



The impact of classroom quality on young children's emotion understanding

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The Impact of Classroom Quality on young Children's Emotion Understanding

Many studies have been conducted to identify the factors explaining individual differences in children's emotion understanding (children's language, non-verbal fluid intelligence, executive function, attachment, parents' emotion-related discourse, mothers' sensitivity and responsiveness to their children's emotional needs, cultural values and practices related to emotions, etc.). These studies represent a significant advance in our comprehension of the origins of the child's capacity to understand emotions. However, almost nothing is known about the impact of classroom quality on children's emotion understanding even though Western children spend about six to eight hours per day in school. In this study, we used the Early Childhood Environmental Rating Scale — Revised edition [ECERS-R] to evaluate global childcare classroom quality in 31 classrooms located in Moscow (middle SES areas) and the Test of Emotion Comprehension [TEC] to assess their emotion understanding (N = 592) while controlling for the effects of age, gender and non-verbal fluid intelligence. We hypothesized that children from high-quality classrooms would outperform their peers from low-quality classrooms in terms of their understanding of emotions. The results showed, albeit controlling for gender, age, non-verbal fluid intelligence, that children from low-quality classrooms had a significantly higher level of emotion understanding than children from high-quality classrooms. Results are discussed both in terms of their theoretical and practical implications.

Keywords: classroom quality, ECERS-R, global quality, Emotion understanding, TEC.

Introduction

Emotion understanding (EU) can be defined as the capacity to comprehend the nature, causes and consequences of emotions in the self and others, its main function being to identify, describe, explain, predict, control the expression and regulate the experience of emotion in everyday life (Pons & Harris, 2019). Studies have revealed a significant impact of children's EU on their psychological well-being. Children who are good at understanding emotions are less likely to experience anxiety, depression and anger (e.g. Banerjee and Henderson, 2001; Trentacosta and Fine, 2010). Research has indicated that children with good EU demonstrate better results on prosocial competences such as interactive peer play (Mathieson & Banerjee, 2011), index of social problem solving (Franco et al., 2017), prosocial behaviors (Liao, Li, &

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3 Su, 2014). More recently, an increasing number of studies has shown that children's emotion
4 understanding is also a good predictor of their school adjustment (Garrett-Peters, Castro, &
5 Halberstadt, 2017) and achievement (Franco et al., 2017; Józsa & Barrett, 2018).
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10 Many studies showed that children's EU goes through 3 main stages (e.g. Pons et al.
11 2004). Children aged between 3 and 5 years (external stage) are capable to recognize basic
12 emotions via facial expressions and to understand the impact of external causes and desires on
13 emotions. Later, between the age of 5 to 7 years, children gradually begin to understand mental
14 causes (e.g. beliefs, memories) that could trigger emotions and that there's a difference between
15 the appearance and the experience of emotions (mental stage). At the third stage, between the
16 ages of 7-9, children start to realize that emotions can be regulated by the means of cognitive
17 strategies, that moral rules have an impact on emotions and that several emotional experiences
18 can be mixed (reflexive stage) (Pons & Harris, 2005; Pons, Lawson, Harris, & Rosnay, 2003;
19 Saltzman, Fiese, Bost, & McBride, 2018).
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33 There is abundant evidence that children's ability to understand emotions varies within
34 particular stages of the above-mentioned periodization. Much research has been devoted to
35 identify factors related to the child or his/her family environment explaining individual
36 differences in children's EU, such as parental occupational class (Kårstad, 2016), mothers'
37 education (Cutting & Dunn, 1999), maternal emotion-related beliefs (Garrett-Peters et al.,
38 2017), the parents' ability to accurately estimate their child's EU (Kårstad, 2016), parents'
39 emotional vocabulary (Harris, De Rosnay, & Pons, 2005; Ornaghi, Brockmeier, & Gavazzi,
40 2011). A number of studies have focused on cognitive and affective factors that determine
41 differences in the EU (De Stasio, Fiorilli, & Di Chiacchio, 2014; von Salisch, Haenel, &
42 Freund, 2013). However, a review of the literature has shown that to date, no research had been
43 carried out to analyze the impact of classroom quality on children's EU. Meanwhile, this factor
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3 could prove very important for EU development due to the large amount of time children
4 normally spend in kindergartens and schools.
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8 Classroom quality of educational environment is explored through the three main
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10 components: structural, process, and global quality (Vandell & Wolfe, 2000). Structural quality
11 assesses classroom materials, curriculum, teacher education, and teacher-child ratio [NICHD
12 Early Child Care Research Network, 2005]. Process quality focuses on more dynamic aspects
13 related specifically to teacher-child and peer-to-peer interactions in classrooms (Hamre &
14 Pianta, 2007; Vandell & Wolfe, 2000). The combined assessment of structural quality and
15 process quality represents global quality and provides an understanding of classroom
16 environment. Early Childhood Environment Rating Scale (ECERS-R) is one of the most
17 widely used tools for evaluating global quality of school environment. The investigation of the
18 impact of classroom quality on preschoolers' achievements is increasingly attracting
19 researchers in the field of developmental and educational psychology. The results of the EPPSE
20 (Effective Pre-School, Primary and Secondary Education) study showed that classroom quality
21 has a long-term impact on the level of academic achievement in school: the adolescents who
22 attended kindergartens with high classroom quality at an early age over a long period of time
23 did better at their final exams than those who did not have such experience (Sylva et al., 2004).
24 These findings have contributed to the acknowledgement of the importance of the educational
25 environment for a child's psychological development in several works (Vandell, Belsky,
26 Burchina et al., 2010; Sammons et al., 2014; Hall et al., 2013). But the majority of studies on
27 classroom quality were aimed to analyze children's outcomes that fall under the "school
28 readiness" category. A systematic review (Brunsek et al., 2017; Nisskaya, 2018) of relationship
29 between the ECERS-R and child's outcomes does not include studies of emotional outcomes.
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31 A. Brunsek and colleagues pointed out the need for studies that address the association between
32 the ECERS-R and social/emotional outcomes in the future.
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Present Study

Given that the EU gradually develops in the preschool and school years and has variability associated not only with child's cognitive or affective factors but also with some environmental family factors, it is of interest to establish whether the classroom quality impacts the EU in 5-6 years old children. As far as we know, no studies to date have examined the possible impact of this variable on EU. Hence, in an attempt to fill this gap in the literature, this study was designed to investigate the impact of classroom quality on EU in a sizeable sample of children aged between 5 and 6 years.

More specifically, we hypothesized that children from classrooms with high-quality settings would perform better than their peers from low-quality settings on general level of EU and its components. Because previous studies exploring the development of EU have reported association between non-verbal fluid intelligence and EU (De Stasio et al., 2014; Rieffe & Wiefferink, 2017; von Salisch et al., 2013), gender and EU (Kårstad, 2016), we also conducted exploratory analysis in which non-verbal fluid intelligence and gender were included as control variables for EU. Other variables that could have a potential impact on the relationship under study, such as age and family socioeconomic status were also controlled.

Method

Participants

Data collection was carried out in 11 preschools in Moscow (Russia), which resulted in a sample of 592 typically-developing 5-6 years old ($M = 5.71$ y. o., $SD = .52$) children (50.1% girls) from 31 same-age kindergarten classrooms. The group size varied from 8 to 27 children ($M = 19.23$, $SD = 5.37$). For the study, we selected kindergartens in the districts characterized by the same level of infrastructure and designed to accommodate primarily medium-income

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3 families. Since children in Russia are normally assigned to the kindergartens according to their
4 registered residence address, this allows us to infer that the sample is homogeneous in terms of
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6 the family's socioeconomic status. In Russia children typically enter kindergarten at the age of
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8 3 and stay there up to the age of 7 years. It is not uncommon that they spend all these 4 years
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10 without changing the classroom, the teacher, the peers or the physical environment. In Moscow
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12 children typically spend up to 8-12 hours 5 days a week in a kindergarten.
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17 Out of 31 classrooms, we selected 8 with extremely low and high classroom quality
18 settings based on ECERS-R total scores. The classrooms have been selected in such a way as
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20 to create quasi-experimental conditions in order to avoid the problem of a non-linear interaction
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22 between children's outcomes and quality settings. Since those two extreme groups (N = 152)
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24 had unequal gender ratios, at the next step we formed two groups with an identical gender
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26 composition using a random numbers generator: low-quality classrooms (N = 60, 51% girls),
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28 high-quality classrooms (N = 60, 49% girls). Further analysis did not include 32 children who
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30 were not selected for any of the groups by a random number's generator.
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37 ***Measures***

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40 To assess children's performance in terms of the EU, we used the Russian version of the Test
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42 of Emotion Comprehension (TEC, Pons & Harris, 2000; Almazova et al., 2019). The test
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44 materials consisted of a picture book with simple cartoon scenarios. For each scenario four
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46 emotional reactions were proposed (in the form of drawings of different facial expressions).
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48 The child was told the story and then asked to choose the drawing of a feeling that the hero of
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50 the story would supposedly have. We also designed control questions to check children's
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52 comprehension of the situation. Children's answers were nonverbal. The test provides
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54 information about nine components of emotion understanding: (I) recognition of emotions, (II)
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56 understanding of external causes of emotions, (III) understanding of emotions based on desires,
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3 (IV) understanding of emotions based on beliefs, (V) understanding of the influence of
4 memories on emotions, (VI) understanding of the possibilities of regulation of emotions, (VII)
5 understanding of hidden and true emotions, (VIII) understanding of mixed emotions, (IX)
6 understanding of moral emotions. For further analysis, these nine components can be divided
7 into three groups depending on their complexity: External, Mental and Reflexive. The External
8 components focus on the ability to recognize emotions, to understand the external causes of
9 emotions and the impact of desires on emotions. The Mental components concern the
10 understanding of the role of beliefs and memories in relation to emotions, as well as the
11 understanding of hidden emotions. The Reflexive components are the most complex and
12 evaluate the understanding of mixed feelings, the possibilities of emotion regulation via
13 cognitive strategies and the influence of moral self-reflective rules on emotions. The score can
14 vary from 0 to 3 for each component. Accordingly, the overall level of understanding of
15 emotions is expressed by the sum of scores from 0 to 9. Previous studies have shown that the
16 TEC has good reliability and validity (e.g. Yulong et al, 2018 for a review).

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The Russian version of ECERS-R (Early Childhood Environment Rating Scale – Revised) (Harms, Clifford, & Cryer, 2013) was applied to measure classroom quality. The authors of this scale report that it's designed “to see how well a program is meeting children's needs – to see whether children receive the protection, learning opportunities, and positive relationships they need for successful development” (Cryer, Harms & Riley, 2003, p. 150). ECERS–R assesses classroom physical environment, materials, warmth and responsivity in child-teacher interaction. It consists of seven scales: Space and furnishings, Personal care, Language and reasoning, Activities, Interactions, Program structure, and Parents/staff. The average on all scales represents the global classroom quality. The validity, reliability and adequacy of the results obtained with its help are confirmed by series of studies (Harms et al, 2005; Sylva, Siraj-Blatchford, Taggart et al., 2010). Depending on conditions observed in a

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3 classroom, an external expert assigns a mark from 1 to 7 to each of seven scales (6-7 items per
4 scale, 43 items in total). The indicators describe specific requirements for each scale and can
5 be presented in scores 1 (inadequate), 3 (minimum), 5 (good) and 7 (excellent). Previously, the
6 Russian version of ECERS-R has been tested on a sample of 1,336 preschool groups in
7 different regions of Russia (Bodrova & Yudina, 2018).
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15 In order to assess the children's non-verbal fluid intelligence, the Colored Progressive
16 Matrices (Raven, Raven 2007) test was used.
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20 21 ***Procedure***

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23 Data collection for the study was conducted in two stages. First, 31 kindergarten classrooms
24 were assessed in terms of classroom quality using the ECERS-R (Harms, Clifford, & Cryer,
25 2005). The assessment was carried out through a 4-hour observation in each classroom.
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27 Second, the evaluation of children's EU abilities and non-verbal fluid intelligence was
28 conducted individually over two sessions lasting 10–15 minutes each in a quiet area away from
29 classrooms. The classrooms and children were observed and tested in September and October
30 2018. Written agreements from each school administration were provided. Parents or
31 caregivers of all participants also provided their written informed consent for the children to
32 take part in the study. Due to their age, children did not sign any forms, but all gave their verbal
33 consent prior to testing. The study and consent procedures were approved by the Ethics
34 Committee of Faculty of Psychology at Lomonosov Moscow State University (the approval
35 No: 2018/41).
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51 52 **Results**

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55 Results are organized into three sections. We first provide descriptive information about
56 children's emotion understanding, non-verbal fluid intelligence, gender, age and all ECERS-R
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3 subscales (see Tables 1 and 2). Next, using a linear regression, we examine age, gender, non-
4 verbal fluid intelligence and classroom quality as predictors of total level of children's emotion
5 understanding. In the third section, we present the results obtained using independent-sample t
6 tests to explore differences in EU performance between children from extremely high- and
7 low-quality classroom settings. Statistical analysis was performed using SPSS version 23.0.
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12 Descriptive statistics of age, non-verbal fluid intelligence, TEC components both for
13 the whole sample (31 classrooms) and for two types of classroom quality settings: low-
14 quality classrooms settings (4 classrooms) and high-quality classrooms settings (4 classrooms)
15 are presented in Table 1.
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25 Exploratory analysis showed that the general level of EU was normally distributed with
26 a minimum of 1 and a maximum of 9 (range 0–9). On TEC External component, children in
27 both extremely high- and low-quality classrooms settings gained close to the maximum scores
28 which indicates the ceiling effect (range 0–3). For Mental and Reflective components, the
29 average scores were within the range of 1 to 1.72 (range 0–3).
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34 Descriptive statistics for all ECERS-R subscales both for the entire sample (50% girls)
35 and separately for two extremely low- (50.1% girls) and high-quality (49.9% girls) classrooms
36 settings are provided in Table 2.
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46 Low-quality classroom settings correspond to the minimum quality level according to
47 the ECERS-R' authors. Thus, the low classroom quality is characterized by a minimum set of
48 equipment and materials and basic safety maintenance. Most of the activities are carried out
49 for all children at the same time; there's neither space for privacy, nor separation between
50 active and quiet play areas; teachers do not interfere in children's interaction; they only
51 intervene in case of danger of physical harm to children, but they neither teach children to
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3 communicate with each other, nor do they help them to join others, make friends and create
4 game ideas. High-quality classroom settings correspond to the moderate quality according to
5 the ECERS' authors. This level of classroom quality, apart from safety maintenance and
6 materials, is characterized by the following: there are separate zones for active and quiet games,
7 as well as places for privacy; teachers help children to find interesting activities and prevent
8 conflicts; conditions for communication and play in small groups are created.
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Next, linear regression analysis for TEC was conducted to examine the potential impact of age, gender, and non-verbal fluid intelligence on the total level of children's emotion understanding. The results indicate that EU was predicted by age ($\beta = .134$, $P < 0.01$) and non-verbal fluid intelligence ($\beta = 0.534$, $P < 0.01$). Gender was not a significant predictor ($\beta = 0.534$, $P < 0.01$). The overall model fit was $R^2 = 0.46$.

As a last step, we conducted an analysis of differences in EU performance between children from extremely high- and low-quality classroom settings. Prior to that type of analysis, we verified that there were no significant group differences in age and non-verbal fluid intelligence between children from extremely high- and low-quality classroom settings. Significant differences were found in TEC Mental ($t(118) = 0.195$, $p = 0.017$) and TEC Total ($t(118) = 2.012$, $p = 0.04$). Trend to significant differences was found in TEC Reflective component ($t(118) = 1.028$, $p = 0.09$). No significant differences between groups in TEC External component were found.

Discussion and Conclusion

The proposed study evaluated the impact of classroom quality on EU in preschool-age children. A review of the literature has shown that to date, no research had been carried out to analyze the impact of classroom quality on children's EU. Previous studies of the relationship between classroom quality and children's outcomes have been focusing mainly on children's "school

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3 readiness" or behavioral problems (Brunsek et al., 2017). No research has been conducted to
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5 examine the impact of classroom quality on EU in preschool age.
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8 Three main findings relevant to our research hypotheses were obtained. They are
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10 discussed below, particularly but not exclusively in relation to their possible applications. First,
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12 we hypothesized that children who attend high-quality classrooms would outperform their
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14 peers from low-quality classrooms. The analysis revealed significant differences in EU
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16 between children from extremely high- and low-quality classroom settings. The obtained
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18 results did not support our hypothesis. Contrary to the expectation, children from low-quality
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20 classroom settings showed significantly higher scores on general level of EU and on
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22 understanding of mental causes of emotions than those who attended high-quality classrooms.
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24 A difference close to significant was found in the Reflective component which evaluates the
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26 understanding of mixed moral feelings and strategies of emotion regulation. The analysis did
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28 not reveal any differences in External component of EU: according to descriptive statistics,
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30 children's results on this component were on average close to a maximum score, which
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32 indicates the ceiling effect. This result corresponds to a development periodization of emotion
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34 understanding (Pons, Harris, & de Rosnay, 2004) according to which the understanding of
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36 external causes of emotions forms at an earlier age.
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43 Unlike previous studies which showed weak positive associations between classroom
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45 quality and children's social (Ishimine, Wilson, & Evans, 2010) and cognitive (Sylva et al.,
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47 2011) skills, the current study demonstrated the negative impact of high-quality classroom
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49 settings on children's EU. It seems that some factors inherent in low classroom quality plays a
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51 positive role in the development of children's EU. These results are interesting in that they
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53 show that the EU is better developed among children who had long experience of attending
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55 classrooms with poor quality of care and adult supervision. This could suggest either that 1)
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57 there are some conditions that urge the use of EU skills in a low-quality classroom settings
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3 (e.g., peer interaction, that is not organized by the preschool teacher; higher rate of conflicts
4 with peers due to insufficient materials and toys; lack of privacy, etc.), or 2) that this study did
5 not appropriately capture other aspects of classroom quality that may also affect the emotion
6 understanding.
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12 A comprehensive consideration of the differences between the two compared levels of
13 classroom quality has led us to make several assumptions about the potential developmental
14 opportunities for EU in low-quality classroom settings. First, in low-quality classrooms
15 teachers only interrupt negative peer-to-peer interaction if it threatens children's safety;
16 teachers do not help children to resolve conflicts; there's a lack of materials and space for motor
17 skills, play activities, art etc. For these reasons, children in low-quality classrooms are likely
18 to have a lot of experience competing for materials and space, and therefore experience of
19 conflict. Although conflicts between children are often seen as undesirable social behaviour
20 which need to be prevented, recent research has shown that peer-to-peer conflict is a part of
21 social interaction in which children learn to maintain their group and individual boundaries
22 (e.g. Farris, 2000; Kyratzis and Guo, 2001), to engage in social relationships (Comparini,
23 Douglas, & Perez, 2014), to understand the position and desires of others (Laursen, Finkelstein,
24 & Betts, 2001). And vice versa, Liao and colleagues found that children's ability to recognize
25 emotions was linked to their propensity to reconcile in conflict situations (Liao et al., 2014).
26 Mathieson & Banerjee showed that, for boys, EU served as positive predictor of interactive
27 peer play and negative predictor of disjointed play (Mathieson & Banerjee, 2011). In the
28 absence of sufficient toys and materials, children are prompted to negotiate through bilateral
29 conflict resolution strategies (Singer, van Hoogdalem, de Haan, & Bekkema, 2012). However,
30 more research is needed to identify the specific relationship between classroom quality, peer
31 conflicts and children's EU.
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3 Another important feature of low-quality classroom setting is a rigid and non-
4 individualized daily routine in which children's preferences and initiatives are not taken into
5 account, while the high-quality classroom settings are characterized by a balance between strict
6 structuring and flexibility of the daily routine. The vast majority of activities in low-quality
7 classrooms are characterized by frontal class work, while in high-quality classrooms children
8 are involved in activities in small groups and can choose the activity (Fuligni et al., 2012). This
9 means that during the day children in low-quality classroom settings are more likely to find
10 themselves participating in joint activity in a large group. The preschool teacher has to be very
11 disciplined in order to manage a large group of children in a classroom. As a result, children
12 are subject to unified rules, which requires the ability to regulate their own emotions. In
13 addition, there's lack of privacy and personal space in low-quality classroom settings.
14 Unavailability of a private place in a classroom limits children's ability to regulate the number
15 and frequency of contacts with other children and to avoid unwanted interactions (Colwell et
16 al., 2016). Absence of privacy in the classroom space forces the child to make numerous
17 contacts with peers throughout the day, even if it provokes negative emotions. Thus, children
18 in low-quality classroom settings are more likely to be involved in a variety of contacts with
19 other children, including uncomfortable ones. This extensive interaction, which children
20 cannot always interrupt, broadens the range of experiences that children need to cope with.
21 Also, children in low-quality classroom setting probably observe a wider range of different of
22 emotional manifestations of peers than in high- quality classroom setting.
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49 Although this study has several strengths, such as large sample and studying children
50 who have attended the same kindergarten classrooms for several years, its results should be
51 interpreted with due regard to a number of constraints. First, while classroom quality was
52 evaluated using a methodology designed for assessing global classroom quality (i.e. both
53 structural and processual components), in this study we analyzed only a global classroom
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3 quality due to the uneven score's distribution across ECERS-R subscales. It should be noted
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5 that the highest classroom quality level presented in this study corresponds to the moderate
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7 level according to ECERS-R methodology. In terms of this study, it also proved impossible to
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9 analyze separately the impact of ECERS-R subscales on children's EU due to insufficient
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11 variation in these parameters among the classrooms included in the study. Although the
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13 teacher-child interaction aspect of the classroom was previously shown to be an important
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15 aspect of social-emotional development, it was not sufficiently addressed in this study. Further
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17 research is needed, including more comprehensive analyses of the teacher-child interaction.
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22 **Acknowledgements**

23
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Table 1. Descriptive statistics by age, non-verbal fluid intelligence, TEC components for the entire sample (N = 592), and for extremely high- (N = 60) and low-quality (N = 60) classroom settings

Parameter	Entire sample		Low-quality classrooms settings		High-quality classrooms settings	
	M	SD	M	SD	M	SD
Age (in month)	66.07	3.41	67.23	4.18	68.05	4.31
Raven	13.78	6.86	14.32	7.34	12.25	7.27
TEC External	2.64	.61	2.52	.65	2.57	.65
TEC Mental	1.46	.87	1.72	.82	1.35	.84
TEC Reflective	1.11	.85	1.28	.80	1.03	.80
TEC Total	5.22	1.50	5.52	1.56	4.95	1.38

Table 2. Descriptive statistics by all ECERS-R subscales for the entire sample (N = 592) and for low- (N = 60) and high-quality (N = 60) classrooms settings

Parameter	Entire sample		Low-quality classrooms settings		High-quality classrooms settings	
	M	SD	M	SD	M	SD
Space and furnishings	3.20	.58	2.63	.23	4.02	.24
Personal care	3.31	.90	2.26	.40	4.21	.44
Language and reasoning	3.26	.50	2.82	.45	3.80	.20
Activities	2.49	.67	1.72	.04	3.52	.65
Interactions	3.68	.84	2.49	.40	5.00	.78
Program structure	2.80	.95	2.11	.37	4.38	.95
Parents/staff	3.40	1.08	2.29	.33	4.89	.60
ECERS-R Total Score	3.16	.63	2.33	.12	4.26	.16