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Classroom composition and quality in early childhood education

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To my dad, I love you and miss you dearly.

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Resumo

A qualidade da educação na primeira infância tem sido reconhecida internacionalmente como uma importante condição para a redução das desigualdades sociais e económicas e para um desenvolvimento mais sustentável. Por estes motivos, a expansão do acesso a estes contextos de educação e a provisão de experiências educativas de qualidade às crianças são, atualmente, prioridades políticas. Com a expansão do acesso, surgiram novos desafios associados a uma crescente diversidade nos grupos de crianças que frequentam estes contextos educativos. Os educadores de infância, em particular, enfrentam novos desafios no que respeita à gestão de grupos mais diversificados, pois são primariamente responsáveis por responder às necessidades de todas as crianças, esperando-se que sejam capazes de diferenciar eficazmente as suas práticas o seu ensino. Com este projeto, visou-se uma maior compreensão sobre estes desafios, ao investigar-se a associação entre a composição dos grupos em contextos de educação de infância e a qualidade dos processos de sala. A literatura que investiga esta associação ainda é escassa. Com o objetivo de colmatar lacunas nesta literatura, foram conduzidos três estudos: uma revisão sistemática de literatura sobre a associação entre a composição do grupo e a qualidade em contextos de educação de infância; um estudo quantitativo sobre a associação entre a composição sociocultural dos grupos e a qualidade dos processos de sala; um estudo qualitativo sobre as perceções dos educadores de infância em relação a desafios e oportunidades associados à composição dos grupos. As evidências encontradas apontam para a importância de considerar a composição do grupo como um indicador estrutural, potencialmente associado à qualidade dos processos de sala em contextos de educação de infância.

Palavras-chave: educação de infância, composição da sala, qualidade de sala

PsycINFO Codes:

2956 Educação Infantil & Cuidados Infantis

3430 Características e Atitudes Pessoais e Profissionais

3560 Dinâmicas de Sala de Aula e Ajustamento e Atitudes dos Alunos

Abstract

Early childhood education quality has been internationally recognized an important condition for the reduction of social and economic inequalities and for the promotion of sustainable development. Therefore, the expansion of access to early childhood education and the provision of quality educational experiences for children are now political priorities. With the expansion of access, new challenges have emerged, associated with an increasing diversity of groups attending these educational contexts. Early childhood education teachers, in particular, face new challenges with regard to the management of more diverse groups, as they are primarily responsible for attending to the needs of all children and are expected to effectively differentiate their practice. With this project, we aimed to further the understanding regarding these challenges, by investigating the association between classroom composition and process quality in early childhood education settings. Literature on this subject is still scarce. With the intent to fill in some gaps in this literature, three studies were conducted: a systematic review of the literature about the association between classroom composition and quality in early childhood education settings; a quantitative study about the association between classroom sociocultural composition and quality; a qualitative study about early childhood education teachers' perceptions of challenges and opportunities associated with the composition of groups. In all, findings point to the importance of considering classroom composition as a structure feature, potentially associated with process quality in early childhood education settings.

Keywords: early childhood education, classroom composition, classroom quality

PsycINFO Codes:

2956 Childrearing & Child Care

3430 Professional Personnel Attitudes & Characteristics

3560 Classroom Dynamics & Student Adjustment & Attitudes

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CHAPTER 1

Introduction

Quality education has been internationally recognized as fundamental to reduce social and economic inequalities and to promote sustainable development (UNESCO, 2015). The expansion of access and the improvement of early childhood education (ECE) quality have been policy priorities within the OECD (see OECD, 2020a) and are also priorities of the European Commission (Council of the European Union, 2019). Accordingly, a growing number of countries have invested in increasing accessibility to and affordability of ECE programs (OECD, 2021). Increased access to schooling (World Bank Group, 2018), including access to ECE (e.g., Barnett et al., 2017), and intensified migration fluxes in Western countries have contributed to greater diversity among (pre)school-aged children (Vervaet et al., 2018). This translated into changes in the ECE landscape (Niemi, 2021; Reid & Ready, 2013) and new challenges emerged to ensure education of equitable quality to all groups of children (Niemi, 2021). This research project tackled these challenges by examining the association between classroom composition and quality in ECE settings.

High-quality ECE has been shown to benefit children's development (i.e., to contribute to cognitive, social, and emotional outcomes) and to foster academic success (see Broekhuizen et al., 2016; Hatfield et al., 2016; Melhuish et al., 2015), including in the long-term (e.g., McCoy et al., 2017), particularly in the case of children from socially and economically disadvantaged backgrounds (e.g., Dearing et al., 2009; Schmerse, 2020). In line with the hypothesis of compensatory effects (see Camilli et al., 2010), experiencing high-quality interactions in ECE – warm, responsive, and stimulating (e.g., Mashburn et al., 2008; Schleicher, 2019) – can work as a protective factor (Arteaga et al., 2014) for children experiencing socioeconomic disadvantage, who are frequently exposed to contextual risk factors that can hinder their school readiness (see Duncan & Magnuson, 2003). Therefore, high-quality ECE can help reduce inequities in the educational outcomes of children experiencing socioeconomic disadvantage (e.g., Council of the European Union, 2019; Duncan & Magnuson, 2013; Vandembroeck et al., 2017).

However, there is some evidence that children experiencing socioeconomic disadvantage, including children with a migrant background/from ethnic minority groups (e.g., Broekhuizen et al., 2017; Kuger et al., 2016; Slot et al., 2018), and children from families with low socioeconomic status (e.g., Sanders & Downer, 2012; Valentino, 2018), are frequently enrolled together in ECE classrooms (Becker & Schober, 2017; Ready & Kagan, 2015) of lower quality (e.g., Early et al., 2010; Ready & Kagan, 2015).

Understanding the factors contributing to persistent inequities in the quality of education provided to different groups of children (e.g., Latham et al., 2021) is imperative (Archambault et al., 2020). Inequities in the opportunities and in the educational outcomes of different groups of children (e.g., Johnson-Staub, 2017), constitute a matter of social justice, with repercussions in the social cohesion and

economic development of countries (OECD, 2018). In this research project, the composition of ECE classrooms, defined as the aggregate of children's sociodemographic characteristics (at the individual and family levels) (Cueto et al., 2016; Jones, 2016) was hypothesized to be an important factor to consider when examining ECE quality (see Reid & Ready, 2013; Slot, 2018).

A widely accepted conceptual definition of ECE quality encompasses two dimensions (e.g., Slot, 2018): structure and process features (e.g., Purtell & Ansari, 2018). Structure features refer to regulable characteristics of classrooms, which include group (e.g., size, adult-child ratio) (e.g., Slot et al., 2015) and teacher characteristics (e.g., education, experience) (see Slot, 2018), whereas process features of quality refer to children's daily interactional experiences in the classroom context with adults and peers (e.g., Anders, 2015; Slot et al., 2015). Structural features have been labeled an important precondition for process quality (e.g., Early et al., 2006; Slot et al., 2015), which, in turn, has been shown to be more directly associated with children's learning experiences (Pianta et al., 2008) and outcomes (e.g., Melhuish et al., 2013; Slot, 2018). Therefore, since structural features are more permeable to regulations (Hu et al., 2017), quality improvement programs benefit from a deeper understanding regarding how structural features relate with process quality and how positive change can come about (Cryer et al., 1999). In this work, we examined classroom composition as a structural feature of ECE potentially associated with process quality (see Read & Ready, 2013; Slot, 2018).

From an ecological perspective, the notion of educational ecosystem comprehends a complexity of links and processes that occur within the ecosystem and the interactions with outer social spheres and structures (see Niemi, 2021; OECD, 2015). This notion, developed in the education field (see Niemi, 2021), aligns with the bioecological model of human development (Bronfenbrenner & Morris, 2006) that frames this work. The educational ecosystem comprehends multiple levels of analysis (i.e., subsystems) which are interconnected, vertically and horizontally (Niemi, 2021). Similarly, the bioecological model of human development posits that human development is shaped by processes that occur at multiple interrelated ecological systems (Bronfenbrenner, 2005). At a macro-level, the educational ecosystem comprehends the interplay between the structure of the educational system (Niemi, 2021) and other national-level factors, such as culture, political trends (Bronfenbrenner, 2005), and economic status (Cryer et al., 1999); the meso-level, or exosystem, in the bioecological model, comprises community and local institutional structures and practices (Niemi, 2021); at the micro-level, the classroom learning environment is at the center (Cryer et al., 1999; Niemi, 2021), with the interactions between teachers and children being influenced by their personal characteristics and cultural background (see Bronfenbrenner & Morris, 2006; Niemi, 2021).

Structural features at the classroom micro-level are considered more relevant for process quality, compared with more distal features at the meso and macro-levels (Slot et al., 2018). In fact, there is little evidence regarding the association between more distal features and process quality in ECE (see Slot et al., 2018). Importantly, when considering studies focused on the association between micro-level group-

related structural features and process quality, evidence is mixed (see Slot, 2018; Wysłowska & Slot, 2020). For example, several studies have investigated the association between group size and child-adult ratio and process quality (see Slot, 2018). While some studies found that smaller groups and lower child-adult ratios were associated with higher process quality (e.g., Barros & Aguiar, 2010; Hu et al., 2016; Mashburn et al., 2008), others found no evidence of a significant association (Veermer et al., 2016; Pianta et al., 2005; Sandstrom, 2012). Little variance in countries with stricter policy regulations may help explain inconsistencies in research findings (Slot, 2018).

Studies focused on the associations between classroom composition, in terms of children's sociodemographic characteristics, and process quality are scarce. Nevertheless, there is some evidence that in classrooms with a higher number of children experiencing socioeconomic disadvantage (e.g., LoCasale-Crouch et al., 2007; Pianta et al., 2005; Sanders & Downer, 2012; Valentino, 2018) and in classrooms with a higher number of children with a migrant background (e.g., Broekhuizen et al., 2017; Kuger et al., 2015; Slot et al., 2015) process quality can be lower. Considering the political agenda prioritizing the provision of equitable quality ECE to all children (Niemi, 2021), with the goal of mitigating early achievement gaps (see Read & Ready, 2013), these findings cause particular concern.

The studies conducted within the scope of this research project add to an underdeveloped line of research regarding how classroom composition may be associated with process quality in ECE (Friedman-Krauss et al., 2014). Based on an ecological perspective, we aimed to contribute to the understanding of the conditions that may influence the provision of high-quality ECE, by gathering further evidence regarding the association between structure features of ECE classrooms and process quality. This deeper understanding is key to the field and may have important policy and practice implications, by supporting quality improvement measures.

With this work we intended to: (a) synthesize extant literature about the association between classroom composition and observed process quality in ECE; (b) investigate the associations between the sociocultural composition of classrooms (based on indicators of classroom-level migrant background and socioeconomic status) and observed process quality in the Portuguese ECE context; (c) examine ECE teachers' perceptions regarding the characteristics of groups associated with increased challenges to their practice and the inherent opportunities of working with those groups. Accordingly, this dissertation is organized in five chapters: first we present the theoretical background supporting this work, then we present the three studies conducted within the scope of this research project, each corresponding to a distinct chapter, and, finally, we present our conclusions. In each of the three studies, we used a different methodological approach: first, we present a systematic review of the literature; then, we present two empirical studies, one based on quantitative methods and another based on a qualitative approach. Figure 1.1. depicts a summary of the theoretical background, the problem outline, and the studies and corresponding research questions that will be presented in this dissertation.

In this chapter, we begin by presenting the theoretical and empirical background that guided this work. We further explain our conceptual framework, then we reflect about the urgency of this topic in light of rapid social changes and of the international policy agenda prioritizing equity in education. We also summarize and analyze the literature about classroom composition effects; here, we distinguish between the literature about the associations between the composition of the peer group and children's developmental outcomes and the literature about the association between the composition of classrooms and quality in ECE. Finally, we describe the Portuguese ECE context and briefly summarize the studies that will be presented in chapters two, three, and four.

In the second chapter, we present a systematic review of the literature about the association between classroom composition and observed quality in ECE, which included studies from 1997 to 2018. Considering the limited and dispersed empirical evidence about the research topic under investigation, our goal was to gather and systematize research evidence regarding indexes of classroom composition and their association with observed classroom quality. Systematic reviews provide knowledge about what is known about a certain problem and about what is still to be disclosed (Crowther et al., 2010), thus providing guidance for future research (Petticrew & Roberts, 2006). Also, systematic reviews can be used to inform policies and practices (Ang, 2018).

The third chapter presents a quantitative study conducted in Portuguese ECE settings from the public education sector. In this study, we investigated the associations between the classroom sociocultural composition (based on indicators such as migrant background, language, and socioeconomic status) and observed process quality. We aimed to bridge a gap in extant research by computing and analyzing heterogeneity indexes for the different sociocultural indicators. Furthermore, we considered the coexistence between factors of sociocultural disadvantage (Williams & Deutsh, 2016) and investigated the association between a composite index of sociocultural heterogeneity (which included all indicators simultaneously) and observed process quality. The lack of empirical evidence to sustain beliefs in the potential benefits of heterogeneity (e.g., European Commission, 2018) and measures promoting classroom heterogeneity, as in the case of Portugal (Normative Dispatch No. 10-A/2018), provides further support to this study.

The fourth chapter presents a qualitative study in which we investigated ECE teachers' perceptions regarding the characteristics of groups associated with increased challenges to their practice and the opportunities of working with groups with such characteristics. Teachers' perceptions and beliefs are thought to relate with their teaching practices (e.g., Hardré et al., 2008; Owens, 2004). More specifically, there is some evidence indicating that teachers' perceptions about students' characteristics can be associated with their practices in the classroom (see Hardré et al., 2008) and the quality of classroom interactions (e.g., Kuklinski & Weinstein, 2000; Myers & Pianta, 2008). Therefore, with this third study we recognized the relevance of ECE teachers' ideas (Fives & Buehl, 2012), as their insights (Barros & Leal, 2015) regarding the challenges and opportunities associated with classroom composition can benefit research and policy (see Katz, 1998).

Lastly, we provide an integrated overview and analysis regarding the findings from the three studies, highlighting the main contributions of this work for research and practice, while also considering its limitations.

Chapter 1- Introduction: Theoretical and empirical background

- Increased access to ECE and migration fluxes are changing the sociodemographic composition of classrooms.
- The social and economic benefits of investing in ECE are increasingly recognized.
- Equity and quality in education became priorities of international organizations and governments.
- Disparities in educational opportunities and outcomes between different groups of children tend to persist.
- High-quality ECE can be key to reduce early achievement gaps.
- Expectations about teacher roles are evolving as new challenges emerge from a need to foster more inclusive learning environments.

Problem outline

- Limited and dispersed evidence about the association between classroom composition and quality in ECE.
- Lack of empirical evidence regarding the association between classroom sociocultural heterogeneity and observed quality in ECE.
- Little evidence regarding teachers' perceptions about the characteristics of groups associated with increased challenges to their practice and about the opportunities inherent to groups with those characteristics.

Studies and research questions

Chapter 2 - Extant research
Classroom composition and quality in early childhood education: A systematic review

What evidence exists about the association between classroom composition and quality in ECE?

Chapter 3 - Classroom composition and observed quality
Classroom sociocultural composition and early childhood education quality in Portuguese public classrooms

Are there associations between indexes of classroom sociocultural composition and observed process quality?

Chapter 4: Teachers' perceptions about classroom composition
Challenges associated with group composition: a qualitative study about the perceptions of teachers in Portuguese public preschools

What group characteristics do teachers associate with increased challenges?
What opportunities do groups with such characteristics offer?

Chapter 5- Conclusion

Figure 1.1. Outline of the theoretical background, problem, studies and research questions.

1.1. Theoretical and empirical background

1.1.1. An ecological framework

The bioecological model of human development that frames this work highlights the importance of quality in the child's environments (see Bronfenbrenner & Morris, 2006). Although it recognizes that child development is shaped by processes that occur at distinct but interrelated ecological systems (Bronfenbrenner, 2005), it posits that proximal processes, which occur in the closest environments of the child, that is, in microsystemic structures, such as the family and school, are the primary force driving development (Bronfenbrenner & Morris, 2006; Tudge et al., 2016). These proximal processes refer to sustained interaction patterns between a child and the persons in his/her closest environments, such as those occurring between children and teachers in the ECE classroom microsystem (see Bronfenbrenner & Morris, 2006). Person characteristics, such as ability (as a resource characteristic), temperament, age, gender, and ethnicity (as demand characteristics), are thought to influence proximal processes, as they can associate differently with social interactions (Bronfenbrenner & Morris, 2006). Therefore, we used this bioecological lens to investigate if and how children's personal characteristics, aggregated at the group level, are associated with their experiences with their teachers in ECE classrooms.

1.1.2. The importance of high-quality ECE from an equity perspective

As the developmental benefits of attending high-quality ECE, particularly for children experiencing socioeconomic disadvantage (e.g., Camilli et al., 2010; Dearing et al., 2009; Zachrisson & Dearing, 2015), are increasingly recognized, a growing number of countries have invested in increasing accessibility to and affordability of ECE programs (OECD, 2021), while simultaneously prioritizing measures aimed at reducing initial achievement gaps (see Bridges et al., 2004; Read & Ready, 2013). Disparities in school readiness among children experiencing socioeconomic disadvantage and their peers can be noted by the time children enter kindergarten (e.g., Bassok et al., 2016). Disparities in cognitive skills have been reported, for example, for children with lower socioeconomic status (e.g., Fernald & Marchman, 2012; Naudeau et al., 2011; Schady et al., 2014). This evidence was found in both developing and developed countries (see Schady et al., 2014).

From a sociological perspective and congruent with a functionalist approach, educational inequalities can be associated with children's sociodemographic characteristics (e.g., ethnicity, nationality, sex, socioeconomic status) and ability (see Noël & de Broucker, 2001). Concomitantly, theories of cultural reproduction (Bourdieu & Passeron, 1977) and cultural mobility (e.g., Downey et al., 2018) postulate that schools can be a vehicle for perpetuating inequalities or for mitigating disparities between children with different social status (Fehérvári & Varga, 2020), respectively. Although findings

from investigations about the quality of ECE programs that serve mostly children in social and economic disadvantage (see Magnuson et al., 2004) are not consensual, existing evidence exposing disparities in the experiences of children in situations of socioeconomic disadvantage (e.g., Latham et al., 2021) is of concern. More so, considering that while high-quality ECE can positively contribute to children's developmental outcomes and well-being (Schleicher, 2019) and potentially counterbalance the negative impact of exposure to adversity (e.g., Duncan & Magnuson, 2013; Leseman & Slot, 2014), research has shown that low-quality ECE can be trivial or even detrimental to children (e.g., Britto et al., 2011; Howes et al., 2008). Therefore, if disparities in the quality of education are not adequately addressed, ECE can perpetuate inequities instead of mitigating them (Schleicher, 2019).

In 2015, the United Nations recognized equity in education as a fundamental value and as one of the core Sustainable Development Goals for 2030 (UNESCO, 2015). Achieving this goal may depend on the implementation of measures with potential to impact children's education paths early on (OECD, 2018). Investing in ECE is cost-beneficial (Heckman, 2011), as early learning can promote learning in later school years (OECD, 2012). For example, enrollment in good quality ECE has been associated with decreased special education placement, grade retention, and drop-out rates (e.g., Camilli et al., 2010; McCoy et al., 2017). Providing affordable access to ECE settings is one of the most notorious investments across countries (OECD, 2021), realized for egalitarian reasons (Suziedelyte & Zhu, 2015). Notably, a meta-analysis of education policies, from over 50 low- and middle-income countries, found that the expansion of access to school settings resulted in higher enrollment rates, but was not necessarily associated with improved achievement (Ganimian & Murnane, 2016). Although important, increasing access to education does not seem to be enough to ensure equity in education, if quality education is not guaranteed to all (Niemi, 2021). Hence, policy makers are now faced with the challenge to move from ensuring access to laying stronger foundations that ensure access to good quality education (Schleicher, 2019).

Simultaneously, schools are expected to play an important role in ensuring equity in education (Thomson et al., 2012), but any efforts made in that regard must be supported by policy levers (OECD, 2012) (at a macro-level) and be aligned with teachers' knowledge (Cochran-Smith et al., 2016), beliefs, and capacities (Evans, 2009) (at a micro-level), so that they can effectively work with all groups of children (Cochran-Smith et al., 2016). Otherwise, exclusion from education can remain a reality for children that, while enrolled, are not truly learning (Shaeffer, 2019), either because of individual/group characteristics (e.g., ability, gender, language, socioeconomic status) or because of educational experiences of poor quality (UNICEF, 2019).

1.1.3. Classroom composition effects

In ECE settings, group composition effects can be particularly relevant (Henry & Rickman, 2007), as children spend a substantial amount of time on peer-to-peer interactions and on whole-group instruction

(e.g., Ansari et al., 2015). Therefore, research has considered the composition of classrooms mainly in terms of the association with children's achievement.

There has been growing interest in peer effects (Henry & Rickman, 2007; Justice et al., 2014) and its operating mechanisms (Yeomans-Maldonado et al., 2019). Within the ECE literature, peer effects have been more commonly conceptualized (Reid & Ready, 2013) in terms of the influence of peer skills (Justice et al., 2014) on children's learning outcomes (e.g., Henry & Rickman, 2007; Mashburn et al., 2009). A few studies focused on the effects of classroom-level sociodemographic characteristics, such as socioeconomic status (e.g., Li et al., 2016; Reid & Ready, 2013; Weiland & Yoshikawa, 2014) and age (e.g., Bell et al., 2013; Guo et al., 2014; Purtell & Ansari, 2018), without clearly accounting for peer skill level (Foster et al., 2020).

Studies about peer effects find support in theory and empirical evidence. The sociocultural theory (Vygotsky, 1979), the social learning theory (Bandura, 1986), and the bioecological model of human development (Bronfenbrenner & Morris, 2006) often serve as frameworks for these studies, given their emphasis on the importance of peer interactions for children's learning (see Chen et al., 2020). There is also growing empirical evidence that peers can be an important factor to consider when investigating children's developmental outcomes (Cekaite et al., 2014). Furthermore, recent evidence suggests that the effects of the peer group on children's development of certain skills, such as language skills, can work independently of the quality of instruction provided by teachers, thus suggesting that teachers and peers can exert important influences over children's learning within ECE classrooms (e.g., Ribeiro et al., 2017; Yeomans-Maldonado et al., 2019).

Researchers in psychology, education, sociology, and economics (Sacerdote, 2011; Vandenberghe, 2001) have attempted to disentangle the mechanisms (Yeomans-Maldonado et al., 2019) through which peer effects work and connect with educational outcomes (Patacchini et al., 2017). Once these mechanisms are identified, educational (Brooks-Gunn, 2003) and social inequities can be more effectively addressed (Marotta, 2017). Comparatively with higher levels of schooling, evidence regarding peer effects in ECE is more limited; however, as detailed below, there is growing evidence of peer-related compensatory effects (Henry & Rickman, 2007) and associations between peer skills and developmental outcomes in preschool-aged children (e.g., DeLay et al., 2016), even when controlling for other relevant variables, such as family characteristics and ECE quality (Henry & Rickman, 2007).

Specifically, some studies found positive, although generally small, effects of peer cognitive ability level (Weiland & Yoshikawa, 2014) on children's cognitive and linguistic skills (e.g., Henry & Rickman, 2007; Mashburn et al., 2009). Of note, although not consensual (Ribeiro et al., 2017), is evidence that peer effects may covary with children's initial level of ability (e.g., Justice et al., 2014; Ribeiro et al., 2017). Relatedly, peer effects can be more relevant for the educational attainment of children with lower skill levels (e.g., Zimmer & Toma, 2000), meaning that, for these children, attending ECE classrooms with more skilled peers may be particularly beneficial (Justice et al., 2011). Simultaneously, a few studies have suggested that more skilled children can be less susceptible to the

influence of peer effects, compared with less skilled children (Henry & Rickman, 2007; Justice et al., 2011). Together, these findings align with the hypothesis of compensatory effects (e.g., Ribeiro et al., 2017). Nonetheless, there is also opposing evidence indicating that more-skilled children can benefit the most from being enrolled in classrooms with highly skilled peers (e.g., Mashburn et al., 2009). This finding aligns with the skills-beget-skills hypothesis (see Cunha & Heckman, 2007). Moreover, evidence from a longitudinal study indicating that the presence of less-skilled children in classrooms can be negatively associated with the outcomes of more skilled children (Fletcher, 2010) also deserves attention and careful consideration.

From a compensatory effects perspective, because children experiencing socioeconomic disadvantage tend to have lower preacademic skills compared with their non-disadvantaged peers (see Schechter & Bye, 2007), a high concentration of children from disadvantaged backgrounds in ECE classrooms may contribute to the perpetuation of disparities in achievement (Cho, 2012). Conversely, it may be beneficial to increase the average skill level in ECE classrooms (Henry & Rickman, 2007) and to promote heterogeneity (Vigdor & Nechyba, 2007). Findings from studies investigating the association between classroom socioeconomic composition in ECE and children's academic skills development lend support to this rationale; overall, positive associations were found in mixed-income classrooms (Schechter & Bye, 2007) and in classrooms with a higher-mean socioeconomic status (Li et al., 2016; Miller et al., 2017; Read & Ready, 2013). In fact, evidence of positive peer effects has fueled debates (Ribeiro et al., 2017) regarding the effectiveness of programs targeting disadvantaged children and of practices such as ability grouping (e.g., Barnett, 2010).

Some studies have found that higher ability stratification, which entails grouping children homogeneously by ability level (Parker et al., 2016; Parker et al., 2018), can be associated with biased academic self-concepts (Parker et al., 2019). Specifically, through a process of social comparison (Parker et al., 2019), in highly stratified contexts, children with a higher ability-level can develop more negative academic self-concepts, by comparing themselves to a higher average ability peer group (e.g., Marsh & Hau, 2003; Parker et al., 2021). Conversely, through an inversed process, less-skilled children can develop more positive academic self-concepts when enrolled in classrooms with a lower average ability level (Hattie, 2002; Parker et al., 2021). This phenomenon is known as the big-fish-little-pond effect (Marsh & Parker, 1984). Nevertheless, there seems to be a negative association between ability stratification and the academic ambitions and achievement of children experiencing socioeconomic disadvantage (Parker et al., 2016; Parker et al., 2021). Hence, more positive academic self-concepts may not necessarily translate into better educational pathways later on (see Parker et al., 2021).

Similarly, there is little empirical evidence supporting the benefits of mixed-age classrooms for children's school readiness, although this is a common model in ECE (Purtell & Ansari, 2018), including in the Portuguese context (see Normative Dispatch No. 10-A/2018). Existing evidence is inconsistent (Bell et al., 2013) and mostly dated (Purtell & Ansari, 2018). One study from 2008 reported a negative association between increased age variability and children's skill development (Moller et al., 2008). In

contrast, an exploratory study from 2014 reported a positive association between a higher age variance and children's vocabulary gains (Guo et al., 2014). Another study yet found that in classrooms with a higher number of 3-year-olds, the academic gains for 4-year-olds were lower (Purtell & Ansari, 2018). However, one study from 2013 found no main effect of classroom age composition on children's school readiness (Bell et al., 2013).

The mechanisms through which peer effects operate remain unclear (Patacchini et al., 2017), as both direct and indirect pathways of influence have been considered (see Henry & Rickman, 2007); in the first case, it is presumed that the characteristics of the peer group directly influence children's outcomes during peer-to-peer interactions (Justice et al., 2011), while in the second case, this influence is presumed to occur through the practices teachers use in response to the characteristics of the group (see Wilkinson & Fung, 2002). Another possibility yet is that both pathways operate simultaneously (Yeomans-Maldonado et al., 2019). Furthermore, some researchers have emphasized the difficulty of estimating true peer effects (e.g., Hoxby, 2000), and pointed measurement error as a potential source of bias (Robertson & Symons, 2003); also, most studies about peer effects considered few covariates, thus raising concerns about the possibility that reported effects may be statistical artifacts (e.g., Harker & Tymms, 2004).

1.1.4. Classroom composition and quality in ECE

Considering the premise that children's characteristics can be related with teacher behavior and, consequently, with classroom quality (DiLalla & Mullineaux, 2008), understanding how classroom composition associates with observed ECE quality may help identify classrooms where teachers require additional support to meet the needs of the children (Purtell & Ansari, 2018).

Notably, extant studies have generally operationalized classroom composition in terms of the proportion of children who share a given characteristic, dichotomizing percentages to contrast groups (e.g., children with a migrant background vs. non-migrant children; children living in poverty vs. non-poor children) (Aguiar & Aguiar, 2020). Therefore, there is a lack of evidence regarding the association between classroom heterogeneity and process quality in ECE. Classroom heterogeneity can be defined in terms of the extent of differences on a given characteristic among enrolled children (see Harrison & Sin, 2006; Solanas et al., 2012). Until recently, only one study had used a heterogeneity index to study the association between classroom age composition and process quality in ECE (Ansari & Pianta, 2018). In contrast with dichotomized percentages, heterogeneity indexes can provide a more accurate picture of the sociodemographic composition of classrooms, by considering a wider array of categories within a certain characteristic (i.e., both the number of possible categories – e.g., nationalities or languages – and the proportion of children in each possible category are considered) (see Dronkers & van der Velden, 2012; Harrison & Klein, 2007).

Findings from studies investigating the association between classroom migrant background (i.e., children from migrant families and children who speak a language other than the majority) and

socioeconomic status and process quality in ECE, are mixed. Results from studies conducted in the United States (e.g., Friedman-Krauss et al., 2004; LoCassale-Crouch et al., 2007) and in European countries (e.g., Broekhuizen et al., 2017; Kuger et al., 2016; Slot et al., 2015) indicated that in classrooms with a higher number of children with a migrant background process quality was lower. In contrast, one study conducted in the United States reported evidence of higher process quality in classrooms with a higher number of minority children (Dotterer et al., 2014). However, there are also reports of non-significant associations in European and North American studies (e.g., Bihler et al., 2008; Downer et al., 2012). Furthermore, evidence from a few studies conducted in the United States seem to indicate that not all groups of minority children experience ECE of similar quality (Aguiar & Aguiar, 2020); specifically, a negative association between a higher number of African-American children in the classroom and process quality was found in studies that simultaneously found no significant associations when considering the number of Hispanic children in the classroom (Bassok & Galdo, 2016; Fram et al., 2012; Valentino, 2018).

Regarding the association between classroom socioeconomic composition, some studies reported lower quality in classrooms with a higher number of children living in poverty (e.g., LoCasale-Crouch et al., 2007; Pianta et al., 2005; Sanders & Downer, 2012; Valentino, 2018), while others found no significant associations (e.g., Bihler et al., 2018; Phillips et al., 2009). Similarly, results from studies focused on classroom age composition are mixed (see Aguiar & Aguiar, 2020; Slot, 2018). There is some evidence of a negative association between higher age heterogeneity (Ansari & Pianta, 2018) and a higher number of younger children in classroom (Kuger et al., 2016) and process quality. On the other hand, there is also evidence of a non-significant association between classroom age composition and process quality in ECE (e.g., Purtell & Ansari, 2018; Slot et al., 2018).

Studies about the association between classroom composition and observed quality in ECE are relatively scarce (see Aguiar & Aguiar, 2020). Extant research varies in theoretical and conceptual frameworks, aims, and designs, making it hard to disentangle contributions to theory and to integrate reported evidence (Aguiar & Aguiar, 2020). Nevertheless, most studies rely on an ecological perspective, thus emphasizing the importance of considering the composition of ECE classrooms, in terms of the children's personal characteristics, as an important feature of the classroom microsystem (Bronfenbrenner & Morris, 2006). However, it remains unclear what group characteristics can be associated with variations in ECE quality (Steinberg & Garrett, 2016).

1.1.5. Classroom-level structural features and ECE quality

Literature regarding the association between structural features and process quality is vast, but evidence is inconsistent (Slot et al., 2015). Furthermore, most studies have focused on three structural features, considered the “iron triangle”: child-adult ratio, group size, and teacher education (Slot et al., 2015). This research interest aligns with regulations that commonly address these structural features as indicators of quality (see Hong et al., 2019).

1.1.5.1. Child-adult ratio and group size

As previously described, although some studies found that lower child-adult ratios and smaller groups can be associated with higher process quality, not all evidence points to that direction (see Slot et al., 2015; Slot, 2018). Simultaneously, defining with precision an ideal child-adult ratio or group size is challenging, considering the potential interactions between both features and with others (Munton et al., 2002). Nonetheless, child-adult ratio and group size can be considered adequate when teachers are able to establish frequent interactions with all children and to effectively manage classroom activities (Bowne et al., 2017).

1.1.5.2. Teacher education

A recent meta-analytic review highlighted that the role of teacher education on the quality of ECE provision is unclear (see Manning et al., 2019). However, from the three structural features that compose the “iron triangle”, teacher education was found to be more strongly associated with ECE quality (e.g., Burchinal et al., 2002; Darling-Hammond et al., 2005; Whitebook, 2003). Some studies, conducted in both North American and European ECE contexts, reported higher quality levels in classrooms with more educated teachers (e.g., Barros & Leal, 2011; Guo et al., 2010; Pianta et al., 2005; Slot et al., 2015). Other studies found no association between teacher education and process quality in ECE (e.g., Vermeer et al., 2013). A comparative analysis of large-scale studies conducted in the United States reported mixed associations between teacher education and process quality in ECE (Early et al., 2007); similar findings were reported in a comparative study of European contexts (Slot et al., 2015). Furthermore, some studies have suggested that process quality can be higher when teachers’ formal education includes ECE content (see Tout et al., 2006). Despite the contradictory evidence, in some countries, such as Portugal (see Decree-Law No. 43/2007), teachers are required to hold a bachelor’s degree or higher in ECE.

Fewer studies focused on the association between other ECE features and process quality in ECE. Next, we present a summary of evidence reported in these studies, considering teacher experience, professional development, work-related stress, and teacher well-being.

1.1.5.3. Teacher experience

Some studies have focused on the association between teacher experience, as a structural feature, and process quality in ECE and, again, found mixed evidence. A few studies conducted in Europe and the United States found that, in classrooms with more experienced teachers, process quality tended to be higher (e.g., Kuger et al., 2016; LoCassale-Crouch et al., 2007). In a recent cross-country study, conducted in Europe, researchers found positive associations between teacher experience and process quality in some countries, but in other countries the association was negative or non-significant (Slot et al., 2015). Evidence of a negative association was also found in studies conducted in the United States

(e.g., Connor et al., 2005; Wilcox-Herzog, 2004). Findings from other studies yet, indicated a non-significant association between teacher experience and process quality in ECE (e.g., Hu et al. 2016; Pianta et al., 2005). A recent meta-analysis found little evidence to support the role of teacher experience as an indicator of ECE quality (see McMullen et al., 2020). Inconsistency in evidence can indicate that teacher experience may interact with other structural features to predict process quality (see Slot, 2018).

1.1.5.4. Professional development

Outside the “iron triangle”, research has given particular attention to in-service professional development (Zaslow et al., 2010). Simultaneously, there has been growing public investment in in-service professional development, with the intent to increase ECE quality (e.g., OECD, 2012; Whitebook & Ryan, 2011). Studies conducted in the United States and Europe, including in Portugal (see Slot et al., 2015), have found a positive association between teachers’ participation in professional development and process quality in ECE (e.g., Hamre et al., 2012; LoCassale-Crouch, 2007; Zaslow et al., 2010). Recently, a meta-analysis found mixed evidence regarding the association between professional development and different measures of process quality: some studies reported positive associations, others reported positive associations for subscales of quality measures, while others found non-significant associations (see Egert et al., 2020). A previous meta-analysis found a positive association between professional development and process quality, with effects being generally of medium-size (Markussen-Brown et al., 2017).

1.1.5.5. Teacher work-related stress and teacher well-being

There is also some research highlighting the importance of teachers’ emotional/psychological well-being for teacher-child interactions in ECE (e.g., Hamre & Pianta, 2004; Pianta et al., 2005). Specifically, teacher stress (e.g., Collmann, 2012), burnout, and depression have been associated with lower process quality in ECE (Jennings, 2015; Jennings et al., 2020). Conversely, a positive association has been found between teacher well-being and process quality (Jennings, 2015).

1.1.6. Beyond the classroom: center-level features and process quality in ECE

Structural features of ECE encompass not only multiple dimensions (e.g., group and teacher characteristics), but also multiple levels (e.g., classroom and school/center) (Wang et al., 2020). However, evidence regarding the association between school/center level features and process quality is limited (Slot, 2018). As teachers’ working conditions, at an organizational level, can be associated with their practices, it is possible that an association exists between school/center level features and process quality (Slot, 2018). The type of provision/education sector and the school/center organizational climate are two examples of school/center level features that have been studied (see Slot, 2018). Specifically, there is some evidence, from the United States and from European countries which provide both public and private options of schooling, that process quality can be higher in ECE classrooms

located in settings from the public education sector, compared with settings from the private sector, including in Portugal (Coley et al., 2016; Slot et al., 2015). Yet, there is also evidence of no significant associations between either type of ECE provision and process quality (Sandstrom, 2012). A few studies found a positive association between the school/center organizational climate (e.g., Bloom & Bella, 2005; Sylva et al., 2004) and the school/center management quality and process quality in ECE (Biersteker et al., 2016). In sum, alike regulations, that mainly target group and teacher characteristics with the goal of promoting equitable access to high-quality ECE for all children (e.g., Slot, 2018) and, consequently, children's school readiness (Pianta et al., 2005), research has shown particular interest in group and teacher characteristics, thus emphasizing the importance of considering the role of microsystemic features in examining ECE quality (Bronfenbrenner & Morris, 2006). However, inconsistencies in evidence regarding the association between structural features and process quality may point to potential nonlinear associations and interactional effects, warranting further investigations (Wang et al., 2020).

1.2. The Portuguese ECE context

Until the late 90's, there was a significant growth of investments in education by Portuguese governments; afterwards, investments remained relatively stable, despite some fluctuations through the years (see DGO/MF/PORDATA, 2021). In Portugal, ECE serves children from 3 to 6 years of age, when compulsory education begins (Law No. 4/97). Attending ECE is not mandatory, but universal access has been recently ensured for 4-year-old children (Normative Dispatch No. 6/2018; No. 10-B/2021). Coverage rates are significant, varying between 83% for 3-year-olds and 94% for 5-year-olds (Direção-Geral de Estatística da Educação e Ciência, 2019). The national ECE system consists of settings from the public sector (where attendance is fully supported by the state) and from the private sector of education (private for-profit and private non-profit settings are included) (Eurydice, 2021). In the school year of 2018/2019, around 52% of children were enrolled in public settings (Direção-Geral de Estatísticas da Educação e Ciência, 2020).

Within the public education sector, Educational Territories of Priority Intervention (the TEIP program), were created to promote the educational success of children living in poverty and social exclusion (Normative Dispatch No. 20/2012). Schools within these territories are provided with additional resources to implement educational projects tailored to the local context, to enhance education quality, to decrease drop-out rates, among other measures aimed at improving educational outcomes (see Normative Dispatch No. 20/2012). Currently, the TEIP program comprises around 17% of school clusters from the public education sector (Direção-Geral da Educação, 2020). With regard to regulations of structural features, ECE classrooms can enroll up to 25 children (Decree-Law No. 147/97); however, in classrooms attended by children with disabilities (in a maximum of two), no more than 20 children should be enrolled (Normative Dispatch No. 10-A/2018). On average, there are 16 children in ECE classrooms (OECD, 2020b). Mixed-age groups are recommended, although not mandatory (Normative

Dispatch No. 10-A/2018). In ECE settings from the public education sector, mixed-age classrooms are predominant, unlike the case of settings from the private sector (Abreu-Lima et al., 2012). Moreover, teachers are commonly supported by one teaching assistant in each classroom (Governmental Order No. 272-A/2017) and are required to have a master's degree in ECE or an equivalent level (Decree-Law No. 43/2007).

In terms of quality standards, the Ministry of Education is primarily responsible for ensuring quality education in ECE settings from the national educational system (Eurydice, 2021). The *Orientações Curriculares para a Educação Pré-Escolar* (OCEPE; Curriculum Guidelines for Preschool Education) are based on global pedagogical goals, guiding curriculum development and management by teachers and ECE settings (Silva et al., 2016). These guidelines recognize the importance of ensuring a good quality relational climate, emphasizing the role of interactions children experience with teachers and peers as learning opportunities (Silva et al., 2016). Furthermore, this document recognizes diversity in children's characteristics – such as ability, nationality, maternal language, ethnicity – as a resource to foster enriching experiences and learning opportunities (Silva et al., 2016). Accordingly, the provision of culturally rich and nurturing environments to all children is greatly encouraged, as is the adoption of inclusive practices, based on differentiated pedagogies (Silva et al., 2016). Teachers are expected to value all children, to effectively respond to the characteristics and needs of each child, to recognize and use diversity as a teaching and learning tool, and to promote children's well-being (Silva et al., 2016).

Studies conducted in Portuguese ECE settings, have indicated low to moderate levels of ECE quality (e.g., Abreu-Lima et al., 2013; Abreu-Lima & Nunes, 2006; Leal et al., 2009), medium-high levels of process quality related to emotional support and classroom organization, and generally low-quality levels for instructional support (e.g., Aguiar et al., 2019; Cadima et al., 2018). Similar results were found in inclusive settings (Coelho et al. 2019). Furthermore, there is also evidence that process quality can be higher in ECE settings from the public sector, comparatively to the private sector (Gamelas, 2010).

1.3. Current work: relevance and purposes of the three studies

Around the globe, diversity among student populations has been increasing (e.g., Gutentag et al., 2018). Accordingly, the last decades have witnessed concerted efforts to promote more inclusive educational systems, that support and value diversity in all its forms (Ainscow & Sandill 2010). Aligned with these efforts, UNESCO developed the Education 2030 Framework for Action (UNESCO, 2015), which recognizes equity and inclusion as precursors for quality education (Ainscow & Sandill 2010).

Educational systems with better performance are those that simultaneously provide equitable and quality education (OECD, 2012). Equity in education implies that all children, independently of individual characteristics or family background, are given the same opportunities to realize their educational potential (OECD, 2012). To be effective, equal opportunities must be provided early on (OECD, 2018).

High-quality ECE has been associated with positive learning and developmental outcomes for children, including in the long-term (e.g., Black et al., 2017; see Ulferts et al., 2019, for a recent meta-analysis), and is thought to counteract adverse effects of social and economic disadvantage (e.g., Melhuish et al., 2015). Therefore, investments that simultaneously target equity of opportunities and quality ECE can be profitable (OECD, 2012), both from a human rights perspective and from an economic perspective (Britto et al., 2011).

At a micro-level of analysis, teachers are primarily responsible for the quality of children's educational experiences in ECE (see Hattie, 2015) and, consequently, have a crucial role in children's learning and educational outcomes (see Snoek et al., 2011). Simultaneously, structural features of ECE classrooms can be associated with process quality (see Slot, 2018). Consequently, as structural features can be permeable to regulations, these are frequently the target of efforts to improve ECE quality (Slot, 2018). As teachers are expected to respond to the needs of children from diverse social and cultural backgrounds and to foster more inclusive educational environments (see Council of the European Union, 2011; 2019), research has mainly focused on which and how teachers' characteristics are associated with process quality in ECE settings (e.g., Jennings, 2015; Lin & Magnuson, 2018; Roberts et al., 2016). Comparatively, fewer studies have investigated the association between classroom composition and quality in ECE (Friedman-Krauss et al., 2014).

Therefore, the focus of this work was on the association between classroom composition and observed process quality in ECE settings, considering that children's sociodemographic characteristics can be associated with their experiences with teachers (see Bronfenbrenner & Morris, 2006), the limited evidence regarding this specific association (see Aguiar & Aguiar, 2020), and the importance of identifying regulable features of ECE with potential to help reduce educational inequities (Suziedelyte & Zhu, 2015). Furthermore, we specifically addressed a gap in extant literature regarding the associations between classroom heterogeneity and quality in ECE (Aguiar & Aguiar, 2020), by providing initial evidence about the operationalization of heterogeneity indexes to compute classroom sociocultural composition in ECE.

Framed by an ecological perspective, the main goals of the three studies developed within the scope of this research project were to:

- a. Synthesize research focused specifically on the association between classroom composition, in terms of aggregated sociodemographic characteristics of children, and observed process quality in ECE settings.
- b. Investigate the association between the sociocultural composition of ECE classrooms and observed process quality, using indexes of sociocultural heterogeneity.
- c. Investigate ECE teachers' perceptions regarding the characteristics of groups that entail increased challenges for their practice and the opportunities of working with groups with such characteristics.

CHAPTER 2

Classroom composition and quality in early childhood education: A systematic review¹

2.1. Abstract

High-quality early childhood education appears to be particularly beneficial for disadvantaged children, since it may help reduce an initial achievement gap. Yet, these children are frequently enrolled in disadvantaged classrooms with lower quality levels. Thus, classroom composition and quality may be associated, but evidence is scarce. In this review, we gathered evidence regarding classroom composition indexes and their association with observed classroom quality, reported in 25 studies that met the inclusion criteria. The majority of studies were conducted in the United States, with disadvantaged samples of children. Classroom composition indexes used were mainly calculations of the percentage, proportion, and average/mean of a particular type of characteristic at the classroom level, that generally captured classroom homogeneity. Most studies focused on minority and socioeconomic status. ECERS and CLASS were the most frequently used standardized observation measures of classroom quality. Evidence suggests that in classrooms with a high concentration of children with minority status and from low-income families, quality tends to be lower, particularly on the CLASS emotional and instructional support domains. Additional research, particularly outside the USA, focused primarily on the association between different types of classroom composition and ECE quality is warranted.

Keywords: systematic review, early childhood education, classroom composition, classroom quality

2.2. Introduction

School systems of Western countries are serving an increasingly diverse student population (Vervaeke, Van Houtte, & Stevens, 2018). Simultaneously, access to early childhood education (ECE) programs has been expanded (Vervaeke et al., 2018). As a result, many young children, from diverse backgrounds, spend a considerable proportion of their days in ECE classrooms, where they experience interactions that shape their development (Pianta & Hamre, 2009).

High-quality ECE typically provides more opportunities for children to establish stimulating, warm, and supportive interactions (Mashburn et al., 2008; Votruba-Drzal, Coley, & Chase-Lansdale, 2004) with teachers and peers (Purtell & Ansari, 2018), and experience adequate and planned instruction (Pianta et al., 2009). Attending high-quality classrooms in ECE has been associated with better outcomes

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for children in terms of cognitive, linguistic (e.g., Pianta & Hamre, 2009), social, and behavioral development (e.g., Mashburn et al., 2008). There is also evidence suggesting that the benefits of attending high-quality classrooms may be long lasting and still visible in elementary school (Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2011). Moreover, placement in special education and grade retention seem to be lower and high-school graduation rates seem to be higher among students who were enrolled in high-quality ECE programs (McCoy et al., 2017).

Attending high-quality classrooms may function as a protective factor for socially disadvantaged children, by providing positive experiences (Clements, Reynolds, & Hickey, 2004), that contribute to the development of self-regulation skills and pro-social behaviors (Sylva et al., 2011). Thus, high-quality ECE may have the potential to reduce initial achievement gaps (Bridges et al., 2004). However, there is evidence that these children are often enrolled in ECE classrooms with a high concentration of other disadvantaged children (Reid & Kagan, 2015), and in classrooms with lower quality (Buyse, Verschueren, Doumen, Van Damme, & Maes, 2008). This suggests that there may be an association between the composition of the classroom and ECE quality levels. However, research on how variations in classroom composition are associated with variations in classroom quality is still relatively underexplored and dispersed. Hence, with this review we intend to gather and systematize findings reported in the ECE literature about the associations between classroom composition and observed classroom quality.

2.2.1. Classroom composition as a structure feature and a predictor of process quality

We examined the association between classroom composition and classroom quality through the lens of the (bio)ecological theory, which postulates that child development is shaped by interaction patterns, that evolve over time, such as those that occur in ECE settings between children and their teachers (Bronfenbrenner & Morris, 2006) as well as the transactional model (Sameroff, 2009), that emphasizes the bidirectional and interdependent effects of the developing child's experience and his/her social environment (Sameroff, 2009). Thus, when applied to ECE, we consider that, during their interactions, children (individually and as a group) and teachers influence each other's behaviors. This means that children's characteristics, measured at the classroom level, and behaviors may affect teachers' responses and vice-versa (DiLalla & Mullineaux, 2008), with an impact on quality (Buyse et al., 2008).

Classroom quality can be defined as encompassing: (a) structural features, which refer to regulable characteristics (Slot, Leseman, Verhagen, & Mulder, 2015), such as class size, children-to-teacher ratio, and teacher education (Howes et al., 2008); and (b) process quality, which relates to children's daily experiences in the classroom context, including their interactions with teachers and peers and their engagement in school activities (Howes et al., 2008; Phillipsen, Burchinal, Howes, & Cryer, 1997). In ECE, process quality seems to be a stronger and more direct predictor of children's linguistic, cognitive, and social development than structural features, which seem to influence children's development

indirectly, through process quality (Friedman & Amadeo, 1999; Howes et al., 2008). Improving classroom process quality has therefore been the main goal of quality improvement programs (Pianta et al., 2014).

Since structural features tend to be easier to regulate (Cryer, Tietze, Burchinal, Leal, & Palacios, 1999), a growing body of research has focused on how these features impact process quality and how they can be used to promote positive change (Cryer et al., 1999). However, the evidence base about the association between structural features and process quality has been relatively inconsistent (Slot et al., 2015). Like other classroom structural features involving group characteristics, such as class size and children-to-teacher ratio, we propose that classroom composition, which encompasses the aggregated personal and family characteristics of the children in each classroom (Cueto, León, & Miranda, 2016; Jones, 2016), should also be examined as structural feature of ECE classrooms potentially subject to regulation.

Most literature about classroom composition effects in ECE settings has focused on the association with children's achievement and has used children's characteristics such as ability (e.g., Steenbergen-Hu, Makel, & Olszewski-Kubilius, 2016), age (e.g., Bell, Greenfield, & Bulotsky-Sheare, 2013; Guo, Tompkins, Justice, & Petscher, 2014; Purtell & Ansari, 2018), gender (e.g., Gottfried & Graves, 2013; Whitmore, 2005), ethnicity/race (e.g., Denton, Germino-Hausken, & West, 2000), and SES (e.g., Li et al., 2016; Reid & Ready, 2013; Weiland & Yoshikawa, 2014), to compute indexes of classroom composition. Fewer studies have focused on the associations between classroom composition and classroom quality in ECE settings.

Although scarce, there is evidence in the ECE literature supporting the idea that classroom composition may be associated with ECE quality levels. For example, some evidence suggests that children from disadvantaged backgrounds (e.g., Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002; den Brok, van Tartwijk, Wubbels, & Veldman, 2010; Raver et al., 2009) can be at higher risk of developing more conflictual and distant interactions with their teachers (Saft & Pianta, 2001), when compared with their peers, as a consequence of contextual factors hindering their social and behavioral development (Raver et al., 2009). Thus, a high concentration of socially disadvantaged children in the classroom and, therefore, at higher risk of exhibiting behavioral problems can be associated with lower quality (Buyse et al., 2008). There is similar evidence for boys (e.g., Baker, 2006; Hamre & Pianta, 2001) and younger children (e.g., Shaw, Lacourse, & Nagin, 2005). In this sense, classroom composition can be an important structural feature of ECE (Reid & Ready, 2013), particularly when considering the impact of economic, sociocultural, and ethnic diversity or homogeneity on teacher-child interactions (Dronkers & Van der Velden, 2013).

2.2.1.1. Classroom composition indexes

Classroom composition can be analyzed to ascertain levels of heterogeneity or homogeneity. Heterogeneity or diversity is determined by the amount of differences on a given characteristic among

members within a social group/community, while homogeneity is related with sameness on a given characteristic (Harrison & Sin, 2006; Solanas, Selvam, Navarro, & Leiva, 2012).

There are indexes created specifically to determine within-group distribution of differences, such as the mean Euclidean distance, the standard deviation, Teachman's index, Blau's index, the coefficient of variation, and the Gini coefficient of concentration (see, Solanas et al., 2012). These indexes are used to ascertain levels of diversity, within three parameters: separation (i.e., differences in position or values), variety (i.e., differences in categorical values), and disparity (i.e., differences in concentration of resources) (see Harrison & Klein, 2007).

To our knowledge, thus far, it is not common to find such conceptualizations of diversity (see Harrison & Klein, 2007) nor the calculation of such composition indexes in the education literature. In studies conducted in ECE settings, as well as in other education levels, the most common practice seems to be the calculation of the percentage/proportion and the average/share of children with a given characteristic in classroom (Veerman, van de Werfhorst, & Dronkers, 2013). A few exceptions can be found in studies, mostly at the primary and secondary levels of education, that used adaptations of the Hirschman-Herfindahl Index (Hirschman, 1964; Dronkers & van der Velden, 2012), first used in the economy literature, and Simpson's diversity index (Simpson, 1949; see Graham, 2004), first used in the ethology literature, to ascertain the school/classroom ethnic and sociocultural compositions. Both indexes vary between 0 (minimum diversity) and 1 (high diversity), but while the Herfindahl Index does not consider multiple possible categories within a given characteristic (e.g., distinguish between particular countries of origin [Stolle, Soroka, & Johnston, 2008]) (Schaeffer, 2013), Simpson's diversity index considers both the number of categories and the share of each category within a group (Graham, 2004).

This distinction between diversity and share is of importance since, in the education literature, results from average/share calculations are sometimes presented as being indicative of school/classroom diversity on a given characteristic (Veerman et al., 2013). Despite a possible overlap (Veerman et al., 2013), there are fundamental conceptual differences since the average/share involves the proportion of children within a group who share a particular characteristic (e.g., migration background), being a potential indicator of homogeneity (e.g., high proportion of migrant children in class from the same ethnic group), while diversity addresses the variety of a certain characteristic within the group (e.g., number and size of distinct ethnic groups) (Veerman, 2014). Therefore, there may be a disconnection between how diversity has been conceptualized and its operationalization, which may impact the validity of findings (see Harrison & Klein, 2007).

Hence, gathering data about how group composition has been measured in education and, particularly, in the ECE literature, can contribute to further clarification on how variations in classroom composition in ECE may be associated with classroom quality (Steinberg & Garret, 2016). Furthermore, it may help inform future research with guidelines for an integrated conceptualization and

operationalization of classroom composition, and also for avoiding key pitfalls, so knowledge about classroom composition effects can be enhanced.

2.2.1.2. Assessing classroom process quality

Classroom quality can be measured with a multitude of assessment tools, with emphasis on standardized observational measures. Observation measures typically focus on global quality, that is, on both the physical aspects of the environment and the social interactions in the classroom. However, there are also process quality measures, which focus primarily on teacher-child interactions and content specific measures, that focus on instructional quality within specific content areas (Burchinal, 2010). A description of standardized observation measures of classroom quality typically used in the literature is presented in Table 2.1. No single standardized observation measure covers all aspects of children's experiences in the classroom (Bryant, 2010), but most have demonstrated good reliability (Burchinal, 2010) and are believed to produce more valid assessments of teachers' effectiveness (Goldring et al., 2015), than non-standardized measures.

Some studies that focused on the association between classroom structural features and standardized observation measures of process quality reported a significant association, for example, between classroom quality and teacher's education and training (e.g., Burchinal, Cryer, Clifford, & Howes, 2002), teacher-child ratios, and group size (e.g., Cryer et al., 1999). However, evidence is mixed (see Resnick, 2010).

2.2.2. This review

High-quality ECE has been consistently linked to children's positive developmental outcomes (e.g., Burchinal, Kainz, & Cai, 2011; Camilli, Vargas, Ryan, & Barnett, 2010; Pianta et al., 2009), with some studies suggesting that this association may be more significant for particular groups of children, specifically, for those in social and economic disadvantage (e.g., Zaslow et al., 2010). Further, child characteristics and classroom composition may influence teacher behavior and classroom quality, in an apparent two-way interaction (DiLalla & Mullineaux, 2008).

Existing reviews and meta-analysis addressing classroom composition effects have focused on its association with student outcomes at different school levels. We identified a review about the effects of within-class grouping in primary and secondary schools (Kutnick et al., 2005); another about between-class ability grouping (i.e., tracking/streaming), in grades 6 to 12 (Belfi, Goos, De Fraine, & Van Damme, 2012); and two meta-analyses on the relationship between peer group composition and students' achievement in primary and secondary schools (Van Ewijk & Slegers, 2010a,b).

Despite the potential practical and research implications, to our knowledge, there are no other reviews addressing the associations between classroom composition and classroom quality in ECE. Therefore, in this systematic review, we aimed to identify classroom composition indexes used in the ECE literature and to examine the associations between classroom composition in ECE and observed

classroom quality. By systematically gathering and examining the current evidence base on classroom composition in ECE, we aimed to inform future research on existing gaps in knowledge regarding the associations between structural features of ECE classrooms and process quality and help inform decision-making processes regarding the organization of classrooms.

2.3. Method

2.3.1. Eligibility criteria

Inclusion and exclusion criteria were defined using the SPIDER tool (Sample, Phenomenon of Interest, Design, Evaluation, and Research type; Cooke, Smith, & Booth, 2012). To be eligible for qualitative synthesis, studies had to meet the following criteria:

- a. Sample: Focus on teachers of children aged between 3 and 5/6 years old, enrolled in ECE center-based programs (i.e., preschool or kindergarten).
- b. Phenomenon of Interest: Classroom composition, including ethnic, racial, sociocultural, socioeconomical, and linguistic heterogeneity/diversity or homogeneity (e.g., proportion/percentage/ratio of children from minority groups or children in disadvantaged/at-risk).
- c. Design: Any type of study (e.g., correlational, longitudinal, experimental) providing empirical evidence on observed classroom quality.
- d. Evaluation: Standardized observations of classroom processes, specifically, of teacher-child relationship/interactions, of teacher-child conflict, of teacher-child proximity, and/or of teacher practices as outcomes, measured systematically and translated into quantitative data. If testing the implementation of specific interventions, studies needed to provide pre-treatment scores and/or scores from control/ “business as usual” /no intervention groups.
- e. Research type: Any type of empirical research using standardized observation measures, both global and content specific, of classroom quality with a quantitative approach to data analyses.

Studies were excluded if the sample consisted of teachers serving in other types of early child care services (e.g., family-centered care, residential care facilities), caregivers other than teachers (e.g., parents), and teachers of younger (infants, toddlers) or older children (from primary school onwards). The focus on children aged between 3 and 6 was related with the goals of the broader project in which this review is included, and also because ECE coverage and attendance rates are considerably higher for preschool-aged children (European Commission/EACEA/Eurydice, 2019). Furthermore, studies were excluded if composition indexes were provided only at the school level (e.g., school ethnic composition, school socioeconomic composition). We decided to focus on the classroom level so that potential variations in quality between classrooms within the same centers would not be overlooked (e.g., Karoly, Zellman, & Perlman, 2013) and also because process quality is typically measured and reported at the

classroom level. Systematic reviews, meta-analyses, and qualitative studies were not included. Studies with naturalistic observations of classroom quality with a qualitative approach to data analyses, studies that employed non-standardized observation measures (despite adopting a quantitative approach to data analyses), studies using teachers' self-reported interactions with children and pedagogical practices, and studies reporting only post-treatment scores (if testing the implementation of specific interventions), were excluded. Only studies written in English and Portuguese were considered. We did not define restrictions regarding scientific discipline or year of publication.

2.3.2. Search procedures

An electronic systematic search of the literature was conducted to identify all potential eligible, published and unpublished, empirical studies providing data on the association between classroom composition and classroom quality in ECE. EBSCO databases such as Academic Search Complete, ERIC, PsycARTICLES, PsycINFO, Psychology and Behavioral Sciences Collection, as well as Scopus and Web of Science were searched. To ensure an appropriate balance between sensitivity and specificity (Hempel, Xenakis, & Danz, 2016), we limited our search to studies that contained the selected search terms in the title, abstract, key terms, and/or topic. Three search strings, regarding the population, the phenomenon of interest, and the method of evaluation, were developed and combined. Each string was composed of a vast array of search terms, representing both more general and more specific concepts, to capture the multiplicity of existing classroom composition indexes and of observation measures of classroom quality used in ECE contexts, while narrowing search results. Examples of search terms included in each string follow: (a) "early childhood education and care" OR "center-based child care" OR preschool* OR "3-to-5-year* old*" AND teacher* OR educator* OR professional* AND (b) "class* composition" OR "class* characteristics" OR "class* heterogeneity" OR "group homogeneity" AND (c) "class* observations" OR "observed interaction*" OR "observed practice*" OR "process quality". For a full scope on the search strategy see Appendix A.

To guarantee the identification of records that might have been missed on the initial electronic database search, a hand-search of reference lists from already known empirical and theoretical literature was conducted, as well as a legacy search, based on the reference lists of all eligible studies.

Table 2.1. Description of standardized observation measures of classroom quality by type of quality.

Type of quality	Measure	Domains /Subscales	Author/year
Global	Assessment of Practices in Early Elementary Classrooms (APEEC)	16 items (e.g., room arrangement, accessibility, use of resources, teacher-child language, instructional methods, children participation)	Hemmeter, Maxwell, Ault, and Schuster, 2001
	Early Childhood Rating Scale (Revised) (ECERS-R)	7 subscales: space and furnishings, personal care, language and reasoning, activities, interactions, program structure, parents/staff	Harms, Clifford, and Cryer, 1998
Content specific	Early Language and Literacy Classroom Observation (ELLCO)	3 components: literacy environment checklist, classroom observation, and literacy activities rating scale	Castro, 2005
Process	Assessing School Settings: Interactions of Students and Teachers (ASSIST)	5 subscales: teacher's control, anticipation and responsiveness, monitoring, proactive behavior management, teacher/student meaningful participation	Rusby, Taylor, and Milchak, 2001
	Caregiver Interaction Scale (CIS)	4 dimensions: teacher's emotional tone, discipline style, and responsiveness to children	Arnett, 1989
	Classroom Assessment Scoring System (CLASS)	3 domains: emotional support, classroom organization, instructional support	Pianta, La Paro, and Hamre, 2008
	Early Childhood Classroom Observation Measure (ECCOM)	3 subscales of constructivist and didactic practices: instruction, management, social climate	Stipek and Byler, 2004
	Eco-behavioral System for the Complex Assessment of Preschool Environments (ESCAPE)	5 categories of teacher behavior: approval, disapproval, verbal prompting, verbal instruction, no response	Carta, Greenwood, and Atwater, 1992

2.3.3. Screening and study selection

Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement (Liberati et al., 2009), a sequential examination process, illustrated in Figure 2.1, was conducted, in order to select studies of interest. The initial electronic database search generated 1095 unique records, after duplicate entries were eliminated ($n = 2335$). Additionally, 21 records were identified through manual search. Peer-reviewed articles, book chapters, dissertations, theses and reports, were retrieved by October 5, 2018. Subsequently, a pair of independent raters conducted title and abstract screenings of these records, using Rayyan, a web and mobile app (Ouzzani, Hammady, Fedorowicz, & Elmagarmid, 2016), reaching 88% agreement at this phase. Conflicting decisions in the exclusion process ($n = 138$) were resolved by a third rater. Most disagreements were on studies not using observation methods of classroom quality in ECE. One hundred and twenty studies qualified for the next phase, a full-text examination, after meeting at least one of the inclusion criteria. Of those, seven could not be retrieved and were excluded without examination. The remaining 113 studies were reviewed in full. Inter-rater agreement for final selection based on full text analysis was 84%. Conflicting decisions in the exclusion process ($n = 21$) were, again, resolved by a third rater. Disagreements were mostly related to studies that did not address directly the association between classroom composition and classroom quality and to studies that focused on children's individual characteristics and not on group level characteristics. Thirty-one studies that provided data on the association between classroom composition and observed classroom quality were identified. However, of those, nine (29%) were excluded because they used non-standardized observation measures of classroom quality. Twenty-five peer-reviewed articles, 15 resulting from electronic database search and 10 from hand-search, were deemed eligible and were selected for qualitative syntheses.

2.3.4. Coding and syntheses

For qualitative analysis, the first author extracted from all eligible studies information on: (a) the theoretical framework, (b) the sample (e.g., sample size, age range), (c) the study design, (d) the classroom composition index, (e) the observation measure used to assess classroom quality, (f) the results on the associations between classroom composition and classroom quality, and (g) covariates. Studies were categorized by the type of classroom composition index used and are presented in the results section accordingly. Studies that report data on the association between more than one classroom composition index and classroom quality were allocated to all adequate categories.

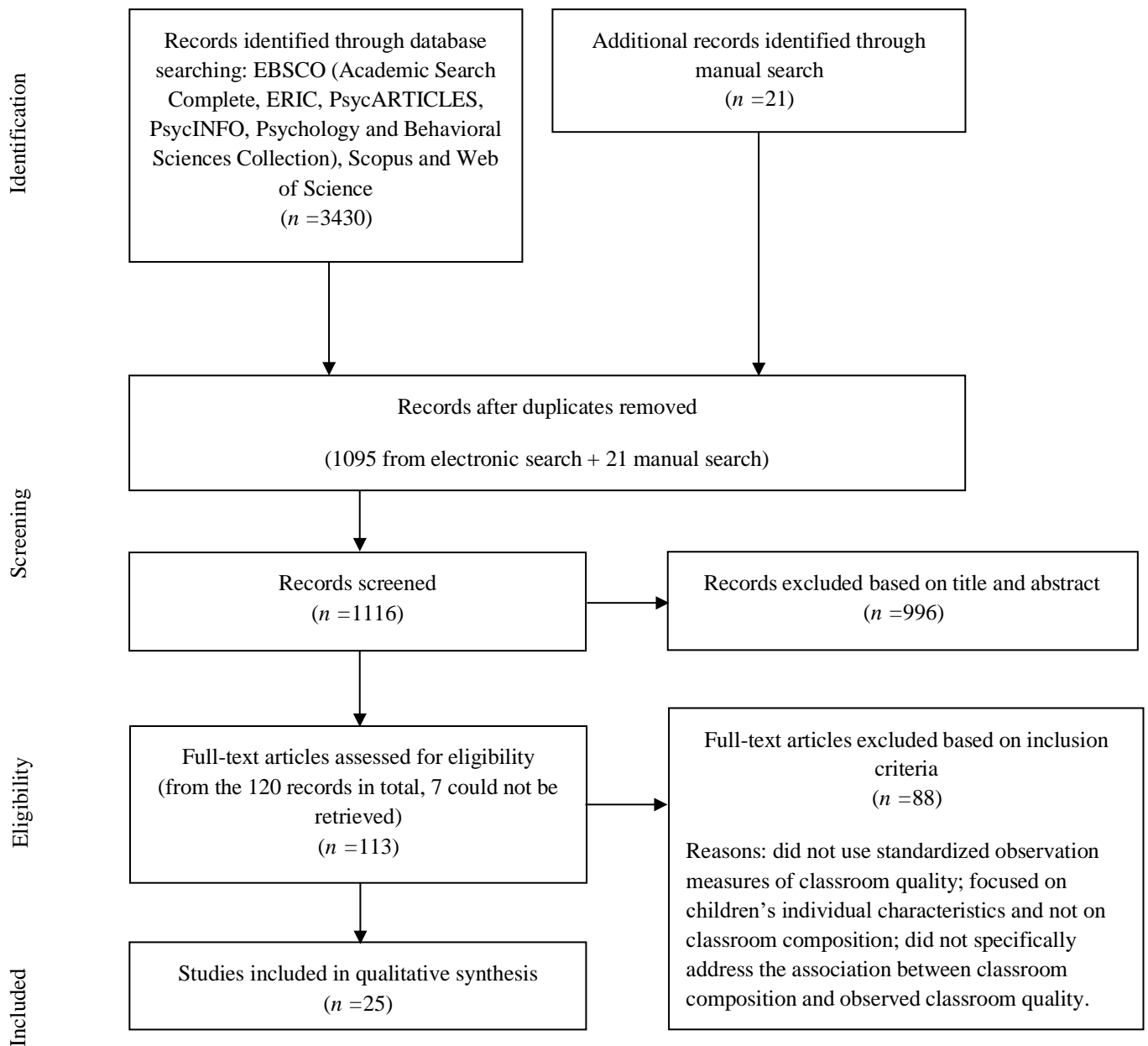


Figure 2.1. Results of the search strategy based on the PRISMA statement (Liberati et al., 2009).

2.4. Results

2.4.1. Description of studies

Information extracted from selected studies is presented in Tables 2.2 to 2.6. The level of detail in the information presented in the tables matches that of the included studies. For each study, we presented

the terminology used by the respective authors regarding sample characteristics used to compute classroom composition indexes and covariates, so that data extraction was as truthful as possible.

Most studies ($n = 18$, 72%) were published after 2010 and only one (Sontag, 1997) was published before 2000. Five studies were conducted in Europe (one in Denmark [Slot, Bleses, Justice, Markussen-Brown, & Højen, 2018], one in Finland [Pakarinen et al., 2010], two in Germany [Bihler et al., 2018; Kuger, Kluczniok, Kaplan, & Rossbach, 2016], one in the Netherlands [Broekhuizen, Slot, van Aken, & Dubas, 2017]) and the remaining 20 were conducted in the USA².

2.4.1.1. Theoretical framework

In several studies ($n = 11$, 44%), the theoretical framework was not clearly stated. Among those which made it explicit ($n = 14$, 56%), around half were framed by the ecological theory. The remaining studies were grounded on different theories and conceptual frameworks, including sociocultural (Vygotsky, 1978) and social-learning theory (Bandura, 1986); input effects on bilingual language development (Unsworth, 2016); transactional model of coercive cycles of adult–child conflict (Snyder, Cramer, Afrank, & Patterson, 2005) and of stress and coping (Lazarus, 1991); culturally responsive teaching (Gay, 2000); and social–interactionist theories of language acquisition (e.g., Baumwell, Tamis-LeMonda, & Bornstein, 1997), among others.

2.4.1.2. Sample characteristics

More than half of the studies ($n = 14$, 56%) relied on data from large-scale studies, such as the National Center for Early Development and Learning’s (NCEDL) Multi-State Study of Pre-Kindergarten, the Study of State-Wide Early Education Programs (SWEEP) (Downer et al., 2012; LoCasale-Crouch et al., 2007; Reid & Ready, 2013; Sanders & Downer, 2012; Valentino, 2018), and the Early Childhood Longitudinal Study, Birth Cohort (Fram & Kim, 2012; Iruka & Morgan, 2014). Of those 14 studies, six relied on data from both the NCEDL Multi-State Study and SWEEP. Almost all studies included classrooms from state-funded programs, such as Pre-K and Head Start, that served a considerable percentage of children at-risk, due to social/economic constraints. The majority of studies ($n = 20$, 80%) were conducted in preschools; two studies involved kindergarten classrooms (Fram & Kim, 2012; Pakarinen et al., 2010); three studies (Stipek, 2004; Maxwell, McWilliam, Hemmeter, Ault, & Schusterb, 2001; Debnam, Pas, Bottiani, & Cash, 2015) were conducted in K-2nd, K-3rd, and K-8th classrooms, respectively.

² This information concerns the countries where data were collected.

Table 2.2. Summary of studies on the association between classroom ability composition and observed classroom quality.

Authors/ Year	Study characteristics	Measures	Results	Covariates
Iruka and Morgan (2014)	<p>Country: USA</p> <p>Theoretical framework: Ecological theory (Bronfenbrenner & Morris, 2007)</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Head Start, preschool, public school prekindergarten ▪ Teachers/Classroom: 14 children <i>per</i> teacher ▪ Children: $n = 350$ preschoolers Mean age 53 months All African-American 48% boys 53% living below (150%) poverty line <p>Study design: Cross-sectional</p> <p>Data set: ECLS-BC</p>	<p>Classroom composition index Proportion of children with IEP</p> <p>$M =$between .12 and .18</p> <p>Observation measure of quality ECERS-R and CIS combined in three quality profiles: 1- Moderately High and Sensitive Interactions (52% of classrooms) 2- Average and Sensitive Interactions (35% of classrooms) 3- Low and Harsh Interactions (13% of classrooms)</p>	No associations	<ul style="list-style-type: none"> ▪ Teacher: education, experience, age, enjoyment of job, intrinsic motivation, professional development opportunities ▪ Classroom: size, % of non-English speakers ▪ Children: age, gender, income-to-needs ratio, maternal education, family structure
Justice, Mashburn, Hamre, and Pianta (2008)	<p>Country: USA</p> <p>Theoretical framework: Social–interactionist theories of language acquisition (e.g., Baumwell, Tamis-LeMonda, & Bornstein, 1997)</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: State-funded preschool, serving at-risk (social/economic) 4-year-old children ▪ Teachers/Classroom: 135 teachers ▪ Children: 350 preschoolers 46% African-American, 29% Caucasian, 12% Hispanic/Latino, 13% other ethnicity 1 out of 5 DLL 50% girls Average income 26.500\$ <p>Study design: Cross-sectional</p> <p>Data set: ECLS-BC</p>	<p>Classroom composition index % children with IEP</p> <p>$M = 9$ ($SD = 16.6$) Range 1-100</p> <p>Observation measure of quality CLASS – IS (scale of language modeling) CLASS – IS (scale of literacy focus)</p>	Positive association with literacy focus, no association with language modeling	<ul style="list-style-type: none"> ▪ Teacher: procedural fidelity (routine, teaching), education, participation in language and literacy workshops, years of experience, self-efficacy, teacher-centeredness ▪ Classroom: % with low English proficiency, number of children participating, language lesson

Maxwell, McWilliam, Hemmeter, Ault, and Schusterb (2001)	<p>Country: USA</p> <p>Theoretical framework: Not clearly stated</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Public elementary schools ▪ Teachers/Classroom: 69 k-3rd grade (12 K) ▪ Children: 350 preschoolers Mean age 53 months All African-American 48% boys 53% living below (150%) poverty line <p>Study design: Cross-sectional</p>	<p>Classroom composition index Number of children with disabilities</p> <p>$M = 3$ children per class Range 1-7</p> <p>Observation measure of quality APEEC</p>	No association	<ul style="list-style-type: none"> ▪ Classroom: grade, size
Sontag (1997)	<p>Country: USA</p> <p>Theoretical framework: Ecological theory (Bronfenbrenner, 1979, 1992)</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Public school, community-based, Head Start ▪ Teachers/Classroom: 8 teachers, 6 classrooms ▪ Children: Subgroups of 8 preschoolers with disabilities in integrated classrooms and 8 in segregated classrooms Mean age 55.75 and 58.63, respectively 9 White, 6 Black, 1 Hispanic 13 boys 13 from low-income families <p>Study design: Longitudinal (multiple measurements of classroom quality over 6 months)</p>	<p>Classroom composition index Two subgroups of children with IEP's</p> <p>Observation measure of quality ESCAPE</p>	*Positive association in integrated classrooms with more teachers' disapprovals of children's behavior	<ul style="list-style-type: none"> ▪ None

Note. IEP = Individualized Education Plan; ECERS-R = Early Childhood Rating Scale Revised; CIS = Caregiver Interaction Scale; CLASS- IS = Classroom Assessment Scoring System – Instructional Support; APEEC = The Assessment of Practices in Early Elementary Classrooms; ESCAPE = Eco-behavioral System for the Complex Assessment of Preschool Environments; ECLS-BC = Early Childhood Longitudinal Study, Birth Cohort; DLL = Dual Language Learners.

*Correlations calculated based on M and SD values provided by the authors.

Table 2.3. Summary of studies on the association between classroom age composition and observed classroom quality.

Authors/ Year	Study characteristics	Measures	Results	Covariates
Ansari and Pianta (2018)	<p>Country: USA</p> <p>Theoretical framework: Sociocultural theory (Vygotsky, 1978); Social-learning theory (Bandura, 1986)</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Head Start (61%), public schools (40%) ▪ Teachers/Classroom: 332 preschool teachers (around 50% participated in a 2-year intervention, 50% in the control group) ▪ Children: <ul style="list-style-type: none"> 8% with disabilities 3-5-year-olds 16% with limited English proficiency 48% girls Average 1.4 income-to-needs ratio <p>Study design: Longitudinal (4 measurements of classroom composition and quality over 2 years)</p> <p>Data set: NCRECE intervention program</p>	<p>Classroom composition index</p> <p>Age diversity</p> <p>Low diversity (73% of 4-year-olds; 8% of 3-year-olds; 19% of 5-year-olds)</p> <p>Moderate diversity (53% of 4-year-olds; 30% of 3-year-olds; 25% of 5-year-olds)</p> <p>High diversity (44% of 4-year-olds; 30% of 3-year-olds; 25% of 5-year-olds)</p> <p>Observation measure of quality</p> <p>CLASS - ES</p> <p>CLASS - CO</p> <p>CLASS - IS</p>	<p>Negative associations (all scales)</p> <p>Increase in age diversity associated with lower CO in the beginning of Year 2 and with lower ES at the end of the year.</p>	<ul style="list-style-type: none"> ▪ Teacher: ethnicity, gender, age, years at current program, income-to-needs ratio, works in pre-K vs Head Start, participated in intervention vs control ▪ Classroom: size, average income-to-needs ratio, racial/ethnic diversity, % girls, % with disabilities, % with limited English
Kuger, Kluczniok, Kaplan, and Rossbach (2016)	<p>Country: Germany</p> <p>Theoretical framework: Not clearly stated</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Public, private for-profit and not-for profit ▪ Teachers/Classroom: 97 kindergarten classrooms ▪ Children: <ul style="list-style-type: none"> Mean age 4.7 years 20% with migration background 	<p>Classroom composition index</p> <p>Classroom mean age</p> <p>Year 1 $M = 4.6$ ($SD = .4$)</p> <p>Year 2 $M = 4.7$ ($SD = .3$)</p> <p>Year 3 $M = 4.8$ ($SD = .3$)</p> <p>Observation measure of quality</p> <p>ECERS-R total score</p>	<p>Positive association</p>	<ul style="list-style-type: none"> ▪ Teacher: experience, satisfaction ▪ Classroom: space per child, teacher-child ratio, class size, proportion of children with migration background, number of adults, number of teacher changes

Study design: Longitudinal (3 measurements of classroom composition and quality over 3 years)

Data set: BiKs-3-10

Pakarinen et al. (2010)

Country: Finland

Theoretical framework:

Theoretical three-factor model of classroom quality

Sample

- Program: Day care, elementary schools
- Teachers/Classroom: 49 teachers and kindergarten classrooms
- Children: around 11 *per* class
Majority 6-year-olds

Study design: Cross-sectional

Data Set: First Steps Study—Interaction and Learning Within the Child–Parent–Teacher Triangle

Classroom composition index

Number of 6-year-olds

$M = 13.85$ ($SD = 5.92$)

Range 3-24

Observation measure of quality

CLASS – ES

CLASS – CO

CLASS - IS

No associations

- None

Purtell and Ansari (2018)

Country: USA

Theoretical framework:

Bioecological model of human development (Bronfenbrenner & Morris, 2006)

Sample

- Program: Head Start
- Teachers/Classroom: 486 classrooms
- Children: $n = 2829$
Aged 3 and 4
Proportion of .20 White children
50% girls
Proportion of .52 unemployed mothers

Study design: Cross-sectional

Classroom composition index

Proportion of 3-year-olds vs 4-year-olds

$M = .59$ ($SD = .31$) 3-year-olds

$M = .22$ ($SD = .21$) 4-year-olds

Observation measure of quality

CLASS total score

No association

- Program: average hours per week
- Teacher: depressive symptomology, education, benefits, hourly salary
- Classroom: teacher-child ratio, adult-child ratio, size, language (English only vs. English and Spanish)
- Children: gender, race/ethnicity, age at the start, months between the fall and spring assessments, mothers' - education, age, employment status, marital status, depressive symptoms; ratio of income to poverty, household size and language

Slot, Bleses, Justice, Markussen-Brown, and

Country: Denmark

Theoretical framework:

Bioecological model of human development (Bronfenbrenner & Morris, 2006)

Sample

Classroom composition index

Mean age

$M = 56.67$ ($SD = 6.91$)

Range 42-70.2

No associations

- None

Højen
(2018)

- Program: Preschool (centers chosen to overrepresent high concentrations of children at risk - social disadvantage and non-Danish background)
- Teachers/Classroom: 402 teachers, 260 classrooms
- Children: $n = 5359$
Aged 4-6
89% monolingual (Danish)
53% girls

Study design: Part of a randomized control trial

Observation measure of quality

CLASS – ES

CLASS – CO

CLASS – IS

(pre-intervention scores)

Note. ECERS-R = Early Childhood Rating Scale Revised; CLASS = Classroom Assessment Scoring System; CLASS-ES = Emotional support; CLASS-CO = Classroom organization; CLASS-IS = Instructional support; NCRECE = National Center for Research on Early Childhood Education.

Table 2.4. Summary of studies on the association between classroom gender composition and observed classroom quality.

Authors/ Year	Study characteristics	Measures	Results	Covariates
Broekhuizen, Slot, van Aken, & Dubas (2017)	<p>Country: Netherlands</p> <p>Theoretical framework: Not clearly stated</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Preschool, child care ▪ Teachers/Classroom: 37 classrooms ▪ Children: $n = 113$ Mean age 37 months 70% monolingual (Dutch) <p>Study design: Cross-sectional</p> <p>Data set: pre-COOL study</p>	<p>Classroom composition index</p> <p>% girls</p> <p>$M = 47.8\%$</p> <p>Observation measure of quality</p> <p>CLASS (Toddler) – Emotional and Behavioral Support</p>	No association	<ul style="list-style-type: none"> ▪ None
Debnam, Pas, Bottiani, and Cash (2015)	<p>Country: USA</p> <p>Theoretical framework: Culturally responsive teaching (Gay, 2000)</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Elementary schools ▪ Teachers/Classroom: 142 K-8th grade teachers ▪ Children: 58% from ethnic minorities 50% boys <p>Study design: Cross-sectional</p> <p>Data set: CSRP and FOL</p>	<p>Classroom composition index</p> <p>% male</p> <p>No information on % at the classroom level</p> <p>Observation measure of quality</p> <p>ASSIST Cultural Responsiveness Teaching</p>	No association	<ul style="list-style-type: none"> ▪ Classroom: total number of children, % White children
Friedman- Krauss et al. (2014)	<p>Country: USA</p> <p>Theoretical framework: Transactional model of coercive cycles of adult-child conflict; (Snyder, Cramer, A Frank, & Patterson, 2005); Transactional model of stress and coping (Lazarus, 1991)</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Head Start (in high-poverty neighborhoods) 	<p>Classroom composition index</p> <p>% male</p> <p>No information on % at the classroom level</p> <p>Observation measure of quality</p> <p>CLASS - EC</p>	No association	<ul style="list-style-type: none"> ▪ Teacher: gender, primary income earner for family or not, psychological distress, job stress in spring ▪ Classroom: number of children present in fall observations, race/ethnicity, average income-to-needs ratio, teacher-reported externalizing behavior

- Teachers/Classroom: 42 teachers, 17 classrooms in control group
 - Children: $n = 262$
 - 63% Black children
 - 48% boys
 - Average 1.17 income-to-needs ratio
- Study design:** Longitudinal (2 measurements of classroom quality over 1 school year)
- Data set:** CSRP and FOL

Note. CLASS = Classroom Assessment Scoring System; CLASS-ES = Emotional support/CLASS-EC= Emotional climate; CLASS-CO = Classroom organization; CLASS-IS = Instructional support; ASSIST= Assessing School Settings: Interactions of Students and Teachers; CSRP = Chicago School Readiness Project; FOL = Foundations of Learning Demonstration in Newark.

Table 2.5. Summary of studies on the association between classroom minority status composition and observed classroom quality.

Authors/ Year	Study characteristics	Measures	Results	Covariates
Bassok and Galdo (2016)	<p>Country: USA</p> <p>Theoretical framework: Input effects on bilingual language development (Unsworth, 2016)</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Pre-K, serving around 55% at-risk children ▪ Teachers/Classroom: 3883 classrooms 19% in poverty (based on zip code) 6 % Hispanic, 27% Black (based on zip code) <p>Study design: Cross-sectional</p>	<p>Classroom composition index</p> <p>1 – % Hispanic</p> <p>3 Quartiles: Low $M = 2.1$; Middle $M =$no value given; High $M = 6.9$</p> <p>2 - % Black</p> <p>3 Quartiles: Low $M = 9.5$; Middle $M =$no value given; High $M = 40.2$</p> <p>Observation measure of quality</p> <p>CLASS – ES CLASS – CO CLASS – IS</p>	<p>1- No associations</p> <p>2- Lower quality in all scales in higher quartile compared with lower quartile</p>	<ul style="list-style-type: none"> ▪ None
Bihler, Agache, Shneller, Willard, and Leyendecker (2018)	<p>Country: Germany</p> <p>Theoretical framework: Input effects on bilingual language development (Unsworth, 2016)</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Preschool ▪ Teachers/Classroom: 169 classrooms ▪ Children: $n = 903$ Mean age 40.37 months 22% from low-income families <p>Study design: Cross-sectional</p>	<p>Classroom composition index</p> <p>% DLLs (German – Other language)</p> <p>$M = 27.78$ ($SD = 17.9$)</p> <p>Observation measure of quality</p> <p>CLASS - total</p>	<p>*No association</p>	<ul style="list-style-type: none"> ▪ None
Broekhuizen, Slot, van Aken, & Dubas (2017)	<p>Country: Netherlands</p> <p>Theoretical framework: Not clearly stated</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Preschool, child care ▪ Teachers/Classroom: 37 classrooms ▪ Children: $n = 113$ 	<p>Classroom composition index</p> <p>Proportion of non-Dutch children</p> <p>45.9% majority Dutch; 21.6% close mix of Dutch and non-Dutch; 32.4% majority non-Dutch</p>	<p>Negative association</p>	<ul style="list-style-type: none"> ▪ None

	<p>Mean age 37 months 70% monolingual (Dutch) 51% boys</p> <p>Study design: Cross-sectional Data set: pre-COOL study</p>	<p>Observation measure of quality CLASS (Toddler) – Emotional and Behavioral Support</p>		
Debnam, Pas, Bottiani, and Cash (2015)	<p>Country: USA Theoretical framework: Culturally responsive teaching (Gay, 2000) Sample</p> <ul style="list-style-type: none"> ▪ Program: Elementary schools ▪ Teachers/Classroom: 142 K-8th grade teachers ▪ Children: <ul style="list-style-type: none"> 58% from ethnic minorities 50% boys <p>Study design: Cross-sectional Data set: CSRP and FOL</p>	<p>Classroom composition index % White children</p> <p>No information on % at the classroom level</p> <p>Observation measure of quality ASSIST Cultural Responsiveness Teaching</p>	No association	<ul style="list-style-type: none"> ▪ Classroom: total number of children, % boys
Dotterer et al. (2014)	<p>Country: USA Theoretical framework: Ecological theory (Bronfenbrenner & Ceci, 1994) Sample</p> <ul style="list-style-type: none"> ▪ Program: Pre-K, target and universal ▪ Teachers/Classroom: 716 classrooms, 76% in targeted programs (64% poor classrooms), 24% in universal programs (41% poor classrooms) ▪ Children: <ul style="list-style-type: none"> 4-years-old Around 50% boys <p>Study design: Longitudinal (2 measurements of classroom quality over 1 school year) Data set: NCEDL Multi-State and SWEEP studies</p>	<p>Classroom composition index % White children</p> <p>51% in Universal 38% in Targeted</p> <p>Observation measure of quality ECERS-R LI ECERS-R PL CLASS - EC CLASS - IC</p>	<p>Lower ECERS scores in Universal compared with Targeted classrooms</p> <p>No association with CLASS – EC</p> <p>Lower CLASS - IC in Universal compared with Targeted classrooms</p>	<ul style="list-style-type: none"> ▪ Program: hours per day ▪ Teacher: education ▪ Classroom: % children living below (150%) poverty line, teacher-child ratio
Downer et al. (2012)	<p>Country: USA Theoretical framework: Not clearly stated Sample</p> <ul style="list-style-type: none"> ▪ Program: Pre-K, 16% Head Start 	<p>Classroom composition index % DLLs (English-Spanish)</p> <p>No DLL = 0 (48.3 % of classrooms)</p>	No association	<ul style="list-style-type: none"> ▪ None

	<ul style="list-style-type: none"> Teachers/Classroom: 721 classrooms Children: $n = 2983$ <ul style="list-style-type: none"> 49% boys 60% non-Caucasian 59% living below (150%) poverty line <p>Study design: Cross-sectional Data set: NCEDL Multi-State and SWEEP studies</p>	<p>Mid DLL = proportion below 50% (35.5% of classrooms) Hi-DLL = proportion above 50% (14.2% of classrooms)</p> <p>Observation measure of quality CLASS - total</p>		
Fram and Kim (2012)	<p>Country: USA Theoretical framework: Not clearly stated Sample</p> <ul style="list-style-type: none"> Program: Kindergarten Teachers/Classroom: 1500 classrooms Children: $n = 2983$ <ul style="list-style-type: none"> 51% girls $M = 57$ months 55% White 25% living below (150%) poverty line <p>Study design: Cross-sectional Data set: ECLS-BC</p>	<p>Classroom composition index</p> <ol style="list-style-type: none"> 1- Predominantly Latino/Hispanic children (around 70% in class) 2- Predominantly Black children (around 80% in class) 3- “Other” predominant (around 70% in class) 4- Predominantly White children (around 80% in class) <p>Observation measure of quality CIS</p>	<p>1, 4- No association</p> <p>2, 3- Negative association</p>	<ul style="list-style-type: none"> Children: gender, birthweight, age in months, age at entry, hours per week in ECE; parent marital status, work status, number of siblings, number of adults in house, parent education, poverty status, annual household income and location
Friedman-Krauss et al. (2014)	<p>Country: USA Theoretical framework: Transactional model of coercive cycles of adult–child conflict (Snyder, Cramer, Afrank, & Patterson, 2005); Transactional model of stress and coping (Lazarus, 1991) Sample</p> <ul style="list-style-type: none"> Program: Head Start (in high-poverty neighborhoods) Teachers/Classroom: 42 teachers, 17 classrooms in control group Children: $n = 262$ <ul style="list-style-type: none"> 63% Black children 48% boys Average 1.17 income-to-needs ratio <p>Study design: Longitudinal (2 measurements of classroom quality over 1 school year)</p>	<p>Classroom composition index % Black children</p> <p>No information on averages at the classroom level</p> <p>Observation measure of quality CLASS - EC</p>	<p>Negative association</p>	<ul style="list-style-type: none"> None

Data set: CSRP and FOL

Iruka and Morgan (2014)

Country: USA

Theoretical framework:

Ecological theory (Bronfenbrenner & Morris, 2007)

Sample

- Program: Head Start, preschool, public school prekindergarten
- Teachers/Classroom: $M = 14.18$ ($SD = 5.11$) children per teacher
- Children: $n = 350$ preschoolers
Mean age 53 months
All African-American
48% boys
53% living below (150%) poverty line

Study design: Cross-sectional

Data set: ECLS-BC

Classroom composition index

% non-English-speaking children (i.e., Spanish speakers)

Observation measure of quality

ECERS-R with CIS to create classroom quality profiles:
1- Moderately High and Sensitive Interactions (52%)
2- Average and Sensitive Interactions (35%)
3- Low and Harsh Interactions (13%)

Higher percentage in classrooms that fit both the lower and higher quality profiles

- Teacher: education, experience, age, enjoyment of job, intrinsic motivation, professional development opportunities
- Classroom: size, % of non-English speakers
- Children: age, gender, income-to-needs ratio, maternal education, family structure

Justice, Mashburn, Hamre, and Pianta (2008)

Country: USA

Theoretical framework: Social-interactionist theories of language acquisition (e.g., Baumwell, Tamis-LeMonda, & Bornstein, 1997)

Sample

- Program: State-funded preschool, serving at-risk (social/economic) 4-year-old children
- Teachers/Classroom: 135 teachers
- Children: $n = 350$ preschoolers
46% African-American, 29% Caucasian, 12% Hispanic/Latino, 13% other ethnicity
1 out of 5 DLL
50% girls
Average income 26.500\$

Study design: Cross-sectional

Data set: ECLS-BC

Classroom composition index

% with low English proficiency

$M = 12.7$ ($SD = 25.8$)
Range 1-100

Observation measure of quality

CLASS – IS (scale of language modeling)
CLASS – IS (scale of literacy focus)

No associations

- Teacher: procedural fidelity (routine, teaching), education, participation in language and literacy workshops, years of experience, self-efficacy, teacher-centeredness
- Classroom: % with low English proficiency, number of participating children, language lesson

Kuger, Kluczniok, Kaplan, and

Country: Germany

Theoretical framework:

Not clearly stated

Classroom composition index

Proportion of children with low proficiency in the German language

Negative association

- Teacher: experience, satisfaction
- Classroom: space per child, teacher-child ratio, class size, proportion of

Roszbach (2016)	<p>Sample</p> <ul style="list-style-type: none"> Program: Public and private for-profit and not-for profit Teachers/Classroom: 97 kindergarten classrooms Children: <ul style="list-style-type: none"> Mean age 4.7 years 20% of children with migration background <p>Study design: Longitudinal (3 measurements of classroom composition and quality over 3 years)</p> <p>Data set: BiKs-3-10</p>	<p>Year 1 $M= 18.3$ ($SD =18.5$) Year 2 $M= 20.1$ ($SD =24.6$) Year 3 $M= 21.9$ ($SD =23.1$)</p> <p>Observation measure of quality ECERS-R total</p>	<p>Increase in the proportion of migrant children from year 1 to year 2 was associated with a decrease in ECERS scores</p>	<p>children with migration background, number of adults, number of teacher changes</p>
LoCasale-Crouch et al. (2007)	<p>Country: USA</p> <p>Theoretical framework: Not clearly stated</p> <p>Sample</p> <ul style="list-style-type: none"> Program: Pre-K, 15% Head Start Teachers/Classroom: 692 classrooms Children: $n =2800$ <ul style="list-style-type: none"> Majority of 4-year-olds 58% non-Caucasian Around 50% boys 58% living below (150%) poverty line <p>Study design: Cross-sectional</p> <p>Data set: NCEDL Multi-State and SWEEP studies</p>	<p>Classroom composition index Proportion of non-Caucasian</p> <p>$M =$between .49 and .73</p> <p>Observation measure of quality CLASS divided into 5 quality profiles: 1- highest quality 2- positive EC, high IC 3- positive EC, mediocre IC 4- mediocre EC, low IC 5- poorest quality</p>	<p>Higher proportion in poorest quality classrooms</p>	<ul style="list-style-type: none"> None
Sanders and Downer (2012)	<p>Country: USA</p> <p>Theoretical framework: Not clearly stated</p> <p>Sample</p> <ul style="list-style-type: none"> Program: Pre-K Teachers/Classroom: 692 classrooms Children: around 17 per class <ul style="list-style-type: none"> 48% boys Proportion of .58 living below (150%) poverty line <p>Study design: Cross-sectional</p> <p>Data set: NCEDL Multi-State and SWEEP studies</p>	<p>Classroom composition index Bilingual (vs. non-bilingual) classrooms (English-Spanish)</p> <p>$M= .33$ bilingual classrooms</p> <p>Observation measure of quality ECERS-R AD CLASS – EC CLASS – IC</p>	<p>Positive association with ECERS-R AD</p> <p>No association with CLASS</p>	<ul style="list-style-type: none"> None

Sawyer et al. (2016)	<p>Country: USA</p> <p>Theoretical framework: Not clearly stated</p> <p>Sample</p> <ul style="list-style-type: none"> Program: Federally and state-funded preschool serving children from low-income families Teachers/Classroom: 62 teachers Children: around 18 <i>per</i> class <p>Study design: Part of a randomized control trial</p>	<p>Classroom composition index</p> <p>% DLL enrollment (English-Spanish)</p> <p>$M = 50\%$ ($SD = 22\%$)</p> <p>Observation measure of quality</p> <p>ELLCO-DLL</p>	No association	<ul style="list-style-type: none"> None
Slot, Bleses, Justice, Markussen-Brown, and Højen (2018)	<p>Country: Denmark</p> <p>Theoretical framework: Bioecological model of human development (Bronfenbrenner & Morris, 2006)</p> <p>Sample</p> <ul style="list-style-type: none"> Program: Preschool (centers chosen to overrepresent high concentrations of children at risk - social disadvantage and non-Danish background) Teachers/Classroom: 402 teachers, 260 classrooms with overrepresentation of children Children: $n = 5359$ Aged 4-6 89% monolingual (Danish) 53% girls <p>Study design: Part of a randomized control trial</p>	<p>Classroom composition index</p> <p>Proportion of non-Danish children</p> <p>$M = .11$ ($SD = .22$) Range 0-1</p> <p>Observation measure of quality</p> <p>CLASS – ES CLASS – CO CLASS – IS (pre-intervention scores)</p>	Negative associations (all scales)	<ul style="list-style-type: none"> None
Stipek (2004)	<p>Country: USA</p> <p>Theoretical framework: Not clearly stated</p> <p>Sample</p> <ul style="list-style-type: none"> Program: Private ($n = 12$) and public schools ($n = 142$) Teachers/Classroom: 314 K-2nd classrooms, 109 kindergarten Children: 46% African-American and Latino/Hispanic 51% living in poverty <p>Study design: Cross-sectional</p>	<p>Classroom composition index</p> <p>1- % African-American children 2- % Latino/Hispanic</p> <p>No information on % at the classroom level</p> <p>Observation measure of quality</p> <p>ECCOM - CT ECCOM - DT</p>	1, 2- Negative associations with CT and positive with DT	<ul style="list-style-type: none"> Teacher: goals (basic skills, higher-order thinking, social skills), perceptions of family (challenges, barriers)

Valentino (2018)	<p>Country: USA</p> <p>Theoretical framework: Link between state policy, classroom structure, process, and child outcomes</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Pre-K serving mostly children from low-income families ▪ Teachers/Classroom: 647 classrooms ▪ Children: $n = 12334$ Proportion of .54 living in poverty <p>Study design: Cross-sectional</p> <p>Data set: NCEDL Multi-State and SWEEP studies</p>	<p>Classroom composition index</p> <p>1-Group of DLL children (vs. non-DLL) (English-Spanish) Proportion $M = .21$ ($SD = .32$) DLL</p> <p>2- Group of Black children (vs. White children) Proportion $M = .19$ ($SD = .30$) Black (vs $M = .40$ [$SD = .37$] White)</p> <p>3- Group of Hispanic children (vs White children) Proportion $M = .27$ ($SD = .35$) Hispanic</p> <p>Observation measure of quality</p> <p>ECERS-R total ECERS-R LI ECERS-R PL CLASS - total CLASS - EC CLASS - IC</p>	<p>1, 2, 3 - Negative associations with all ECERS scales</p> <p>1 – No associations with CLASS</p> <p>2, 3 - Negative associations with all CLASS scales</p>	<p>▪ None</p>
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Note. DLL = Dual Language Learners; CIS = Caregiver Interaction Scale; ECERS-R = Early Childhood Rating Scale Revised; ECERS-R LI = Language/interactions; ECERS-R PV = Provisions for learning; ECERS-R AD = Acceptance of diversity; CLASS = Classroom Assessment Scoring System; CLASS-ES = Emotional support/ EC= Emotional climate; CLASS-CO = Classroom organization; CLASS-IS = Instructional support/ IC = Instructional climate; ELLCO-DLL= Early Language and Literacy Classroom Observation; ASSIST= Assessing School Settings: Interactions of Students and Teachers; ECCOM =Early Childhood Classroom Observation Measure; ECCOM-CT = Constructivist teaching; ECCOM-DT = Didactic teaching; ECLS-BC = Early Childhood Longitudinal Study, Birth Cohort; NCEDL Multi-State = National Center for Early Development and Learning’s Multi-State Study of Pre-Kindergarten; SWEEP = Study of State-Wide Early Education Programs; CSRP = Chicago School Readiness Project; FOL = Foundations of Learning Demonstration in Newark; ECLS-BC = Early Childhood Longitudinal Study, Birth Cohort.; BiKS study = Early childhood cohort of the German longitudinal BiKS study.

*Correlation coefficients were provided by the authors of the study upon request.

Table 2.6. Summary of studies on the association between classroom socioeconomic composition and observed classroom quality.

Authors/ Year	Study characteristics	Measures	Results	Covariates
Bassok and Galdo (2016)	<p>Country: USA</p> <p>Theoretical framework: Input effects on bilingual language development (Unsworth, 2016)</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Pre-K, serving around 55% at-risk children ▪ Teachers/Classroom: 3,883 classrooms, 19% poor (based on zip code), ▪ Children: 6 % Hispanic, 27% Black (based on zip code) <p>Study design: Cross-sectional</p>	<p>Classroom composition index</p> <p>% children living in poverty by zip code</p> <p>3 Quartiles: Low $M = 11.4$; Middle $M =$no value given; High $M = 24.9$</p> <p>Observation measure of quality</p> <p>CLASS – ES CLASS – CO CLASS – IS</p>	<p>Lower CLASS – ES and IS in higher quartile compared with lower quartile</p> <p>No association with CLASS - CO</p>	<ul style="list-style-type: none"> ▪ None
Bihler, Agache, Shneller, Willard, and Leyendecker (2018)	<p>Country: Germany</p> <p>Theoretical framework: Input effects on bilingual language development (Unsworth, 2016)</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Preschool ▪ Teachers/Classroom: 169 classrooms ▪ Children: $n = 903$ Mean age 40.37 months 22% from low-income families <p>Study design: Cross-sectional</p>	<p>Classroom composition index</p> <p>% low SES children</p> <p>No information on % at the classroom level</p> <p>Observation measure of quality</p> <p>CLASS total score</p>	<p>*No association</p>	<ul style="list-style-type: none"> ▪ Classroom: % children from low income families, teacher-child ratio ▪ Children: age, duration of attendance
Dotterer et al. (2014)	<p>Country: USA</p> <p>Theoretical framework: Ecological theory (Bronfenbrenner & Ceci, 1994)</p> <p>Sample</p> <ul style="list-style-type: none"> ▪ Program: Pre-K, target and universal, serving 4-year-olds ▪ Teachers/Classroom: 716 classrooms, 76% in targeted programs (64% poor), 24% in universal programs (41% poor) 	<p>Classroom composition index</p> <p>% children living below the 150% poverty line</p> <p>41% in Universal 64% in Targeted programs</p> <p>Observation measure of quality</p>	<p>Lower ECERS scores in Universal compared with Targeted classrooms</p>	<ul style="list-style-type: none"> ▪ Program: hours per day ▪ Teacher: education ▪ Classroom: % White children, teacher-child ratio

	<ul style="list-style-type: none"> Children: 50% boys <p>Study design: Longitudinal (2 measurements of classroom quality over 1 school year)</p> <p>Data set: NCEDL Multi-State and SWEEP studies</p>	<p>ECERS-R LI ECERS-R PL CLASS - EC CLASS - IC</p>	<p>No association with CLASS – EC</p> <p>Lower CLASS - IC in Universal compared with Targeted classrooms</p>	
Friedman-Krauss et al. (2014)	<p>Country: USA</p> <p>Theoretical framework: Transactional model of coercive cycles of adult–child conflict; (Snyder, Cramer, Afrank, & Patterson, 2005); Transactional model of stress and coping (Lazarus, 1991)</p> <p>Sample</p> <ul style="list-style-type: none"> Program: Head Start (in high-poverty neighborhoods) Teachers/Classroom: 42 teachers, 17 classrooms in control group Children: $n = 262$ 63% Black 48% boys Average 1.17 income-to-needs ratio <p>Study design: Longitudinal (2 measurements of classroom quality over 1 school year)</p> <p>Data set: CSR and FOL</p>	<p>Classroom composition index Average income-to-needs ratio (based on number of people in household + federal poverty level)</p> <p>No information on averages at the classroom level</p> <p>Observation measure of quality CLASS - EC</p>	<p>Negative association</p>	<ul style="list-style-type: none"> None
LoCasale-Crouch et al. (2007)	<p>Country: USA</p> <p>Theoretical framework: Not clearly stated</p> <p>Sample</p> <ul style="list-style-type: none"> Program: Pre-K, 15% Head Start Teachers/Classroom: 692 classrooms Children: $n = 2800$ Majority of 4-year-olds 58% non-Caucasian 50% boys 58% living below the 150% poverty line 	<p>Classroom composition index</p> <p>1- Mean level of maternal education $M =$ between 12.3 and 13.5 years</p> <p>2 - Proportion of children living below the poverty line $M =$ between .59 and .65</p>	<p>1-Positive association with highest quality</p> <p>2- Positive association with poorest quality</p>	<ul style="list-style-type: none"> None

	<p>Study design: Cross-sectional Data set: NCEDL Multi-State and SWEEP studies</p>	<p>Observation measure of quality CLASS divided into 5 quality profiles: 1- highest quality 2- positive EC, high IC 3- positive EC, mediocre IC 4- mediocre EC, low IC 5- poorest quality</p>		
Phillips, Gormley and Lowenstein (2009)	<p>Country: USA Theoretical framework: Not clearly stated Sample</p> <ul style="list-style-type: none"> ▪ Program: Pre-K, Head Start, serving 4-year-olds ▪ Teachers/Classroom: 77 Pre-K + 28 Head Start classrooms <p>Study design: Cross-sectional</p>	<p>Classroom composition index % children in poverty below (130%) poverty line</p> <p>63% in Pre-K; 95% in Head Start</p> <p>Observation measure of quality CLASS – ES CLASS – CO CLASS – IS</p>	No associations	<ul style="list-style-type: none"> ▪ Program: full-day (or half-day) ▪ Teacher: education, years of experience, type of curriculum used
Pianta et al. (2005)	<p>Country: USA Theoretical framework: Not clearly stated Sample</p> <ul style="list-style-type: none"> ▪ Program: Pre-K ▪ Teachers/Classroom: 238 teachers ▪ Children: around 7 3- and 4-year-olds per teacher <p>Study design: Cross-sectional</p>	<p>Classroom composition index % poor children in classroom</p> <p>54% classrooms with > 60% children living in poverty</p> <p>Observation measure of quality ECERS-R LI ECERS-R PL CLASS – ES CLASS – IS</p>	Negative associations with all ECERS and CLASS scales	<ul style="list-style-type: none"> ▪ Program: in-school, full-day (or half-day), state (location) ▪ Teacher: education, experience, traditional attitudes, depressive symptoms, wage ▪ Classroom: child-staff ratio
Reid and Ready (2013)	<p>Country: USA Theoretical framework: Bioecological theory of human development (Bronfenbrenner, 2004) Sample</p> <ul style="list-style-type: none"> ▪ Program: Pre-K, public schools, Head Start ▪ Teachers/Classroom: 704 classrooms, 51% with 2/3 of poor children 	<p>Classroom composition index Mean SES (average between family income and maternal education)</p> <p>1- low 2- middle 3- high SES classrooms</p>	<p>1 - Negative associations with both ECERS and CLASS – ES</p> <p>2 - No associations</p>	<ul style="list-style-type: none"> ▪ None

	<ul style="list-style-type: none"> Children: $n = 2966$ 50% boys <p>Study design: Cross-sectional Data set: NCEDL Multi-State and SWEEP studies</p>	<p>Observation measure of quality ECERS-R total CLASS - ES CLASS - IS</p>	<p>3 – Positive associations with both ECERS and CLASS – EC</p> <p>No associations with CLASS-IC</p>	
Sanders and Downer (2012)	<p>Country: USA Theoretical framework: Not clearly stated Sample</p> <ul style="list-style-type: none"> Program: Pre-K Teachers/Classroom: 692 classrooms Children: around 17 per class 48% boys <p>Study design: Cross-sectional Data set: NCEDL Multi-State and SWEEP studies</p>	<p>Classroom composition index 1 - % children living below (150%) poverty line $M = .58 (SD = .32)$ 2 - Mean of maternal education level $M = 12.8 (SD = 1.39)$</p> <p>Observation measure of quality ECERS-R AD CLASS – EC CLASS – IC</p>	<p>1-Negative association with ECERS AD and CLASS – EC</p> <p>2-Positive association with ECERS AD and CLASS - EC</p> <p>No associations with CLASS - IC</p>	<ul style="list-style-type: none"> None
Stipek (2004)	<p>Country: USA Theoretical framework: Not clearly stated Sample</p> <ul style="list-style-type: none"> Program: Private ($n = 12$) and public schools ($n = 142$) Teachers/Classroom: 314 K-2nd classrooms, 109 kindergarten Children: 46% African-American and Latino/Hispanic 51% living in poverty <p>Study design: Cross-sectional</p>	<p>Classroom composition index % eligible for free lunch No information on % at the classroom level</p> <p>Observation measure of quality ECCOM - CT ECCOM - DT</p>	<p>Negative association with CT and positive with DT</p>	<ul style="list-style-type: none"> Teacher: goals (basic skills, higher-order thinking, social skills), perceptions of family (challenges, barriers)
Valentino (2018)	<p>Country: USA</p>	<p>Classroom composition index Poor children (i.e., living below the 150% poverty line) vs. non-poor</p>	<p>Negative associations (all scales)</p>	<ul style="list-style-type: none"> None

Theoretical framework: Link between state policy, classroom structure, process, and child outcomes

Sample

- Program: Pre-K serving mostly children from low-income families
- Teachers/Classroom: 647 classrooms
Children: $n = 12334$
Proportion of .19 Black, .40 White, .27 Hispanic
Proportion of .21 DLL

Study design: Cross-sectional

Data set: NCEDL Multi-State and SWEEP studies

Proportion $M = .54$ ($SD = .32$) poor

Observation measure of quality

ECERS-R total

ECERS-R LI

ECERS-R PL

CLASS - total

CLASS - EC

CLASS - IC

Note. ECERS-R = Early Childhood Rating Scale Revised; ECERS-R LI = Teaching/interactions; PV = Provisions for learning; CLASS = Classroom Assessment Scoring System; CLASS-ES = Emotional support/ CLASS-EC= Emotional climate; CLASS-CO = Classroom organization; CLASS-IS = Instructional support/ CLASS-IC = Instructional climate; ECCOM =Early Childhood Classroom Observation Measure; ECCOM-CT = Constructivist teaching; ECCOM-DT = Didactic teaching; NCEDL Multi-State = National Center for Early Development and Learning’s Multi-State Study of Pre-Kindergarten; SWEEP = Study of State-Wide Early Education Programs; CSRP = Chicago School Readiness Project; FOL = Foundations of Learning Demonstration in Newark.

*Correlation coefficients provided by the authors of the study upon request.

2.4.1.3. Study design

Most studies ($n = 18$, 72%) were cross-sectional and all, except for two (Sawyer et al., 2016; Slot et al., 2018), were correlational. In terms of number of data collection points, two longitudinal studies (Ansari & Pianta, 2018; Kuger et al., 2016) assessed simultaneously classroom composition and quality, at least in two distinct moments, and three other studies (Dotterer et al., 2013; Friedman-Krauss et al., 2014; Sontag, 1997) assessed classroom quality in more than one moment, over time, but assessed classroom composition only one time. Two studies were part of randomized control trials (Sawyer et al., 2016; Slot et al., 2018).

2.4.1.4. Standardized observation measures of classroom quality

Eight standardized observation measures of classroom quality in ECE were used. Details on these measures are presented in Table 1. Two global quality measures, one content specific measure, and five process quality measures were extracted. Most measures include a set of items which can be scored into specific quality factors or averaged into a global score (Bryant, 2010). The Early Childhood Environment Rating Scale (ECERS, ECERS-R; Harms & Clifford, 1980; Harms, Clifford, & Cryer, 1998, 2008), a global quality measure, and the Classroom Assessment Scoring System (CLASS, CLASS PRE-K; Pianta, LaParo, & Hamre, 2008) were the most frequently used standardized observation measures of classroom quality ($n = 6$, 24% and $n = 17$, 68%, respectively). Four studies used both the ECERS and CLASS (Dotterer et al., 2013; Pianta et al., 2005; Reid & Ready, 2013; Valentino, 2018). The ECERS was also used in combination with the Caregiver Interaction Scale (CIS; Arnett, 1989) in one study to create three quality profiles (Iruka & Morgan, 2014).

All associations between classroom composition and the ECERS were significant. Most studies reported scores on domains of language/interactions and provisions for learning separately. Regarding CLASS scores, results were not so consistent. Most studies reported scores on domains of quality, separately, even though classroom organization was not assessed as frequently as emotional and instructional support. Few associations between the CLASS total score and classroom composition were significant (four out of 11). Emotional support was assessed 23 times in association with classroom composition and 15 of those associations were significant. Instructional support was assessed 19 times and 12 associations were significant. Five of the nine associations tested between classroom organization and composition were significant.

2.4.1.5. Classroom level characteristics and classroom composition indexes

Five types of children's characteristics, measured at the classroom level, were used to compute classroom composition indexes: ability ($n = 4$, 16%), age ($n = 5$, 20%), gender ($n = 3$, 12%), minority status ($n = 17$, 68%), and SES ($n = 11$, 44%). Twelve out of the 25 studies included two types of characteristics (48%) and one included three. Of these, all except for one, which

focused simultaneously on age and gender, focused on minority status and one other index. The most common overlap was between minority status and SES ($n = 7, 28\%$).

Under minority status, we coded all studies that operationalized classroom composition indexes based on the concentration of children identified as belonging to a particular ethnicity or race, as having an immigration background, and as being a dual-language learner (DLL). First, we found that the aforesaid characteristics frequently coexisted, that is, children often accumulated some of these characteristics (e.g., Hispanic/Latino children from immigrant families attending ECE in the USA generally learn both the Spanish and English languages), so aggregation was a possibility. Second, in the USA education system it is common to gather information on children's ethnic and racial identifications separately. However, ethnicity tends to be related almost exclusively with being or not part of the Hispanic/Latino culture, while race is associated with children's country of origin/ancestry, such as being American Indian or Alaska Native, Asian, Black or African American, a Native Hawaiian or other Pacific islander, or White (National Forum on Education Statistics, 2008). Therefore, the distinction between the two concepts can become blurry. Both ethnicity and race are socially constructed concepts (Markus, 2008), often used to distinguish between social groups (Johnson-Bailey & Drake-Clark, 2010). Thus, in our view, independently of the terminology used, these concepts are primarily related with perceptions of belongingness to a given social group that often represents having a minority status (Khanna & Harris, 2009).

In 24 of the studies (96%), classroom composition indexes were calculated based on the percentage/proportion and the average/mean of children with a given characteristic in the classroom and, therefore, measured mostly classroom homogeneity. One study (Ansari & Pianta, 2018) used Simpson's Diversity Index (1949) to calculate classroom age diversity. More detail on how composition indexes were computed in each study, for each characteristic of children in the classroom is presented next.

2.5. Associations between classroom composition and observed classroom quality

Only four of the studies (16%) defined specific research hypotheses regarding the potential direction of the association between classroom composition and quality (Ansari & Pianta, 2018; Sawyer et al., 2016; Slot et al., 2018; Stipek, 2004). The remaining studies though providing data on the association between classroom composition and quality, focused primarily on the association between classroom composition and children's developmental outcomes. A synthesis of the main findings regarding the association between classroom composition indexes and process quality is presented in Table 2.7. The magnitude of effects was generally small.

Table 2.7. Summary of findings on the association between classroom composition and observed classroom quality by type of characteristic, index, and classroom quality observation measure.

	APEEC	ESCAPE	ECERS-R total score	ECERS-R LI	ECERS-R PL	ECERS AD	ELCO-DLL	ASSIST	CIS	CLASS total score	CLASS ES/EC	CLASS CO	CLASS IS/IC	CLASS LM	CLASS LF	ECCOM CT	ECCOM DT	ECERS X CIS
Ability	●	□												●	□			●
Age										●	●	●	●					
Minority Status			□	□	□	□	●			●●●	●		●●					
			□								□	□	□	●□				□□
			□	□	□				□			□				□	□	
			□	□	□				●	□□□●	●□□□	□	□□□●			□	□	
				□	□			●	●		●		●					
									□									
Gender								●			●							
											●							
SES			□	□□□	□□□	□				□●	□□□□□●●	□●●	□□□□●●			□	□	
			□□●								□□		●●●					
								□			□□		●					

*Note.*¹ The association was significant with teachers' disapproval behaviors but not with other teacher behaviors.

● = association was not significant; ■ = association was negative; □ = association was positive.

APEEC = The Assessment of Practices in Early Elementary Classrooms; ECERS-R = Early Childhood Rating Scale Revised; ECERS-R LI = Language/interactions; ECERS-R PV = Provisions for learning; ECERS-R AD = Acceptance of diversity; ELLCO-DLL= Early Language and Literacy Classroom Observation; ASSIST= Assessing School Settings: Interactions of Students and Teachers; CIS = Caregiver Interaction Scale; CLASS = Classroom Assessment Scoring System; CLASS-ES/EC = Emotional support/climate; CLASS-CO = Classroom organization; CLASS-IS/IC = Instructional support/climate; CLASS-LM =Language Modeling; CLASS-LF = Literacy Focus; ECCOM =Early Childhood Classroom Observation Measure; ECCOM-CT = Constructivist teaching; ECCOM-DT = Didactic teaching; ESCAPE = Eco-behavioral System for the Complex Assessment of Preschool Environments.

2.5.1. Classroom ability composition and classroom quality

Four studies defined ability in terms of the presence or absence of disabilities in children or the percentage of children with IEPs (see Table 2.2). One longitudinal study reported that teachers in inclusive classrooms (i.e., including both children with and without disabilities) used significantly more disapprovals of children's behavior compared with teachers in segregated classrooms (i.e., all children with disabilities), based on assessments with the ESCAPE (Sontag, 1997). A cross-sectional study found a positive association between a higher number of children with disabilities in the classroom and the quality of literacy focus, but no association was found with language modeling, two scales included in the CLASS (Justice et al., 2008). Two other cross-sectional studies found no association between the number of children with disabilities in the classroom and the APEEC (Hemmeter, Maxwell, Ault, & Schuster, 2001) and quality profiles defined by a combination of the ECERS and the CIS (Iruka & Morgan, 2014).

2.5.2. Classroom age composition and classroom quality

Out of five studies on the association between classroom age composition and classroom quality (see Table 2.3), two found significant associations. One longitudinal study reported a negative association between higher age diversity and the CLASS emotional support, classroom organization, and instructional support domains, compared with less diverse classrooms in terms of children's age (Ansari & Pianta, 2018). Furthermore, this study reported a decrease in classroom organization and emotional support scores in year two following an increase in age diversity. Another study found that a higher mean age was positively associated with the ECERS total score (Kuger et al., 2016). Conversely, three studies, two cross-sectional (Pakarinen et al., 2010; Purtell & Ansari, 2018) and one randomized control trial (Slot et al., 2018), found no association between the proportion of children in the classroom within a determined age range or the classroom mean age and CLASS scores.

2.5.3. Gender composition and classroom quality

The three studies that focused on the associations between gender composition and classroom quality, reported no significant associations between the percentage of boys or girls in the classroom and the CLASS emotional and behavioral support scores (Toddler version; Broekhuizen et al., 2017), the CLASS emotional climate domain (Friedman-Krauss et al., 2014), and the ASSIST scores (Debnam et al., 2015) (see Table 2.4).

2.5.4. Classroom minority status and classroom quality

Seven cross-sectional studies found no association between the concentration of Hispanic/Latino children learning both the English and Spanish language in the classroom and ELLCO-DLL scores (Sawyer et al., 2016), CIS scores (Fram & Kim, 2012), and CLASS scores (Bassok & Galdo, 2016; Bihler et al., 2018; Downer et al., 2012; Sanders & Downer, 2012; Valentino, 2018). One more study

reported no association between the percentage of children with low proficiency in the English language in the classroom and the quality of literacy focus and of language modeling, two scales included in the CLASS (Justice et al., 2008). Another cross-sectional study found no association between the percentage of White children in the classroom and the use of culturally responsive teaching, assessed with the ASSIST (Debnam et al., 2015).

Conversely, two cross-sectional studies reported that a high concentration of Hispanic/Latino children in the classroom, compared with a high concentration of majority children, was associated with lower global quality in the ECERS total score, language and interactions, and provisions for learning (Valentino, 2018) and with the use of fewer constructivist teaching strategies measured with the ECCOM (Stipek, 2004). Similar results were reported in these two studies in classrooms with a high concentration of Black/African-American children, again, in comparison with classrooms with a higher concentration of majority children. This type of composition was also associated with lower quality in the CLASS total score and in emotional and instructional supports in classrooms with higher (Bassok & Galdo, 2016), and with lower CIS scores (Fram & Kim, 2012). One longitudinal study (Friedman-Kraus et al., 2014), also reported a similar association between the percentage of Black children and the CLASS emotional climate scores. Note, however, that the longitudinal study by Dotterer et al. (2014) reported lower quality in the ECERS language and interactions, and provisions for learning subscales, and the CLASS instructional support domain in universal programs with higher percentages of White children in the classroom.

Four more studies reported significant associations: in one study conducted in the USA both classrooms with higher quality and lower quality, measured with a combination of ECERS and CIS, had a higher percentage of non-English-speaking children compared with classrooms with medium quality (Iruka & Morgan, 2014); in German ECE settings, a proportion of 100% migrant children (with low proficiency in the German language) in the classroom was negatively associated with the ECERS total score, that was about .75 points lower than in classrooms with a proportion of 0%; also, from year 1 to year 2 an increased proportion of children from migrant families was associated with a decrease in ECERS scores (Kuger et al., 2016); in a Danish study, a pre-intervention assessment revealed that a higher proportion of non-Danish children in the classroom was associated with lower quality scores in all of the CLASS domains, particularly with Classroom Organization (Slot et al., 2018); lastly, one study conducted in the Netherlands reported lower emotional and behavioral support in the CLASS in classrooms with a higher proportion of non-Dutch children (Broekhuizen et al., 2017) (see Table 2.5).

2.5.5. Socioeconomic composition and classroom quality

Under SES we included studies that operationalized this index based on indicators such as family income, maternal education, and average of family income and maternal education. Out of 11 studies focusing on socioeconomic composition and classroom quality, nine reported significant associations (see Table 2.6). Two studies found no association between the percentage of children living in poverty

in the classroom and the CLASS total score (Bihler et al., 2018; Phillips et al., 2009). Two more studies found no association with the CLASS emotional support (Dotterer et al., 2013) and the CLASS instructional support (Reid & Ready, 2013).

Conversely, four studies, three cross-sectional and one longitudinal, reported a negative association between a higher concentration (i.e., percentage or proportion) of children living in poverty in the classroom and the CLASS total score (LoCasale-Crouch et al., 2007; Sanders & Downer, 2012; Valentino, 2018) and emotional and instructional support scores (Bassok & Galdo, 2016; Pianta et al., 2005; Valentino, 2018). Of these studies, two were conducted with subsamples from the same larger-scale studies. A negative association was also found with the ECERS total score (Valentino, 2018), the ECERS interactions and provisions for learning (Pianta et al., 2005; Valentino, 2018) and the use of constructivist teaching strategies, measured with the ECCOM (Stipek, 2004). Conversely, one longitudinal study reported that in classrooms from targeted programs, with more children living in poverty, scores in the ECERS interactions and provisions for learning scales and the CLASS instructional support were higher, compared with classrooms from universal programs with a lower percentage of economically disadvantaged children (Dotterer et al., 2013).

Two cross-sectional studies, conducted with subsamples from the same larger-scale projects, focused on the association between classroom mean level of maternal education and classroom quality and reported that in classrooms with higher mean levels of maternal education, the CLASS total score was higher (LoCasale-Crouch et al., 2007; Sanders & Downer, 2012). In classrooms with a higher average of family income and maternal education, the ECERS total score and the CLASS emotional support score were also higher (Reid & Ready, 2013).

2.5.6. Covariates

There was wide variation in the number and type of covariates considered in the association between classroom composition and process quality. In more than half of the studies, this association was not assessed considering the presence of covariates. In the remaining studies the number of covariates considered varied between two (Debnam et al., 2015; Maxwell et al., 2001; & Stipek, 2004) and 21 (Purtell & Ansari, 2018). Covariates were related with program, teacher, classroom and child characteristics. The most common covariates were associated with teacher characteristics, mainly, teacher education, years of experience, and training; and with classroom characteristics, such as composition, size, and teacher-child ratio. There were no substantial differences in terms of significant associations between classroom composition and quality reported in studies that considered covariates (seven out of 12 reported at least one significant association) and those that did not (nine out of 13 reported at least one significant association). Since we did not formally conduct a meta-analysis, we can only mention that the size of effects appeared to be, in general, small.

2.6. Discussion

We set out to identify the types of classroom composition indexes used in the ECE literature and their association with observed classroom quality, based on the premise that the characteristics of the children in the classroom shape their experiences (e.g., Pianta et al., 2005). Even though there is a growing interest in classroom composition effects, particularly over the last two decades, most screened studies focused on the association between classroom composition and children's outcomes and only a small number was eligible for this review. Thus, more empirical research is needed to inform policies and decision-making processes, regarding the organization of classrooms in center-based ECE.

2.6.1. Theoretical framework

The lack of a clearly stated framework in many studies does not mean that these studies do not have a valid rationale, built upon a substantive theory, or a conceptual framework (Camp, 2001). Nonetheless, defining a clear theoretical framework helps in the definition of the research design, contributes with new knowledge to a specific theoretical community, and clarifies the assumptions underlying the problem under investigation to readers (Camp, 2001). Since studies varied substantially in their research aims and designs, it is not possible to identify contributions to one specific theoretical string or to fully integrate findings reported in this review. Nevertheless, ecological frameworks seem to be salient in the empirical research reviewed, suggesting an acknowledgement of the role of classroom composition as an important feature of the classroom microsystem (Bronfenbrenner & Morris, 2006).

2.6.2. Study design

Given that this review was framed by the transactional model (Sameroff, 2009) and (bio)ecological theory (Bronfenbrenner & Morris, 2006), it was of interest to analyze if eligible studies considered the passage of time in the association between classroom composition and quality, based on the premise that interactional processes between children and teachers can change over time, as a function of classroom composition. Only two studies (Ansari & Pianta, 2018; Kuger et al., 2016) measured both classroom composition and quality over time and reported noteworthy findings. Both studies reported differences from year to year in classroom quality associated with variations in classroom composition, regarding age diversity (Ansari & Pianta, 2018) and concentration of children with minority status (Kuger et al., 2016). These results are indicative of both the importance of investigating how classroom composition may be associated with the quality of education children receive (e.g., Snell, Hindman, & Belsky, 2015) and of doing so over time (Ansari & Pianta, 2018). Multiple assessments over the year(s) can help identify what and how any type of change in classroom composition may constitute an additional challenge and hinder teachers' conditions to establish good quality interactions with children, as well as the strategies and supports needed to help teachers overcome them (Ansari & Pianta, 2018).

2.6.3. Observation measures of classroom quality

Even though structural features have been considered preconditions of process quality (e.g., Philips et al., 2000; Pianta et al., 2005), the evidence base about the association between structural features and process quality has been inconsistent (Slot et al., 2015). Quality scores on the ECERS and the CLASS were those with more associations with classroom composition (see Table 2.7). We found relatively consistent negative associations across studies, between disadvantaged classroom compositions, from a social and economic perspective, and the ECERS scores. Even though a recent meta-analysis about the relationship between ECERS and child outcomes reported that, in general, ECERS scores tend to be low across programs and that little variance in quality measured with the ECERS can impact the level of significance found in associations (Brunsek et al., 2017), these results should be cause for concern. Moreover, although associations with CLASS scores were not so consistent across studies, negative associations between higher proportions of children from disadvantaged backgrounds and emotional and instructional support were found frequently.

Mixed results for the CLASS may arise, for example, from distinct operationalizations of classroom composition indexes and from the diversity in number and type of covariates used in the studies (Perlman et al., 2016). Nevertheless, the significant associations reported in this review should not be overlooked. Evidence from the ECE literature indicates that while emotional support is frequently of medium-high to high-quality (Pianta et al., 2008), instructional support is frequently of low-quality, both in American (e.g., Hamre et al., 2014) and European classroom samples (e.g., Aguiar, Aguiar, Cadima, Correia, & Fialho, 2019; Bihler et al., 2018). Hence, the association between disadvantaged classroom compositions and lower-quality emotional support is particularly relevant, although both raise concerns. In classrooms with high-quality emotional support teachers are sensitive and responsive to children's emotional states and needs (Pianta, Hamre, & Allen, 2012), and children experience positive and warm interactions with teachers and peers (Pianta et al., 2008). Ultimately, teachers in these classrooms are able to promote the social and emotional functioning of children (Pianta et al., 2008). In classrooms with high-quality instructional support, teachers are able to implement activities in a way that promotes the learning of useful knowledge (Pianta et al., 2008) and contributes to children's cognitive and linguistic development (e.g., Pianta & Hamre, 2009). Together, these findings indicate that specific groups of disadvantaged children are enrolled in lower-quality classrooms, meaning that potential benefits of high-quality ECE may not be reaching the children most in need.

2.6.4. Classroom level characteristics and classroom composition indexes

Sociodemographic variables are often divided into two or more categories, except age, that can have multiple values (Steel & Tranmer, 2011). This was the case in multiple studies included in this review, that focused mostly on grouping children according to a shared category in a given sociodemographic variable (Steel & Tranmer, 2011), and then contrasting groups of children who fit a different category within the same sociodemographic variable (e.g., groups of DLL vs. non-DLL; poor vs. non-poor; 100%

proportion migrant vs. 0% proportion migrant; Caucasians vs. non-Caucasians; high average maternal education vs. low average maternal education). Consequently, these studies portrayed classroom composition in terms of relative homogeneity. Results add to the still scarce evidence that disadvantaged classroom compositions can be associated with lower quality. Conversely there was little evidence about the association between classroom diversity and quality. Only in one study addressing age composition (Ansari & Pianta, 2018) there was a clear consideration of within-group heterogeneity. This study reported a significant association with classroom quality and is illustrative of how a diversity index can be used in the study of diversity regarding distinct demographic characteristics.

Researchers in the education field may not be very familiar with existing diversity indexes (e.g., Roberson, Sturman, & Simons, 2007) that can potentially be adapted to the study of classroom composition or, as reported in other fields of study (see Harrison & Klein, 2007), the concept of diversity may not yet be refined to the point that choices about the most adequate operationalization methods can be clearly made (Harrison & Klein, 2007). However, the development of studies that assess classroom composition diversity is crucial not only to produce in-depth knowledge on the association between classroom composition and quality, but also to adequately inform policies and decision-making processes regarding the organization of classrooms.

No study included in this review used the Herfindahl index, presented in the introduction section, to compute classroom composition diversity. Nonetheless, this index has already been used in the field of education. For example, Dronkers and van der Velden (2012), in a study with 15-year-olds, used this index with complementary calculations of the average/share of children from a set of particular countries of origin to compute the school ethnic composition, so that a combined effect of ethnic diversity and share on students' outcomes could be examined. Diversity and average/share can, thus, be used as separate and complementary group composition indicators (Dronkers & van der Velden, 2012). Other composition indexes, mostly used in studies outside the education literature, should be examined in future research about the association between classroom composition and quality in ECE. The mean Euclidean distance, the standard deviation, Teachman's index, Blau's index, the coefficient of variation, and the Gini coefficient of concentration have all been used to determine differences in the distribution of demographic characteristics such as age, gender, ethnicity, and education level, within groups (e.g., Harrison & Klein, 2007). These indexes allow a direct and simple calculation of diversity effects, but they do not account for group size or differences in the number of categories between characteristics (Solanas et al., 2012). Thus, group variances must be corrected to account for the effects of differences in group size, when aggregating different groups with respect to a given category, to prevent systematic bias (e.g., Biemann & Kearney, 2010). Bias-corrected formulas have been proposed for each of these measures (see Biemann & Kearney, 2010).

In sum, there are some group composition indexes with good potential that can be used to ascertain levels of diversity within ECE classrooms. However, the choice of the index must be guided by a clear definition of diversity (Harrison & Klein, 2007). In this review, we discussed some alternatives to

ascertain diversity at the school and classroom levels, as well a broader conceptualization of diversity, considering parameters of separation, variety, and disparity. They may help researchers choose the most adequate operationalization method, accordingly with the research aim. If correctly operationalized, diversity indexes can produce valid and robust evidence (Biemman & Kearney, 2010) on classroom composition effects.

2.6.5. Associations between classroom composition and observed classroom quality

Overall, we found evidence that supports the importance of examining the association between classroom composition and process quality. The focus of most studies on minority status likely illustrates the political and research agendas prioritizing the needs of groups of children experiencing early achievement gaps (Bridges et al., 2004). Although, in general, evidence indicates that classrooms with higher proportions of children with minority status attended lower quality classrooms, results were somewhat mixed. Apparent inconsistencies found across studies included in this review are in line with evidence about the quality of programs serving children in social and economic disadvantage (see Magnuson, Meyers, Ruhm, & Waldfogel, 2004).

In studies conducted in the USA, results varied, particularly in the association between classrooms with a high concentration of Hispanic/Latino children. A couple of studies reported lower quality in classrooms with more Hispanic children, but most did not find a significant association. Confounding effects can help explain this lack of significant results, since only one of these studies (Iruka & Morgan, 2014) modeled for other structural indicators. The study reported that teacher's education, training, and enjoyment of their job were associated with classroom quality (Iruka & Morgan, 2014). Hispanic/Latino children are often dual language learners; so the lack of significant associations may be due to interactions with other factors believed to be associated with the use of bilingual practices, such as teachers' motivation and preparedness to teach DLL's or administrator support (e.g., Sawyer et al., 2016), which can derive, for example, from the development of new models of ECE that target the specific needs of the Hispanic/Latino communities (Downer et al., 2012).

Conversely, examined studies seem to indicate that Black/African-American children and children with other migration backgrounds are more likely to be enrolled in ECE classrooms with lower process quality, particularly when considering the CLASS emotional and instructional support domains. Conversely, one study (Dotterer et al., 2014) found higher instructional support and global quality in classrooms from targeted programs that served mostly children with minority status. One possible explanation for this contradictory result is related with differences in investment across states and, consequently, in the quality of programs (Cryer et al., 1999) that minority children attend. Pre-K and Head Start programs frequently provide better quality education and care, compared with other community programs (Magnuson et al., 2004), so some minority children may be experiencing modest to good classroom quality (Iruka & Morgan, 2014).

An association between higher concentrations of children with a migration background and lower process quality was also reported in four of the five studies conducted in Europe. One European study (Kuger et al., 2016) reported a negative association between a higher proportion of children with a migration background and low proficiency in the language of the host country and classroom quality measured with the ECERS and two others (Broekhuizen et al., 2017; Slot et al., 2018) reported a similar association with the CLASS domains, with particular emphases on emotional support. Furthermore, one of these studies reported that quality tended to decrease from year to year, as concentration levels increased (Kuger et al., 2016). These classrooms may be more challenging for teachers because of communication limitations and increased difficulties in structuring learning activities (Kuger et al., 2016). Also, the accumulation of such challenges over time can, perhaps, be reflected in process quality levels (Ansari & Pianta, 2018). Providing professional development opportunities and assuring a more balanced adult-to-child ratio, for example, may help mitigate these negative associations (Kuger et al., 2016).

As expected, we found studies that reported negative associations between lower SES classroom compositions and process quality. However, we note that risk factors such as poverty and minority status group often overlap (e.g., Williams, Priest, & Anderson, 2016). In socioeconomic disadvantaged ECE classrooms, teachers are often less experienced than those allocated to classrooms with high-SES compositions (see Kalogrides & Loeb, 2013; Kalogrides, Loeb, & Beteille, 2013; Reid & Ready, 2013) and are more likely to have insufficient training and lack the necessary support to effectively manage groups of children with increased emotional and behavioral difficulties (see Raver et al., 2008; Raver et al., 2009). Teachers in classrooms serving children from disadvantaged backgrounds also seem to hold less child-centered views compared with teachers in classrooms with more favorable sociocultural compositions (Lee & Ginsburg, 2007). At least one study considered a reasonable array of covariates at the teacher, classroom, and child levels, and still reported lower quality on both ECERS and CLASS in classrooms with a higher concentration of children living in poverty, which indicates that classroom SES composition can also be a predictor of classroom quality (Pianta et al., 2005).

Most studies did not report associations between classroom age composition and process quality. However, based on two studies, classrooms with higher age diversity and with more younger children seem to have lower quality. The two studies that reported an association between classroom age composition and process quality considered an array of covariates, associated with teacher and classroom characteristics, including other classroom composition indexes, such as gender, ability (Ansari & Pianta, 2018), and migration background (Kuger et al., 2016), which can increase the accuracy of findings. These results may indicate that attending to the needs of children in these classrooms can be more demanding, particularly for less experienced teachers and for those with teacher-centered views (Ansari & Pianta, 2018). Although heterogeneous classrooms are increasingly common, there is no substantial empirical evidence supporting that this model is associated with better process quality (Ansari & Pianta, 2018). Further exploring the association between classroom age composition and

process quality can have practical implications, for example, by informing enrollment policies about age cutoff points (Ansari & Pianta, 2018), if adequate, or determine more favorable funding of staff based on the classroom age composition (Kuger et al., 2016). Mechanisms to regulate classroom age composition should be dependent on how the national ECE system in question is organized (Fuller, Kagan, Loeb, & Chang, 2004).

Evidence was not clear about the association between classroom ability composition and process quality. All studies used different quality observation measures. Two reported significant associations, but in one of them (Sontag, 1997) the authors discussed a potential artifact, associated with a specific classroom. In the other study, teachers in classrooms with more children with disabilities provided higher-quality literacy instruction. Teachers in these classrooms may benefit from additional supports from early childhood intervention and early childhood special education professionals and, therefore, may have additional resources to individualize their literacy instruction practices, thus increasing observed quality (e.g., Coombs-Richardson & Mead, 2001). These teachers can also have more experience working with children with disabilities and, consequently, have greater knowledge in the application of such practices (e.g., Küçüker, Acarlar, & Kapci, 2006). More research about the association between classroom quality and classroom ability composition is clearly needed.

Lastly, we address the lack of significant associations between classroom gender composition and process quality. The three studies examined used distinct quality observation measures. One of these measures was associated with culturally responsive teaching and might not be the most adequate to investigate the association with classroom gender composition. The lack of significant associations in the remaining two studies, that assessed emotional and behavioral support, is of particular interest, since we expected to find lower quality in classrooms with more boys (e.g., Baker, 2006; Hamre & Pianta, 2001). It might have been that confounding effects were at play. Although one of the studies considered a few teacher and classroom level covariates, other indicators frequently associated with quality levels, such as teacher's education, training, or experience (e.g., Phillipsen et al., 1997) were not included. Another possibility is that the variance in the percentage of boys and girls in the samples was not sufficient to produce statistically significant associations.

Even though we proposed classroom composition as a relevant structural feature and a predictor of process quality in ECE classrooms, this association may not always be linear. Investigating the impact of a single or a couple of structural features may be limited and insufficient to capture variations in process quality (Cryer et al., 1999), since variation may result from multiple factors and interactions among them (Slot et al., 2018). Indicators at the classroom and center levels (e.g., financial resources, type of program, center size), as well as more distal structural indicators, at the national and community levels (Cryer et al., 1999) (e.g., subsidies, regulatory mechanisms [Schechter & Bye, 2007], quality monitoring systems [Blau, 2001], community economic well-being [Cryer et al., 1999]) can interact with classroom composition to explain variations in process quality. Nevertheless, this review presents

initial evidence that supports further investigation of which classroom composition indexes in ECE may be associated with quality and under which circumstances.

2.7. Limitations

First, we discuss limitations associated with the review process. This review may have been limited by the search strategy used. Although we defined a multitude of key terms and search strings regarding the most commonly studied classroom composition indexes, we limited this search to the title, abstract, key terms, and topic of studies. Thus, while we did this to ensure both sensitivity and specificity in our approach (Hempel et al., 2016), we might have failed to capture literature that could contribute to a deeper understanding of the association between the composition of the classroom and observed quality. Moreover, the fact that the large majority of studies included in this review were conducted in the USA may be due to a biased search strategy and to our inability to review studies in languages other than English and Portuguese. Our decision to only include studies that assessed classroom quality with standardized observation measures may also have narrowed our scope. However, these measures tend to produce more reliable data, compared to non-standardized measures (Burchinal, 2010; Goldring et al., 2015). Similarly, our pool of studies could have been more substantial if studies with younger children and at the center level were included. Nonetheless, we felt our decisions regarding both issues were justified by practical and substantive reasons. Lastly, this synthesis is fundamentally descriptive, since conducting a meta-analysis did not seem appropriate due to the variability in sample characteristics, classroom composition indexes, study designs, standardized observation measures of classroom quality, covariates and statistics (e.g., Ahn & Kang, 2018).

Regarding limitations associated with the characteristics of the studies included in this review, 20 of the 25 studies were cross-sectional and collected data on only one occasion. Thus, these studies provide a static picture of ECE classrooms (Curby et al., 2011; Kuger et al., 2016) that may not represent accurately the predominant interaction patterns (Sawyer et al., 2016). Also, it is not possible to disentangle the direction of the associations or outline a more comprehensive scope of the challenges teachers face associated with more disadvantaged classroom compositions and with changes in composition (Ansari & Pianta, 2018), in order to determine the aspects and mechanisms associated with stability or change in quality levels over time (Kuger et al., 2016). Furthermore, 23 out of the 25 studies were correlational, therefore, no causal associations can be drawn (Read & Ready, 2013)

In this review, effect sizes appeared to be generally small, as it is common to find in studies conducted in ECE settings (e.g., NICHD ECCRN, 2002; Pianta, La Paro, Payne, Cox, & Bradley, 2002), but may have important practical implications since many disadvantaged children may be experiencing lower-quality ECE, which can have a substantial adverse effect on children's development (see Melhuish et al., 2015). However, any estimates must be interpreted with caution due to potential selection effects (Hill, Rosenman, Tennekoon, & Mandal, 2013). Variability in this review may be restricted (Perlman et al., 2016), since multiple studies relied on data from the same large-scale studies,

mainly conducted in the USA, with samples that seem to overrepresent disadvantaged programs. Although some of the large-scale studies, such as the NCEDL and SWEEP studies, selected programs randomly, more than 20% of the invited programs for the NCEDL did not participate and parental consent was around 60%. This means that the samples from these studies may not be entirely representative (Perlman et al., 2016).

Also, since multiple studies reported zero-order correlations and simple mean comparisons between two groups regarding the association of classroom composition and quality, results are potentially exposed to the influence of confounders. Finally, considering that no single standardized observation measure can cover all relevant aspects of classroom quality (Bassok & Galdo, 2016), most studies were limited by the use of only one standardized observation measure. For example, quality measures such as APEEC, ECCOM, ECERS, or CIS, do not cover instructional support/practices, an essential dimension of teaching, associated with children's social, language, and academic outcomes (e.g., Hamre, Hatfield, Pianta, & Jamil, 2014). Thus, complementing these measures with others that capture teachers' instructional practices (e.g., CLASS) can mitigate limitations inherent to the use of one single measure (Maxwell et al., 2011).

2.8. Implications for practice

the results of the studies examined in this review indicate that in classrooms with higher percentages of children with minority status and low SES, process quality is lower. These results are in line with previous evidence suggesting that there may be a trend for children to be enrolled in classrooms with peers from similar backgrounds (Reid & Kagan, 2015) which becomes problematic when quality gaps become large, as those reported by Valentino (2018). Creating mechanisms that ensure a more balanced sociocultural composition in ECE classrooms can have practical implications when it comes to reduce process quality gaps (de Haan, Elbers, Hoofs, & Leseman, 2013).

Furthermore, teacher allocation processes should consider classroom composition, so that more qualified teachers are assigned to classrooms serving higher percentages of children from minority and low SES backgrounds, in an attempt to raise the quality within particularly challenging groups (Ansari & Pianta, 2018). But more than teacher allocation, it is important to design and implement training and professional development programs for all teachers, that address the main difficulties experienced in their interactions with more challenging groups of children (e.g., Pianta et al., 2009; Valentino, 2018).

In order to improve classroom quality for all children, evaluation and certification processes should adopt a holistic perspective of quality in ECE (Kuger et al., 2016). This involves a focus on the identification of key factors that may be associated with interaction patterns and teaching practices that can benefit all children (Ansari & Pianta, 2018; Maxwell et al., 2010). Beyond the regulation of administrative procedures, quality rating improvement systems should focus on teachers' ability to support the social and academic development of children through their daily interactions in the classroom (Pianta et al., 2008).

2.9. Implications for future research

More research focused primarily on the association between classroom composition and process quality is clearly needed. Additionally, studies regarding the quality of ECE programs are conducted primarily in the USA. Differences in policy, regulatory mechanisms, and investment in ECE across countries (Vermeer, van Ijzendoorn, Cárcamo, & Harrison, 2016), reflect the cultural values about childhood of a given society (e.g., Bertram et al., 2016) and cannot be overlooked. Hence, more research in different cultural contexts, such as the European, could contribute to a deeper understanding of how ECE policies and service models may be associated with differences in quality (Vlasov et al., 2016).

Given the recent emphases on the potential benefits of classroom heterogeneity (see European Commission, 2018; Reid & Ready, 2013), research using diversity indexes to study the association between classroom heterogeneity and quality is warranted. Future research focused, for example, on the skills and practices of highly qualified teachers and teachers who endorse child-centered views, can contribute to the design of more efficient quality improvement programs (Ansari & Pianta, 2018; Purtell & Ansari, 2018).

Studies analyzed principal effects of classroom composition indexes. Future research considering the potential interactions between indexes and other structural features of the classroom context can further our understanding of classroom composition effects. Longitudinal studies examining variations in the association between classroom quality levels and context factors, as a function of fluctuations in quality and/or context, over time, are also warranted (Kuger et al., 2016).

In sum, the evidence gathered in this review supports the proposition that classroom composition may be a key component to consider in the assessment of classroom structural features as well as in the definition of strategies aiming to improve ECE quality (Reid & Ready, 2013). It underpins the need for future research regarding the association between different types of classroom composition and quality in ECE.

CHAPTER 3

Classroom sociocultural composition and early childhood education quality in Portuguese public classrooms³

3.1. Abstract

We investigated the associations between indicators of classroom sociocultural composition and observed process quality. Further, we examined the association between a composite index of sociocultural diversity and classroom quality. Sociocultural indicators considered were migrant background, language, and socioeconomic status (SES). Participants were 42 preschool teachers ($M_{age} = 51.90$, $SD = 6.75$), serving in 42 classrooms from the public education sector in the Metropolitan Area of Lisbon, Portugal. Results indicated that a higher percentage of children with a migrant background, a higher percentage of children who spoke a foreign language at home, and a higher migrant background and language heterogeneity in the classroom were correlated with lower observed process quality. No correlations were found when considering classroom socioeconomic status. In classrooms with a higher sociocultural heterogeneity, measured with a composite index of migrant background, language, and SES status, observed process quality was lower. Classroom composition is an important feature of the microsystem to consider when examining the predictors of observed process quality.

Keywords: early childhood education, observed process quality, classroom composition, composite index of sociocultural diversity

3.2. Introduction

High-quality early childhood education (ECE) may help reduce initial achievement gaps (see Bridges et al., 2004), by assuring that children in social disadvantage experience warm, responsive, and stimulating interactions (e.g., Mashburn et al., 2008; Votruba-Drzal et al., 2004), and engage in relevant and useful learning opportunities (Pianta & Hamre, 2009). Although scarce (for a review, see Aguiar & Aguiar, 2020), there is evidence suggesting that in classrooms with a higher percentage of children experiencing social disadvantage, such as children from migrant families (e.g., Broekhuizen et al., 2017; Kuger et al., 2016; Slot et al., 2018) and children living below the poverty line (e.g., LoCasale-Crouch et al., 2007; Pianta et al., 2005; Sanders & Downer, 2012; Valentino, 2018), observed quality is frequently lower (e.g., Buyse et al., 2008; Reid & Kagan, 2015). Thus, the potential benefits of high-quality ECE (e.g., Bridges et al., 2004; Mashburn et al., 2008; Pianta & Hamre, 2009; Zaslow et al., 2010) may not always reach groups of children most in need (Aguiar & Aguiar, 2020).

³ The study presented in this chapter has been submitted for publication.

Grounded on a bioecological perspective (Bronfenbrenner & Morris, 2006), we focused on observed quality in the ECE classroom microsystem. We propose that the composition of classrooms, in terms of the aggregate sociodemographic characteristics of enrolled children (Cueto et al., 2016; Jones, 2016), may be associated with the quality of children's interactions and experiences in these settings. As the interactions children establish with others in their proximal contexts, namely ECE teachers, are considered particularly relevant to their learning and development (Bronfenbrenner & Morris, 2006), evidence regarding the associations between classroom composition and quality in ECE can contribute to further our understanding regarding issues of equity in educational opportunities and outcomes (see Johnson-Staub, 2017; Kagan, 2009). Specifically, this study examined the associations between classroom sociocultural composition and observed classroom quality, based on indicators of group sociocultural composition (see Dronkers & van der Velden, 2013) such as migrant background, language, and socioeconomic status (SES) (see Aguiar & Aguiar, 2020), as features of the microsystem that warrant consideration when investigating ECE quality.

Classroom composition can be operationalized through different methods including (1) indexes that reflect sameness on a given characteristic, commonly presented in terms of dichotomized percentages, and (2) indexes of heterogeneity/diversity that reflect the extent of differences on a given characteristic among children within a classroom (see Harrison & Sin, 2006; Solanas et al., 2012). Available studies have generally computed the proportion of children who shared a given characteristic, usually examining the distribution of two contrasting groups (e.g., migrant children vs. non-migrant children; children living in poverty vs. children not living in poverty); few have presented calculations of classroom heterogeneity (Aguiar & Aguiar, 2020). Despite beliefs in the potential benefits of classroom heterogeneity (e.g., European Commission, 2018), additional empirical evidence about the associations between classroom sociocultural heterogeneity and quality in ECE is warranted (Aguiar & Aguiar, 2020), namely outside the US.

Classroom composition indexes can help identify the circumstances under which teachers may require additional supports (Aguiar & Aguiar, 2020). This study adds to previous research by examining the associations between indexes of group sociocultural composition, based on indicators of children's migrant background and socioeconomic status, and observed classroom quality in ECE. Furthermore, since sociocultural risk often coexist (e.g., Williams & Deutsh 2016), this study examined the association between classroom heterogeneity as an aggregate of sociocultural indicators and quality in ECE. The calculation of indexes of group sociocultural heterogeneity is a particularly relevant contribution of this study.

3.2.1. Classroom composition and process quality in ECE

Quality in ECE can be conceptualized and assessed in terms of structural and process features (Slot et al., 2018). Structural features include regulable characteristics of classrooms (Slot et al., 2018), associated with group (e.g., class size, teacher-child ratio) and teacher characteristics (e.g., education,

training, experience) (Howes et al., 2008). These features may provide the conditions for process quality (Burchinal, 2018; Cryer et al., 1999; Pianta et al., 2005). Like other group-related characteristics, classroom composition may be considered a structural feature of ECE classrooms, potentially associated with process quality (Aguiar & Aguiar, 2020).

Process quality includes the educational processes (Cryer et al., 1999) and the social interactions children experience in ECE classrooms (Howes et al., 2008), and it is believed to be more directly associated with children's outcomes (e.g., Howes et al., 2000). Process quality is usually assessed through standardized observation measures (Burchinal, 2010), such as the Classroom Assessment Scoring System (CLASS; Pianta et al., 2008). The CLASS is based on the Teaching Through Interactions' framework (TTI; Hamre et al., 2013; Hamre, 2014), which defines emotional support (i.e., teachers' practices aiming to promote children's social and emotional development), classroom organization (i.e., teachers' practices concerning the flow of classroom activities and behavior management), and instructional support (i.e., teachers' strategies to implement the curriculum in a way that promotes the development of relevant academic, cognitive, and linguistic skills) as domains of process quality (Pianta et al., 2008).

Given that the structural features of classrooms can be easier to regulate (Cryer et al., 1999), quality improvement programs may benefit from evidence about how these features associate with process quality (Cryer et al., 1999). Further, somewhat inconsistent findings (e.g., Cryer et al., 1999; Pianta et al., 2005; Slot et al., 2015) warrant further investigation about the strength of the associations between structure features and process quality in ECE (Cadima et al., 2018).

3.2.1.1. Classroom composition indexes

Research in education has computed group composition mainly in terms of dichotomized percentages (e.g., migrant vs non-migrant children) (see Veerman et al., 2013). Comparatively, heterogeneity indexes can capture a wider range of categories within a certain characteristic of the group (e.g., number of countries of origin and distribution of children among them) (see Veerman, 2015). Indexes that indicate sameness on a given characteristic and heterogeneity indexes can be used as complementary indicators of classroom composition, as they are fundamentally distinct, despite the frequent high correlations between them (see Dronkers & van der Velden, 2012).

For example, two classrooms may have a similar proportion of migrant children, but while one classroom may be highly heterogeneous (i.e., with children from multiple nationalities), another may serve migrant children with a common country of origin (i.e., with low heterogeneity). Classroom heterogeneity can be ascertained with specific indexes associated with distinct conceptualizations of group heterogeneity, namely, disparity (i.e., discrepancies in resource concentration); separation (i.e., differences in position/personal values); and variety (i.e., categorical differences) (see Harrison & Klein, 2007). Therefore, the selection of adequate indexes must be based on a clear definition of heterogeneity (see Biemman & Kearney, 2010; Harrison & Klein, 2007).

There are few instances where heterogeneity indexes have been used in educational research (Aguiar & Aguiar, 2020). Two studies with children enrolled in higher levels of education, used adaptations of Simpson's diversity index (Simpson, 1949; Graham, 2004) and the Hirschman-Herfindahl Index (Hirschman, 1964; Dronkers & van der Velden, 2013) to determine school/classroom ethnic/sociocultural compositions. To the best of our knowledge, the only study conducted in ECE (Ansari & Pianta, 2018) adapted Simpson's diversity index to operationalize classroom age composition. In this case, a negative association between higher age heterogeneity and process quality domains consistent with the TTI framework was found. Since mixed-age classrooms are extremely common in ECE, these findings can have relevant practical implications, by informing enrollment policies (Ansari & Pianta, 2018), funding of staff (Kuger et al., 2016), and supports for teachers (Ansari & Pianta, 2018).

Both Simpson's diversity index and Hirschman-Herfindahl Index constitute indicators of variety. Simpson's diversity index, which derives from ethology studies, allows a more comprehensive examination of the sociocultural composition of classrooms, as it considers multiple categories and computes the share of each category (i.e., subgroup of children) within a group (i.e., classroom) (Graham, 2004); for example, the share of migrant children per country of origin (Stolle et al., 2008). The Hirschman-Herfindahl Index does not compute individual shares (Schaeffer, 2013). The Simpson's diversity index has informed the development of a composite index of social diversity (Sullivan, 1973), which can be used to assess variety considering multiple sociocultural and socioeconomic indicators simultaneously.

3.2.1.2. Sociocultural indicators of classroom composition

Children's sociocultural identity can include a multitude of dimensions, including age, gender, ability, migrant background, and SES (United Nations Educational, Scientific and Cultural Organization & International Bureau of Education, 2011). Available studies have focused predominantly on minority status and socioeconomic disadvantage (Aguiar & Aguiar, 2020). This trend is likely associated with the need to create mechanisms to reduce early achievement gaps (Bridges et al., 2004), by helping teachers overcome challenges and respond to a wider range of needs (Ansari & Pianta, 2018) associated with an increasingly diverse child population (Vervaet et al., 2018).

Evidence that particular subgroups of vulnerable children such as those from migrant families (e.g., Broekhuizen et al. 2017; Fram et al., 2012; Slot et al., 2018), those with low proficiency in the majority language (e.g., Kuger et al., 2016; Valentino, 2018), and those with lower SES (usually assessed through family income and/or mother's level of education) (e.g., LoCasale-Crouch et al., 2007; Pianta et al., 2005; Sanders & Downer, 2012) can be at higher risk of experiencing low-quality ECE, cause particular concern (e.g., Aguiar & Aguiar, 2020; Burchinal & Cryer, 2003; Howes et al., 2008). However, there is also evidence that children in social and economic disadvantage can experience medium to high-quality ECE, namely in targeted programs (see Dotterer et al., 2014; Slot et al., 2015), as well as reports of no

associations between classroom composition and ECE quality (e.g., Bihler et al., 2018; Downer et al., 2012; Justice et al., 2008; Phillips et al., 2009). These inconsistent findings may be partially explained by the observation measures used to assess ECE quality (see Aguiar & Aguiar, 2020), by the methods used to compute group sociocultural composition, or by the covariates considered (Perlman et al., 2016). Importantly, these inconsistencies suggest the need for additional research.

3.2.1.3. Children's behavior, teacher characteristics, and process quality in ECE

Classrooms are complex microsystems (Bronfenbrenner & Morris, 2006; McLean & Connor, 2015). Given that structure features at the classroom-level are thought to be more closely associated with process quality (e.g., Slot, 2018), it is important to disentangle how different classroom variables covary with quality (see Cadima et al., 2018). A multidimensional ecological approach, that considers the characteristics of the group, such as sociocultural composition (Pianta et al., 2005) and behavior (e.g., Buyse et al., 2008), and the characteristics of the teacher, such as experience (Pianta et al., 2005) and emotional/psychological well-being (e.g., Hamre et al., 2003; Pianta et al., 2005), can help identify microsystemic variables with potential to influence process quality in ECE (Pianta et al., 2005).

3.2.1.4. Children's behavior

Children experiencing social disadvantage (e.g., Buyse et al., 2008; Fantuzzo et al., 1999), younger children (e.g., Shaw et al., 2005), and boys (e.g., Hamre & Pianta, 2001) are believed to present higher risk for behavior difficulties. Children's externalizing behavior problems, such as aggression and noncompliance (e.g., Turney & McLanahan, 2015; Yamauchi & Leigh, 2011), can be particularly disruptive of the ECE classroom environment (see Liu, 2004), with potential negative associations with process quality (e.g., Buyse et al., 2008). Children with difficulties to self-regulate their behavior according to teachers' expectations (Tucker-Drob & Harden, 2013) tend to be active in the classroom, but frequently their engagement is considered inappropriate (Sjöman et al., 2016). Importantly, children's engagement, defined as the extent to which children spend their time appropriately interacting with others, with materials and/or activities in the classroom (McWilliam & Casey, 2008), has long been proposed as an indicator of quality in ECE (e.g., McWilliam et al., 1998).

3.2.1.5. Teacher experience

Teachers' experience, a potential primary target of regulation policies (Snyder et al., 2004), is believed to be associated with process quality (Brandenburg et al., 2016; Cadima et al., 2018). Despite a tendency to expect higher process quality in classrooms with more experienced teachers (Brandenburg et al., 2016), evidence about the direction of the association in ECE is mixed (see Graham et al., 2020; Slot et al., 2015). For example, Cryer et al. (1999) found a positive association in Portuguese and US settings, but a negative association in Germany. In other studies, there was no association between teaching experience and process quality (e.g., Graham et al., 2020; Pianta et al., 2005; Sthulman & Pianta, 2009).

Further, a recent meta-analysis found little evidence to support teacher experience as a quality indicator (see McMullen et al., 2020). Differences in the categorization of teachers by years of experience, together with differences in the conceptualization and assessment of process quality can contribute to inconsistent findings (Graham et al., 2020).

3.2.1.6. Teacher job-related stress

Over the past two decades, research emphasizing the importance of considering teachers' emotional well-being when assessing the quality of classroom practices (see Sandilos et al., 2018) has increased. Teacher stress, in particular, has caused concern (see Jennings & Greenberg, 2009), with some studies reporting an association with reduced process quality in ECE (e.g., Collmann, 2012; Hamre & Pianta, 2004). Job-related stress is a negative emotional condition that results from a perceived inability to cope with job stressors (e.g., Kyriacou, 2001; Shewark et al., 2018). Teachers can be particularly vulnerable to stress due to hefty professional demands, such as low compensation (Gooze, 2014) and inadequate supports (e.g., Whitebook et al., 2014). Stressors can have multiple sources (Sandilos et al., 2018), such as excessive workload and responsibilities, constraints to professional investment (e.g., lack of opportunities for professional development; limited control regarding job-related decisions) (see Sandilos et al., 2018), and increased difficulties to effectively manage children's behavior problems (e.g., Friedman-Krauss et al., 2004; Raver et al., 2012).

3.2.2. This study

This study was conducted in Portuguese ECE settings from the public sector. In Portugal, ECE is not mandatory but universal access is ensured from the age of 4 (Law No. 65/2015). ECE serves children aged 3 to 6, that is, until their enrollment in compulsory education (Law No. 4/97). Coverage rates vary between 83% for 3-year-olds and 94% for 5-year-olds (Direção-Geral de Estatísticas da Educação e Ciência, 2019). About 52% of children attending ECE were enrolled in public settings in 2018/2019, where attendance is fully supported by the state (Direção-Geral de Estatísticas da Educação e Ciência, 2020). Studies conducted in Portuguese ECE classrooms, based on the TTI framework, reported medium to medium-high process quality in emotional support and classroom organization and low-quality instructional support (e.g., Aguiar et al., 2019; Cadima et al., 2018). Importantly, some findings from studies conducted in Portuguese settings suggest that process quality tends to be higher in the public sector, compared with settings from the private sector (e.g., Gamelas, 2010).

We investigated the associations between classroom sociocultural composition and observed process quality in ECE. Specifically, we considered group-level indicators of (a) children's migrant background, focusing on mothers' nationalities and the language spoken at home; and (b) children's SES, focusing on mothers' level of education and School Financial Assistance (SFA; a proxy for low family income).

Dichotomized percentages of classroom composition were calculated for the indicators of migrant background and socioeconomic status. Classroom heterogeneity was conceptualized based on variety, since variety indexes are better suited to measure the distribution of unit members (i.e., children in each classroom) across qualitatively distinct categories of a given indicator (Harrison & Klein, 2007). Due to its properties and previous use in ECE (Ansari & Pianta, 2018), Simpson's diversity index was selected. A composite index of social diversity, that included all the sociocultural and socioeconomic indicators was also computed. Seemingly, this is the first study to consider the association between an aggregate of various sociocultural characteristics and process quality in ECE.

We expected to find significant associations between all classroom composition indexes and observed process quality, after controlling for other microsystem variables potentially associated with process quality. Evidence from extant research, conducted in European ECE contexts, suggests a negative association between the number of migrant children and children with low proficiency in the majority language in the classroom and ECE quality (e.g., Broekhuizen et al., 2017; Kuger et al., 2016; Slot et al., 2018). Accordingly, we predicted that in classrooms with a higher percentage of children with migrant mothers (H1) and of children who spoke a language other than the majority at home (H2), process quality would be lower. We also predicted lower process quality in classrooms with a higher percentage of children receiving SFA (H3), and with a higher percentage of children with less educated mothers (H4). We based these predictions on evidence that children from socioeconomic disadvantaged backgrounds can be at higher risk for exhibiting behavior difficulties (e.g., Buyse et al., 2008), which can lead teachers to perceive increased job demands (OECD, 2014) and to spend more time in behavior management tasks (La Paro et al., 2002), with potential detrimental effects in the quality of education they provide (see OECD, 2020a). Moreover, we predicted decreased process quality in classrooms with higher heterogeneity regarding mothers' nationalities (H5) and the languages children spoke at home (H6). We based these predictions on extant research about school composition, indicating a negative association between higher heterogeneity of students' nationalities and effective teaching (Dronkers & van der Velden, 2013). Also, we considered that responding to a broader range of needs, including cultural and language barriers (Kuger et al., 2016) would be more demanding for teachers (Ansari & Pianta, 2018). These hypotheses were further supported by considerable evidence that teachers can feel increased difficulties in managing more diverse classrooms (e.g., OECD, 2019a; Trachtenberg et al., 2020). In addition, following the same rationale, we hypothesize a negative association between SFA heterogeneity (H7), heterogeneity regarding mothers' level of education (H8), and the composite index of sociocultural heterogeneity (H9), and process quality.

3.3. Method

3.3.1. Participants

Participants were 42 preschool teachers ($n = 41$ women), responsible for 42 classrooms, from 24 public preschool settings. Between one and five classrooms from each of the 24 settings were included. Preschools were located in the metropolitan area of Lisbon, in urban and semi-urban areas (Conselho Nacional de Educação, 2018). About 24% of classrooms were part of the Educational Territories of Priority Intervention (TEIP) program, which targets socially disadvantaged communities. Participating teachers were aged between 37 and 63 years ($M = 51.90$, $SD = 6.75$). All teachers were Caucasian and spoke Portuguese as their first language. Around 64% had a bachelor's degree and the remaining had a masters' degree in ECE. More than half (55%) had at least one specialization, in areas such as special education ($n = 10$) or school administration and management ($n = 4$).

Participating teachers served groups between 19 and 26 children ($M = 22.76$, $SD = 2.38$). Ninety-three percent of classrooms were mixed-age, reflecting the national trend (Abreu-Lima et al., 2013). Across classrooms, children's age varied between 49 and 69 months ($M = 59.1$, $SD = 4.73$) and the percentage of boys varied between 33% and 69% ($M = 49.57$, $SD = 9.53$). Around 60% of classrooms included at least one child with disabilities.

When examining classroom-level sociodemographic characteristics, a maximum of 33% of migrant children and a maximum of 44% of children with migrant mothers were reported by teachers. A maximum of 32% of children who spoke a language other than Portuguese at home was reported for participating classrooms. Information about mothers' education level was missing for 5% of classrooms. A maximum of 82% of children whose mothers completed 9th grade or a lower level of schooling, and a maximum of 72% of children who received SFA were reported (see Table 1).

Overall, when considering all children across classrooms, around 50% of migrant mothers were from Brazil, 24% were from one of the Portuguese-speaking African countries (PALOP), 18% were from a Central or Eastern European country, and the remaining were from countries in North- and South-America, in South- and Southeast-Asia, and in Africa. Of the total number of children who spoke a foreign language, 23% also spoke Portuguese; this was specifically the case of children who spoke Crioulo. The remaining migrant children only spoke their native languages at home. Russian and other Eastern European languages (31%), English (19%), and French (12%) were the most reported.

3.3.2. Procedure

This study was approved by the Portuguese General Directorate of Education and the Institutional Review Board at ISCTE-IUL. Recruitment and assessments, including teacher questionnaires (see Appendix B) and classroom observations, were conducted between September 2019 and February 2020. To maximize variability, we selected school clusters that included at least one preschool with a percentage of children receiving SFA below 33% or above 66%. However, we did not exclude preschools that fell between these percentages if they belonged to the same school clusters as the target preschools. The response rate was 9% (of 122 school boards contacted, 11 responded). Teachers from

all school clusters agreed to participate. Only classrooms with at least 75% of parental informed consents were included in this study. Five classrooms were excluded for not fulfilling this requirement.

Participating classrooms were observed during one full day. Observations of classroom quality occurred in the mornings and were conducted by two certified CLASS Pre-K observers. Four cycles of observations, lasting around 20 minutes (plus 10 minutes of scoring), were conducted in each classroom. Group engagement was always assessed in the afternoon period. Between 4-9 children ($M = 7$) were randomly selected in each classroom, to be observed. Children with severe disabilities were not included. The goal was to observe as many children as possible, while guaranteeing an even distribution between boys and girls. Three trained observers conducted one 10-minute observation cycle for each selected child, during which their engagement was coded, in intervals of 15 seconds (40 intervals in total).

At the end of the day, a questionnaire was delivered to teachers. In this questionnaire, teachers were asked to report on their age, years of experience, education, and work-related stress. Also, teachers reported on the characteristics of their groups, such as size and age composition. The sociodemographic characteristics of participating children were also gathered through teacher report; this information was later used to compute the classroom composition indexes. Informed consent forms sent to the parents of participating children were explicit regarding the indicators that teachers would be asked to report on. Data regarding teachers' ethnicity and first language were collected through observation by members of the research team.

3.3.3. Measures

3.3.3.1. Classroom sociocultural composition

Teachers were asked to report on the characteristics of every child in the classroom with parental consent. Despite an expected overlap, the distinction between the two indicators of migrant background and between the two indicators of SES is important. First, in this study, many young children with migrant mothers originated from countries with Portuguese as the official language; although children from PALOP often also speak Crioulo at home, they are fluent in the majority language. Further, children whose parents originated from Brazil spoke Portuguese at home but had migrant background. Secondly, some teachers reported that there were children who fulfilled the criteria for SFA, but whose parents did not apply for this support. By considering mothers' level of education, we collected an additional indicator of SES.

We calculated dichotomized percentages of children in the classroom with migrant mothers vs. children with native mothers and the percentage of children who spoke a language other than Portuguese at home (including the children who also spoke Portuguese) vs. children who only spoke the majority language at home, as indicators of classroom migrant background. Dichotomized percentages of children with mothers with a lower level of education vs. children with mothers with a higher level of

education and the percentage of children that received SFA vs. children that did not receive SFA, were computed as indicators of classroom SES. Mothers who completed 9th grade or a lower level of schooling were considered as having lower-education, compared with mothers who finished high-school or had a university degree.

Simpson's diversity index was computed for mothers' nationalities and for languages spoken at home, as indicators of children's migrant background and for mothers' education level and for SFA, as indicators of children's socioeconomic status. The online calculator available at Virtue-s.eu was used for this purpose. All calculations were confirmed in Excel, using Simpson's formula:

$$D_c = 1 - \sum_{i=1}^g p_i^2 \quad (1)$$

For Simpson's diversity index, sociocultural diversity (D) was dependent on the proportion of children in the classroom who fit each category of a given indicator (g). These proportions (p), regarding each classroom (i), were then squared, summed, and subtracted from one (Ansari & Pianta, 2018). The value of the index increases as richness (i.e., the number of categories observed), evenness (i.e., distribution of children among categories), or both increase (Nagendra, 2002). The index varies between 0 (no heterogeneity) and 1 (absolute heterogeneity). Values below 0.40 indicate low heterogeneity, between 0.41 and 0.80 indicate moderate to moderately high heterogeneity, and values above .80 indicate high heterogeneity (see Guajardo, 2013).

The composite index of sociocultural diversity was calculated in Excel, using the formula:

$$A_w = 1 - \sum_{k=1}^p \left[\frac{(Y_k)^2}{V} \right] \quad (2)$$

In this case, sociocultural heterogeneity was indicated by the number of observed categories (p) within all considered sociocultural dimensions (V) and the proportion of children included in each observed category of each dimension (Y_k) (Sullivan, 1973). Composite index values are interpreted as those of Simpson's diversity index. For each classroom, the number of categories computed regarding mothers' nationalities and the language children spoke at home was equal to the number of all nationalities and languages observed. In the case of mothers' education level, there were five possible categories: 4th grade or lower, 6th grade, 9th grade, high-school, university degree. Lastly, SFA was limited to three possible categories: level A (i.e., the lower level of family income); level B (financial benefits slightly lower than in level A); non-beneficiary.

3.3.3.2. Observed classroom process quality

Classroom process quality was assessed with the CLASS, Pre-K version (Pianta et al., 2008). The CLASS includes 10 dimensions, commonly organized within the domains of emotional support (comprising the dimensions of positive climate, negative climate reversed, teacher sensitivity, and regard for student perspectives), classroom organization (comprising the dimensions of behavior management, productivity, and instructional learning formats), and instructional support (comprising

the dimensions of concept development, quality of feedback, and language modeling). Quality is assessed based on a 7-point scale, considering three levels: low quality (scores of 1-2), medium quality (scores of 3-5), and high quality (scores of 6-7) (Pianta et al., 2008).

A confirmatory factorial analysis (CFA) was conducted in AMOS 25, using a robust maximum likelihood estimation. A good model fit is attained if: the ratio of the chi-square statistic to the degrees of freedom (χ^2/df) is < 2 (Arbuckle, 2017); the comparative fit index (CFI) is $> .90$; both the standardized root mean square residual (SRMR) and the root mean square error of approximation (RMSEA) are $< .08$ (e.g., Hu & Bentler, 1999). The original structure of the CLASS with three factors did not fit the data well. Previous studies have reported similar results (e.g., Pakarinen et al., 2010; von Suchodoletz et al., 2014). A two-factor structure previously proposed (Hamre et al., 2013), with emotional support and classroom organization aggregated as a single domain of social support and the original instructional support domain was then tested. The fit of this model was also inadequate.

A good fit was attained when testing a single factor structure of effective teaching ($\alpha = .82$) (Hamre et al., 2013), based on modification indices and with error terms between several dimensions allowed to correlate (Hu & Bentler, 1999): $\chi^2(32) = 25.668$, $p = 0.32$; $\chi^2/df = 1.116$; CFI = 0.99; SRMR = 0.04; RMSEA = 0.05. In previous studies, correlated residuals were also allowed to assure a good fit (e.g., Pakarinen et al., 2010; Leyva et al., 2015). The scores for the 10 dimensions that comprise the CLASS were, therefore, averaged across observation cycles to compute a single composite score for process quality. A single composite score for process quality based on the CLASS was previously used in Portuguese ECE settings (see Ferreira et al., 2019).

Reliability checks were conducted in about 20% of classrooms and an Intraclass Correlation Coefficient (ICC; two-way mixed-effects model, single measures, consistency) of .74 was obtained. Mean percent interrater agreement within-1 point was 95.4%.

3.3.3.3. Covariates

3.3.3.3.1 Child engagement

The Portuguese version (Almeida & Grande, 2013) of the Child Engagement Record – Revised (ICER-R) (Kishida & Kemp, 2008) was used to assess the observed engagement of individual children in classroom activities. We focused on active non-engagement behaviors, that is, in inappropriate child interactions with the classroom environment (e.g., crying, quarreling, displaying aggressiveness/destructive behaviors towards others or objects, and breaking rules) (McWilliam & Casey, 2008). During the observation period, observers recorded the frequency with which children demonstrated these behaviors. One way to assess group engagement is through the aggregation of externalizing behavior problems exhibited by individual children (Friedman-Kraus et al., 2004); thus, the percentage of time individual children spent displaying active non-engagement behaviors was aggregated as an indicator of group active non-engagement. Reliability checks were performed in around

20% of classrooms with an ICC (two-way mixed-effects model, single measures, absolute-agreement) of .76. Mean inter-rater agreement was 85.3%.

3.3.3.3.2 Teacher experience

Teachers were asked to report on their total number of years of experience in ECE.

3.3.3.3.3. Teacher job-related stress

To assess the level of teacher stress associated with ECE work, we used a shorter version of the Teacher Stress Inventory (TSI; Fimian & Fastenau, 1990). This 16-item version was previously used (Sandilos et al., 2018) but had not yet been translated and validated for the Portuguese preschool context. Two members of the research team independently translated the scale and discrepancies between the two versions were analyzed and resolved by consensus, with the participation of a third party (Sousa & Rojjanasrirat, 2011). Based on a Likert-type scale, ranging from 1 (not stressful) to 5 (highly stressful), teachers reported the level of stress they experienced in various work-related situations.

We performed a PCA (with varimax rotation) to identify the factorial structure of the scale. A single factor ($\alpha = .89$) was extracted, based on the Kaiser criterion and a parallel analysis. This single factor structure was further supported by a confirmatory factor analysis (CFA), after modification indices were considered and error terms between some of the items were allowed to correlate (Hu & Bentler, 1999): $\chi^2(53) = 54.680, p = .41; \chi^2/df = 1.032; CFI = 0.99; RMSEA = 0.28$. Three items (“There is too much administrative paperwork in my job”, “My class is too big”, “I lack opportunities for professional improvement”) were excluded because of communality values below 0.4 (Osborne et al., 2008) and of factor loadings under 0.5 (Truong & McColl, 2011). The scale included items related with work stressors such as time constraints (e.g., “There is too little time to prepare lessons”), lack of autonomy and control (e.g., “My personal opinions are not sufficiently aired”), and difficulties in disciplining and motivating children (e.g., “I feel frustrated because of discipline problems in my classroom”). A score was calculated as the mean of the 13 items.

3.3.4. Data analyses

Analyses were conducted using SPSS version 25. Firstly, we performed descriptive analysis. Next, to examine the associations between classroom composition indexes and observed process quality, we computed Person coefficients. Finally, we regressed classroom observed process quality on the indexes of dichotomized percentages and of heterogeneity for each of the four sociocultural indicators, and on the composite index of sociocultural diversity (in a total of 9 models), while controlling for group active non-engagement, teacher experience, and teachers’ self-reported job-related stress.

3.4. Results

3.4.1. Descriptive statistics

Descriptive statistics for study variables, at the classroom level, are presented in Table 3.1. There was low heterogeneity in the sample for both indicators of classroom migrant background ($M = 0.26$, $SD = 0.15$ for mothers' nationalities; $M = 0.06$, $SD = 0.08$ for languages spoken at home) and for classroom SFA ($M = 0.39$, $SD = 0.24$), and moderate heterogeneity for mothers' education level ($M = 0.60$, $SD = 0.13$). Classroom sociocultural heterogeneity measured with the composite index was low ($M = 0.40$, $SD = 0.07$). Mean classroom quality was on the medium range ($M = 3.91$, $SD = 0.45$). Teachers had, on average, more than two and a half decades of experience ($M = 27$, $SD = 7.8$). The mean percentage of time children spent displaying active non-engagement in classroom activities was low ($M = 7.9$, $SD = 6.84$). On average, teachers reported moderated levels of stress ($M = 2.6$, $SD = 0.84$).

Table 3.1. Descriptives for classroom-level characteristics ($N=42$).

	Min	Max	<i>M</i>	<i>SD</i>
Percentage of children with migrant mothers	0	44.4	15.1	10.1
Percentage of children who spoke a foreign language at home	0	32.2	3.2	5.6
Percentage of mothers with lower education level	0	88.2	27.84	21.7
Percentage of children with SFA	0	72	31.1	22.72
Simpson's diversity index of mothers' nationalities	0	0.57	0.26	0.15
Simpson's diversity index of languages spoken at home	0	0.43	0.06	0.08
Simpson's diversity index of SFA	0	0.66	0.39	0.24
Simpson's diversity index of mothers' level of education	0.30	0.80	0.60	0.13
Composite index of sociocultural diversity	0.27	0.54	0.40	0.07
Group active non-engagement	0	32.25	7.9	6.84
Observed process quality	2.95	4.90	3.91	0.45
Teachers' years of experience	10	42	27	7.8
Teachers' self-reported work-related stress	1.31	4.23	2.6	0.84

Note. SFA = School Financial Assistance; Percentage of mothers with lower education = percentage of mothers with 9th grade or lower.

3.4.2. Correlations

Pearson's correlation coefficients are presented in Table 3.2. Dichotomized percentages and heterogeneity indexes regarding migrant background and SES indicators were strongly correlated with each other. Correlations among indexes were generally significant.

Both a higher percentage of children with a migrant background and a higher heterogeneity regarding migrant background were negatively correlated with observed process quality. A similar significant correlation was found when considering the composite index of sociocultural heterogeneity. Reported effects ranged from small to large. Contrarily to expectations, there was no correlation between indexes based on SES indicators and process quality. Classroom SFA heterogeneity and the percentage of children with less educated mothers were positively correlated with group active non-engagement. Teachers' experience was positively correlated with classroom quality.

3.4.3. Multiple regressions

For each of the four indicators of the sociocultural composition of classrooms we modeled the dichotomized percentages and the heterogeneity indexes, separately, while including the same covariates⁴ in all models (i.e., teachers' experience, teachers' self-reported stress, and group active non-engagement), to predict observed process quality. Models with dichotomized percentages and with heterogeneity indexes for the same sociocultural indicator are presented in the same tables, to facilitate the understanding of differences between the two types of composition indexes (see Tables 3.3, 3.4, 3.5, and 3.6).

First, we modeled the percentage of children with migrant mothers and Simpson's diversity index of mothers' nationalities and covariates to predict observed process quality (see Table 3.3). Both models were significant and explained about 18% and 20% of the variance in observed process quality, $F(4, 37) = 3.173, p = .024, R^2_{\text{Adjusted}} = .175$ and $F(4, 37) = 3.605, p = .014, R^2_{\text{Adjusted}} = .203$, respectively. Like we hypothesized, the percentage of children with migrant mothers (H1; $t = -2.236, p = .031$) and Simpson's diversity index of mothers' nationalities (H5; $t = -2.542, p = .015$) were both negatively and significantly associated with observed process quality, even when controlling for other microsystemic variables. Therefore, our hypotheses 1 and 5 were confirmed.

Secondly, we modeled the percentage of children who spoke a foreign language at home and Simpson's diversity index of languages children spoke at home and covariates to predict observed process quality (see Table 3.4). Again, both models were significant, with the first explaining about 17% of the variance in observed process quality and the latter explaining around 15% of variance, $F(4, 37) = 3.027, p = .030, R^2_{\text{Adjusted}} = .165$ and $F(4, 37) = 2.863, p = .037, R^2_{\text{Adjusted}} = .154$, respectively. As predicted, the percentage of children who spoke a foreign language at home was negatively and

⁴ Models considering TEIP vs non-TEIP schools as a covariate were also tested. Results were not significantly altered.

significantly associated with observed process quality (H2; $t = -2.123, p = .041$), while controlling for other microsystemic variables, thus confirming our hypothesis 2. On the other hand, contrary to our predictions, the association between Simpson's diversity index of languages children spoke at home and observed process quality was not significant (H6; $t = -1.988, p = .054$), meaning that hypothesis 6 was not confirmed.

Thirdly, we modeled the percentage of children with SFA and Simpson's diversity index of SFA and covariates to predict observed process quality (see Table 3.5). Neither one of the models were significant, $F(4, 37) = 2.376, p = .070, R^2_{\text{Adjusted}} = .118$ and $F(4, 37) = 2.414, p = .066, R^2_{\text{Adjusted}} = .121$, respectively. Moreover, contrarily to our predictions, the percentage of children with SFA (H3; $t = -1.519, p = .137$) and Simpson's diversity index of SFA ($t = -1.560, p = .127$) were not significantly associated with observed process quality, when controlling for other microsystemic variables. Thus, hypotheses 3 and 7 were not confirmed. On the other hand, teacher experience was positively and significantly associated with process quality ($t = 2.310, p = .027$ and $t = 2.251, p = .030$, respectively).

Further, we modeled the percentage of mothers with lower education level and Simpson's diversity index of mothers' education level and covariates to predict observed process quality (see Table 3.6). Like in the case of SFA, the models were not significant, $F(4, 37) = 2.575, p = .055, R^2_{\text{Adjusted}} = .139$ and $F(4, 37) = 2.118, p = .099, R^2_{\text{Adjusted}} = .103$, respectively. Also, our predictions that the percentage of mothers with lower education level ($t = -1.356, p = .184$) and Simpson's diversity index of mothers' education level ($t = -0.596, p = .555$) would be significantly associated with observed process quality, even when controlling for other microsystemic variables, were not confirmed. Conversely, teacher experience was, again, positively and significantly associated with process quality ($t = 2.114, p = .042$ and $t = 2.209, p = .034$, respectively). This, our hypothesis 4 and 8 were not confirmed.

Lastly, we modeled the composite index of sociocultural heterogeneity and covariates to predict observed process quality (see Table 3.7). The model was significant and explained around 21% of the variance in process quality, $F(4, 37) = 3.619, p = .014, R^2_{\text{Adjusted}} = .212$. As expected, sociocultural heterogeneity was significantly associated with observed process quality ($t = -2.289, p = .028$), even when controlling for other microsystemic variables. The negative association indicates that in classrooms with higher heterogeneity, process quality tends to be lower, confirming hypothesis 9. Teacher experience was also significantly associated with process quality ($t = 2.051, p = .048$), with increased experience associated with higher observed process quality.

Table 3.2. Pearson's Correlation Coefficients.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Percentage of children with migrant mothers												
2. Simpson diversity index of mothers' nationalities	.93**											
3. Percentage of children who spoke a foreign language at home	.32*	.27										
4. Simpson diversity index of languages children spoke at home	.39*	.32*	.98**									
5. Percentage of mothers with lower education level	.41**	.38*	.44**	.40*								
6. Simpson diversity index of mothers' education level	.31	.30	.27	.29	.63**							
7. Percentage of children with SFA	.28	.23	.15	.17	.54**	.40*						
8. Simpson diversity index of SFA	.30	.22	.17	.19	.41**	.35*	.94**					
9. Composite index of sociocultural diversity	.46**	.37*	.34*	.35*	.34*	.26	.63**	.72**				
10. Group active non-engagement	.04	.01	.16	.12	.32*	.26	.27	.33*	.23			
11. Teachers' years of experience	-.23	-.19	-.09	-.08	-.06	.19	.12	.07	-.08	-.13		
12. Teachers self-reported stress	-.13	-.16	.02	.01	.00	.04	-.04	-.06	-.06	.16	-.24	
13. Observed process quality	-.36*	-.38*	-.34*	-.32*	-.25	-.06	-.19	-.21	-.37*	-.14	.36*	-.22

Note. SFA = School Financial Assistance. Percentage of mothers with lower education = 9th grade or a lower level. $N = 42$ for all variables, except for mother's education level, $N = 40$.
 * $p < .05$, ** $p < .01$.

Table 3.3. Models Predicting Classroom Observed Process Quality with the Percentage of Children with Migrant Mothers and Simpson's Diversity Index of Mothers' Nationalities ($N = 42$).

Variable	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Percentage of children with migrant mothers	-.015	.007	-.332*			
Simpson's diversity index of mothers' nationalities				-1.128	.444	-.370*
Group active non-engagement	-.004	.009	-.061	-.005	.009	-.069
Teachers' years of experience	.013	.009	.231	.013	.009	.229
Teachers' self-reported stress	-.105	.080	-.198	-.113	.079	-.213
R^2		.26			.28	
R^2 adjusted		.18			.20	
F		3.173*			3.605*	

* $p < .05$.

Table 3.4. Models Predicting Classroom Observed Process Quality with the Percentage of Children who Spoke a Foreign Language at Home and Simpson's Diversity Index of Languages Children Spoke at Home ($N = 42$).

Variable	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Percentage of children who spoke a foreign language at home	-.025	.012	-.308*			
Simpson's diversity index of languages children spoke at home				-1.525	.767	-.288
Group active non-engagement	-.002	.010	-.025	-.003	.010	-.039
Teachers' years of experience	.017	.008	.296	.017	.009	.299
Teachers' self-reported stress	-.074	.079	-.140	-.075	.079	-.141
R^2	.25			.24		
R^2 adjusted	.17			.15		
F	3.027*			2.863*		

* $p < .05$.

Table 3.5. Models Predicting Classroom Observed Process Quality with the Percentage of Children with SFA and Simpson's Diversity Index of SFA ($N = 42$).

Variable	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Percentage of children with SFA	-.005	.003	-.235			
Simpson's diversity index of SFA				-.460	.295	-.245
Group active non-engagement	-.000	.010	-.001	.001	.010	.015
Teachers' years of experience	.020	.009	.355*	.020	.009	.343*
Teachers' self-reported stress	-.077	.081	-.144	-.082	.081	-.154
R^2		.21			.21	
R^2 adjusted		.12			.12	
F		2.376			2.414	

Note. SFA = School Financial Assistance. * $p < .05$.

Table 3.6. Models Predicting Classroom Observed Process Quality with the Percentage of Mothers with Lower Education Level and Simpson's Diversity Index of Mothers' Education Level ($N = 40$).

Variable	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Percentage of mothers with lower education level	-.004	.003	-.213			
Simpson's diversity index of mothers' education level				-.326	.547	-.096
Group active non-engagement	-.004	.011	-.066	-.007	.011	-.108
Teachers' years of experience	.019	.009	.330*	.021	.009	.362*
Teachers' self-reported stress	-.072	.085	-.134	-.062	.087	-.114
R^2	.23			.20		
R^2 adjusted	.14			.10		
F	2.575			2.118		

* $p < .05$.

Table 3.7. Model Predicting Classroom Observed Process Quality with the Composite Index of Sociocultural Diversity ($N = 40$).

Variable	B	$SE B$	β
Composite index of sociocultural diversity	-2.050	.896	-.337*
Group active non-engagement	-.004	.010	-.053
Teachers' years of experience	.018	.009	.307*
Teachers' self-reported stress	-.089	.082	-.163
R^2		.29	
$R^2_{adjusted}$.21	
F		3.619*	

Note. Two of the forty-two participating classrooms were not included in the model due to missing information regarding mothers' level of education.

* $p < .05$.

3.5. Discussion

This study investigated the associations between classroom sociocultural composition indexes and observed process quality. Overall, findings support the value of considering classroom composition as a relevant structural feature of ECE classrooms, potentially associated with process quality. Furthermore, findings provide evidence that heterogeneity indexes focusing on individual sociocultural indicators or on aggregates of classroom diversity, may be useful to identify classrooms/teachers that require additional resources and supports to ensure high-quality process quality.

The association between the composite index of sociocultural diversity and observed process quality, when controlling for other variables of the microsystem related with group and teachers' characteristics, is particularly relevant. Classroom heterogeneity offers powerful learning opportunities (OECD, 2015) and constitutes a resource for promoting social inclusion and belongingness (Aguiar et al., 2020). In Portugal, these potential benefits are recognized in legislation recommending classroom heterogeneity across all school levels (Normative Dispatch No. 10-A/2018). Therefore, the confirmation of our hypothesis regarding a negative association between the classroom sociocultural diversity and observed process quality (H9) warrants careful discussion. This finding suggests that teachers in sociocultural heterogeneous classrooms may not be receiving adequate supports (e.g., Raver et al., 2009) and/or specific training (e.g., Bellour et al., 2017) to help them address inequalities (European Commission/EACEA/Eurydice, 2020) and face the increased challenges associated with a broader array of child abilities and learning needs (e.g., Reid et al., 2015). Indeed, ECE teachers' competences for working with heterogeneous groups and specific training to mitigate inequalities were considered key areas for improvement in Portugal and other OECD countries (see European Commission/EACEA/Eurydice, 2020).

When looking at the individual indicators of group composition, we found mixed evidence. In line with previous findings (see Aguiar & Aguiar, 2020), the results confirmed our hypotheses that a higher percentage of children with a migrant background and a higher percentage of children who spoke a language other than Portuguese at home would be negatively associated with process quality (H1 and H2, respectively), even when controlling for other variables at the classroom level. Likewise, we confirmed our hypotheses that observed process quality would be lower in classrooms with higher heterogeneity in terms of mothers' nationalities, measured with Simpson's diversity index (H5). Together, these results seem to indicate that ECE teachers may struggle (see Raver et al., 2008; Raver et al., 2009) and/or need additional supports, resources (e.g., Bellour et al., 2017), and materials (e.g., Aguiar et al., 2020) to help them overcome communication/language barriers (Kuger et al., 2016), implement relevant curriculum (Howard, 2003), and/or adapt instructional practices and activities to meet the needs of all children in more diverse settings or in settings with a higher concentration of children with migrant background (Howard, 2003; Kuger et al., 2016). Furthermore, the non-significant association between a wider variety of languages children spoke at home and observed process quality,

which contradicted our prediction of a negative association (H6), may indicate that serving a higher number of children who speak a language other than Portuguese is more challenging for teachers than serving children who speak a wider variety of languages. Nonetheless, more research is needed to further our knowledge regarding this issue (Choi et al., 2021).

Contrarily to our hypotheses (H3, H4, H7, and H8), a higher percentage of children with lower SES (H3 and H4) and a higher diversity regarding children SES in the classroom (H7 and H8) were not associated with observed process quality. Thus, this study adds to the inconsistent findings regarding the associations between group level socioeconomic disadvantage and ECE process quality (see Magnuson et al., 2004). Importantly, teachers in Portuguese public preschools may be better equipped (i.e., well trained and supported) to respond to the needs of children in socioeconomic disadvantage (see Raver et al., 2008; Raver et al., 2009) than children with migrant backgrounds. Consistent with extant literature indicating that, due to contextual stressors (Raver et al., 2008), children in socioeconomic disadvantage can be at higher risk of developing behavior problems (Buyse et al., 2008), we found that in classrooms with a higher percentage of children with less educated mothers, children tended to display more externalizing behavior problems, measured as active non-engagement. However, contrarily to what we expected, group-level active non-engagement was not associated with lower observed process quality. It may be that participating teachers were generally effective in managing classroom behavior (e.g., Raver et al., 2008; Webster-Stratton & Taylor, 2001). Another possible explanation for the non-significant associations between classroom composition indexes based on SES and classroom process quality may be linked with the overall low levels of observed active non-engagement in this sample. More research is clearly needed to disentangle the direction of associations between each index of classroom socioeconomic composition and process quality in ECE and to uncover potential underlying mechanisms associated with inconsistencies found in available literature.

Another important finding was that in classrooms with more experienced teachers, observed process quality was higher, even when controlling for other group and teachers' characteristics. Despite inconsistent evidence (e.g., Early et al., 2007; McMullen et al., 2020; Pianta et al., 2005), this study provides further support for the role of teacher experience as an indicator of ECE structural features (Tout et al., 2010). More experienced teachers in this sample may have acquired more efficient strategies to manage the classroom environment in a way that is supportive and responsive to the needs of children, compared with less experienced teachers (e.g., Brown et al., 2008).

Finally, no association was found between teachers' self-reported job-related stress and observed process quality. Self-reported job-related stress levels were in the medium range. Therefore, teachers' coping abilities (Kyriacou, 2001) may have been reflected in sufficient emotional resources to manage classroom challenges and demands, without costs to the quality of teaching (Sandilos et al., 2018). Other variables (e.g., additional supports and professional development; Jennings & Greenberg, 2009), not accounted for here, could have contributed to teachers' abilities to cope with job stressors (Sandilos et al., 2018). Also, given that stress is a multidimensional concept, there may be specific stressors (e.g.,

Chang, 2009), not examined here, more closely associated with observed process quality (see Sandilos et al., 2018).

3.6. Limitations and future directions

A few limitations must be considered in the interpretation of our findings. First, the cross-sectional and correlational nature of this study does not allow causal effects to be established nor does it disentangle the direction of the associations. Secondly, data were collected on just one occasion; thus, our observations do not illustrate key transactional patterns in classrooms (Sawyer et al., 2016). Longitudinal studies can contribute to a more comprehensive examination of how variations in classroom sociocultural composition may be associated with change or lack thereof in process quality and in the conditions to provide higher quality ECE (Ansari & Pianta, 2018).

Furthermore, the size of the sample was relatively small, resulting in decreased statistical power. Given that validity problems may arise from low power (e.g., Button et al., 2013), our sample size prevented analyses considering a wider array of variables believed to be associated with process quality as well as potential interactions among them (Slot et al., 2018). Further, the variables included in this study explained a small proportion of variance in observed process quality. Future investigations with larger samples are needed to test how structural indicators at multiple ecological levels, from the classroom (e.g., teacher experience, education, adult-to-child ratio) and school (e.g., funds, type of program), to the community (e.g., economic wellbeing [Cryer et al., 1999]), and national levels (investments, regulation mechanisms [Schechter & Bye, 2007], and quality monitoring systems [Blau, 2001]) can interact with classroom sociocultural composition to predict ECE process quality. Also, sampling was geographically delimited and restricted to settings from the public education sector. Although the decision to consider public settings aimed to assure higher variation in classroom heterogeneity, our findings may not be generalized to all public settings and cannot be generalized to settings from the private non-profit and private for-profit sectors.

Other noteworthy limitations concern the measures used in this study. For one, we cannot exclude the possibility of error on teachers' reports regarding the sociodemographic characteristics of participating children, which were used to compute classroom composition indexes. Also, the indicator used as a proxy for family income resulted in only three categories to compute classroom heterogeneity and failed to capture some children in socioeconomic disadvantaged but whose families did not apply for SFA. A measure of family income per year, for example, might be useful in future studies. Likewise, considering existing evidence that both child-teacher ethnic match (e.g., Brown, 2009; van den Bergh et al., 2010) and teachers' intercultural competence (see Trachtenberg et al., 2020) can be associated with the experiences of children in the classroom, the interpretation of the results obtained in this study could have benefited from further data regarding teachers' sociocultural characteristics and intercultural competence.

Further, we used a single measure of ECE process quality (Maxwell et al., 2001). While the CLASS is widely used internationally, inconsistent associations between the CLASS and children's developmental outcomes (see Burchinal, 2018; Guerrero-Rosada et al., 2021; Pearlman et al., 2016) should not be overlooked. Following previous studies (Dotterer et al., 2014; Pianta et al., 2005; Reid & Ready, 2013; Valentino, 2018), future investigations could benefit from the use of complementary measures of ECE quality, such as the Early Childhood Rating Scale-Revised (ECERS-R; Harms et al., 1998), a global quality measure, which includes subscales for the assessment of both process and structural quality. The use of a global CLASS score was an additional limitation, justified by the need to improve model fit. However, future studies may examine if classroom sociocultural composition indexes are differently associated with specific domains of ECE process quality (Ansari & Pianta, 2018). Finally, future consideration for thresholds of dichotomized percentages and heterogeneity indexes can inform decision-making processes concerning the organization of ECE classrooms (Aguiar & Aguiar, 2020).

3.7. Implications for practice

Evidence reported in this study indicated that process quality was lower in classrooms with higher sociocultural heterogeneity (i.e., increased variety in mothers' nationalities and languages spoken at home), in classrooms with a higher percentage of children with migrant mothers, and in classrooms with a higher percentage of children who spoke a language other than Portuguese at home. Investing in teachers' competences to work with heterogeneous groups, through initial teacher training and continuous professional development programs (European Commission/EACEA/Eurydice, 2020) that address the adoption of equity pedagogies (e.g., cooperative learning; Banks, 2015) and language supports (Aguiar & Silva, 2018), while promoting sharing of good practices (European Commission/EACEA/Eurydice, 2020), can be key to diminish process quality gaps for children experiencing sociocultural disadvantage (de Haan et al., 2013). Additional measures could target, for example, the identification of supplementary supports needed to provide more effective teaching in classrooms where teachers may struggle (see Early et al., 2006; Raver et al., 2008); as well as suitable incentives to attract more experienced and qualified teachers to settings that serve children at higher risk of experiencing educational inequities (see OECD, 2018), while also ensuring the conditions (e.g., financial and non-financial incentives) to retain them (see European Commission/EACEA/Eurydice, 2020).

In all, our findings are consistent with previous recommendations regarding the need, and the challenge, to provide specialized support and training for teachers, while also retaining the workforce in more heterogeneous settings and in settings with a higher percentage of children in social disadvantage (see European Commission/EACEA/Eurydice, 2020).

3.8. Conclusion

Findings reported in this study highlight the need for further investigating the role of classroom sociocultural composition as structural feature associated with ECE process quality and of doing so based on a clear conceptual distinction between group composition indexes (see Dronkers & van der Velden, 2013). Equity in education has been recognized as one of the core Sustainable Development Goals for 2030 (see UNESCO, 2015), constituting a basis for most of the other goals (OECD, 2018). Inequalities in educational outcomes cannot be eliminated if equal opportunities are not provided to all children (see OECD, 2018). Thus, sustainable investments in ECE must consider inequalities in the quality of ECE experiences of distinct subgroups of children and strive to foster more inclusive settings (Reid et al., 2015).

CHAPTER 4

Challenges associated with group composition: a qualitative study about the perceptions of teachers in Portuguese public preschools⁵

4.1. Abstract

We investigated the perceptions of teachers about challenges and opportunities associated with group features in early childhood education (ECE) settings. Semi-structured interviews were conducted with 18 preschool teachers ($M_{\text{age}} = 51.77$, $SD = 7.74$), serving in Portuguese public ECE settings. Thematic analysis of the data was conducted. According to teachers' accounts, groups with children with disabilities, mixed-age groups and groups with a higher number of younger children, socioeconomic disadvantaged groups, groups with children who speak a language other than the majority, and groups with more boys than girls, can be particularly challenging; larger groups and a lower adult-child ratio can also present increased challenges. Teachers participating in this study noted the impact of teachers' age on their ability to manage more challenging groups. Teachers' accounts further indicated that increased challenges can result from an interaction between microsystemic features. Findings support the relevance of considering multiple structure features and the interactions among them when investigating variations in ECE quality.

Keywords: early childhood education, teachers' perceptions, group features, thematic analysis

4.2. Introduction

The positive and potentially enduring effects of good quality early childhood education (ECE) on children's development, learning, and achievement (e.g., Melhuish et al., 2015; Pianta et al., 2009) are becoming increasingly acknowledged (European Commission/EACEA/Eurydice, 2019). The European Pillar of Social Rights (European Parliament, Council, and Commission, 2017) declared that all children have the right to be enrolled in affordable, good quality ECE. At present, around 95% of 4-year-olds are enrolled in ECE in European Union countries (Eurostat, 2021); therefore, efforts have been in place to improve its quality (e.g., OECD, 2020a).

4.2.1. Structure features and process quality in ECE

Quality in ECE encompasses structure and process features (e.g., Slot et al., 2015; Slot et al., 2018a). Structural features include regulable characteristics of ECE (Slot et al., 2018a), such as the size of the group, adult-child ratio, and teacher education and experience (e.g., Duncan & Magnuson, 2013; Howes et al., 2008). Group composition (i.e., children's characteristics, measured at the group level; Cueto et

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al., 2016; Jones, 2016), can also be an important feature to consider when examining ECE quality (Author, 2020; OECD, 2012; Slot, 2018a). There is evidence suggesting that structure features can contribute to process quality (see Burchinal, 2018; Cryer et al., 1999; OECD, 2019b; Pianta et al., 2005), which refers to children's daily experiences in ECE, including their interactions with teachers and peers (e.g., Duncan & Magnuson, 2013; Howes et al., 2008; Pianta et al., 2005), and is thought to be more closely associated with children's developmental outcomes (e.g., Howes et al., 2008; Vandell et al., 2010).

Teachers are key to high-quality ECE (OECD, 2020a); therefore, investments to improve teachers' working conditions and well-being can produce relevant social and economic returns (OECD, 2020b). Relatedly, understanding how microsystemic features can impact teachers' ability to establish positive interactions with children and provide high-process quality (e.g., Rudasill & Rimm-Kaufman, 2009) can help inform enrollment policies (Ansari & Pianta, 2018) and group organization processes (Author, 2020), contribute to teachers' education and professional development (e.g., Rudasill & Rimm-Kaufman, 2009), and identify teachers' needs for support (e.g., Ansari & Pianta, 2018). In addition, teachers may benefit from an increased awareness about how group features can impact their interactions with children and classroom practices (Rudasill & Rimm-Kaufman, 2009).

4.2.2. Teachers' perceptions about group features in ECE

Both research and policy can benefit from an inside perspective (see Katz, 1998), that is, from analyzing teachers' insights (see Barros & Leal, 2014) about challenges and opportunities associated with group composition. Such insights may help further understand the factors potentially associated with their ability to establish good quality interactions with children (Mashburn et al., 2008; Votruba-Drzal et al., 2004) and to provide them with meaningful instruction (Pianta & Hamre, 2009). Hence, grounded in the bioecological model of human development, we investigated teachers' perceptions about challenges and opportunities associated with group composition. Previous research suggesting that teachers' beliefs and perceptions can be more predictive of positive classroom interactions than other more objective features, such as education and experience, supports this work (see Myers & Pianta, 2008; Stuhlman & Pianta, 2002).

To our knowledge, there is little qualitative research focused on ECE teachers' perceptions about the association between group features and their practices. One study, conducted in northern Europe, analyzed ECE teachers' ideas about the ideal group composition and work conditions to maximize children's learning, and found that teachers preferred a balanced distribution of children in terms of age, gender, language, ethnicity, and social status (Pramling Samuelsson et al., 2015). Teachers perceived more pedagogical and management difficulties in groups with higher age diversity; believed that girls and boys are different in their choices, the way they act and play, and considered an even number of girls and boys as more harmonious; preferred groups with fewer children with a different first language; and considered social and ethnic diversity as enriching for all children (Pramling Samuelsson et al.,

2015). Furthermore, teachers shared a preference for working with smaller groups of children (Pramling Samuelsson et al., 2015).

Similarly, teachers have noted increased challenges associated with larger groups of children (Alvestad et al., 2013). In Nordic studies (e.g., Sheridan et al., 2014; Williams et al., 2018) focusing on teachers' perspectives about group size, teachers shared concerns about children's well-being in larger groups (Alvestad et al., 2013), feeling they often lacked the time to give attention to children individually (Alvestad et al., 2013; Pramling Samuelsson et al., 2015; Sheridan et al., 2014) and to engage in their learning (Alvestad et al., 2013; Sheridan et al., 2014). In turn, teachers perceived more opportunities to interact meaningfully with children in smaller groups (Alvestad et al., 2013; Williams et al., 2018). Importantly, teachers believed that an adequate group size was dependent on other features of the group, such as the presence of children with disabilities, age and gender composition, or the adult-child ratio (Sheridan et al., 2014; Williams et al., 2018).

In a recent study, conducted with teachers serving in Head Start programs in the United States, high child-to-adult ratios were perceived as the biggest barrier to the development of high-quality teacher-child interactions (Rodriguez & McKee, 2021). The typical ratio of two adults per 17-20 children in this program was considered insufficient by participating teachers, who emphasized that a lot of instructional time can be lost in routine tasks and that a third adult in the group could allow teachers more time to interact with children (Rodriguez & McKee, 2021).

Some research has focused on ECE teachers' ideas about specific types of group features. A few studies, conducted in Europe and the United States, investigated teachers' perceptions about the inclusion of children with disabilities and reported that, in general, teachers were favorable towards inclusion and were willing to work with these children (e.g., Leatherman, 2007; Smith & Smith, 2000; Zabeli et al., 2020). Teachers believed that children with disabilities benefit from their daily interactions with children without disabilities peers, but also noted more difficulties in meeting the needs of these children, particularly of those with more severe conditions (see Mitchell & Hegde, 2007). Furthermore, teachers often identified the need for more training and adequate supports to help them implement inclusive practices (e.g., Bryant & Ewing, 2018; Leatherman, 2007; Zabeli et al., 2020).

Other studies investigated the perceptions of ECE teachers about group age composition, identifying both challenges and opportunities. In a study conducted in Europe, teachers conveyed more negative views about teaching in mixed-age groups, as they perceived more difficulties associated with younger children's need for more attention, and in implementing differentiated activities (Ertürk-Kara, 2018). Nonetheless, teachers also identified opportunities of working with mixed-age groups: all children benefit in terms of social development; younger children can engage in more advanced tasks, as they learn from older peers, who serve as role models and aides (Ertürk-Kara, 2018). Another study, conducted in New Zealand, identified positive challenges for teachers, who need to learn to be more flexible and adapt their practice (Beach, 2013).

Teachers views about the cultural and linguistic composition of ECE groups have also been examined. In one small ethnographic study, conducted in Australia, teachers shared overall positive attitudes towards cultural diversity and acknowledged the importance of teaching children about other cultures (Buchori & Dobinson, 2015). However, teachers' accounts suggested that they frequently lacked the knowledge and the adequate supports to manage cultural diversity in the group and to engage children in a way that is culturally sensitive (Buchori & Dobinson, 2015). Another study, conducted in the United States, investigated the challenges ECE teachers, in Head Start programs, perceived in educating dual language learners (DLLs) and found that communication with DLL children and their families was particularly challenging for teachers, who emphasized the need for more supports to work with children who speak a first language other than Spanish (Choi et al., 2021).

4.2.3. This study

The extant research reviewed above has mainly investigated teachers' perceptions about specific features of ECE groups, except for one study, which used a questionnaire with open-ended questions to investigate teachers' ideas about an ideal ECE group (see Pramling Samuelsson et al., 2015). In the present study, we used a similar approach, but adopted a distinct methodology: we interviewed teachers and asked them to share their thoughts about the group characteristics associated with increased challenges to their practice and the inherent opportunities of working with groups that possess such characteristics (e.g., Fylan, 2005), so we could gain greater knowledge about teachers' unique understandings (deMarrais, 2004). By adopting a distinct approach to examining teachers' perceptions from that of extant research, this study may provide a more comprehensive understanding of teachers' perceptions of ECE groups. Nevertheless, we also had a particular analytic interest in teachers' perceptions about specific challenges and opportunities associated with group cultural and linguistic diversity. To support teachers in their work with increasingly diverse groups in ECE (e.g., Raver et al., 2015), it is important to further our understanding about the challenges teachers associate with different types of groups and the opportunities teachers associate with their work with such groups, so that these can be enhanced (see OECD, 2020b).

4.2.3.1. The Portuguese ECE context

This study was conducted in Portugal, where ECE serves children aged between 3 and 6-years-old, and enrollment is guaranteed from the age of 4, but not mandatory (Law No. 65/2015). In 2018/2019, ECE coverage rates varied between 83% and 94% for 3- and 5-year-olds, respectively (Direção-Geral de Estatísticas da Educação e Ciência, 2019), and about 52% of the children attended ECE public settings, which are free-of-charge (Direção-Geral de Estatísticas da Educação e Ciência, 2020). Due to universal access to public ECE settings in Portugal (Law No. 65/2015), groups in these settings tend to be more

diverse, compared with private settings. Hence, a study conducted with teachers serving in the public sector can be particularly relevant.

In Portugal, the maximum group size in ECE can vary between 20 and 25 children (Decree-Law No. 147/97). In case of enrollment of a child with disabilities (in a maximum of two children with disabilities per group), group size must not exceed 20 children (Normative Dispatch No. 10-A/2018). There are, on average, 16 children per ECE teacher in Portugal; comparatively, the average in the European Union is of 14 children per teacher (OECD, 2020a). The number of teaching assistants per group is one (Governmental Order No. 272-A/2017). Group age diversity is recommended, but not mandatory (Normative Dispatch No. 10-A/2018).

To work as an ECE teacher in Portugal, a master's degree in ECE or an equivalent level is required (Decree-Law No. 43/2007). In 2018, 42% of ECE teachers in Portugal were aged over 50 (OECD, 2020a) and only 1% were aged under 30 (OECD, 2020a). In 2019, there were 597 ECE teachers aged 50 and above for each 100 teachers aged below 35 (DGEEC/ME-MCTES/PORDATA, 2020). Other European countries such as Greece, Czech Republic, and Hungary have a similar share of older teachers, but only Italy compares to Portugal in the low share of younger teachers (OECD, 2020a).

4.3. Method

4.3.1. Participants

Eighteen ECE teachers (100% female), serving in 18 classrooms in public ECE settings, located in urban and semi-urban areas within the metropolitan area of Lisbon (Conselho Nacional de Educação, 2018), participated in this study. Teachers' ages ranged between 39 and 62 ($M = 51.77$, $SD = 7.74$). On average, teachers had 26 years of experience ($SD = 9.19$). Most teachers (78%) had a bachelor's degree while the rest held a master's degree in ECE. About 72% of teachers had at least one specialization (special education, $n = 7$, and Portuguese language, $n = 3$, were the most common). Around 28% served socially disadvantaged communities within the scope of the Educational Territories of Priority Intervention program. Group size varied between 19 and 25 children ($M = 23.22$, $SD = 2.17$). All groups were mixed age. Six of the participating teachers served children with an Individualized Education Program, but almost all of them reported having at least one child in need of specialized support. Groups of participating teachers enrolled up to 17% of migrant children ($M = 6.88$, $SD = 5.07$), 30% of children with migrant mothers ($M = 16.77$, $SD = 8.27$), 32% of children who spoke a language other than the majority at home ($M = 4.77$, $SD = 7.49$), and 81% of children from an ethnic minority group ($M = 25.90$, $SD = 15.66$). ECE groups of the participating teachers enrolled up to 72% of children receiving School Financial Assistance ($M = 31.40$, $SD = 25.20$). Information about mothers' level of education was missing for one of the groups, but the remaining enrolled up to 88% of children whose mothers finished 9th grade or a lower level of education ($M = 34.71$, $SD = 22.73$).

4.3.2. Procedure

4.3.2.1. Sampling

This qualitative study was approved by the Portuguese Directorate-General for Education and the Institutional Review Board at ISCTE. The recruitment process began in September 2019 and interviews were conducted between November 2019 and February 2020. To recruit teachers serving diverse populations, school clusters with at least one ECE setting where the percentage of children receiving school financial assistance was below 33% or above 66% were contacted. We did not exclude teachers serving in other ECE settings from the same school cluster. Of the 122 school clusters contacted, 11 showed interest in participating (9%). Joint meetings were held with teachers and/or representatives from these school clusters and all chose to participate in the broader research project. Forty-two teachers were interviewed. We achieved saturation at the 18th interview. The 18 teachers included in this study represented eight of the 11 school clusters that participated in data collection.

4.3.2.2. Data collection

the interview guide (see appendix c) used in this study was piloted before data collection. Interviews were scheduled according with teachers' availability, and conducted after school hours or at lunch time, in the teachers' classroom or in a private room within school facilities, based on teachers' preferences. All interviews that were used in this study were conducted by the first author. Teachers were briefed about the purpose of the study, the topics that would be covered during the conversation, and the expected duration, so they could provide informed consent to participate (Fylan, 2005). Teachers' consent to record audio was also obtained. Confidentiality and anonymity were assured. Teachers were first asked about features of challenging groups and then questioned about inherent opportunities of working with the groups they identified as particularly challenging. Then, all teachers were asked about the challenges and the opportunities specific to their teaching experiences with ethnocultural heterogeneous groups. All audio records were permanently eliminated once the transcripts were completed and verified.

4.3.3. Analysis

Transcripts of the interviews were made by a research assistant and were later verified for accuracy by the first author. Thematic analysis of teachers' interviews was conducted, using NVivo 12. Thematic analysis involves identifying patterns and defining themes within data and the approach taken determines how the coding process evolves (Braun & Clarke, 2006). We used an inductive approach to coding the data, meaning that the data gathered from the interviews was analyzed based on inductive reasoning, repeated examination, and comparison (Chandra & Shang, 2019), with the goal of generating themes (e.g., Thomas, 2006). Themes and sub-themes emerged directly from teachers' accounts

(Fereday & Muir-Cochrane, 2006; Guest et al., 2012). Data was analyzed at the semantic level, that is, coding was based on explicit accounts of teachers (Braun & Clark, 2006).

The analytic process began with a review of the entire data set, which led to the identification of an extensive array of initial codes with potential research interest (Braun & Clarke, 2006). Some of these were sorted into higher order codes, while other miscellaneous codes were kept separately, so all potentially relevant data was retained (Kwong et al., 2018). Next, codes were sorted into themes and sub-themes, with some remaining in a miscellaneous section (Braun & Clarke, 2006). From here on, the analysis was continuously refined through an iterative review process (Kwong et al., 2018). The validity of the themes was continuously tested to ensure that these reflected the data as truthfully as possible (Braun & Clarke, 2006). Coded extracts were reviewed in detail and relocated or discarded, whenever incoherencies in the evolving coding scheme were noted (Kwong et al., 2018). Some themes and sub-themes were discarded because there was little evidence to support them (Kwong et al., 2018). All data was read-through, further coded and/or re-coded, until saturation was achieved (i.e., until no new evidence emerged), and a final thematic map was defined (Braun & Clarke, 2006). The two authors participated in the coding process and continuously discussed progress, ensuring consensus regarding the retention of themes and sub-themes.

4.4. Results

We examined themes emerging from ECE teachers' accounts of challenging groups. Features of particularly challenging groups and associated opportunities were organized into four themes: group composition, group size, adult-child ratio, beyond the group. For the group composition theme, we describe the opportunities teachers associated with some of the subthemes. Teachers did not associate opportunities with all subthemes of group composition, nor with the remaining three themes. Older teachers believed that their age was a relevant factor in how they perceived the challenges presented by different groups; therefore, this issue was addressed under a specific theme. Figure 4.1 illustrates the identified themes and sub-themes.

4.4.1. Group composition

4.4.1.1. Groups with children with disabilities

for more than half of the participating teachers, the inclusion of children with disabilities can be particularly challenging. First, teachers shared that they often struggle to attend to the needs of children with conditions that require more individualized supports within a large group. For example, one teacher noted: "Children with disabilities, in particular, need more focused attention, and it is not always possible to provide them with that." (45-year-old teacher; group of 20 children). According to teachers' accounts, this task can become even arduous when children have more severe limitations, when more than one child with disabilities is enrolled in the group, or when both of these factors meet, despite the

reduction in group size. One teacher shared the difficulties of her current situation: “Our group is smaller. (...) We have two children with disabilities. One of them has big limitations, so it’s hard, sometimes, to attend to everything.” (47-year-old teacher; group of 20 children). Another teacher recalled a prior experience “I had a blind girl and a boy with a developmental delay (...) we have some training, but when we are faced with a real situation, how do we manage, right?”. Teachers also pointed out that many children enroll in ECE settings without a diagnosis, so it is not uncommon for groups to exceed the maximum number of 20 children defined by law.

Furthermore, for teachers, the inclusion of children with disabilities in regular classroom activities can be demanding, particularly in cases of children that exhibit very limited social and communication skills, children that display behavior difficulties, and children with difficulties concentrating and staying involved in a task. Considering teachers’ accounts, working with children with autism spectrum disorders seems to be particularly demanding. It can be hard for teachers to “reach the child” (60-year-old teacher; group of 24 children) and to “stabilize the child within the group” (53-year-old teacher; group of 25 children) in these conditions. One teacher remembered an experience that made her question “if inclusion is really working” because “sometimes, the child’s behavior was not compatible (...) maybe we shouldn’t have insisted, in that case, it was not very positive (...) for the other children (...) the development of their activities, even their playing, was sometimes compromised.” (41-year-old teacher; group of 24 children).

Notwithstanding, teachers’ also perceived opportunities associated with groups with children with disabilities. According to their reports, one of the main opportunities associated with the work with these groups is the willingness of other children to accept children with disabilities, to help them, and to cooperate in their inclusion. Teachers shared experiences such as, “I didn’t have to say anything, they would help him, calm him down, include him in their activities, on their own initiative” (54-year-old teacher; group of 24 children), “They are very welcoming and very protective (of him), it’s really beautiful to watch.” (60-year-old teacher; group of 24 children).

Teachers also emphasized the opportunity for personal gratification, derived from the work they develop with children with disabilities, as they contribute to and witness their evolution. Teachers’ accounts are illustrative of their “challenging” and “hard”, but “gratifying” journey with children with disabilities: “It was really hard, but was also very enriching, to evaluate the work we all did with him, by the end of the year” (47-year-old teacher; group of 19 children), “(...) he couldn’t do that and now he is doing it (...), and God knows how hard it was to get there (...) that is the biggest reward.” (47-year-old teacher; group of 20 children), “So, these small steps, for me, are gratifying. Compared with the others, these may not be much, but meant a lot for him.” (60-year-old teacher; group of 24 children).

4.4.1.2. Group age composition

Age composition was also considered a potentially challenging feature of groups by more than half of the teachers, who reported challenges in both age homogeneous and in age heterogeneous groups. First,

according to teachers' accounts, serving groups with many 3-year-olds can be particularly demanding, because these children tend to require more care overall. Specifically, teachers noted that younger children often lack autonomy (e.g., many still wear diapers and pacifiers), need greater emotional availability, and may be less able to concentrate and engage in classroom activities (e.g., whole group activities), compared with older children. Thus, teachers' ability to manage the group and avoid disruptions can wane. For example, one teacher mentioned that, "It's harder to get a hold of the group." (60-year-old teacher; group of 24 children).

Some of these teachers also shared concerns about instances of older children imitating the behaviors of younger peers (e.g., throwing tantrums, not following classroom rules) in age heterogeneous groups. One teacher observed that, "Some of the older children do not understand why they are expected to behave differently (...) they won't hesitate to act like the younger ones." (57-year-old teacher; group of 25 children).

Lastly, considering teachers accounts, increased efforts may be needed in age heterogeneous classrooms to respond to a wider range of children's needs. One teacher shared: "For us, it's complicated (...). We need to respond differently to a lot of things, within the same group." (47-year-old teacher; group of 20 children). Thus, implementing differentiation practices and organizing the classroom educational environment were identified by teachers as particularly challenging in these groups.

Despite the challenges teachers associated with age heterogeneity, teachers also identified opportunities associated with this type of group feature. Overall, teachers considered that interactions among children in age heterogeneous groups can be very enriching, more than in age homogeneous groups. Teachers emphasized that younger children tend to learn better and faster with older peers, who serve as models, with one teacher affirming "(...) the younger ones learn faster, because we all learn through models, right?" (61-year-old teacher; group of 25 children). Furthermore, teachers noted that older children are generally very willing to help their younger peers and oftentimes develop a sense of responsibility for them. One teacher mentioned: "It's very advantageous. (...) the older children feel responsible for and help their younger peers." (39-year-old teacher; group of 25 children). According to teachers, age heterogeneity is not only beneficial to the inclusion, learning, and development of all children in the group, but can also be "an asset" (40-year-old-teacher; group of 24 children) for teachers and "facilitate many practices" (62-year-old teacher; group of 24 children).

4.4.1.3. Socioeconomic disadvantaged groups

serving groups with a high number of children from families with low socioeconomic status, which often overlapped with minority status, was also considered particularly challenging by about half of the teachers. Teachers associated contextual risks with lower social, emotional, and behavioral skills, as well as more learning difficulties overall in children from low-socioeconomic families. For example, one teacher mentioned: "This type of group is the most challenging. It's like a diamond in the rough." (45-year-old teacher; group of 25 children). According to teachers, families may not have the means or

the knowledge to adequately support children's learning and to provide them with structure. As one teacher observed, "This context is hard, the neighborhood... there is no stimulation, the parents, it's like a snowball effect, the parents didn't learn, so they are unable to teach their children." (60-year-old teacher; group of 24 children).

For teachers, one of the biggest challenges when serving these groups is the incidence of behavior problems, which leads them to spend a lot of time on behavior management tasks and to be "constantly managing emotions" (45-year-old teacher; group of 20 children). Teachers reported child behavior problems that go from having difficulties sitting down, waiting for their turn, using respectful language, and following classroom rules, to tantrums and aggression. According to teachers' accounts, externalizing behaviors can be particularly distressful for them and for the group. A handful of teachers shared instances of children fighting each other, hitting adults in the classroom, hurting themselves, screaming uncontrollably, throwing and breaking things in the classroom. Teachers described these episodes as "really complicated" (61-year-old teacher; group of 25 children), "disturbing" and "scary for the other children" (45-year-old teacher; group of 24 children), "destabilizing of the group" (45-year-old teacher; group of 20 children), and "hard to manage" (45-year-old teacher; group of 20 children).

Nonetheless, teachers who worked with socioeconomic disadvantaged groups also highlighted the positive impact they had on their personal and professional growth, and generally described their experiences in positive terms, such as, "I grew a lot, as a person and a teacher." (45-year-old teacher; group of 20 children), "It changes our perspective of the world and of life. That is really good." (61-year-old teacher; group of 25 children), "I talk about this with enthusiasm, because I learned so much." (53-year-old teacher; group of 25 children), "Here, I feel that I'm making a difference." (45-year-old teacher; group of 24 children). One of the teachers mentioned that she believed all teachers could benefit from going through such a hard experience, as it "opens up our spirit" (40-year-old teacher; group of 24 children).

4.4.1.4. Groups with children who speak a different language

none of the teachers spontaneously identified cultural and linguistic diversity as a particularly challenging feature of groups. However, when directly asked about the challenges associated with group cultural and linguistic diversity, around half of the teachers considered that the inclusion of children who speak a language other than the majority can be a challenge. One teacher shared "I've experienced a lot of difficulties in understanding them and in making myself understood." (47-year-old teacher; group of 19 children). Teachers' reports indicated that such difficulties depend on the children's first language, that is, serving children who speak more familiar languages, such as Spanish or English, was not considered challenging by teachers. Furthermore, teachers identified the cases of children who only speak their first language at home as more challenging, compared with children whose parents already speak Portuguese, independently of their first language. Two separate accounts from teachers illustrate

this idea: “If the parents only speak their native language, it’s hard, sometimes, for the children to learn Portuguese quicker.” (60-year-old teacher; group of 24 children); “They were from India. (...). But it wasn’t difficult in that case, because the mother already spoke Portuguese.” (47-year-old teacher; group of 19 children).

When asked about the opportunities of working with culturally and linguistically diverse groups, teachers were unanimous in identifying the possibility of learning, from experience, about other cultures, as the biggest opportunity, for both the children and themselves. For example, teachers reported that, “Those experiences are very enriching, for the group, for the child (who is sharing her culture), and for myself.” (61-year-old teacher; group of 25 children), “There is a lot to work with nationalities (...) it’s fun work (...) with the ethnicities, the cultures.” (45-year-old teacher; group of 25 children), “(...) they learn from each other.” (45-year-old teacher; group of 24 children). Teachers frequently used the word “enriching” to describe their work with these groups and emphasized the importance of cultural sharing for everyone in the group.

4.4.1.5. Groups with more boys than girls

three teachers considered that a group with more boys than girls can be more challenging. As one teacher put it, “can make things more difficult” (61-year-old teacher; group of 25 children). Another teacher shared her experience with a particular group: “There were mostly boys, which complicated things. There were a lot of boys, and they were very aggressive.” (45-year-old-teacher; group of 20 children). According to teachers, “girls are calmer” and “boys are more agitated” (59-year-old teacher; group of 25 children). So, in their view, ideally, the gender composition of the groups should be as balanced as possible.

4.4.1.6. Changes in group composition

there were also a few teachers who considered that changes in group composition entail increased challenges, particularly in the first semester, because, in their words, “the pattern of relationships changes” (57-year-old teacher; group of 25 children) as new children are enrolled in the group and “have to adapt” (62-year-old; group of 20 children), while the children who were part of the group before “were already used to a particular rhythm (...) and the new ones are not used to that rhythm” (47-year-old teacher; group of 20 children).

4.4.2. Group size

for close to half of the teachers, the number of children in the group can constitute a challenge. For part of these teachers, having a large group can be more challenging than children’s characteristics per se. As one teacher mentioned: “If the groups were smaller, independently of other characteristics, it would work better.” (57-year-old teacher; group of 25 children). Group size in Portuguese ECE settings can reach up to 25 children, but using the words of two teachers, “It’s just too many children” (57-year-old

teacher; group of 25 children), “We can’t be everywhere.” (59-year-old teacher; group of 25 children). For other teachers, increased demands arise from an interaction between the size of the group and other group features, such as the enrollment of children with disabilities, the presence of younger children, and the adult-child ratio. Two of the teachers emphasized that the enrollment of children with disabilities should further reduce the size of the group from the stipulated 20 children.

4.4.3. Adult-child ratio

Teachers reported a frequent lack of “human resources” as a challenge to their work, that is, for them, the number of adults in the group is oftentimes insufficient. Teachers emphasized that in the cases of big groups in general, groups that include children with disabilities, and groups with younger children, more adults are needed. Usually, teachers can rely on the help of one teaching assistant, but reported that it is not uncommon for them to be alone in the classroom for some periods of the day, which only increases their difficulties, as illustrated in the accounts of two teachers: “(...) being alone, even for an hour, is very hard (...)” (54-year-old teacher; group of 20 children), “I had to work alone many times, I think that a teaching assistant is sorely needed.” (45-year-old teacher; group of 20 children).

4.4.4. Beyond the group: teachers’ age

Teachers were asked about group features they viewed as particularly challenging, but for older teachers, it was important to share that their age was associated with increased difficulties and that “there are very tough days” (60-year-old teacher; group of 24 children), when it comes to dealing with more challenging groups. One teacher said with humor that, “I get home in a kind of chock. More than I did 20 years ago, right? (...) retirement would be nice.” (62-year-old teacher; group of 20 children). Another teacher showed big concerns for herself and her elder colleagues, sharing multiple cases in her school of teachers taking sick leave due to exhaustion. She believed that older teachers are in need of “more stability” and of “groups with other characteristics” (e.g., smaller groups), so that they “can use their experience to go further”, but feels “unable to do that, because the necessary conditions are not provided” (57-year-old teacher; group of 25 children).

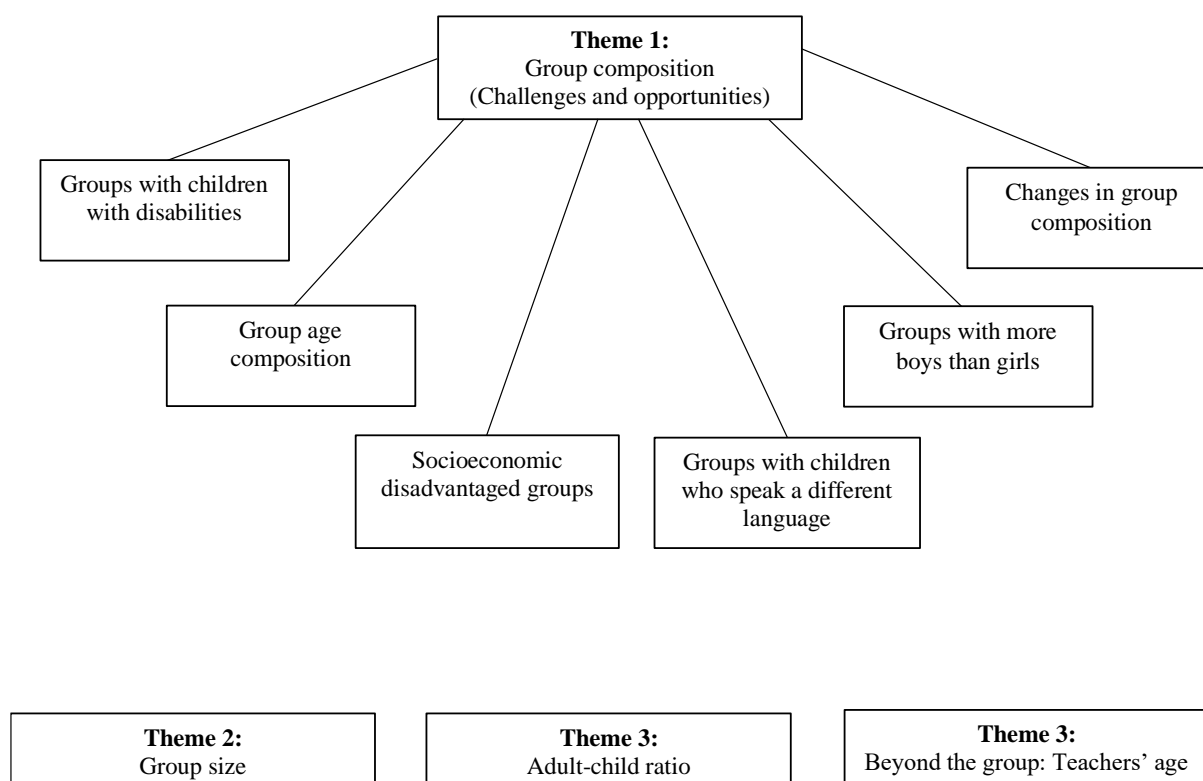


Figure 4.1. Final Thematic Map Showing the Themes Regarding Challenging Features of Group Composition

4.5. Discussion

This study investigated teachers' perceptions about the challenges and opportunities associated with group composition. Aligned with findings from previous investigations, teachers identified increased challenges associated with groups with children with disabilities (e.g., Mitchell & Hedge, 2007), age heterogeneous groups (e.g., Berry, 2004; Ertürk-Kara, 2018; Pramling Samuelsson et al., 2015), groups with a higher number of younger children (e.g., Ertürk-Kara, 2018), groups with children who speak a language other than the majority (see Choi et al., 2021; Pramling Samuelsson et al., 2015), groups with a higher number of boys than girls (see Pramling Samuelsson et al., 2015), and larger groups, in general (e.g., Alvestad et al., 2013; Sheridan et al., 2014; Williams et al., 2018).

Considering existing evidence that the benefits of experiencing high-quality ECE may be particularly relevant for children with disabilities, children with low socioeconomic status, and children with a minority culture and language (see OECD, 2019b), teachers' perceptions regarding increased challenges in groups with children with these characteristics seem particularly important. Also, as mixed-age classrooms are an increasingly common model in ECE settings (Purtell & Ansari, 2018), identifying the challenges teachers may face in these classrooms can have important practical implications. Importantly, teachers also recognized opportunities in their work with groups with children with disabilities, with socioeconomic disadvantaged groups, with groups with children who speak a

foreign language, and with mixed-age groups. Teachers accounts seemed to emphasize the importance of inclusion and the potential benefits of attending ECE for children experiencing situations of social and economic disadvantage. In addition, teachers' accounts indicated that increased challenges may arise from interactions between microsystemic structure features, at the group and teacher-levels which further adds to extant evidence (e.g., Sheridan et al., 2014; Williams et al., 2018).

4.5.1. The importance of inclusion

First, in line with previous findings (Leatherman, 2007; Smith & Smith, 2000; Zabeli et al., 2020), most teachers were favorable to the inclusion of children with disabilities and acknowledged its benefits for the group and for themselves, as professionals. The opportunities identified by teachers seem consistent with findings from quantitative investigations about peer effects indicating an association between contact with children without disabilities and developmental gains for children with disabilities (e.g., Justice et al., 2011; Justice et al., 2014; Mashburn et al., 2009); simultaneously, children without disabilities can become more sensitive, aware and accepting of differences due to their contact with children with disabilities (e.g., Diamond, 2001). Similarly, teachers' perceptions about group cultural and linguistic diversity were, overall, positive. Resonating with previous findings, teachers emphasized the opportunity for cultural sharing in culturally diverse groups (see Buchori & Dobinson, 2015). Perceiving diversity as an asset and opportunity is a right step towards enhancing its benefits for children's learning (OECD, 2019b), and for the promotion of children' social inclusion and sense of belonging (Aguiar & Silva, 2018).

Furthermore, despite perceived challenges, teachers believed that working with mixed-age groups was the most beneficial model for children. Like in previous studies of similar nature, teachers perceived generalized gains resulting from the opportunity for older children to model behavior and help younger peers who, in turn, become more capable of participating in increasingly challenging activities (see Berry, 2004; Ertürk-Kara, 2018). Teachers' perceptions about the benefits of mixed-age groups support findings of positive associations between mixed-age groups and children's social and learning outcomes (e.g., Kowalski et al., 2005).

Lastly, teachers also recognized the importance of ECE for children with lower socioeconomic status, believing they have an important role in these children's lives. Teachers' beliefs are supported by literature suggesting that teachers are primarily responsible for the quality of children's experiences in ECE (see Hattie, 2015) and, consequently, for their educational outcomes (e.g., Snoek et al., 2011). Furthermore, there is evidence that high-quality experiences in the classroom may be particularly beneficial for the development of children living in socioeconomic disadvantage (see Sylva et al., 2011; Watamura et al., 2011; Broekhuizen et al., 2016; Hatfield et al., 2016; Melhuish et al., 2015), by functioning as a protective factor/ buffer for the adverse effects of contextual risks (see Arteaga et al., 2014; Clements et al., 2004). Relatedly, teachers' positive feelings regarding their work experiences with socioeconomic disadvantaged groups can be associated with teachers' motivation to work with

these groups (see Bullough et al., 2012), as teachers seem to be particularly moved by a will to help children succeed (Lin et al., 2012).

4.5.2. A matter of workload: demands vs. resources

Teachers' reports regarding the challenges associated with group composition suggest that perceptions of increased challenges may be largely associated with perceptions of increased workload. Therefore, results from this study can be discussed in light of a work demands and resources perspective (see Bakker & Demerouti, 2007).). When the available resources to manage the perceived demands of the job are systematically considered insufficient by teachers, feelings of stress may exacerbate (e.g., OECD, 2020b) and, if not adequately addressed (see Whitebook et al., 2016), teachers' engagement with teaching may decrease, while the risk of burnout (see, Bakker et al., 2003; Demerouti et al., 2001) and the desire to leave teaching may increase (OECD, 2020b). In many instances, it seems that teachers participating in this study may be perceiving a mismatch between increasing demands associated with group features, and the availability of resources (personal and work-related) to help them manage those demands (Hakanen et al., 2006).

4.5.2.1. Groups with children with disabilities

Teachers found it particularly challenging to adequately support children with disabilities, without overlooking the needs of the other children in the group. Furthermore, congruently with evidence from previous studies, teachers noted that the challenges of serving children with disabilities can be enhanced when the group is larger (see Pramling Samuelsson et al., 2015; Smith & Smith, 2000; Zabeli et al., 2020), when there are multiple children with disabilities in the group (e.g., Smith & Smith, 2000), and when children with disabilities display social difficulties and behavior problems (see Smith & Smith, 2000; Zabeli et al., 2020). Moreover, according to teachers, frequent staff shortages can further compromise their ability to manage groups with children with disabilities (see also Zabeli et al., 2020). Therefore, it seems that an accumulation of less favorable conditions can negatively impact teachers' perceived ability to manage the workload (Bettini et al., 2017; Embich, 2001).

Of note were also remarks revealing that some teachers may feel unprepared to serve children with disabilities. Concerns about the preparedness of teachers to work with children with disabilities have been raised in multiple occasions (e.g., Avramidis & Norwich, 2002; Odom & Bailey, 2001). Successful inclusion requires that teachers receive adequate training to work with children with disabilities (e.g., Rheams & Bain, 2005), including hands-on training opportunities (see Avramidis & Norwich, 2002; Burke & Southerland, 2004). Since in Portugal, it is not mandatory for ECE teachers to have education and training regarding the inclusion of children with disabilities (European Commission/EACEA/Eurydice/Eurostat, 2014), teachers may be in need of opportunities to develop more specific knowledge and competences in this area (Mitchell & Hedge, 2007).

4.5.2.2. Groups with younger children and mixed-age groups

As in the case of groups with children with disabilities, and resonating with previous findings, teachers reported that serving younger children is more demanding, because these children require greater individualized attention (e.g., Ertürk-Kara, 2018). As the number of younger children in the group increases, more supports may be needed; otherwise, teachers' perceptions of workload may increase (see Bettini et al., 2017; Embich, 2001).

Furthermore, we note that participating teachers seemed to hold somewhat traditional or adult-centered beliefs regarding young children's education and discipline (Dowsett et al., 2008), opposed to more progressive or child-centered beliefs (e.g., Driscoll & Pianta, 2010; Justice et al., 2008; Pianta et al., 2005). That is, some accounts seemed to value children's conformity (Shears & Robinson, 2010) to classroom rules and teachers' behavioral expectations, and children's ability to stay focused during learning activities directed by the teachers (e.g., McMullen et al., 2006; Pianta et al., 2005). This finding can be particularly relevant in light of previous evidence suggesting that the quality of interactions may be higher in classrooms of teachers with more child-centered beliefs (see Pianta et al., 2005).

The challenges reported by teachers regarding their work with mixed-age groups are, again, consistent with evidence from previous studies indicating that teachers frequently experience increased difficulties in making the necessary accommodations (see Greenman et al., 2008) and in planning activities for children of different ages and, thus, with a wider range of abilities (e.g., Berry, 2004; Ertürk-Kara, 2018; Manship et al., 2016). Indeed, while with age homogeneous groups teachers may be able to implement practices more suitable for that particular age group, in mixed-age groups teachers may feel somewhat unprepared (see Ertürk-Kara, 2018), if not provided with opportunities to develop the competences needed to make adaptations and implement more flexible practices (see Beach, 2013).

2.5.2.3. Socioeconomic disadvantaged groups

With respect to groups composed mostly of children in socioeconomic disadvantage, the biggest challenge for participating teachers seems to concern the management of emotional and behavioral difficulties, deemed as particularly prevalent in these groups, due to children's exposure to contextual stressors (Raver et al., 2008; Duncan & Magnuson, 2003). Externalizing behavior problems, in particular, can be challenging and lead teachers to spend considerable time on behavior management tasks; consequently, important instructional time may be lost (e.g., La Paro et al., 2002). Given that children experiencing situations of socioeconomic disadvantage can be at higher risk of not achieving their learning and developmental potential, this is particularly concerning (see Schleicher, 2019).

Furthermore, teachers' reports appear to support suggestions that a cumulative effect may arise in groups with a high number of children exhibiting externalizing behavior problems (Buyse et al., 2008), meaning that teachers may feel overwhelmed and limited in their capacity to effectively manage behavior (e.g., Friedman-Krauss et al., 2004; Raver et al., 2015), if the necessary supports to help them do so more effectively are not available (see Raver et al., 2008; Raver et al., 2009). Teachers may also

lack training to build up their capacity to proactively manage group behavior, which could allow them to support children's positive behavior and reduce instances of aggression and disruptive behavior (e.g., Brotman et al., 2005; Webster-Stratton & Taylor, 2001).

2.5.2.4. Groups with children who speak a different language

It is noteworthy that teachers did not spontaneously share perceived challenges of working with groups with children who speak a language other than the majority, they did so only when specifically asked about the perceived challenges associated with group cultural and linguistic diversity. Hence, although teachers may seemingly face some difficulties when working with these groups, it is possible that they perceived them as less demanding or easier to overcome, compared with challenges imposed by other types of group features.

Notwithstanding, according to teachers' accounts, serving groups with children who speak a language other than the majority can present challenges, especially when teachers are not familiar with the children's first language. As teachers' knowledge about children's first language can be associated with their capacity to effectively communicate with them and to use linguistic responsive practices (see Fillmore & Snow, 2000), this finding was not unexpected. Teachers may not always be aware of the resources and practices with potential to support their interactions with children in these situations (see Buyse et al., 2010).

Further, a main concern for teachers seemed to be that children who speak a different language learn Portuguese as quickly as possible, because they believed this contributes to their inclusion. Some of the teachers shared a belief that the process of learning a new language can be optimized when children's parents speak Portuguese at home. These reports were congruent with those of previous investigations indicating that ECE teachers may feel responsible for teaching children a new language, but not for the development of their first language (Lee & Oxelson, 2006). Hence, teachers may endorse children's maximum exposure to the new language (e.g., Lee & Oxelson, 2006; Lian & Fontanéz-Phelan, 2001). However, these findings seem somewhat contradictory to teachers reports emphasizing the opportunities of cultural and linguistic diversity. It may be that teachers lack training regarding effective practices to support language development for children who speak a language other than the majority (Buyse et al., 2010), thus leading to seemingly assimilationist views (see Slot et al., 2018b, Slot et al., 2019).

2.5.2.5. Groups with more boys than girls

Consistent with reports from previous studies, a few teachers noted that they preferred to work with groups with a more balanced gender composition (e.g., Sheridan et al., 2014; Williams et al., 2018). Such preference may result from prevalent beliefs among ECE teachers regarding differences between boys and girls (see Nordberg et al., 2010), despite counteracting evidence that differences in behavior can be found as easily between children of the same sex (e.g., Davies, 2003). Aligned with findings from

previous studies, these teachers believed that boys tend to be more active in the group, to display more dominant behaviors (Maccoby, 1998), including aggressive (DeSouza & Czerniak, 2002; Walker, 2004) and negative behaviors towards peers (Sundell, 2000), and to be more competitive (DeSouza & Czerniak, 2002); while girls tend to be quieter, more cooperative (Maccoby, 1998; Sundell, 2000), and submissive (DeSouza & Czerniak, 2002).

2.5.2.6. Larger groups and lower adult-child ratios

Besides group composition, teachers also perceived group size and adult-child ratio as potentially challenging, more specifically, larger groups and lower adult-child ratios were associated with increased demands, that can potentially compromise their ability to effectively manage teaching responsibilities (Whitebook et al., 2016). Again, these reports aligned with those of previous studies (on group size see Alvestad et al., 2013; Sheridan et al., 2014; Williams et al., 2018; on adult-child ratio see Rodriguez & McKee, 2021). With smaller groups, teachers may be able to spend more time in one-on-one interactions with children (e.g., Hagekull & Hammarberg, 2004) and behavior management can be less demanding (Wasik, 2008).

2.5.2.7. Increased challenges for older teachers

Teachers' considerations about the impact of their own age on their ability to manage more challenging groups warrants reflection. Teaching young children is considered emotionally and physically demanding (Whitebook et al., 2016). Teachers' accounts seem congruent with previous evidence of a negative association between teachers' age and their work ability, that is, their capacity to respond to job demands (see van den Berg et al., 2009), based on an interplay between perceived physical and psychological resources, and job-related resources and demands (see van den Berg et al., 2009). Furthermore, concerns raised by one of the teachers regarding the health status of older teachers should not be overlooked, as these have been the topic of public discussions in Portugal for some time. We note that Portuguese law recognizes the high demands ECE teachers are exposed to and has in place measures to lessen the classroom load on older teachers. Specifically, it allows for a reduction of five contact hours per week for teachers aged 60 and above, as well as dismissal of teaching for a period of one year for teachers who reach 25 and 33 years of service (Decree-Law 41/2012); during that time, teachers are still expected to perform school related activities, such as administrative work, which can also induce stress (see OECD, 2020b).

In all, when examining some teachers' accounts, it was clear that perceptions of increased challenges may often arise from an interplay between groups features. Adding to this, some teachers emphasized that all groups can be potentially challenging, since the composition of each group is unique. As groups change from year to year, even if changes are small, teachers are required to constantly adapt their practices, which, in itself, may be a challenge (Ansari & Pianta, 2018). Therefore, to better comprehend the factors potentially associated with teachers' ability to establish high-quality interactions

with children (Ansari & Pianta, 2018), focusing on a single feature of the classroom may be insufficient (see Cryer et al., 1999; Slot et al., 2018a).

4.6. Limitations and future directions

Findings from this study must be interpreted considering a few limitations. First, findings cannot be transferable to all ECE teachers since only the views of teachers serving in public settings, located in a geographically delimited area, were analyzed. Secondly, we restricted our investigation to teachers' perceptions about challenges and opportunities associated with group composition. Although this decision was made with the purpose of allowing for a more detailed scrutiny of teachers' perspectives about the challenges associated with different group features, further analysis of teachers' reported practices to manage increased challenges and teachers' needs for support, would have contributed to a deeper understanding of the implications group features may have on teachers work and of how they can be better supported. Likewise, since teachers were asked to share their perceptions based on their global professional experiences, gathering more information about teachers' professional paths could have been advantageous.

Additionally, the ecological scope of this study could be broadened by complementing teachers' reports with those of other key stakeholders, such as ECE coordinators and school directors, about how schools are supporting teachers who work with more challenging groups. Lastly, triangulation of data from teachers' interviews with assessments of process quality, can also contribute to a better understanding of how teachers' perceptions and practices in ECE may be connected.

4.7. Implications for practice

Considering that structure features of ECE programs tend to be the main target of regulation mechanisms (NCES, 2003), this study aimed to contribute to the identification of key microsystemic features potentially associated with teachers' ability to provide higher-quality ECE. With the widespread implementation of policies aimed at ensuring the access of all children to ECE settings (see European Commission/EACEA/Eurydice, 2019), teachers are facing new challenges, as they are expected to manage and respond to a wider range of social and learning needs, in increasingly diverse groups (e.g., Author, 2018). Understanding the demands associated with this increased diversity (see Grant et al., 2016) and how these may impact teachers' well-being is crucial to ECE quality (Kwon et al., 2020). Findings from this study seemingly support the importance of considering adjustments in the organization and size of groups in ECE, to prevent the accumulation of less favorable conditions for certain teachers (see OECD, 2020b).

More balanced group compositions, in terms of children's abilities, socioeconomic status, age, and gender, may have practical implications when it comes to ensuring more favorable working conditions for teachers (see OECD, 2020b). Also, considering that teachers' perceptions of increased challenges can result from an interaction between group structure features (see Cryer et al., 1999; Slot

et al., 2018a), it seems fitting that regulation mechanisms regarding group size and adult-child ratios consider the social composition of the group (see Barth et al, 2004; Bennett, 2008; European Commission, 2021). Particularly in the case of groups with children with disabilities, groups with younger children, and groups with children in socioeconomic disadvantage, smaller groups and higher adult-child ratios, may contribute to lessen the load on teachers (see Smith & Smith, 2000). Furthermore, beyond group size reduction, the implementation of screening mechanisms that consider the number of children with disabilities per group, the type, and the severity of children's conditions, may be required (Smith & Smith, 2000).

Since costs associated with the employment of more teaching staff cannot be overlooked (European Commission/EACEA/Eurydice, 2019), teachers who serve larger and more challenging groups can benefit from training on group management and from additional supports (see OECD, 2020b). Providing teachers with education and training on child-centered, inclusive practices (European Commission, 2021), and creating the opportunities for informal learning, for example, through collaboration, discussions (OECD, 2020c), and sharing of good practices, can increase teachers' feelings of competence (European Commission/EACEA/Eurydice, 2020), to work with groups of children with a wider range of abilities and learning needs (e.g., Reid et al., 2015).

Lastly, given the strain and stress associated with teaching (e.g., van Dick & Wagner, 2001; Jeon et al., 2017), policies aimed at improving teachers working conditions and well-being (OECD, 2020b), can be particularly relevant for older teachers, who may require additional and specific supports to more effectively manage job demands associated with particularly challenging groups. Measures such as reducing the contact time older teachers have with children, while simultaneously ensuring that this time is not filled with other stress inducing tasks, such as too much administrative work (see OECD, 2020b); promoting co-teaching experiences, when and if feasible (see Jortveit & Kovač, 2021); allocating older teachers to smaller groups (based on concerns about group size and research on job-related stressors for teachers [see Clipa & Boghean, 2015]), may have some potential in this regard.

4.8. Conclusion

Children's learning and well-being is closely related with the work experiences of teachers (OECD, 2012; Whitebook et al., 2016). Thus, research focused on the identification of microsystemic structure features that ECE teachers perceive as more challenging, can help inform policy makers about how to ensure more favorable working conditions for teachers (see OECD, 2020b) and how to build up their capacity to establish stable (OECD, 2012), responsive, and stimulating (e.g., Mashburn et al., 2008; Votruba-Drzal et al., 2004) interactions with all children. As the benefits of high-quality ECE can be particularly relevant for children with disabilities, children in socioeconomic disadvantage, and children with a different culture and language than the majority (see OECD, 2019b), policies aimed at fostering more inclusive settings (Reid et al., 2015) can help mitigate social disparities (OECD, 2017). In sum, more sustainable investments in ECE may involve strengthening teachers' capacity to work

with children with a wider range of needs (see OECD, 2019b) and in providing them with consistent supports to manage groups perceived as more challenging (see OECD, 2020b).

CHAPTER 5

Conclusion

5.1. Overview of research findings

With this research project, we investigated the associations between classroom composition, in terms of the aggregate of children's individual sociodemographic characteristics, and quality in ECE settings. We aimed (a) to gather and systematize existing evidence about the associations between classroom composition and observed process quality in ECE; (b) to investigate the associations between the sociocultural composition of ECE classrooms and observed process quality and to provide initial evidence regarding the use of heterogeneity indexes to compute classroom sociocultural composition in ECE studies; and (c) to investigate teachers' perceptions regarding the characteristics of groups associated with increased challenges to their practice and about the inherent opportunities of working with groups with such characteristics. In this chapter, we present an overview of the findings from each study and then provide an integrative reflection regarding the implications of findings for research and practice.

We adopted an ecological perspective to investigate the associations between classroom composition and quality in ECE. Accordingly, we proposed that the individual sociodemographic characteristics of children can be associated with the quality of ECE that children experience (Bonfenbrenner & Morris, 2006). The quality of teacher-child interactions in ECE, a core feature of process quality, is thought to be an important mechanism associated with children's educational outcomes (Mashburn & Pianta, 2010; Mashburn et al., 2008; Melhuish et al., 2015). Specifically, a large body of evidence indicates that high-quality ECE has positive effects on children learning and developmental outcomes (e.g., Broekhuizen et al., 2016; Hatfield et al., 2016; Yoshikawa et al., 2013; Zaslow et al., 2010), with some research further highlighting that these positive effects can be long-lasting (Schleicher, 2019). For example, early learning can predict later educational achievement (e.g., McCoy et al., 2017), enhance employment opportunities, promote intergenerational social and economic mobility, and overall well-being (see Sammons et al., 2008; Schleicher, 2019; Sylva et al., 2004). Furthermore, high-quality ECE can compensate for the exposure to risk factors that oftentimes hinders the development and achievement of children experiencing socioeconomic disadvantage (see Duncan & Magnuson, 2013; Heckman, 2006). However, children in social and economic disadvantage often attend classrooms of lower quality (e.g., Waldfogel, 2006). Therefore, ensuring high-quality ECE for all children constitutes an essential condition for educational and social equity (see Britto et al., 2011; Schleicher, 2019).

Following previous recommendations regarding priorities for future research (see Duncan & Magnuson, 2013; Sim et al., 2018), we sought to investigate potential disparities in the quality of ECE experiences of different groups of children and to help identify microsystemic elements that may be

associated with those disparities. Specifically, we investigated if the sociodemographic composition of classrooms in ECE is associated with process quality.

We began this dissertation by presenting the theoretical background for the three studies developed within the scope of this research project. We highlighted the relevance of this work in light of increased scientific and political recognition regarding the benefits of attending high-quality ECE for all children, and its potential to counteract early achievement gaps between disadvantaged and non-disadvantaged groups of children (see Camilli et al., 2010). We also highlighted the international policy agenda prioritizing equity and quality in education (e.g., Council of the European Union, 2019; OECD, 2020a; UNESCO, 2015), and extant research indicating prevailing disparities in the quality of ECE experiences for different groups of children (e.g., Early et al., 2010; Ready & Kagan, 2015).

Next, we presented our first study, a systematic review of the literature about the associations between classroom composition and observed quality in ECE settings. To our knowledge, this was the first work that systematized evidence regarding these associations. In this initial work, we found a small number of empirical peer-reviewed studies on the associations between classroom composition and observed quality in ECE. Moreover, not all studies defined a clear theoretical or conceptual framework and among those that did, there were some different approaches. Therefore, no specific theoretical perspective was supported by findings, nor could findings be fully integrated. Findings highlighted the inconsistent or mixed evidence regarding the associations between structural features and ECE process quality. Two studies (Ansari & Pianta, 2018; Kuger et al., 2016) collected and contrasted data, on both classroom composition and observed quality, in two different occasions; notably, both studies found variations in observed quality associated with variations in classroom composition (for age heterogeneity and the concentration of children in social and economic disadvantage, respectively). Hence, the passage of time can be an important element to consider (Bronfenbrenner & Morris, 2006). Furthermore, this review exposed a particular interest from researchers on the social and economic composition of classrooms: most studies operationalized classroom composition in terms of dichotomized percentages (i.e., children with a certain characteristic vs. children without that characteristic); only one study (Ansari & Pianta, 2018) computed a heterogeneity index, to test the association between classroom age heterogeneity and observed quality in ECE. This means that empirical evidence regarding the association between classroom heterogeneity and observed quality in ECE is practically non-existent.

Subsequently, we presented a quantitative study about the associations between classroom sociocultural composition and observed quality in ECE. The main contribution of this study was that we provided evidence supporting the use of heterogeneity indexes to compute classroom sociocultural composition in ECE, namely a composite index of sociocultural diversity. Furthermore, this study added to extant research, by providing evidence about the association between classroom migrant background heterogeneity and observed process quality in ECE settings, measured with the CLASS. Results indicated that higher heterogeneity regarding mothers' nationality, as an indicators of children's migrant

background, and higher sociocultural diversity, measured with a composite index, were associated with lower observed process quality. Yet, no association was found in the case of classroom heterogeneity regarding the language children spoke at home. Also, in classrooms with a higher percentage of children with a migrant background, that is, of children with migrant mothers and of children who spoke a language other than Portuguese at home, observed process quality was lower. No association was found between dichotomized percentages and heterogeneity regarding socioeconomic status and observed process quality. Therefore, findings provide some support that classroom composition can be an important structural feature to consider in association with process quality and that heterogeneity indexes can help identify classrooms where teachers may face increased challenges, informing decision-making regarding the allocation of supports. On the other hand, more research is warranted to further our knowledge regarding the association between classroom heterogeneity and ECE quality, to unravel the associations between indexes of socioeconomic composition and ECE quality, and to uncover potential interaction effects between ECE structure features.

Lastly, we presented a qualitative study about teachers' perceptions regarding the characteristics of groups associated with increased challenges to their practice and the opportunities of working with groups with such characteristics. Considering that teachers' perceptions can be associated with their interactions with children (e.g., Myers & Pianta, 2008), and that their perceptions (Barros & Leal, 2015) can inform research and policy (see Katz, 1998), we conducted interviews with a subset of the teachers who participated in the quantitative study. We found that, for these professionals, working with groups with children with disabilities, mixed-age groups, and groups with a high number of children experiencing socioeconomic, can be particularly challenging. Overall, teachers found it difficult to respond to the needs of all the children in these groups. On the other hand, teachers also identified opportunities and positive aspects of working with groups with these characteristics. Groups with children with disabilities and mixed-age groups were perceived as providing enriching interactions for all children, while working with socioeconomic disadvantaged groups was considered enriching for teachers themselves, in terms of personal and professional growth. Teachers further identified increased challenges in their work with groups including children who speak a language other than Portuguese. However, teachers only shared these specific challenges when directly asked, and emphasized the learning opportunities associated with cultural and linguistic diversity. Teachers also perceived increased challenges associated with larger groups and lower adult-child ratios. Furthermore, for some of the teachers, challenges can be exacerbated when larger groups and a lower adult-child ratio interact with other particularly challenging group characteristics. In all, teachers' reports suggested that mechanisms that consider the sociodemographic composition of the group, in addition to group size and adult-child ratios, can contribute to teachers' positive perceptions regarding working conditions at the classroom level.

Overall, evidence reported in this dissertation supports the role of group composition as an important structural feature of the classroom microsystem, potentially associated with process quality

in ECE settings (e.g., Read & Ready, 2013; Slot, 2018). Relatedly, our work contributed to extend the evidence base regarding the associations between structure features and process quality in ECE settings, by going beyond a predominant research line focused on the “iron triangle” features (see Slot et al., 2015). Furthermore, we provided evidence regarding the associations between indexes of sociocultural heterogeneity and process quality in ECE settings. The fact that we did not find a significant association between classroom socioeconomic composition and observed process quality in our second study added to inconsistent findings regarding the quality of ECE provided to children experiencing socioeconomic disadvantage (see Magnuson et al., 2004). Also, the little variance in observed process quality explained by the models we computed, in addition to teachers’ reports, in our third study, indicating that increased challenges to their practice can arise from an interplay between different group features, seem to lend support to preceding propositions that structural features may interact to predict process quality (see Slot, 2018).

5.2. Limitations

Despite the important contributions of this research to the literature about the associations between classroom composition and quality in ECE settings, findings from our three studies must be interpreted in light of some limitations.

First, although we investigated the associations between classroom composition and quality in ECE through the lens of the bioecological model, we did not account for the time factor in our work (Bronfenbrenner & Morris, 2006). The authors of this model proposed a framework for its operationalization, based on four components: process, person, context, and time (Bronfenbrenner & Morris, 2006; Rosa & Tudge, 2013; Xia et al., 2020); and stressed that the interdependence between the four components should be considered when conducting research (Rosa & Tudge, 2013). We intended to collect data for our quantitative study at two different points in time – at the beginning of the school year of 2019/2020 and close to the end of the same school year – and planned with teachers accordingly. However, we were unable to collect data a second time, due to the COVID-19 pandemic. Consequently, we did not consider if and how continuity and change (Bronfenbrenner & Morris, 2006) in the composition of classrooms can be associated with variations in process quality and, therefore, our contribution to theory was limited. Also, the correlational data presented in this work prevented us from disentangling the direction of the associations between classroom composition and quality in ECE.

Additionally, the small size of our sample prevented us from considering a wider array of classroom-level features, including group and teacher characteristics (and interactions among them), in our analysis of the associations between classroom sociocultural composition and quality in ECE. Moreover, findings reported in this dissertation must be carefully considered, due to potential confounding effects. Extant research suggests that a vast number of structure variables, at multiple ecological levels, can be associated with process quality in ECE, as well as interactions among them (Slot et al., 2018). Even though our purpose was to investigate microsystemic features potentially

associated with process quality in ECE, this narrower scope prevented us from considering the role of more distal features, at other ecological levels, such as the organizational climate (see Slot, 2018). Additionally, the small size of our sample prevented us from considering a wider array of classroom-level features, including additional group and teacher characteristics, in our analysis of the associations between classroom sociocultural composition and quality in ECE.

Another limitation of this work was that we used a single observation measure to measure process quality (Maxwell et al., 2001). Our choice to use the CLASS was supported by its extensive use to assess the process quality of ECE classrooms (Farran & Nesbitt, 2019). Nonetheless, by using one single measure, we were limited in our understanding of children's experiences in the classroom (see Burchinal, 2018). The calculation of a global score for the CLASS also limited our understanding regarding the associations between classroom sociocultural composition and different domains of process quality (Ansari & Pianta, 2018), and prevented us from directly linking our findings to those of extant research.

The fact that we only considered teachers' perceptions in our work, and not the perceptions of other professionals, such as ECE coordinators and school directors, also limited our ecological scope into the potential underlying mechanisms associated with process quality in ECE. Our investigation was further limited to teachers' perceptions about challenges and opportunities associated with different classroom compositions. Despite our goal to capture, in greater depth, teachers' perceptions of circumstances in which the composition of the group can be associated with increased challenges to their practice, the fact that we did not examine teachers' perceptions regarding the supports needed to help them overcome arising challenges, prevented us from elaborating further recommendations regarding when and how teachers can be better supported.

Finally, we recognize some limitations of our sampling procedures. We conducted our studies in ECE settings, from the public education sector, located in the Metropolitan Area of Lisbon. Our choice to focus on public ECE settings was justified by the need to ensure higher variability in classroom composition; nonetheless, the location and education sector of our sample mean that findings reported in this work cannot be generalized to all public settings nor to private settings.

5.3. Implications for future research

Findings from this research project emphasize the pertinence of considering classroom composition as a relevant structural feature of ECE classrooms, potentially associated with process quality, while simultaneously stressing the need to conduct further research focused on the association between these two variables, to uncover potential underlying mechanisms.

With our second study, we provided evidence of an association between indexes of classroom sociocultural heterogeneity and process quality in ECE settings, which is worthy of careful attention. Further research focused on the association between classroom heterogeneity and quality in ECE can contribute to deepen our understanding about how classroom heterogeneity can be better capitalized.

Current political and public discourses (Reid & Kagan, 2015) recognize heterogeneity in the educational system as a resource to expand learning opportunities (Forghani-Arani et al., 2019; OECD, 2015) and to promote social inclusion (e.g., Aguiar et al., 2020). In Portugal, classroom heterogeneity is endorsed at all school levels (see Normative Dispatch No. 10-A/2018). Simultaneously, teachers are key to ensuring the quality of children's educational experiences (e.g., Hattie, 2015). However, as of now, there is little evidence regarding the quality of teacher practices in heterogeneous classrooms (Forghani-Arani et al., 2019). In addition, future research could consider thresholds of heterogeneity in relation with process quality (Aguiar & Aguiar, 2020).

Furthermore, inconsistent evidence regarding the associations between structure features and process quality in ECE settings suggests that structural features may interact to predict process quality (e.g., Cryer et al., 1999; Slot et al., 2018). Predominantly, extant research that focused on the association between classroom composition and quality in ECE did not consider potential interaction effects between structure features (Aguiar & Aguiar, 2020; Slot, 2018). In our second study, we controlled for a few classroom-level variables, considering both objective and subjective dimensions of the microsystem (Bronfenbrenner & Morris, 2006), but were restricted to one single ecological level and our models explained little variance in process quality. Congruent with an *ecological systems* perspective, future research could consider potential interaction effects between indexes of classroom composition and other structure features, at multiple ecological levels (Bronfenbrenner & Morris, 2006; Niemi, 2021). Specifically, based on our findings and on similar evidence reported in previous studies that teachers' perceptions of increased challenges to their practice can arise from an interaction between group-level features (e.g., e.g., Sheridan et al., 2014; Williams et al., 2018), future studies could investigate the interactions between the sociodemographic composition of classrooms, the size of the group, and adult-child ratio. Also, given that teacher training (pre- and in-service) can be a predictor of ECE quality (e.g., OECD, 2018) and that teachers may feel particularly challenged in sociocultural heterogeneous classrooms (e.g., Trachtenberg et al., 2020), future research could consider the role of teachers' training.

Furthermore, we investigated the associations between the classroom sociocultural composition and observed process quality based on the premise that the ECE environment is shaped by both objective and subjective experiences related to those features (Bronfenbrenner & Morris, 2006). Accordingly, we suggest that future studies also adopt a multidimensional ecological approach (e.g., Pianta et al., 2005) to further investigate the associations between the sociocultural composition of classrooms and quality in ECE. Both research and policy (see Forghani-Arani et al., 2019) have proposed that for teachers to effectively teach in heterogeneous classrooms, a set of competences (European Commission, 2017) that allows them to effectively respond to contextual demands and opportunities (see Council of Europe, 2016) is required. In this sense, teachers' competence is multidimensional, as it encompasses attitudes, values, skills, and knowledge (see Council of Europe, 2016), regarding issues of diversity, multiculturalism, and inclusion (Williamson McDiarmid & Cleverger-Bright, 2008). Therefore, future

research could investigate the role of different dimensions of teachers' diversity-related competence in the associations between classroom sociocultural composition and process quality in ECE settings.

Further, features at the organizational/school level can be associated, even if indirectly, with process quality (Connors, 2016). The organizational climate, which includes the supports provided to teachers and school practices (e.g., Barbieri et al., 2019), has been associated with classroom quality in ECE settings (e.g., Biersteker et al., 2016), as well as with teachers' well-being, self-efficacy beliefs (Gutentag, 2018), and attitudes towards sociocultural heterogeneity (Dubbled et al., 2019), in subsequent education levels. Therefore, the organizational climate may be an important feature to consider (Slot, 2018) in future studies investigating the associations between classroom composition and process quality in ECE settings. It may also be worth considering the potential role of the type of provision in future studies. In this work, we only included settings from the public sector, some of them included in the TEIP program. While we found no association between TEIP vs. non-TEIP ECE classrooms and process quality, our sample was small. In Portugal, the ECE system comprehends settings from the public and private sectors, with some being integrated in the TEIP program (in the case of the public sector) and/or the REEI program (which includes both the public and private sectors). TEIP and REEI schools aim to promote inclusion and the academic success of all children and are provided with additional resources and supports to achieve those goals. Therefore, it is possible that the type of provision/program can interact with classroom (sociocultural) composition to predict process quality.

Given that most studies focused on the associations between classroom composition and quality in ECE settings were conducted in the United States, future research conducted in other countries can help further our understanding about how cultural differences in policies and ECE service models can be associated with variations in ECE quality (see Vlasov et al., 2016).

Although scarce, evidence of variations in process quality, seemingly associated with variations in classroom composition, over time (Ansari & Pianta, 2018; Kuger et al., 2016), aligns with relevant theoretical frameworks that conceive interactional processes as constantly evolving through time (e.g., Bronfenbrenner & Morris, 2006). Accordingly, conducting longitudinal studies in the future, can further our understanding about what and how variations in classroom composition can be associated with change or stability in process quality in ECE (Ansari & Pianta, 2018).

Additionally, considering evidence that teachers' perceptions can be associated with their classroom practices (e.g., Myers & Pianta, 2008), more qualitative research focused on teachers' perceptions about how the composition of the group can relate with their working conditions may also be worthy. Likewise, since working conditions and the organizational climate can be associated with teachers' interactions with children (Viac & Fraser, 2020), future research could investigate teachers' perceptions about resources and supports provided by the school to help them manage increased challenges associated with classroom composition. Future research could be further enriched by the adoption of an ecological approach that complements teachers' reports with those of other key stakeholders, such as ECE coordinators and school directors, regarding school efforts to support

teachers. Moreover, future research could include a macro-level of analysis, by considering existing resources made available or endorsed by Ministries of Education to schools and teachers, with the purpose of promoting quality education, and by investigating teachers' knowledge and perspectives regarding those resources and how school leaders are using them, if there are challenges to their use, and how could potential challenges be overcome. Relatedly, future studies could triangulate data from teachers' reports with measurements of process quality in ECE, to further our understanding about how teachers' perceptions and classroom practices may be connected.

Another issue that may merit future consideration regards the selection of observation measures to assess ECE quality. Inconsistent findings from research regarding the association between the CLASS and children's developmental outcomes (see Burchinal, 2018; Perlman et al., 2016) can expose a need to broaden the scope regarding children's experiences in the classroom, that is, of extending the assessment of ECE quality beyond teacher-child interactions (see Burchinal, 2018). Accordingly, future research could consider the use of complementary measures of classroom quality, as previous studies have done (Dotterer et al., 2014; Pianta et al., 2005; Reid & Ready, 2013; Valentino, 2018). In going further, future research may need to extend existing measures of ECE quality to consider relevant dimensions of children's learning experiences, like curriculum and differentiated instruction, if policy goals to provide high-quality ECE to all children are to be realized (Burchinal, 2018).

5.4. Implications for practice

With this work, we aimed to contribute to an underdeveloped line of research, regarding the associations between classroom composition and observed quality in ECE settings, under the premise that the identification of regulable microsystemic features associated with process quality in ECE could inform quality improvement initiatives. With the expansion of access to ECE settings, particularly in Western countries (see European Commission/EACEA/Eurydice, 2019), teachers are expected to work under continuously changing conditions and to manage increasingly heterogeneous classrooms, in terms of children's abilities and sociodemographic characteristics (OECD, 2018). Evidence from international studies indicates that managing classroom heterogeneity can be particularly challenging for teachers (Santoro & Forghani-Arani, 2015). Simultaneously, working under challenging conditions can negatively impact, among other dimensions, teachers' well-being, motivation, and self-efficacy beliefs (e.g., Desrumaux et al., 2015), and be associated with a lower capacity to provide quality educational experiences to children (see Albuлесcu & Tuşer, 2018; Skaalvik & Skaalvik, 2018).

When considering the implications of our work for practice, we begin by looking at teachers' working conditions in terms of work demands and resources (see Bakker & Demerouti, 2007). Findings from our three studies align with previous considerations that the composition of classrooms can be an important indicator of work demands for teachers (see Viac & Fraser, 2020). Opportunities for training and social support from school personnel can, on the other hand, be relevant work resources for teachers (e.g., Bakker & Bal, 2010). Therefore, it may be important to provide teachers with adequate and

specialized training and professional development opportunities (European Commission/EACEA/Eurydice, 2020), to assist them in their work with children from diverse backgrounds (see Forghani-Arani et al., 2019). Our findings add to previous evidence that teachers may struggle when working with groups with higher cultural and linguistic diversity (e.g., Forghani-Arani et al., 2019; Gay, 2010), and reinforce recent recommendations for the improvement of Portuguese ECE teachers' competences to work in heterogeneous classrooms (see European Commission/EACEA/Eurydice, 2020).

Investments in teacher education can contribute to higher-quality learning environments (e.g., Britto et al., 2011; Early et al., 2007). Further, teacher continued professional development can be particularly relevant in view of current societal changes (Schleicher, 2018). Notably, recent data, presented by the European Commission (2017), revealed shortcomings, across countries, regarding teachers' training to promote the development of key competences to work in more diverse environments. Promoting teachers' competence to work in diverse settings is a complex process (Forghani-Arani et al., 2019); it requires the capacity to adequately respond to the needs of all children (Gutentag, 2018), to recognize diversity as an asset (Forghani-Arani et al., 2019), and to promote an equitable learning environment (Gutentag, 2018).

For pre-service teachers, the inclusion of issues of diversity in the curriculum (European Commission, 2017), with a reflexive component and complementing theory, and with opportunities to practice in heterogeneous classrooms can contribute to increased effectiveness of teaching programs (Forghani-Arani et al., 2019). On the other hand, in-service teachers' competence may benefit from professional development activities that address their knowledge and understanding regarding issues of cultural diversity, their intercultural communication abilities, and the adoption of culturally responsive pedagogies (see April et al., 2018). Also, professional development activities that allow for theory and practice to merge (European Commission, 2017), and that promote the sharing of good practices (European Commission/EACEA/Eurydice, 2020), can be particularly effective (see Forghani-Arani et al., 2019).

Professional development programs developed or endorsed by education authorities can be particularly relevant for teacher practices (OECD, 2016). In Portugal, recent initiatives regarding teachers' professional development, at the level of the Ministry of Education, addressed (a) curriculum development related with issues of citizenship, based on two guiding documents aimed at schools, with the intent to promote the inclusion of an education for citizenship component on the curriculum: the National Strategy of Education for Citizenship, which includes relevant domains such as human rights, interculturality, and sustainable development (Monteiro et al., 2017), and the Referential of Education for Development, which also includes relevant themes such as poverty and inequities, social justice, and global citizenship (Torres et al., 2016); (b) the creation and expansion of communities of practice, the promotion of tutoring and mentoring practices, and the development of a project-based learning methodology, based on a MOOC titled Learning and School Communities; (c) the creation of more

inclusive educational environments, according with the approach established by the Decree-Law 54/2018, also based on a MOOC titled Inclusive Education.

Considering evidence that receiving support from school directors to participate in professional development activities can contribute to better outcomes for teachers who participate (OECD, 2016), and that teacher classroom practices can be associated with a joint vision in the school (Viac & Fraser, 2020), it could be important to understand if and how schools support teachers in participating in these professional development activities and if and how schools are supporting teachers to implement what they learn. Likewise, it could be important to understand if and how other resources, made available by the Portuguese Ministry of Education, have been used by schools and teachers. Having knowledge does not necessarily translate into knowing how to apply that knowledge (Forghani-Arani et al., 2019). Therefore, it could also be important to understand if the resources available adequately respond to the needs of schools and teachers and if there are challenges to their practical use.

Regarding social supports, teachers working with more diverse/challenging groups can benefit, for example, from opportunities to work in partnership with school colleagues (Viac & Fraser, 2020), to participate in learning communities, and collaborative networks (Forghani-Arani et al., 2019). For example, in 2016, a partnership between the Ministry of Education, the High Commissariat for Migrations I.P., and the Aga Khan Foundation resulted in the conception of a network of schools for intercultural education (the so-called REEI program), which includes settings from the public and private education sectors. This network's mission is to promote the inclusion and educational success of all children, based on a transformative process, that encompasses changes in the organization and pedagogical approach of participating schools, aimed at building a shared vision about the benefits of intercultural education and at endorsing sharing of practices and resources (Alto Comissariado para as Migrações, I.P./Direção-Geral da Educação/Fundação Aga Khan Portugal, 2020).

The evidence gathered in the three studies, conducted within the scope of this research project, further supports previous recommendations that, when possible, adjustments in the composition of ECE classrooms may contribute to ensure more favorable working conditions to teachers (OECD, 2020b) and, expectantly, to higher process quality (de Haan et al., 2013; OECD, 2015). Specifically, regulations could consider, in addition to the size of ECE groups and the adult-child ratio, the sociodemographic composition of the group (see Barth et al, 2004; European Commission, 2021). If possible, ensuring a lower number of children and a higher adult-child ratio in classrooms with a potentially challenging sociodemographic composition, as well as ensuring a more balanced distribution of children (de Haan et al., 2013) with a migrant background or who speak a language other than the majority, can contribute to lessen teachers' perceptions of workload (see Smith & Smith, 2000). To better inform policy in this regard, we urge future research to further investigate how different indicators of classroom composition can be associated with teachers' perceptions of increased challenges and how these perceptions can translate into the quality of classroom processes.

Importantly, teachers working with groups with particularly challenging characteristics may benefit from additional supports (e.g., OECD, 2020b; Raver et al., 2008). As an example, co-teaching experiences when/if possible (see Jortveit & Kovač, 2021), can be beneficial for all teachers working with groups with particularly challenging characteristics, and for older professionals in particular, as this measure has the potential to lessen their workload. Considering the aged ECE teacher workforce in Portugal (see DGEEC/ME-MCTES/ORDATA, 2020) and the concerns shared by some of the teachers regarding a perceived increase in the number of cases of teacher absenteeism due to burnout, among older teachers, this and any other type of special measures aimed at improving the working conditions and well-being of these professionals can be particularly relevant (OECD, 2020b).

In face of current migration fluxes and increased social inequities, revisions in policy and practice in ECE seem warranted, as issues of belongingness and social cohesion become more prominent (Vandenbroeck, 2017). In increasingly diverse societies, teachers are expected to foster more inclusive settings, to provide equitable education to all children (Nunes & Madureira, 2015). Portuguese law recognizes diversity as an asset and urges schools (and teachers) to do so too, to adjust educational processes to the characteristics of children, and to grant equitable access to supports to all children, so that they can realize their full learning and developmental potential. Furthermore, it recognizes that inclusion depends on multi-level processes within schools' systems, that encompass changes in culture, organization, and practices (Decree-law No. 54/2018). Within an inclusive educational system, teachers can have an important role in the inclusion of children from diverse backgrounds (e.g., Mlinar & Krammer, 2021), and in the transmission of crucial values such as respect for diversity (Jabeen, 2019; Mlinar & Krammer, 2021). However, findings from our work suggest that serving in diverse classrooms and using diversity as a resource can be a complex and challenging task for teachers (OECD, 2019b), if not met with adequate resources and supports (see European Commission/EACEA/Eurydice, 2020).

5.5. Concluding thoughts

Quality education in early childhood has become a priority of international policy initiatives, supported by frameworks that highlight its importance from a child's rights perspective (e.g., The Convention on the Rights of the Child) (United Nations Committee on the Rights of the Child, 2005), and from a social and economic development perspective (e.g., the Millennium Development Goals; Education for All) (Britto et al., 2011). Independently of individual and family characteristics, all children must be provided with equitable opportunities to access quality education (Britto et al., 2011; UNESCO, 2015). High-quality ECE can have the potential to mitigate achievement gaps (see Camilli et al., 2010) and change the life courses of children experiencing social and economic disadvantage (e.g., Barnett, 2011; Camilli et al., 2010; Dearing et al., 2009; Melhuish et al., 2008; Schleicher, 2019), contributing to increased social and economic mobility (see Sammons et al., 2008; Sylva et al., 2004; Schleicher, 2019). Nonetheless, children experiencing socioeconomic disadvantage tend to get enrolled together (e.g., Reid & Kagan, 2015) and to attend lower-quality ECE, compared to non-disadvantaged children (e.g., Buyse

et al., 2008; Early et al., 2010; Justice et al., 2008; Ready & Kagan, 2015). As the characteristics of the peer group can be associated with children's developmental outcomes, policies aiming to ensure equity in education can greatly benefit from evidence about how the composition of groups in ECE may be associated with process quality (see Schleicher, 2019).

This research project extended previous knowledge regarding the association between the sociodemographic characteristics of ECE classrooms and the quality of children's early educational experiences, with a few important contributions. For one, this work provided the research field with a systematic review of evidence about the associations between classroom composition and quality in ECE. Secondly, we provided initial evidence regarding the potential of using heterogeneity indexes to compute classroom composition, for policies aimed at improving ECE quality, for example, through the allocation of additional resources and supports to schools and teachers. Furthermore, this work contemplated different levels of analysis, namely, teachers' practices and perceptions, and different methodologies, specifically, classroom observations and teachers' self-reports, to study the associations between classroom composition and process quality in ECE.

Overall, this work contributed to further our knowledge regarding a current and pressing topic, still understudied. Findings reported in this dissertation support the pertinence of considering the classroom composition as an important structural feature of the ECE microsystem, potentially associated with process quality, while highlighting the need to further investigate the possible underlying mechanisms of this association.

Early childhood is a critical time for learning, since the social, emotional, and cognitive competencies developed at this stage help set the foundations for life-long attainment and well-being (Schleicher, 2019). High-quality ECE can contribute to children's early learning and positive development, to increased achievement in subsequent school levels (e.g., McCoy et al., 2017; Melhuish et al., 2015), and to overall enhanced life conditions in adulthood (e.g., Sammons et al., 2008; Sylva et al., 2004). High-quality ECE can compensate for the exposure to contextual risk factors that often hinder the development and attainment of children in social and economic disadvantaged (e.g., Camilli et al., 2010; Heckman, 2006). Therefore, evidence that children living in socioeconomic and cultural disadvantage often experience lower-quality ECE (see Aguiar & Aguiar, 2020) causes concern and stresses that there is still a long way to go if the goal of equity in education is to be realized (see Ainscow & Sandill, 2010).

Investments in ECE can help children achieve their developmental potential (see Schleicher, 2019) and contribute to better social and economic outcomes (Heckman, 2011). Evidence suggesting associations between structural features and process quality in ECE can help decision making processes regarding the target of these investments; however, existing evidence is inconsistent and somewhat limited (Schleicher, 2019). Nevertheless, considering that teachers are primarily responsible for providing relevant learning opportunities and guidance to children (Lippard et al., 2018) and, therefore, are determinant to the quality of children's experiences in ECE classrooms (Diamond et al., 2013;

Phillips et al., 2016), teachers' capacities can be the target of sustainable investments (see OECD, 2019b). More than ever before, teachers are expected to foster high-quality education and care environments (Johnson et al., 2021), with potential to promote children's achievement (Stipek, 2006). Concurrently, teachers are being challenged to manage growing sociocultural diversity among the children they serve and to effectively differentiate teaching (e.g., OECD, 2019b; 2020c). To fulfill the high expectations placed upon them, teachers may benefit from targeted and cohesive policies (OECD, 2012), aimed at providing them with quality and specialized training (pre and in-service) (Johnson et al., 2004; OECD, 2018, 2019b), as well as from more supportive working conditions (OECD, 2012).

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APPENDIX

Appendix A

Search terms based on the SPIDER tool (Sample, Phenomenon of Interest, Design, Evaluation, and Research type; Cooke, Smith, & Booth, 2012) entered in EBSCO databases and Scopus. Search conducted in title, abstract, key terms, and/or topic.

Sample	<p>"early education" OR "early childhood education" OR "early childhood education and care" OR ecec OR "child care" OR childcare OR preschool* OR kindergarten* OR "center-based child care" OR "center-based childcare" OR "center-based programs" OR daycare OR "day care" OR preschooler* OR kindergartener* OR "three year*-old*" OR "3 year*-old*" OR "four year*-old*" OR "4 year*-old*" OR "five year*-old*" OR "5 year*-old*" OR "3-to-5-year* old*" OR "age* between three and five" OR "age* between 3 and 5" OR "age* 3" OR "age* 4" OR "age* 5"</p> <p>AND</p> <p>teacher* OR professional* OR adult* OR educator* OR caregiver*</p>
Phenomenon of interest	<p>AND</p> <p>"group composition" OR "group characteristics" OR "group level" OR "classroom level" OR "class level" OR "classroom composition" OR "class composition" OR "classroom characteristics" OR "class characteristics" OR "ethnic* composition" OR "ethnic* group composition" OR "ethnic* classroom composition" OR "ethnic* class composition" OR "group ethnic* composition" OR "classroom ethnic* composition" OR "class ethnic* composition" OR "sociocultural composition" OR "sociocultural group composition" OR "sociocultural classroom composition" OR "sociocultural class composition" OR "group sociocultural composition" OR "classroom sociocultural composition" OR "class sociocultural composition" OR "cultural composition" OR "cultural group composition" OR "cultural classroom composition" OR "cultural class composition" OR "group cultural composition" OR "classroom cultural composition" OR "class cultural composition" OR "racial composition" OR "racial group composition" OR "racial classroom composition" OR "racial class composition" OR "group racial composition" OR "classroom racial composition" OR "class racial composition" OR "socioeconomic status composition" OR "socioeconomic composition" OR "socio-economic status composition" OR "socio-economic composition" OR "SES composition" OR "socioeconomic status group composition" OR "socio-economic status group composition" OR "SES group composition" OR "socio-economic status classroom composition" OR "SES classroom composition" OR "socioeconomic status class composition" OR "socio-economic status class composition" OR "SES class composition" OR "group socioeconomic status composition" OR "group socioeconomic status composition" OR "group socio-economic status composition" OR "group SES composition" OR "classroom socioeconomic status composition" OR "classroom socio-economic status composition" OR "classroom SES composition" OR "class socioeconomic status composition" OR "class socio-economic status composition" OR "class SES composition" OR "socioeconomic status average" OR "socio-economic status average" OR "SES average" OR "heterogeneous group*" OR "heterogeneous classroom*" OR "heterogeneous class*" OR "group heterogeneity" OR "classroom heterogeneity" OR "class heterogeneity" OR "heterogeneity in classroom*" OR "heterogeneity in class*" OR "heterogeneity in group*" OR "homogeneous classroom*" OR "homogeneous class*" OR "classroom homogeneity" OR "class homogeneity" OR "homogeneity in classroom*" OR "homogeneity in class*" OR "homogeneous group*" OR "group homogeneity" OR "homogeneity in group*" OR "group diversity" OR "diversity in group*" OR "diverse group*" OR "diversity within group*" OR "classroom diversity" OR "diversity in classroom*" OR "diverse classroom*" OR "diversity within classroom*" OR "class diversity" OR "diversity in class*" OR "diverse class*" OR "diversity within class*" OR "ethnic* divers*" OR "sociocultural* divers*" OR "cultural* divers*" OR "socioeconomic* divers*" OR "socio-economic* divers*" OR "SES divers*" OR "proportion of minority" OR "percentage of minority" OR "ratio of minority" OR "proportion of ethnic*</p>

minorit*" OR "percentage of ethnic* minorit*" OR "ratio of ethnic* minorit*" OR "proportion of sociocultural minorit*" OR "percentage of sociocultural minorit*" OR "ratio of sociocultural minorit*" OR "proportion of cultural minorit*" OR "percentage of cultural minorit*" OR "ratio of cultural minorit*" OR "proportion of racial minorit*" OR "percentage of racial minorit*" OR "ratio of racial minorit*" OR "proportion of language minority" OR "percentage of language minority" OR "ratio of language minority" OR "proportion of bilingual*" OR "percentage of bilingual*" OR "ratio of bilingual*" OR "proportion of dual language learners" OR "percentage of dual language learners" OR "ratio of dual language learners" OR "proportion of DLL" OR "percentage of DLL" OR "ratio of DLL" OR "proportion of English language" OR "percentage of English language" OR "ratio of English language" OR "proportion of non-native speakers" OR "percentage of non-native speakers" OR "ratio of non-native speakers" OR "proportion of native speakers" OR "percentage of native speakers" OR "ratio of native speakers" OR "proportion of disadvantaged" OR "percentage of disadvantaged" OR "ratio of disadvantaged" OR "proportion of children in disadvantage*" OR "percentage of children in disadvantage*" OR "ratio of children in disadvantage*" OR "proportion of at-risk children" OR "percentage of at-risk children" OR "ratio of at-risk children" OR "proportion of children at-risk" OR "percentage of children at-risk" OR "ratio of children at-risk" OR "proportion of children low-income" OR "percentage of children low-income" OR "ratio of children low-income" OR "proportion of children low income" OR "percentage of children low income" OR "ratio of children low income" OR "proportion of poor children" OR "percentage of poor children" OR "ratio of poor children" OR "proportion of children poverty" OR "percentage of children poverty" OR "ratio of children poverty" OR "proportion of immigrant* children" OR "percentage of immigrant* children" OR "ratio of immigrant* children" OR "proportion of migrant* children" OR "percentage of migrant* children" OR "ratio of migrant* children" OR "proportion of children from immigrant famil*" OR "percentage of children from immigrant famil*" OR "ratio of children from immigrant famil*" OR "proportion of non-white children" OR "percentage of non-white children" OR "ratio of non-white children" OR "proportion of white children" OR "percentage of white children" OR "ratio of white children" OR "herfindal index" OR "composition index*"

AND

"observed relation*" OR "observed interaction*" OR "observed practice*" OR "observation measures" OR "observation* of" OR "class* observation*" OR "process quality" OR "classroom organization" OR "instructional support" OR "emotional support" OR "Assessment Profile for Early Childhood Programs" OR APECP OR "Classroom Assessment of Supports for Emergent Bilingual Acquisition" OR "CASEBA" OR "Child Caregiver Interaction Scale" OR CCIS OR "Arnett Caregiver Interaction Scale" OR CIS OR "Classroom Assessment Scoring System" OR CLASS OR "Classroom Language and Literacy Environment Observation" OR CLEO OR "Caregiver Observation Form and Scale" OR COFAS OR "Classroom Practices Inventory" OR CPI OR "Early Childhood Classroom Observation Measure" OR ECCOM OR "The Early Childhood Environment Rating Scale" OR ECERS* OR "Early Literacy Observation Tool" OR "E-LOT" OR "Observation Measures of Language and Literacy" OR OMLIT OR "The Preschool Classroom Implementation Rating Scale" OR PCI OR "Preschool Mental Health Climate Scale" OR PMHCS OR "Preschool Program Quality Assessment" OR PQA OR "Preschool Rating Instrument for Science and Math" OR PRISM OR "Quality of Early Childhood Care Settings: Caregiver Rating Scale" OR QUEST OR "Ramey and Ramey Observation of Learning Essentials" OR ROLE OR "Teacher Behavior Rating Scale" OR TBRS OR "Teacher Instructional Engagement Scale" OR TIES OR "Teaching Pyramid Observation Tool for Preschool Classrooms" OR TPOT OR "Teaching style rating system" OR TSRS

Evaluation

Appendix B

Teacher questionnaire

POR FAVOR, FALE-NOS DE SI, DO SEU JARDIM DE INFÂNCIA E DO SEU GRUPO

1. Sexo: Feminino Masculino
2. Idade: _____
3. Habilitações académicas (assinale todas as que se aplicam):
 Bacharelato Licenciatura Pós-graduação
 Mestrado Doutoramento Outra: _____
4. Especializações? Sim Não
4.1. Especifique: _____
5. Número de anos de escolaridade completos⁶: _____
6. Número de anos de serviço como educadora de infância⁷: _____
7. Modelo(s) pedagógico(s) ou modelo(s) curricular(es) que procura implementar na sua sala:
Especifique: _____
8. Número total de crianças no seu grupo: _____
9. Tipo de grupo:
 Misto 3 anos 4 anos 5 anos
10. Tipo de instituição em que trabalha:
 Pública Privada sem fins lucrativos Privada com fins lucrativos

⁶ Por exemplo, se completou o 12º ano e concluiu uma licenciatura de 4 anos, tem 16 anos de escolaridade completos.

⁷ Incluindo o presente ano letivo (a mesma regra aplica-se à pergunta n.º 6.1.).

A cortar pela
equipa de
investigação
após
preenchiment
o pela
Educadora.

POR FAVOR, FALE-NOS DAS CRIANÇAS DA SUA SALA (QUE TÊM AUTORIZAÇÃO PARA PARTICIPAR NESTE ESTUDO).

Código individual	Género	Data de nascimento	Nacionalidade ¹	Etnia	É emigrante?	Língua falada	Escalão ação			Escolaridade da mãe ⁴					Tem incapacidade? ⁵
							em casa ²	social escolar		1º ciclo	2º ciclo	3º ciclo	12º ano	Sup.	
Nome							A	B	NA ³						
1	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	<input type="checkbox"/> F <input type="checkbox"/> M	__/__/__			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

¹ Coloque PT se portuguesa; S e outra, especifique por favo

² Coloque PT se português; Se outra, especifique por favor

³ Não aplicável

⁴ **1º ciclo** = 1º ao 4º ano; **2º ciclo** = 5º e 6º ano; **3º ciclo** = 7º ao 9º ano; **Sup.** = Ensino Superior

⁵ Consideram-se apenas as crianças que recebem o 2º ou 3º nível de suporte da educação especial ao abrigo do DL N.º 54/2018 ou serviços de intervenção precoce ao abrigo do DL n.º 281/2009.

POR FAVOR, FALE-NOS DAS CARACTERÍSTICAS DAS CRIANÇAS DA SUA SALA PELA ORDEM EM QUE APARECEM NA LISTAGEM DA PÁGINA ANTERIOR.

Por favor, leia cada um dos itens que se seguem e pense sobre o comportamento de **cada uma das crianças**, durante os dois últimos meses. Decida **com que frequência** cada uma das crianças apresenta o comportamento descrito na *sua* sala, assinalando com um **círculo**.

Código individual	PROBLEMAS DE COMPORTAMENTO																	
	1. Faz birras.			2. É irrequieto(a) ou move-se excessivamente.			3. Discute com outros.			4. Perturba as actividades em curso.			5. É agressivo(a) em relação a pessoas ou objectos.			6. Desobedece a regras ou pedidos.		
	Nunca	Algumas vezes	Muitas vezes	Nunca	Algumas vezes	Muitas vezes	Nunca	Algumas vezes	Muitas vezes	Nunca	Algumas vezes	Muitas vezes	Nunca	Algumas vezes	Muitas vezes	Nunca	Algumas vezes	Muitas vezes
1	0	1	2	0	0	2	0	1	2	0	1	2	0	1	2	0	1	1
2	0	1	2	0	0	2	0	1	2	0	1	2	0	1	2	0	1	1
3	0	1	2	0	0	2	0	1	2	0	1	2	0	1	2	0	1	1
4	0	1	2	0	0	2	0	1	2	0	1	2	0	1	2	0	1	1
5	0	1	2	0	0	2	0	1	2	0	1	2	0	1	2	0	1	1
6	0	1	2	0	0	2	0	1	2	0	1	2	0	1	2	0	1	1
7	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
8	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
9	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
10	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2

11	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
12	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
13	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
14	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
15	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
16	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
17	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
18	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
19	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
20	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
21	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
22	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
23	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
24	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2
25	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2	0	1	2

POR FAVOR, FALE-NOS DAS CARACTERÍSTICAS DAS CRIANÇAS QUE SELECIONAMOS, AO ACASO, NO INÍCIO DESTE ESTUDO, PELA ORDEM COM QUE APARECEM NA LISTAGEM DAS PÁGINAS ANTERIORES.

Por favor, leia cada um dos itens que se seguem e decida em que medida cada uma das seguintes afirmações se aplica à sua relação com cada **CRIANÇA-ALVO**, assinalando com um **círculo** o valor mais apropriado.

Não se aplica nada	Não se aplica	Indecisa	Aplica-se ligeiramente	Aplica-se totalmente
1	2	3	4	5

	CRIANÇA-ALVO A	CRIANÇA-ALVO B	CRIANÇA-ALVO C	CRIANÇA-ALVO D
1. Tenho uma relação afetuosa com a criança.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
2. Eu e esta criança temos alguma dificuldade em nos relacionarmos.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
3. Esta criança procura o meu conforto quando está perturbada.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4. Esta criança sente desconforto com o meu contacto e afeto físico.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5. Esta criança valorize a sua relação comigo.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6. A criança mostra-se orgulhosa quando a elogio.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7. Esta criança partilha comigo, espontaneamente, informação sobre si própria.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8. Esta criança fica facilmente irritada comigo.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9. É fácil estar em sintonia com os sentimentos desta criança.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10. Esta criança permanece irritada ou é resistente depois de ser disciplinada.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

11. Lidar com esta criança suga-me a energia.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12. Quando esta criança está com mau-humor já sei que vamos ter um dia longo e difícil.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13. Os sentimentos desta criança por mim são imprevisíveis e facilmente mutáveis.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14. Esta criança é traiçoeira ou manipulativa para comigo.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
15. Esta criança partilha comigo, livremente, os seus sentimentos e experiências.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

POR FAVOR, INDIQUE O NÍVEL EM QUE ACREDITA SER CAPAZ DE REALIZAR O SEGUINTE GRUPO DE AÇÕES

Por favor, assinale com um **círculo** o nível em que **acredita conseguir ou não a realizar o seguinte grupo de ações**, numa escala que varia entre **nada (1) e muito mesmo (9)**. Não existem respostas corretas ou erradas, estamos apenas interessadas em conhecer a sua opinião. A confidencialidade das suas respostas está assegurada.

1	2	3	4	5	6	7	8	9
Não consigo		Consigo com dificuldade		Consigo razoavelmente		Consigo bem		Consigo perfeitamente

1	... controlar comportamentos disruptivos na sala de aula	1	2	3	4	5	6	7	8	9
2	... motivar as crianças que mostram menos interesse nos trabalhos escolares	1	2	3	4	5	6	7	8	9
3	... levar as crianças a acreditarem que podem ter sucesso nos trabalhos escolares	1	2	3	4	5	6	7	8	9
4	... ajudar as crianças a valorizarem a aprendizagem	1	2	3	4	5	6	7	8	9
5	... elaborar questões relevantes para colocar às crianças	1	2	3	4	5	6	7	8	9
6	... fazer com que as crianças sigam as regras da sala	1	2	3	4	5	6	7	8	9
7	... acalmar uma criança que está agitada ou a fazer barulho	1	2	3	4	5	6	7	8	9
8	... estabelecer um sistema de gestão de sala com cada grupo de crianças	1	2	3	4	5	6	7	8	9
9	... utilizar uma variedade de métodos de avaliação	1	2	3	4	5	6	7	8	9
10	... dar uma explicação alternativa ou outro exemplo quando as crianças estão confusas	1	2	3	4	5	6	7	8	9
11	... apoiar as famílias para que ajudem as crianças a saírem-se bem na escola	1	2	3	4	5	6	7	8	9
12	... implementar estratégias de ensino alternativas	1	2	3	4	5	6	7	8	9

Appendix C

Teacher interview

INTRODUÇÃO

Boa tarde!

Antes de mais, obrigada por aceitar o nosso convite para participar no nosso estudo acerca dos desafios associados à crescente diversidade dos grupos de crianças que frequentam contextos de educação pré-escolar.

Com este projeto de investigação pretendemos compreender as relações entre a composição do grupo de crianças e as interações estabelecidas entre as mesmas e os(as) educadores(as) de infância. No entanto, para avançarmos nesse sentido, parece-nos fundamental, conhecer as perceções e experiências dos(as) educadores(as) de infância sobre esta temática. O nosso principal objetivo é identificar recursos e necessidades, de forma a contribuir para a otimização dos processos de tomada de decisão relativos à organização dos grupos de crianças em contexto pré-escolar e para o desenho de programas de melhoria de qualidade e desenvolvimento profissional mais eficazes e adequados às reais necessidades no terreno.

Não existem respostas certas nem erradas, apenas pretendemos conhecer os seus pontos de vista pois são importantes para nós. Por favor, sinta-se à vontade para partilhar as suas ideias, opiniões e experiências.

Caso concorde, a entrevista será gravada para garantir que não perdermos nenhum dos seus comentários. Nenhum nome será incluído em nenhum relatório ou publicação. Os seus comentários são confidenciais.

Esta entrevista terá a duração aproximada de 30 minutos. Podemos começar? Obrigada

PERGUNTAS

Pergunta introdutória

2/3 min.

1. Que critérios são utilizados, neste agrupamento, para constituir as turmas de educação pré-escolar?
2. Qual a sua opinião sobre esses critérios?

Pergunta de transição

3 min.

3. Tendo em conta a sua experiência, que tipo de turmas são mais desafiantes? Porquê?

Perguntas-chave

aprox. 25 min.

4. Quais são, para si, os principais desafios impostos pelas turmas que considera mais desafiantes?
5. E quais considera serem as principais oportunidades?
6. Que estratégias procura utilizar para gerir estas turmas?
7. Que estratégias se têm mostrado mais eficazes? Por que é que funcionam?
8. E que estratégias são menos eficazes? Porque acha que assim é?
9. Que tipos de suporte recebe, por parte do agrupamento, que a ajudam no trabalho com turmas mais desafiantes?
Que outros tipos de suporte, não providenciados atualmente pelo agrupamento, lhe poderiam ser úteis?

Perguntas adicionais a ser colocadas, caso não seja abordada, ao longo da entrevista, a composição étnica ou sociocultural das turmas:

10. Quais são, para si, os principais desafios associados à composição étnica ou sociocultural das turmas no contexto da educação pré-escolar?
11. E quais considera serem as principais oportunidades?
12. Considera ter os conhecimentos e ferramentas necessários à gestão eficaz de turmas com diferentes tipos de composição étnica ou sociocultural?
13. Que tipos de suporte lhe seriam úteis nesta tarefa?

Perguntas finais

1 min.

14. Suponha que tem um minuto para dar conselhos a uma educadora recém-licenciada. Que conselhos lhe daria a propósito da gestão da composição da turma/do grupo?

Últimas perguntas

2 min.

12. Há alguma coisa sobre a qual considere que devíamos ter falado e não falámos? Há alguma coisa que

gostaria de ter dito e não teve oportunidade para dizer? Tem algo a acrescentar?

CONCLUSÃO

Gostaria de lhe agradecer a sua colaboração. É muito importante conhecer as suas ideias sobre este tema. Quando nos for possível, caso esteja interessado/a em conhecer os resultados deste estudo, enviaremos um resumo das nossas conclusões para que possa dizer-nos se refletem de uma forma fidedigna os conteúdos discutidos nesta entrevista.

Mais uma vez, muito obrigada.