	
Sense of belonging	13.59 (2.56)	0.29	5–16	14.13 (2.78)	0.31	4–16	2.62	0.005*	0.21

Note. $N=79$

was put on these aspects during game development. For example, the narratives have gently been co-developed with early adolescents in iterative stages, involving early adolescents in storytelling and as experts of their own experiences at school. Additionally, the narratives were enriched by real world experiences from interviews with adult children of parents with a mental illness to tell a realistic story (Mittmann et al., 2022a). These iterative feedback loops were also used to optimize enjoyment of LINA among players. The high score in the subscale social connectivity demonstrates that LINA also gently supports social interactions between players, suggesting it is a highly positive multiplayer experience.

Translation of Theory-led LINA Design into User Experience

In accordance with our theory-led LINA design (see Fig. 1), the six key features received high approval rates meeting at least 79.86%, with one exception (i.e., "During gameplay, I know what to do") meeting 77.40%. These findings support that players experienced equal status, cooperation to solve a common goal, received appropriate support, felt safe during social interactions, and experienced fun throughout the activity. In particular, players experienced a high feeling of safety, reporting that they can trust, listen to, and help each other during gameplay. We also assessed experienced fun of LINA, which was exceptionally high compared to other educational games or activities using the same instrument (Tisza & Markopoulos, 2021b; Tisza et al., 2021).

Potential Effectiveness of LINA

For the first time, LINA was tested for increases in sense of belonging before and after gameplay. The significant increase over time suggests that LINA has great potential to enhance sense of belonging among classmates.

This study makes an important contribution to classroom-based programs during early adolescence with a focus on enhancing a sense of belonging among classmates. While early childhood is well-studied, the age group typically confronted with school transition (8–14 age range) remains underrepresented in intervention research (Milton et al., 2021). In particular, the focus on fostering relationships between classmates in its own rights received little attention (Pollak et al., 2023). LINA provides unique classroom-focused components and social interactions with multiple classmates in both, digital and face-to-face ways. We argue that LINA holds potential to add to the small list of universal, classroom-based programs that facilitate relationships among classmates (Pollak et al., 2023).

Although increases in sense of belonging were observed across all four classrooms in our study, our exploratory analyses showed some variation across these classes (see also supplementary material). Our findings suggest that these classes are affected by pedagogically relevant group differences (e.g., general class climate, teachers). Indeed, relationships between classmates, but also teacher-student relationships and individual student factors (e.g., gender, migration background) can affect classroom processes and students' well-being (Saxer et al., 2024). Therefore, including other pedagogically relevant aspects on class level in future LINA development might add important knowledge to our results.

Finally, sense of belonging did not differ between participants with low or high levels of peer victimization, which suggests that all pupils can benefit regardless of their peer victimization level. This result is promising since victimized peers have difficulties establishing good relationships at school, which might be particularly true after a transition (Ehrhardt et al., 2022). There is evidence that face-to-face collaborative games can reduce the level of self-reported peer rejection (Mikami et al., 2005), a potential effect that might apply to LINA as well. If LINA with merged digital and face-to-face collaboration can also minimize feelings of peer rejection, needs further investigation.

Practical Implications and Future Directions

To our knowledge LINA is the first mobile AR social game that focuses specifically on relationships between classmates, instead of peers in general or friends only. Yet, teacher-student relationships play an additional role in the development of positive relationships with classmates and their well-being (Saxer et al., 2024). For example, when teachers create a warm and supportive classroom environment, it strengthens relationships between classmates, especially through fostering closeness rather than merely reducing conflict. In future, LINA should add playful elements that also addresses teacher-student relationships within the game. For example, by instructing the teacher to make positive intentional comments about students, which may further enhance student inclusion in the classroom (Saxer et al., 2024). In line with these considerations, future studies should assess not only changes in student-student but also teacher-student relationships.

While LINA could achieve a feeling of safety through structured contact situations, it is unclear how much contact is needed to achieve even better results and how quality and quantity of contact interact (Skinner & Meltzoff, 2019). Another digital game supporting peer relationships with focus on social skills training showed effective results after nine online episodes (Sanchez et al., 2017). In general,

programs supporting peer relationships in children and adolescents last an average of 18 weeks (Pollak et al., 2023). Thus, extending playtime of LINA including several episodes might be a promising avenue to explore. Moreover, successful programs that exclusively focus on rejected or victimized peers and the promotion of their peer relationships typically include social skills training (e.g., DeRosier, 2004; Healy & Sanders, 2014). Thus, LINA might be improved by proving optional support material after each episode, opening up further opportunities for discussions in class or traditional active practice in social skills training to best support at-risk children (Pollak et al., 2023).

To our knowledge LINA is the first mobile AR social game that creates an immersive social game for multiple players to promote sense of belonging. The high scores on satisfaction, collaboration, experienced fun and feeling of safety during social interactions suggest that the school environment might only be one of many possible application areas. For example, also at university the establishment of good peer relationships is essential for mental health (Maunder, 2017; Swenson et al., 2008), suggesting that LINA could be adjusted for university courses to foster relationships and well-being when transitioning to university.

LINA is developed with theoretical considerations primarily based on Contact Theory, which typically investigate the reduction of prejudice, attitude or behavioral changes towards particularly disliked individuals or members of social groups (e.g., Armstrong et al., 2017; Beelmann & Heinemann, 2014). These aspects have not been investigated so far. Moreover, since the narrative addresses a story about children of parents with a mental illness (COPMI), attitude changes towards COPMI, and mental health literacy in general, could also be addressed in future LINA episodes and research.

Strengths and Limitations

Although the development of LINA has only reached proof-of-concept status, a statistically significant increase in sense of belonging could be demonstrated over the course of only one episode. This result, combined with the high ratings of player experience and excellent ratings on experienced fun and collaboration, make LINA a highly promising social experience with many potential application areas, which should be further investigated. Yet, the current study uses a convenience sample without a control group, which does not allow for conclusions regarding true intervention effects. There is a possibility that students would have improved their sense of belonging naturally over time without LINA or that students overestimated how their sense of belonging changed over time because of their investment in the study. Another limitation of this study is the small cluster size (i.e., data were drawn from only four classrooms in two schools), which falls below the recommended 10–15 clusters for reliable multilevel analyses (McNeish & Stapleton, 2016). Future research should test LINA with a larger sample and more robust study design (e.g., a randomized controlled trial) to enable robust multilevel modeling. Nevertheless, this study provides promising results on potential effectiveness with a reasonable sample size that can be used to determine statistical power for future studies, an important foundation for future trials. We showed that a sense of belonging among classmates can change in the assessed time period and with the measure we applied. Yet, the measure assessing the variable sense of belonging produced ceiling effects, as 33% of participants indicated the highest score at T1, leaving no room for further improvement. To reduce these effects, other operationalization methods could be considered.

Conclusion

LINA is a novel AR social game to increase sense of belonging among classmates by promoting their relationships in the classrooms. Early adolescents were highly satisfied with the player experience. The high approval ratings on the six key features of the theory-led LINA design demonstrate successful application of the theory-led design into user experiences. LINA provided opportunities for good collaboration where players meet on equal grounds and safe social interactions are possible. Further development of LINA should add to the complexity of classroom processes by taking aspects such as teacher-student relationships and individual factors into account.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s12310-025-09846-y.

Acknowledgements The D.O.T. (Die Offene Tür - The Open Door) team of co-investigators – Adam Barnard (playwright and theatre director), João Dias (computer scientist), Marija Mitic (medical doctor), Beate Schrank (practicing & research psychiatrist) and Kate Woodcock (research psychologist) – came together through a sandpit event organized by the Open Innovation Center of Ludwig Boltzmann Society and facilitated by Know Innovation. The team would like to thank these organizations for their role in its formation. D.O.T team work is jointly conceived and led by the co-investigators. The team sees this as a fully meaningful interdisciplinary collaboration.

Funding Open access funding provided by Karl Landsteiner University. This work was supported by Ludwig Boltzmann Society Open Innovation for Science, Karl Landsteiner University of Health Sciences, and Lower Austrian Research and Education Association (NFB). This work was also sponsored by a VDS CoBeNe final fellowship by University of Vienna. We acknowledge support by Open Access Publishing Fund of Karl Landsteiner University of Health Sciences, Krems, Austria. Declarations of interest: We have no known conflict of interest

to disclose.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

References

Allen, K., Kern, M. L., Vella-Brodrick, D., Hattie, J., & Waters, L. (2018). What schools need to know about fostering school belonging: A meta-analysis. *Educational Psychology Review*, *30*, 1–34. https://doi.org/10.1007/s10648-016-9389-8

Allen, K. A., Kern, M. L., Rozek, C. S., McInerney, D. M., & Slavich, G. M. (2021). Belonging: A review of conceptual issues, an integrative framework, and directions for future research. *Australian Journal of Psychology*, *73*(1), 87–102. https://doi.org/10.1080/00049530.2021.1883409

Allport, G. (1954). *The nature of prejudice*. Addison-Wesley.

Andersen, L. M. B., Rasmussen, A. N., Reavley, N. J., Bøggild, H., & Overgaard, C. (2021). The social route to mental health: A systematic review and synthesis of theories linking social relationships to mental health to inform interventions. *SSM - Mental Health*. https://doi.org/10.1016/j.ssmmh.2021.100042., 1, Article 100042.

Armstrong, M., Morris, C., Abraham, C., & Tarrant, M. (2017). Interventions utilising contact with people with disabilities to improve children's attitudes towards disability: A systematic review and meta-analysis. *Disability and Health Journal*, *10*(1), 11–22. https://doi.org/10.1016/j.dhjo.2016.10.003

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*(3), 497–529.

Beelmann, A., & Heinemann, K. S. (2014). Preventing prejudice and improving intergroup attitudes: A meta-analysis of child and adolescent training programs. *Journal of Applied Developmental Psychology*, *35*(1), 10–24. https://doi.org/10.1016/j.appdev.2013.11.002

Brij, Y., & Belhadaoui, H. (2021). Virtual and augmented reality in school context: A literature review. *E3S Web of Conferences, 297*, Article 01027. https://doi.org/10.1051/e3sconf/202129701027

Burke, M. A., & Sass, T. R. (2013). Classroom peer effects and student achievement. *Journal of Labor Economics*, *31*(1), 51–82. https://doi.org/10.1086/666653

Cameron, L., & Rutland, A. (2006). Extended contact through story reading in school: Reducing children's prejudice toward the disabled. *Journal of Social Issues*, *62*(3), 469–488. https://doi.org/10.1111/j.1540-4560.2006.00469.x

Cameron, L., Rutland, A., & Brown, R. (2007). Promoting children's positive intergroup attitudes towards stigmatized groups: Extended contact and multiple classification skills training. *International Journal of Behavioral Development*, *31*(5), 454–466. https://doi.org/10.1177/0165025407081474

Chae, S., Park, E. Y., & Shin, M. (2018). School-based interventions for improving disability awareness and attitudes towards disability of students without disabilities: A meta-analysis. *International Journal of Disability Development and Education*, *66*(4), 1–19. https://doi.org/10.1080/1034912x.2018.1439572

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155–159. https://doi.org/10.1037//0033-2909.112.1.155

Corrigan, P. W., Morris, S. B., Michaels, P. J., Rafacz, J. D., & Rüsch, N. (2012). Challenging the public stigma of mental illness: A meta-analysis of outcome studies. *Psychiatric Services*, *63*(10), 963–973. https://doi.org/10.1176/appi.ps.201100529

Curson, S., Wilson-Smith, K., & Holliman, A. (2019). Exploring the experience of students making the transition from primary school to secondary school: An interpretative phenomenological analysis of the role of friendship and family support. *Psychology Teaching Review*, *25*(1), 30–41. https://doi.org/10.53841/bpsptr.2019.25.1.30

DeRosier, M. E. (2004). Building relationships and combating bullying: Effectiveness of a school-based social skills group intervention. *Journal of Clinial Child and Adolescent Psychology*, *33*(1), 196–201. https://doi.org/10.1207/s15374424jccp3301_18

Ehrhardt, A. D., Hoffman, A. J., & Schacter, H. L. (2022). On shaky grounds: Peer victimization predicts friendship instability across the ninth grade school year. *Journal of Adolescence*, *94*(7), 1041–1046. https://doi.org/10.1002/jad.12081

Felnhofer, A., Wittmann, L., Reichmann, A., König-Teshnizi, D., & Kothgassner, O. D. (2022). Character identification is predicted by narrative transportation, immersive tendencies, and interactivity. *Current Psychology*, *42*(22), 18567–18577. https://doi.org/10.1007/s12144-022-03048-4

Field, A. (2013). *Discovering statistics using IBM SPSS statistics: And sex and drugs and rock'n'roll* (4. ed.). SAGE.

Franco, K., Baumler, E., Torres, E. D., Lu, Y., Wood, L., & Temple, J. R. (2022). The link between school climate and mental health among an ethnically diverse sample of middle school youth. *Current Psychology*, *42*(22), 18488–18498. https://doi.org/10.1007/s12144-022-03016-y

Gempp, R., & Gonzalez-Carrasco, M. (2021). Peer relatedness, school satisfaction, and life satisfaction in early adolescence: A non-recursive model. *Frontiers in Psychology*, *12*, 641714. https://doi.org/10.3389/fpsyg.2021.641714

Healy, K. L., & Sanders, M. R. (2014). Randomized controlled trial of a family intervention for children bullied by peers. *Behavior Therapy*, *45*(6), 760–777. https://doi.org/10.1016/j.beth.2014.06.001

Hoferichter, F., Kulakow, S., & Raufelder, D. (2022). How teacher and classmate support relate to students' stress and academic achievement. *Frontiers in Psychology*, *13*, 992497. https://doi.org/10.3389/fpsyg.2022.992497

Huebner, E. S., Hills, K. J., Jiang, X., Long, R. F., Kelly, R., Lyons, M. D., Ben-Arieh, A., Frønes, I., Casas, F., & Korbin, J. E. (2014). Schooling and children's subjective well-being. In *Handbook of child well-being* (pp. 797–819). Springer Netherlands. https://doi.org/10.1007/978-90-481-9063-8_26

Kinzie, M. B., & Joseph, D. R. D. (2008). Gender differences in game activity preferences of middle school children: Implications for educational game design. *Educational Technology Research and Development*, *56*(5), 643–663. https://doi.org/10.1007/s11423-007-9076-z

Košir, K., Klasinc, L., Špes, T., Pivec, T., Cankar, G., & Horvat, M. (2020). Predictors of self-reported and peer-reported victimization and bullying behavior in early adolescents: The role of school, classroom, and individual factors. *European Journal of Psychology of Education*, *35*(2), 381–402. https://doi.org/10.1007/s10212-019-00430-y

Krammer, I., Schrank, B., Pollak, I., Stiehl, K. A. M., Nater, U. M., & Woodcock, K. A. (2023). Early adolescents' perspectives on factors that facilitate and hinder friendship development with peers

at the time of school transition. *Journal of School Psychology*, *98*, 113–132. https://doi.org/10.1016/j.jsp.2023.03.001

Lindsay, S., McPherson, A. C., Aslam, H., McKeever, P., & Wright, V. (2013). Exploring children's perceptions of two school-based social inclusion orograms: A pilot study. *Child & Youth Care Forum*, *42*(1), 1–18. https://doi.org/10.1007/s10566-012-9183-9

Lucas, C. V., & Soares, L. (2013). Bibliotherapy: A tool to promote children's psychological well-being. *Journal of Poetry Therapy*, *26*(3), 137–147. https://doi.org/10.1080/08893675.2013.823310

Maas, M. J., & Hughes, J. M. (2020). Virtual, augmented and mixed reality in K–12 education: A review of the literature. *Technology Pedagogy and Education*, *29*(2), 231–249. https://doi.org/10.1080/1475939X.2020.1737210

Marchante, M., Coelho, A., V., & Maria Romão, A. (2022). The influence of school climate in bullying and victimization behaviors during middle school transition. *Contemporary Educational Psychology*, *71*., Article 102111. https://doi.org/10.1016/j.cedpsych.2022.102111

Maunder, R. E. (2017). Students' peer relationships and their contribution to university adjustment: The need to belong in the university community. *Journal of Further and Higher Education*, *42*(6), 756–768. https://doi.org/10.1080/0309877x.2017.1311996

McGraw, K., Moore, S., Fuller, A., & Bates, G. (2008). Family, peer and school connectedness in final year secondary school students. *Australian Psychologist*, *43*(1), 27–37. https://doi.org/10.1080/00050060701668637

McNeish, D. M., & Stapleton, L. M. (2016). The effect of small sample size on two-level model estimates: A review and illustration. *Educational Psychology Review*, *28*(2), 295–314. https://doi.org/10.1007/s10648-014-9287-x

Mikami, A. Y., Boucher, M. A., & Humphreys, K. (2005). Prevention of peer rejection through a classroom-level intervention in middle school. *The Journal of Primary Prevention*, *26*(1), 5–23. https://doi.org/10.1007/s10935-004-0988-7

Milton, A. C., Stewart, E., Ospina-Pinillos, L., Davenport, T., & Hickie, I. B. (2021). Participatory design of an activities-based collective mentoring program in after-school care settings: Connect, promote, and protect program. *JMIR Pediatrics and Parenting*, *4*(2). https://doi.org/10.2196/22822. Article e22822.

Mittmann, G., Barnard, A., Krammer, I., Martins, D., & Dias, J. (2022a). LINA - A social augmented reality game around mental health, supporting real-world connection and sense of belonging for early adolescents. *Proceedings of the ACM on Human-Computer Interaction*, *6*(CHI PLAY), 1–21. https://doi.org/10.1145/3549505

Mittmann, G., Woodcock, K., Dörfler, S., Krammer, I., Pollak, I., & Schrank, B. (2022b). TikTok is my life and Snapchat is my ventricle: A mixed-methods study on the role of online communication tools for friendships in early adolescents. *The Journal of Early Adolescence*, *42*(2), 172–203. https://doi.org/10.1177/02724316211020368

Mittmann, G., Zehetner, V., Hoehl, S., Schrank, B., Barnard, A., & Woodcock, K. (2023a). The use of augmented reality to improve social skills: A systematic scoping review. *JMIR Preprints*. https://doi.org/https://preprints.jmir.org/preprint/42117

Mittmann, G., Zehetner, V., Krammer, I., & Schrank, B. (2023b). Translation, adaptation and validation of the German version of the game user experience satisfaction scale (GUESS-GA-18) for adolescents. *Behaviour & Information Technology*, *43*(7), 1401–1415. https://doi.org/10.1080/0144929X.2023.2212807

Monachino, C., Splett, J. W., Shen, Z., Cornett, S., Halliday, C. A., & Weist, M. D. (2021). Patterns and pathways of peer victimization across the transition to middle school. *School Psychology Review*, *50*(2–3), 420–440. https://doi.org/10.1080/2372966X.2021.1904792

Moreira, A. L., Yunes, M. Â. M., Nascimento, C. R. R., & Bedin, L. M. (2021). Children's subjective well-being, peer relationships and resilience: An integrative literature review. *Child Indicators Research*, *14*(5), 1723–1742. https://doi.org/10.1007/s12187-021-09843-y

Ng-Knight, T., Shelton, K. H., Riglin, L., Frederickson, N., McManus, I. C., & Rice, F. (2019). Best friends forever'? Friendship stability across school transition and associations with mental health and educational attainment. *British Journal of Educational Psychology*, *89*(4), 585–599. https://doi.org/10.1111/bjep.12246

Oberle, E., Schonert-Reichl, K. A., & Zumbo, B. D. (2011). Life satisfaction in early adolescence: Personal, neighborhood, school, family, and peer influences. *Journal of Youth and Adolescence*, *40*(7), 889–901. https://doi.org/10.1007/s10964-010-9599-1

Pollak, I., Mitic, M., Birchwood, J., Dörfler, S., Krammer, I., Rogers, J. C., Schek, E. J., Schrank, B., Stiehl, K. A. M., & Woodcock, K. A. (2023). A systematic review of intervention programs promoting peer relationships among children and adolescents: Methods and targets used in effective programs. *Adolescent Research Review*, *8*(3), 297–321. https://doi.org/10.1007/s40894-022-00195-4

Quintana, R. (2021). Who belongs in school? Using statistical learning techniques to identify linear, nonlinear and interactive effects. *The Quantitative Methods for Psychology*, *17*(3), 312–328. https://doi.org/10.20982/tqmp.17.3.p312

Qvortrup, A., & Qvortrup, L. (2018). Inclusion: Dimensions of inclusion in education. *International Journal of Inclusive Education*, *22*(7), 803–817. https://doi.org/10.1080/13603116.2017.1412506

Redep, T., & Hajdin, G. (2021). Use of augmented reality with game elements in education - Literature review. *Journal of Information and Organizational Sciences*, *45*(2), 473–494. https://doi.org/10.31341/jios.45.2.7

Redondo, B., Cózar-Gutiérrez, R., González-Calero, J. A., & Sánchez Ruiz, R. (2020). Integration of augmented reality in the teaching of english as a foreign Language in early childhood education. *Early Childhood Education Journal*, *48*(2), 147–155. https://doi.org/10.1007/s10643-019-00999-5

Richartz, A., Hemming, K., & Sallen, J. (2009). *Kinder im Leistungssport. Chronische Belastungen und protektive Ressourcen*.

Sanchez, R., Brown, E., Kocher, K., & DeRosier, M. (2017). Improving children's mental health with a digital social skills development game: A randomized controlled efficacy trial of adventures aboard the S.S. GRIN. *Games for Health Journal*, *6*(1), 19–27. https://doi.org/10.1089/g4h.2015.0108

Saxer, K., Schnell, J., Mori, J., & Hascher, T. (2024). The role of teacher–student relationships and student–student relationships for secondary school students' well-being in Switzerland. *International Journal of Educational Research Open*, *6*, 100318. https://doi.org/10.1016/j.ijedro.2023.100318

Schmidt, A., Dirk, J., & Schmiedek, F. (2019). The importance of peer relatedness at school for affective well-being in children: Between- and within-person associations. *Social Development*, *28*(4), 873–892. https://doi.org/10.1111/sode.12379

Schmidt, A., Dirk, J., & Schmiedek, F. (2020). The power of everyday peer relatedness in predicting subjective well-being after school transition. *Zeitschrift Für Entwicklungspsychologie Und Pädagogische Psychologie*, *52*(3–4), 64–74. https://doi.org/10.1026/0049-8637/a000220

Schorer, A., & Protopsaltis, A. (2021). Learners' user experience assessment of a serious game for social innovation education. *European Conference on Games Based Learning*, 622–630. https://doi.org/10.34190/GBL.21.051

Shao, Y., Kang, S., Lu, Q., Zhang, C., & Li, R. (2024). How peer relationships affect academic achievement among junior high school students: The chain mediating roles of learning motivation and learning engagement. *BMC Psychology*, *12*(1), 278–212. https://doi.org/10.1186/s40359-024-01780-z

Skinner, A. L., & Meltzoff, A. N. (2019). Childhood experiences and intergroup biases among children. *Social Issues and Policy Review*, *13*(1), 211–240. https://doi.org/10.1111/sipr.12054

Skivington, K., Matthews, L., Simpson, S. A., Craig, P., Baird, J., Blazeby, J. M., Boyd, K. A., Craig, N., French, D. P., McIntosh, E., Petticrew, M., Rycroft-Malone, J., White, M., & Moore, L. (2021). Framework for the development and evaluation of complex interventions: Gap analysis, workshop and consultation-informed update. *Health Technology Assessment*, *25*(57), 1–132. https://doi.org/10.3310/hta25570

Stiehl, K. A. M., Krammer, I., Schrank, B., Pollak, I., Silani, G., & Woodcock, K. A. (2023). Children's perspective on fears connected to school transition and intended coping strategies. *Social Psychology of Education*, *26*(3), 603–637. https://doi.org/10.1007/s11218-023-09759-1

Swenson, L. M., Nordstrom, A., & Hiester, M. (2008). The role of peer relationships in adjustment to college. *Journal of College Student Development*, *49*(6), 551–567. https://doi.org/10.1353/csd.0.0038

Symonds, J. E., & Galton, M. (2014). Moving to the next school at age 10–14 years: An international review of psychological development at school transition. *Review of Education*, *2*(1), 1–27. https://doi.org/10.1002/rev3.3021

Tisza, G., & Markopoulos, P. (2021a). FunQ: Measuring the fun experience of a learning activity with adolescents. *Current Psychology*, *42*, 1936–1956. https://doi.org/10.1007/s12144-021-01484-2

Tisza, G., & Markopoulos, P. (2021b). Understanding the role of fun in learning to code. *International Journal of Child-Computer Interaction*, *28*., Article 100270. https://doi.org/10.1016/j.ijcci.2021.100270

Tisza, G., Zhu, S., & Markopoulos, P. (2021). Fun to enhance learning, motivation, self-efficacy, and intention to play in DGBL. In J. Baalsrud Hauge, J. C. S. Cardoso, L. Roque, & P. A. Gonzalez-Calero, *Entertainment Computing – ICEC 2021* Cham.

Van Ryzin, M. J., & Roseth, C. J. (2018). Cooperative learning in middle school: A means to improve peer relations and reduce victimization, bullying, and related outcomes. *Journal of Educational Psychology*, *110*(8), 1192–1201. https://doi.org/10.1037/edu0000265

Venetz, M., Zurbriggen, C., & Eckhart, M. (2014). Entwicklung und erste validierung einer Kurzversion des Fragebogens Zur erfassung von dimensionen der integration von Schülem (FDI 4–6) von Haeberlin, Moser, bless und Klaghofer [Development and preliminary validation of a short questionnaire based on the FDI 4–6 by Haeberlin, Moser, bless, and Klaghofer measuring the educational integration of pupils]. *Empirische Sonderpädagogik*, *6*(2), 99–113. https://doi.org/10.25656/01:9247

Waqas, A., Malik, S., Fida, A., Abbas, N., Mian, N., Miryala, S., Amray, A. N., Shah, Z., & Naveed, S. (2020). Interventions to reduce stigma related to mental illnesses in educational institutes: A systematic review. *Psychiatric Quarterly*, *91*(3), 887–903. https://doi.org/10.1007/s11126-020-09751-4

Weller, S. (2007). Sticking with your mates?' children's friendship trajectories during the transition from primary to secondary school. *Children & Society*, *21*, 339–351. https://doi.org/10.1111/j.1099-0860.2006.00056.x

Zhang, J., Li, G., Huang, Q., Feng, Q., & Luo, H. (2022). Augmented reality in K-12 education: A systematic review and meta-analysis of the literature from 2000 to 2020. *Sustainability*, *14*(15). https://doi.org/10.3390/su14159725

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

B Summary

English Abstract

Supportive peer relationships play a crucial role during early adolescence, particularly during the transition from primary to secondary school, a sensitive period for the development of belonging among classmates. Despite this, limited research has addressed early adolescents' specific needs during this transition or how to effectively foster belonging, especially through digital and participatory approaches. The aim of this thesis was to develop and evaluate a theory- and early adolescents-informed digital social game (LINA) designed to enhance classmates' sense of belonging. To achieve this, a participatory approach was adopted, integrating early adolescents' perspectives into both theoretical understanding and game design processes. Across two studies comprising three articles, this approach enabled the exploration of early adolescents' needs, the development of LINA, and its evaluation.

Findings indicate that early adolescents experience multiple fears during school transition, with social concerns (e.g., peer victimisation and the need to belong) being more prominent than academic fears. Friendships and the ability to form new peer relationships emerged as central, alongside coping strategies such as support seeking and communication. Friendship development was found to be facilitated by shared activities, positive emotional experiences, and safe interaction environments, particularly when repeated over time. Digital interactions were also identified as important components of peer relationships. Building on these insights, a comprehensive LINA design was developed to inform game design processes. The evaluation of LINA showed increased levels of classmates' sense of belonging and high player satisfaction, suggesting that the intended design principles were successfully implemented.

These findings highlight the importance of participatory design approaches for developing tailored interventions. This thesis lays a comprehensive foundation for the continued development of LINA while underscoring the need for more rigorous research. In general, understanding early adolescents' social needs and factors for supportive contact can inform educators and school psychologists in supporting peer relationships during this critical developmental period.

German Abstract

Unterstützende Peer-Beziehungen spielen in der frühen Adoleszenz eine zentrale Rolle, insbesondere während des Übergangs von der Primar- in die Sekundarstufe, einer sensiblen Phase für die Entwicklung von Zugehörigkeit innerhalb der Klasse. Bislang hat sich die Forschung nur begrenzt mit den spezifischen Bedürfnissen von Kindern in dieser Übergangsphase sowie mit der Frage beschäftigt, wie Zugehörigkeit effektiv gefördert werden kann, insbesondere digitale und partizipative Ansätze fehlen. Ziel dieser Dissertation war es, ein theorie- und zielgruppenorientiertes digitales soziales Spiel (LINA) zu entwickeln und zu evaluieren, das darauf abzielt, das Zugehörigkeitsgefühl unter Mitschüler:innen zu stärken. Zu diesem Zweck wurde ein partizipativer Ansatz verfolgt, der die Perspektiven von Kindern sowohl in das theoretische Verständnis als auch in die Spielentwicklung integrierte. Bedürfnisse von Kindern während des Schulwechsels, die Entwicklung von LINA sowie dessen Evaluation wurde über zwei Studien hinweg untersucht.

Die Ergebnisse zeigen, dass Kinder während des Schulübergangs verschiedene Ängste erleben, wobei soziale Sorgen (z. B. Viktimisierung durch Gleichaltrige und das Bedürfnis nach Zugehörigkeit) stärker im Vordergrund stehen als leistungsbezogene Schulängste. Freundschaften und die Fähigkeit, neue Peer-Beziehungen aufzubauen, erwiesen sich als zentral, ebenso wie Bewältigungsstrategien wie das Suchen von Unterstützung und Kommunikation. Die Entwicklung von Freundschaften wurde durch gemeinsame Aktivitäten, positive emotionale Erfahrungen sowie sichere Interaktionsumgebungen begünstigt, insbesondere wenn diese wiederholt stattfinden. Digitale Interaktionen wurden als weitere wichtige Bestandteile von Peer-Beziehungen identifiziert. Aufbauend auf diesen Erkenntnissen wurde ein ganzheitliches LINA Design entwickelt und für die Spielentwicklung herangezogen. Die Evaluation von LINA zeigte erhöhte Zugehörigkeitswerte unter Mitschüler:innen sowie eine hohe Nutzerzufriedenheit, was auf ein erfolgreiche Umsetzung der intendierten Designprinzipien hindeutet.

Diese Ergebnisse unterstreichen die Bedeutung partizipativer Designansätze für die Entwicklung zielgruppenspezifischer Interventionen. Diese Dissertation bietet eine umfassende Grundlage für die Weiterentwicklung von LINA, wobei weitere rigorose Forschung notwendig erscheint. Insgesamt kann das Verständnis der sozialen Bedürfnisse von Kindern und das Wissen zu relevanten Kontaktmechanismen in Peer-Beziehungen, Lehrpersonen und Schulpsycholog:innen bei der Förderung dieser Beziehungen unterstützen.