
Development and Psychometric Properties of the Classroom Peer Context Questionnaire

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Abstract

Children's view on the peer context in their classroom may differ from that of other informants, but no measure systematically examines children's own view. Therefore, we developed the Classroom Peer Context Questionnaire (CPCQ) and evaluated its reliability, validity, and stability in two studies. In Study 1, 464 children ($M_{age} = 10.8$ years, 53.2% girls) from 18 Grade 5 classrooms participated in 2 waves of data collection. In Study 2, 1538 children ($M_{age} = 10.6$ years, 47.2% girls) from 59 Grade 5 classrooms participated in 3 waves of data collection. Exploratory factor analyses in Study 1 revealed 5 dimensions labeled comfort, cooperation, conflict, cohesion, and isolation. Confirmatory factor analyses in Study 2 supported these 5 dimensions. Study 2 also demonstrated good reliability, validity, and stability for each dimension. Researchers and professionals in schools may use the CPCQ to obtain reliable and quick information on how children perceive the peer context in their classroom.

Keywords: assessment; children's perceptions; classroom; peer context; questionnaire

The classroom is an important context for children, and peers make up a large part of this environment (Ladd, 2005). The peer context in the classroom (i.e., interactions and relations among children) influences children's academic and social development (e.g., Rubin, Bukowski, & Parker, 2006; Wentzel, 2009). The peer context has been assessed with observations (Fabes, Martin, & Hanish, 2009), sociometric methods (Cillessen, 2009), social network analyses (Kindermann & Gest, 2009), and teacher ratings (e.g., Gest, 2006). Surprisingly, comprehensive measures that directly assess children's own perceptions of their classroom peer context do not exist. Therefore, the goal of this study was to develop a measure of the classroom peer context from the child's perspective and to examine its psychometric properties.

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Theoretical Framework

The peer context of the classroom is complex. Rubin et al. (2006, see also Hinde, 1987) proposed a theoretical framework to understand this complexity. This framework has four levels: the individuals involved, interactions, relationships, and the group. The individual level includes the characteristics children bring to social interactions such as their social orientation to peers, social skills and knowledge, and individual traits such as temperament. The interaction level focuses on children's dyadic day-to-day interactions in which they are interdependent, that is, behaviors that they cannot perform without each other. The relationship level addresses the meanings, expectations, and emotions of two children towards each other. Relationships are dyadic and based on long-term knowledge of one another. Finally, the group level considers the patterns and features of interactions and relationships that are present in a collection of individuals (e.g., a classroom) who have reciprocal influence on each other.

The four levels are intertwined, that is, there are no interactions without individuals, no relationships without interactions, and no groups without relationships (Rubin et al., 2006). Children's peer experiences at one level influence their experiences at other levels. For example, a positive orientation to classroom peers (individual level) may lead to positive interactions (interaction level) and friendships (relationship level), which may yield a cohesive classroom (group level).

Assessment of the Classroom Peer Context

The levels of the classroom peer context have been assessed with various methods. Firstly, observations provide a detailed picture of classroom or playground interactions at all levels (Fabes et al., 2009; Hawkins & Pepler, 2001). Because observations are typically conducted by independent coders, they allow for objective comparisons between classroom peer contexts.

Secondly, sociometric methods have been used (Cillessen, 2009; Hymel, Rubin, Rowden, & LeMare, 1990). With peer nominations, children name classmates who best fit a criterion (e.g., 'who do you like most?'). With peer ratings, children rate each classmate on the criterion using a Likert scale (e.g., 'how much do you like Jane?'). Sociometric methods have widely been used to examine all levels of the classroom peer context.

Thirdly, classroom peer context has been studied with social network analyses, based on peer nominations for friendship or who hang out together in the classroom (Kindermann & Gest, 2009). Social network analyses address the group level as they describe patterns of relationships. For example, network density describes the average number of ties between classmates and network hierarchy describes to what degree ties are equally distributed among children (e.g., Ahn, Garandeanu, & Rodkin, 2010).

Fourthly, teacher ratings have been used (e.g., Gest, 2006). In primary school, teachers spend as much time in the classroom as the children making them useful informants of children's interactions, relationships, and groups.

Although these existing measures of the classroom peer context are extremely important, they do not ask children directly how they evaluate and perceive the peer context of their classroom, even though they are immersed in it. Observations by researchers and teachers assess the classroom peer context from an adult point of

view. However, children's perceptions often differ from adults' perceptions (e.g., De Los Reyes & Kazdin, 2005). As, children's peer interactions often take place in the absence of adults, in hallways or on the playground. As a result, adults are not aware of all that occurs in the peer group. Also, sociometry and network methods, children are the informants but their perceptions of the overall peer context are assessed indirectly. For example, the number of peer nominations for prosocial behavior may indicate children's perceptions of positive peer interactions. It is assumed that a child who nominates more peers for positive behaviors perceives the peer context more positively than a child who nominates fewer peers. However, it is not a direct measure of the child's perception of the peer context.

Finally, observations, sociometric methods, and social network analyses are time-consuming and complicated for practitioners because specific knowledge and software are needed. Self-reports also have some limitations (e.g., they may be biased by individual characteristics and recent events in the classroom). Yet, they directly assess children's views of the peer context and are easy to administer. Therefore, self-reports of the classroom peer context are a valuable addition to existing measures to obtain a complete understanding of the classroom peer context. Such self-reports may also enhance understanding of the effects of peer relations on children's development. For example, children who observe their peers to interact in a friendly way with each other may also act more positively themselves as they think this is expected by their peers.

Existing self-report measures do not assess the peer context systematically or in-depth, as most include a single scale (e.g., Brock, Nishida, Chiong, Grimm, & Rimm-Kaufman, 2008; Rowe, Kim, Baker, Kamphaus, & Horne, 2010). Instruments with multiple scales are usually for secondary school students (see, for a review, Fraser, 1998). Exceptions are the My Class Inventory (MCI; Fisher & Fraser, 1981), the Classroom Life Instrument (CLI; Johnson, Johnson, & Anderson, 1983), and the Climate Scale (CS; Donkers & Vermulst, 2011). However, these three do not fully address the complexity of the classroom peer context as they do not cover all levels of the peer group described above. For example, the MCI includes scales for negative interactions (friction) and group structure (cohesion), but lacks scales for positive interactions and the individual level (Fisher & Fraser, 1981). The CS includes scales for positive and negative interactions, but lacks scales for the relationship and group levels (Donkers & Vermulst, 2011). All three instruments, and especially the CLI (Johnson et al., 1983), have scales that mix classroom-oriented items (e.g., children are friends with *each other*) with personally oriented items (e.g., children are friends with *me*) (Rowe et al., 2010). Children's perceptions of classroom peer relationships in general and their own personal relationships differ (Fraser, 1998) and it does not seem optimal to merge them into one scale.

Dimensions of the Classroom Peer Context Questionnaire

In order to address these issues, we developed the Classroom Peer Context Questionnaire (CPCQ) to obtain a comprehensive understanding of children's perceptions of classroom peer context. Three principles guided the development of this measure. Firstly, the dimensions of the measure should match Rubin et al.'s (2006) theoretical framework of the peer context. Secondly, items should be directed either at all classroom peers (class orientation) or at the individual child (personal orientation)

(cf. Rowe et al., 2010). As we were interested in children's evaluations of the overall peer context, items for the interaction, relationship, and group levels should have a class orientation. The items for the individual level should have a personal orientation, as this level by definition regards personal orientations towards social situations. Thirdly, the CPCQ should be relatively quick and easy to use. Based on these criteria and the existing classroom environment questionnaires we formulated five key dimensions for the CPCQ: comfort, cooperation, conflict, mutual affection, and cohesion. They each capture basic constructs of the peer context (e.g., positive and negative interactions, friendships, group structure) that have been studied extensively with one or more traditional measures and have been related to children's social and academic development (see Rubin et al., 2006).

Comfort, defined as the extent to which children feel at ease around their classroom peers, represents the individual level. It indicates whether children feel that they belong to their classroom and can be themselves. A child who feels comfortable in the classroom also will view the other levels of classroom peer context positively (cf. Osterman, 2000). Thus, a child's degree of comfort in the classroom is an individual characteristic closely linked to her or his perceptions of classroom interactions and relationships.

Cooperation and conflict are at the interaction level. Cooperation refers to positive peer interactions in the classroom. Items for this dimension represent positive behaviors that benefit a peer and cannot be performed without the presence of this peer. Examples are helping and cooperation (e.g., Chang, 2004). Conflict refers to negative classroom interactions in which a child harms another directly (e.g., fighting) or indirectly (e.g., gossiping) (e.g., Crick, 1996). Cooperation and conflict should be studied together because the absence of one does not mean that the other is present. A child who perceives low cooperation in the classroom could also perceive many conflicts among peers or that they just do not interact with each other.

Mutual affection reflects positive relationships and represents the relationship level. Contrary to cooperation and conflict, which represent behavior, this dimension measures affect based on long-term interactions (Rubin et al., 2006). Items for this dimension can refer either to relationships (e.g., friendships) or mutual feelings (e.g., liking) (e.g., Gifford-Smith & Brownell, 2003).

Finally, cohesion refers to the unity and inclusiveness among children and reflects the group level (Forsyth, 2010; Rubin et al., 2006). Because it concerns the patterns of relationships in the classroom, it is a group level construct. Cohesion is an important construct in learning environment research (e.g., Allodi, 2002; Fisher & Fraser, 1981; Johnson et al., 1983). In cohesive classrooms, all children are connected and included in interactions. In non-incohesive classrooms, the number of connections is low and many members are isolated from the group. Therefore, items indicating cohesion should either reflect that all children in the classroom are included in interactions as well as relationships (positive indicators) or that children are isolated from the group (negative indicators).

Present Study

A measure that pays attention to children's direct perceptions of the key dimensions of the peer context is generally lacking. Yet, assessing these perceptions in combination with traditional measures may lead to a more comprehensive view of the

classroom peer context. In addition, children's perceptions of the classroom context can affect their social and academic development in this context (e.g., Brock et al., 2008). Therefore, the CPCQ was developed to examine how individual children perceive this context. In the present study, we describe the development of the CPCQ and examined its psychometric properties (reliability and validity). Two empirical studies were conducted. In Study 1, we constructed a questionnaire with five scales (comfort, cooperation, conflict, mutual affection, and cohesion) using two waves of data. In Study 2, we investigated whether the factor structure of the measure that resulted from Study 1 could be replicated in a new and larger sample. In this study, we also examined how the dimensions of the CPCQ were related to peer nominations given for behavior and friendship, peer ratings given for likeability, and ratings of self-concept and self-esteem. We used peer nominations and ratings *given* instead of nominations and ratings received to validate the CPCQ, as both the CPCQ and nominations and ratings given are perceptions of the same child. We expected that the number of nominations given for prosocial behavior and friendship ratings for likeability, self-concept and self-esteem would be positively related to children's perceptions of comfort, cooperation, mutual affection, and cohesion, but negatively to their perceptions of conflict. Contrary, we expected the number of nominations given for aggression and social withdrawal would be positively related to the perceptions of conflict and negatively to the perception of the other dimensions.

In addition to the reliability and validity of the CPCQ, we were interested in its stability because this contributes to the understanding of change in children's perceptions of the classroom peer context during the school year. Studies have documented that peer group constructs are relatively stable over time (e.g., Camodeca, Goossens, Terworgt, & Schuengel, 2002; Jiang & Cillessen, 2005; Ladd, 2006). Therefore, we expected that the CPCQ would be a stable measure of child perceptions of the classroom peer context over the school year. We tested this hypothesis in Study 2, using three waves of data.

Study 1

Method

Participants. Study 1 was conducted in the Spring semester of 2012. Thirty schools were contacted of which 14 participated, including 18 5th grade classrooms ($M_{\text{size}} = 26.4$ children, range = 20–33). Active parental consent was obtained for 464 children (97.1%, $M_{\text{age}} = 10.8$ years, $SD = 0.51$; 53.2% girls). Following the classification by Statistics Netherlands (2012b), ethnic background was based on parental country of birth. Most children (91.8%) were Dutch (both parents born in the Netherlands), 4.5% were Western immigrants (at least one parent born in another western country), and 3.7% were non-Western immigrants (at least one parent born in a non-western country). This distribution was representative for the area in which the schools were located (Statistics Netherlands, 2012a).

The study consisted of two waves with approximately 10 weeks between them. Most participants (94.6%) were present at both waves. Due to absence on the day of data collection, 14 children (3.0%) participated in Wave 1 only and 11 (2.4%) in Wave 2 only.

Measure. The first version of the CPCQ had 23 items measuring comfort (4), cooperation (4), conflict (6), mutual affection (3), and cohesion (6). Of the 23 items, 14 came from two existing questionnaires (Donkers & Vermulst, 2011; Johnson et al., 1983). Nine items were added, revised, and refined after extensive discussion and revision in the research group based on the theoretical framework and the existing peer relations literature. The research group included experts in peer relationships and questionnaire development from two universities. Children rated each item on a 5-point scale (1 = not true at all, 5 = very true). Table 1 lists the items and their source. Items are presented with the construct they represented in the final version of the measure. In the Results, we explain how we came to this final version. For items that shifted constructs, the initial construct is listed in parentheses. For example, coh1 was part of mutual affection in the first version of the CPCQ, but part of cohesion in the final version of the CPCQ, and is therefore presented under cohesion with mutual affection between parentheses (see Table 1).

Procedure

We contacted schools by telephone and letter. After the principal and respective teacher(s) agreed to participate, parents received a letter requesting active informed consent. Children completed the questionnaire on a netbook computer in a classroom session. The netbooks were programmed so that children could not accidentally skip questions. However, if children did not want to answer a question or wanted to stop, they could tell the researcher and then were allowed to skip the question or stop. To assure confidentiality, children sat separately with partition screens on their desks. Also, the researchers emphasized confidentiality in the instructions. During administration, teachers worked at their desks in the classroom. A researcher was available to answer children's questions. The study was approved by our institute's Ethics Board for Behavioral Science.

In between waves 1 and 2, an intervention focusing on improving peer relationships through classroom seating arrangements and collaboration took place, which was not part of the present study. All classrooms were randomly assigned to one of three conditions. Six classrooms participated in systematic classroom rearrangement (cf. van den Berg, Segers, & Cillessen, 2012), six in systematic rearrangement and a collaboration project, and six were randomly rearranged. Multigroup analyses showed no differences in the structure of the CPCQ between the three conditions. Thus, to have the maximum possible sample size for Wave 2 comparable to Wave 1, for Wave 2 we analyzed all 18 classrooms together.

Results

Wave 1. There were no missing values, because no child skipped a question. Examination of univariate outliers showed that six items had 2 to 11 outliers but they were within the possible range of responses and therefore not removed. Multivariate outliers were detected using Mahalanobis D^2 . Twenty cases had a Mahalanobis distance that was statistically significant at $p < .001$, $F(23, 429) = 49.73$. As the factor structure differed between the analyses with or without these cases, we removed them, leaving 433 cases. All items except one (com3) were normally distributed. Because com3 only slightly deviated from normality, no transformation was applied.

Table 1. Items of the CPCQ by Scale and Source

Scale		Item	Source ^a
Comfort	Com1.	In this class, I feel comfortable.*	DV
	Com2.	In this class, I belong to the group.*	DV
	Com3.	I like my class.*	DV
	Com4.	In this class, I can be myself.*	New
Cooperation	Coop1.	In this class, children collaborate well.*	JJA
	Coop2.	In this class, children help each other.*	JJA
	Coop3.	In this class, children share with each other.	JJA
	Coop4.	In this class, children do a lot of things together. (Cohesion)*	New
	Coop5.	In this class, children are nice to each other.	New
	<i>Coop6.</i>	<i>In this class, children look after each other.*</i>	New
	<i>Coop7.</i>	<i>In this class, children give each other compliments.</i>	New
Conflict	Con1.	In this class, children gossip about each other.	DV
	Con2.	In this class, children argue with each other.*	DV
	Con3.	In this class, children bully each other.*	DV
	Con4.	In this class, children call each other names.*	DV
	Con5.	In this class, children are mean to each other.*	DV
	Con6.	In this class, children break personal belongings of each other.	DV
Mutual affection	Ma1.	In this class, many children do not like each other.	New
Cohesion	<i>Coh1.</i>	<i>In this class, everyone is friends. (Mutual affection)*</i>	JJA
	Coh2.	In this class, everyone knows each other well.	JJA
	<i>Coh3.</i>	<i>In this class, everyone likes each other. (Mutual affection)*</i>	New
	Coh4.	In this class, everyone is equally popular.	New
	Coh5.	In this class, everyone gets along well.	New
	Coh6.	In this class, some children are never invited to birthday parties.	New
	<i>Coh7.</i>	<i>In this class, everyone plays together on the playground.*</i>	New
	<i>Coh8.</i>	<i>In this class, everyone belongs to the group.</i>	New
Isolation	Iso1.	In this class, some children do not belong to the group. (Cohesion)*	New
	<i>Iso2.</i>	<i>In this class, some children are outsiders.*</i>	New
	<i>Iso3.</i>	<i>In this class, some children play alone most of the time.</i>	New
	<i>Iso4.</i>	<i>In this class, there are children with whom (almost) nobody wants to play.*</i>	New
	<i>Iso5.</i>	<i>In this class, some children are often alone.*</i>	New
	<i>Iso6.</i>	<i>In this class, some children often may not join a game or activity.</i>	New

Note. Items that shifted scales are presented with the first scale between parentheses. Items in italics were added in Wave 2 of Study 1. Items with an asterisk are included in Study 2. DV = Donkers & Vermulst (2011); JJA = Johnson et al. (1983).

^a Formulation of the items is sometimes adapted to be in line with the complete questionnaire.

Table 2. Descriptive Statistics of Study 1 by Item and Wave

Item	Wave 1 (N = 433)		Wave 2 (N = 422)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Com1	4.23	0.93	4.23	0.92
Com2	4.18	0.92	4.20	0.83
Com3	4.44	0.87	4.37	0.88
Com4	4.14	0.95	4.05	0.95
Coop1	4.00	0.70	3.98	0.74
Coop2	4.15	0.71	4.14	0.73
Coop3	3.77	0.74		
Coop4	4.03	0.77	4.03	0.79
Coop5	3.85	0.84		
Coop6			3.89	0.76
Coop7			3.73	0.85
Con1	2.98	0.99	3.07	1.02
Con2	2.99	0.97	2.90	0.97
Con3	2.42	1.00	2.43	1.03
Con4	2.53	1.08	2.49	1.04
Con5	2.20	0.91	2.29	0.97
Con6	1.99	0.90	2.00	0.93
Ma1	2.21	0.96		
Coh1	2.95	1.01	2.99	1.05
Coh2	4.23	0.81		
Coh3	3.07	0.98	3.18	1.01
Coh4	2.79	1.17		
Coh5	3.49	0.87		
Coh6	2.91	1.16		
Coh7			3.21	1.00
Coh8			3.48	1.09
Iso1	2.82	1.18	2.93	1.19
Iso2			2.70	0.99
Iso3			2.37	1.00
Iso4			3.04	1.10
Iso5			2.63	0.97
Iso6			2.45	1.09

There was no multicollinearity or singularity among the items. Table 2 presents the item means and standard deviations.

We ran an exploratory principal-axis factor analysis to obtain a first impression of the factors of the CPCQ. Oblique rotation was used, as we expected factors to be related. This was supported by correlations among the factors ranging from $-.57$ to $.54$.

The analysis yielded five factors explaining 51.28% of the variance. Table 3 shows that four factors fit the expected data structure (cohesion, cooperation,

Table 3. Pattern Matrix for the Exploratory Factor Analysis of Study 1 Wave 1

Item	F1	F2	F3	F4	F5
Com1			-.88		
Com2			-.77		
Com3			-.69		
Com4			-.73		
Coop1				-.52	
Coop2				-.54	
Coop3				-.38	
Coop4				-.53	
Coop5	.32			-.30	
Con1		.56			
Con2		.68			
Con3		.73			
Con4		.81			
Con5		.69			
Con6		.63			
Ma1		.48			
Coh1	.74				
Coh2					
Coh3	.70				
Coh4	.43				
Coh5	.46				
Coh6					.38
Iso1					.77

Note. N = 433. Cells with loadings between $-.30$ and $.30$ are left blank.

conflict, and comfort). Cronbach's alpha's were .78 for cohesion (Factor 1), .87 for conflict (Factor 2), .87 for comfort (Factor 3), and .71 for cooperation (Factor 4). The fifth factor suggested isolation rather than mutual affection. However, it should be interpreted with caution as only one item loaded above .50.

Wave 2. In Wave 2, we made several changes compared to Wave 1. We removed coop3, coop5, coh2, coh4, coh5, coh6, and ma1 because their factor loadings were below the recommended .50 (Costello & Osborne, 2005). Because cohesion, cooperation, and isolation were now represented by three or fewer items, we added items for them. The added items for cohesion and cooperation were again based on the theoretical framework and dimension characteristics. The isolation items had to reflect the criterion for isolation (Gazelle & Ladd, 2003) that children lack interaction with peers either as a consequence of withdrawal or because peers excluded them. All new items were based on the peer relationships literature after thorough discussion within the research team. The added items are in Table 1.

There were no missing values and univariate outliers all had valid values. Twenty-eight cases had a Mahalanobis distance that was statistically significant at

$p < .001$, $F(26, 420) = 54.05$. The analyses with and without these cases yielded a similar factor structure, but slightly different factor loadings. Therefore, we excluded them and ran the analyses with 422 cases. All items were normally distributed and there was no singularity or multicollinearity. Item means and standard deviations are in Table 2.

We conducted a CFA using ML estimation in Amos 20.0 to examine whether the factor structure of Wave 1 was confirmed in Wave 2. Model fit was good, $\chi^2(266) = 636.44$, CFI = 0.93, RMSEA = 0.06, SRMR = 0.05.

In order to reduce assessment time whereas retaining good internal consistency for each construct, we limited the number of items to four per scale. For each scale, we removed the items with the lowest standardized loadings (coop7, con1, con6, is3, is6). Model fit of the reduced 20-item measure was good, $\chi^2(160) = 395.96$, CFI = 0.94, RMSEA = 0.06, SRMR = 0.05. Figure 1 presents this final model with loadings and correlations among factors.

Study 2

Method

Participants and Procedure. Study 2 was administered in school year 2012–2013 and included three waves (one in the Fall, two in the Spring). For this study, 211 schools were contacted. A completely new sample of 41 schools agreed to participate (response rate: 19.4%). At one school the teacher, but none of the children, had participated in Study 1. The schools had 59 5th grade classrooms ($M_{\text{size}} = 26.34$ children, range = 18–42). Of the 1560 children in these classrooms at Wave 1, 98.6% received active parental consent ($N = 1538$, $M_{\text{age}} = 10.6$ years, $SD = 0.49$; 47.2% girls). Ethnic background was Dutch (83.4%), western immigrant (5.6%), non-western immigrant (10.9%), and unknown for one child.

Of the 1538 children with permission, 1491 participated in Wave 1, 1440 in Wave 2 (13 weeks later), and 1449 in Wave 3 (10 weeks later). In Wave 1, 47 children (3.0%) were absent during data collection. In Wave 2, one classroom had dropped out of the study ($N = 27$, 1.8%), 19 children (0.7%) had moved away, 68 (4.5%) were absent due to illness, while 7 children, new in their classrooms, joined the study. In Wave 3, 5 children had moved away (0.3%), 58 (3.8%) were absent during data collection, and 4 new children joined the study.

The procedure was the same as in Study 1. At Wave 1, children completed peer nominations, likeability ratings, and ratings of self-concept and self-esteem in addition to the CPCQ. Between Wave 1 and Wave 2, 26 classrooms participated in an intervention and the other 32 classrooms served as the control group. The intervention involved rearranging classroom seatings and teacher assignments to improve classroom peer relations. Multigroup analyses showed no differences in the structure of the CPCQ between intervention and control groups. Therefore, we included all classrooms in the analyses of waves 2 and 3. There was no intervention between Wave 2 and Wave 3. Study 2 also was approved by our institute's Ethics Board for Behavioral Science.

Measures

CPCQ. Children completed the CPCQ in each wave. Based on Study 1, the five scales were: comfort (4 items), cooperation (4 items), conflict (4 items), cohesion

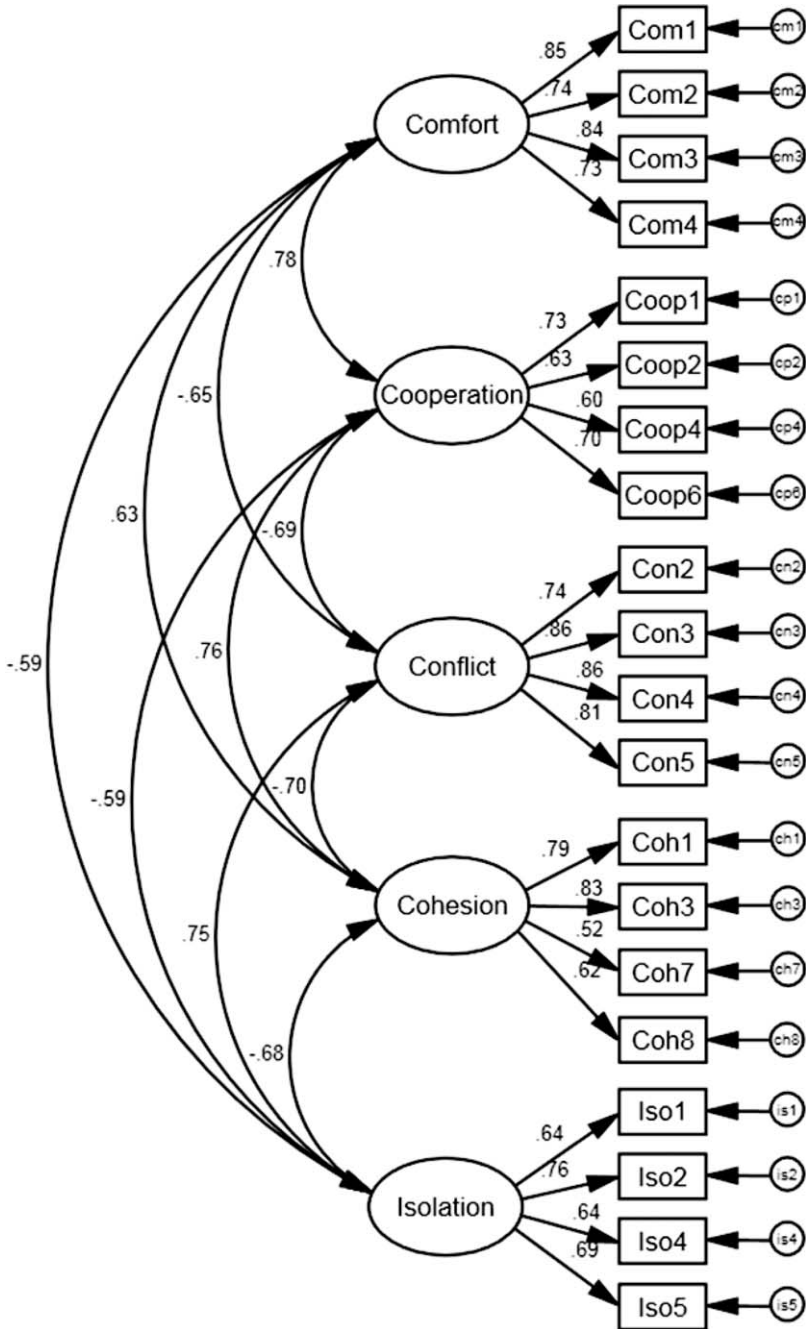


Figure 1. Final Model of the CPCQ in Study 1, Wave 2.

(3 items; coh8 was not included in Study 2), and isolation (4 items). The items included in Study 2 are indicated with an asterisk in Table 1. Children rated each item on a 5-point scale (1 = not true at all, 5 = very true).

Behavior and Friendship Nominations. Unlimited same- and cross-sex nominations were used to assess children's perceptions of peer behaviors ('cooperate well', 'help others', 'call names', 'kick, hit, or push', 'gossip', 'exclude others', 'play or sit alone during breaks') and their unilateral friendships ('best friends'). Self-nominations were not allowed and children were asked to nominate at least one peer for each question. For each child, a proportion score was calculated for every question by summing the number of nominations given and dividing this by the number of children in the classroom minus 1, to correct for differences in classroom size. Prosocial behavior was computed by adding the proportion scores for 'cooperate well' and 'help others' ($r = .59$) and dividing the sum by 2. Overt aggression was computed similarly from 'call names' and 'kick, hit or push' ($r = .60$) and relational aggression from 'gossip' and 'exclude others' ($r = .51$). Social withdrawal ('play or sit alone during breaks') and friendship ('best friends') were single items measures.

Likeability Rating. Children rated how much they liked each classmate on a 7-point Likert scale. Likeability was computed as the average rating given.

Self-Concept and Self-Esteem. Academic self-concept, social self-concept, and self-esteem were measured with three scales from the Dutch version of the Harter scales (Veerman et al., 2004). The items were adapted such that each could be rated on a 5-point Likert scale (1 = not true at all, 5 = completely true). Although each scale originally had six items, confirmatory factor analyses showed insufficient model fit, $\chi^2(132) = 1457.23$, $p < .001$, CFI = .86, RMSEA = .08, SRMR = .07. After removing six items, two for each scale, model fit was sufficient, $\chi^2(51) = 389.37$, $p < .001$, CFI = .95, RMSEA = .07, SRMR = .05. For each scale, the average of the four items was computed. Cronbach's alpha was .74 for academic self-concept, .77 for social self-concept, and .83 for self-esteem.

Results

For each wave, we ran a CFA with ML estimation in Amos 20.0 on all participants with complete data for that wave. Before the analyses, we screened the data for outliers, distributions, and singularity and multicollinearity. In line with Study 1, we removed multivariate outliers (Wave 1 = 56, Wave 2 = 44, Wave 3 = 50), although the factor structure did not differ between the analyses with and without them. No other problems were detected.

The model had good fit for Wave 1, $\chi^2(142) = 399.30$, $p < .001$, CFI = 0.98, RMSEA = 0.04, SRMR = 0.03, Wave 2, $\chi^2(142) = 449.28$, $p < .001$, CFI = 0.97, RMSEA = 0.04, SRMR = 0.03, and Wave 3, $\chi^2(142) = 463.63$, $p < .001$, CFI = 0.98, RMSEA = 0.04, SRMR = 0.03. Table 4 presents the standardized estimates for each wave. All loadings differed significantly from zero at $p < .001$ and exceeded .50 with one exception. In Wave 1, coh7 loaded .49.

Means, standard deviations, and Cronbach's alpha's for each wave are shown in Table 5. Internal consistency of the factors was sufficient to good for all three waves and seemed to slightly increase over the year. The ICCs revealed more within-classroom variation for comfort than for the other factors and increasing between-classroom variation for conflict and isolation over the year.

Table 6 presents the correlations between the dimensions of the CPCQ and peer nominations given for behavior and friendship, likeability ratings given, and self-

Table 4. Standardized Estimates for a CFA by Wave for Study 2

	Wave 1 ^a	Wave 2 ^b	Wave 3 ^c
Item	β	β	β
Com1	0.78	0.82	0.84
Com2	0.71	0.75	0.73
Com3	0.75	0.75	0.79
Com4	0.77	0.82	0.82
Coop1	0.69	0.69	0.69
Coop2	0.70	0.74	0.76
Coop4	0.65	0.67	0.66
Coop6	0.76	0.77	0.81
Con2	0.66	0.65	0.72
Con3	0.80	0.80	0.83
Con4	0.79	0.81	0.81
Con5	0.75	0.74	0.80
Coh1	0.73	0.80	0.79
Coh3	0.76	0.77	0.82
Coh7	0.49	0.54	0.55
Iso1	0.63	0.69	0.76
Iso2	0.74	0.76	0.82
Iso4	0.61	0.59	0.63
Iso5	0.59	0.67	0.70

Note. ^aN = 1435. ^bN = 1396. ^cN = 1399.

ratings for self-concept and self-esteem. Correlations were modest, but in expected directions. For example, the number of peer nominations given for overt aggression was positively related to children's perceptions of conflict, but negatively to perceptions of cooperation. There were two exceptions. Firstly, peer nominations given for social withdrawal were unrelated to any CPCQ dimension. Secondly, the correlations of social self-concept and self-esteem with comfort, and of social self-concept with cooperation were substantially higher than the others.

Table 5. Means, Standard Deviations, Cronbach's Alphas, and Intraclass Correlation Coefficients by Wave for Study 2

Scale	Wave 1 (N = 1435)				Wave 2 (N = 1396)				Wave 3 (N = 1399)			
	<i>M</i>	<i>SD</i>	α	ICC	<i>M</i>	<i>SD</i>	α	ICC	<i>M</i>	<i>SD</i>	α	ICC
Comfort	4.26	0.74	.84	.04	4.26	0.78	.87	.03	4.25	0.77	.87	.05
Cooperation	3.86	0.61	.79	.08	3.88	0.64	.81	.11	3.88	0.64	.82	.12
Conflict	2.73	0.78	.84	.18	2.69	0.84	.84	.23	2.57	0.84	.87	.27
Cohesion	2.79	0.78	.68	.11	2.77	0.86	.74	.12	2.78	0.90	.76	.13
Isolation	2.81	0.79	.73	.09	2.82	0.84	.77	.17	2.76	0.88	.82	.18

Table 6. Correlations of the CPCQ with Nominations Given for Social Behaviors and Friendship, Ratings of Likeability Given, and Children's Self-concept and Self-esteem for Study 2, Wave 1

	Comfort	Cooperation	Conflict	Cohesion	Isolation
Prosocial behavior	.04	.12**	-.07*	.11**	-.04
Overt aggression	-.18**	-.18**	.28**	-.13**	.16**
Relational aggression	-.20**	-.20**	.23**	-.14**	.19**
Social withdrawal	-.02	-.04	.00	-.04	.03
Friendship	.14**	.14**	-.04	.11**	-.02
Likeability	.27**	.30**	-.17**	.28**	-.18**
Academic self-concept	.28**	.20**	-.12**	.11**	-.11**
Social self-concept	.62**	.48**	-.24**	.31**	-.23**
Self-esteem	.57**	.35**	-.22**	.23**	-.23**

Note. $N = 1435$.

* $p < .05$. ** $p < .01$.

Table 7 shows the correlations among the factors by wave. Correlations were mild to moderate for each wave. Stability correlations showed that the constructs were moderately stable over time. Fisher's r -to- Z transformations revealed that the factors became more stable over time (all p 's $< .001$).

Discussion

The aim of this study was to develop a measure of children's perceptions of the classroom peer context and to examine its reliability, validity, and stability. The CPCQ measures comfort, cooperation, conflict, cohesion, and isolation. Together these dimensions provide a comprehensive view of the classroom peer context. The CPCQ demonstrated good reliability, validity, and stability.

Dimensions of the CPCQ

The final version of the CPCQ included four of the five dimensions that were originally expected, while a new dimension was added (isolation). These five key dimensions are linked to the levels of complexity of the peer context (cf. Hinde, 1987; Rubin et al., 2006). Comfort represented the individual level because it examines children's personal orientation towards the classroom. Cooperation and conflict are linked to the interaction level because they describe children's social exchanges in the classroom. Cohesion and isolation are linked to the group level because they assess patterns of interactions and relationships.

The comfort dimension measured the degree to which children felt at ease in their classroom. The moderate correlations of comfort with the other dimensions suggest that children's feelings of comfort may affect their perceptions of the classroom peer context and vice versa. This implies that when researchers study children's experiences of the classroom peer context, the possible influence of individual child characteristics should be considered.

Table 7. Concurrent and Stability Correlations among Factors for Waves 1 to 3 of Study 2

	Wave 1					Wave 2					Wave 3				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Wave 1															
1. Comfort	-														
2. Cooperation	.60 ^a	-													
3. Conflict	.40 ^a	.44 ^a	-												
4. Cohesion	.40 ^a	.54 ^a	.46 ^a	-											
5. Isolation	.35 ^a	.37 ^a	.57 ^a	.43 ^a	-										
Wave 2															
6. Comfort	.64 ^d	.43 ^d	.29 ^d	.31 ^d	.29 ^d	-									
7. Cooperation	.43 ^d	.55 ^d	.34 ^d	.41 ^d	.29 ^d	.62 ^b	-								
8. Conflict	.32 ^d	.34 ^d	.60 ^d	.34 ^d	.41 ^d	.45 ^b	.49 ^b	-							
9. Cohesion	.25 ^d	.36 ^d	.32 ^d	.55 ^d	.33 ^d	.38 ^b	.55 ^b	.47 ^b	-						
10. Isolation	.26 ^d	.29 ^d	.39 ^d	.34 ^d	.52 ^d	.70 ^b	.43 ^b	.61 ^b	.50 ^b	-					
Wave 3															
11. Comfort	.54 ^e	.36 ^e	.26 ^e	.26 ^e	.26 ^e	.71 ^f	.50 ^f	.39 ^f	.30 ^f	.32 ^f	-				
12. Cooperation	.36 ^e	.46 ^e	.29 ^e	.36 ^e	.27 ^e	.50 ^f	.65 ^f	.44 ^f	.45 ^f	.41 ^f	.63 ^c	-			
13. Conflict	.23 ^e	.30 ^e	.51 ^e	.31 ^e	.39 ^e	.35 ^f	.42 ^f	.71 ^f	.40 ^f	.51 ^f	.45 ^e	.55 ^e	-		
14. Cohesion	.20 ^e	.31 ^e	.26 ^e	.49 ^e	.27 ^e	.29 ^f	.42 ^f	.39 ^f	.65 ^f	.40 ^f	.36 ^c	.53 ^c	.48 ^c	-	
15. Isolation	.18 ^e	.25 ^e	.33 ^e	.31 ^e	.44 ^e	.28 ^f	.35 ^f	.47 ^f	.43 ^f	.66 ^f	.36 ^c	.45 ^c	.61 ^c	.51 ^c	-

Note. Stability correlations are in bold. All correlations were significant at $p < .001$.
^a N = 1435. ^b N = 1396. ^c N = 1399. ^d N = 1300. ^e N = 1312. ^f N = 1306.

As expected, we found support for separate positive (cooperation) and negative (conflict) dimensions of peer interaction. They appeared as two separate factors in the EFA of Study 1 and were only moderately correlated in Study 2. This is in line with studies of individual child behavior, indicating that some children behave both positively and negatively in the classroom (e.g., Cillessen & Rose, 2005). Our findings also indicate that only studying one of these dimensions will give an incomplete picture of the classroom peer context.

Contrary to expectations, the CPCQ did not reveal the dimension mutual affection. Perhaps children understood the mutual affection items differently than intended. Take, for example, 'in this class, everyone is friends'. Because of the word 'friends', we considered this item to be representative of mutual affection. It could be, though, that children focused more on the word 'everyone'. This may refer to an overall level of connectedness in the classroom, which seems more representative of cohesion. It may also be that the nature of mutual affection itself explains why it was not found. Mutual affection is a construct of affection in dyads. Sociometric research has shown that children agree less on affective items than on reputational or behavioral items (Cillessen, 2009). While mutual affection is highly prominent in dyads, it may be less observable in the overall classroom context.

We originally formulated one dimension at the group level (cohesion), but the analyses revealed two group level dimensions, cohesion and isolation. Cohesion measures the extent to which all children have positive relationships with each other. Isolation measures the extent to which some children in the classroom have no relationships with classroom peers at all. We considered isolation as a group level construct because the items refer to children's position in their classroom (i.e., they are outsiders), regardless of the reason for it. Children can be outsiders because they withdraw from interactions or because classmates actively exclude or avoid them (Gazelle & Ladd, 2003). Just as cooperation and conflict reflect the positive and negative sides of peer context at the level of interactions, cohesion and isolation represent the positive and negative sides of peer context at the group level and should both be considered in future research.

Reliability, Validity, and Stability

In Study 2, the CPCQ demonstrated good internal consistency for all dimensions in all waves (all α 's > .70, with the exception of cohesion at Wave 1) (Kline, 1999). Our results also evidenced the validity of the CPCQ. Construct validity was demonstrated as all items of the final CPCQ version loaded well (> .50) on their dimension. In addition, we found moderate associations among the scales in expected directions (e.g., negative between cooperation and conflict, positive between cooperation and cohesion). The moderate associations revealed that the dimensions were related but distinct dimensions of the classroom peer context. Construct validity further was indicated by high associations of CPCQ dimensions (especially comfort) with self-concept and self-esteem.

This study also provided evidence for concurrent validity of the CPCQ as associations of CPCQ dimensions with peer nominations given for friendship and behavior and peer ratings given for likeability were in expected directions. These associations were modest, but strengthened by the fact that different methods were used. While this is evidence for concurrent validity, it also underlines that the

CPCQ and traditional measures of peer context may not replace each other and each provide unique insights into the peer context.

The stability correlations in Study 2 were moderate to strong according to Dancey and Reidy's categorization (2004). Also, stability was higher over shorter intervals (Waves 1–2; Waves 2–3) than over the long-term (between Wave 1 and 3). This is in line with other studies of stability of peer constructs (e.g., Camodeca et al., 2002; Jiang & Cillessen, 2005; Ladd, 2006).

Limitations and Directions for Future Research

This study had some limitations. One is that all participating children were in Grade 5. Although classrooms varied in size and ethnic composition, the question remains whether the results generalize to other schools and classrooms. For example, whereas in primary school children spend the entire day with the same classroom peers, in secondary school classroom composition changes several times a day and students interact within an entire grade. Thus, the applicability of the CPCQ might differ between primary and secondary schools. Furthermore, children in lower primary school grades may not yet be able to evaluate overall classroom peer context as it may be hard for them to distinguish their own experiences from those of all peers together. Finally, cultural differences may impact the use of the CPCQ. The degree to which the CPCQ dimensions generalize across various contexts should be examined.

In this study, we evaluated the structure and psychometric properties of the CPCQ at the level of the individual child. Another next step is to examine its structure and psychometric properties at the classroom level (e.g., by using a multilevel CFA), as the ICCs showed at least a basic level of within-classroom agreement on four of the five dimensions. Previous studies have shown that group-level structure may differ from individual-level structure (e.g., Allodi, 2002), thus this is also an important next step on the research agenda.

Future research also should examine whether children's experiences of their classroom peer context relate to their social and academic behavior and whether the predictive value of these perceptions differs from other that of informants as found in other studies (e.g., Erath, Flanagan, & Bierman, 2008). Researchers also may want to examine individual differences related to perceptions of classroom peer context, as the ICCs showed variation between children in the same classroom. Furthermore, there are other relevant dimensions of classroom context (e.g., norms) that are not yet captured with the CPCQ.

Practical Implications and Conclusion

The new measure presented in this study may serve several practical purposes. Firstly, the CPCQ may be helpful to achieve teacher attunement to the classroom. Teachers can use the CPCQ to obtain an understanding of their students' views of the peer context of their classroom at the beginning of the school year. Research has shown that children in classrooms in which teachers are more attuned to the peer context at the beginning of the school year have more positive views of their school at the end of the year (Hamm, Farmer, Dadisman, Gravelle, & Murray, 2011). When teachers have a good understanding of children's perceptions of their classroom they can take actions to achieve positive relationships in the classroom for the remainder of the school year.

Secondly, practitioners and researchers can use the CPCQ to evaluate interventions aimed at improving classroom peer relationships by administering it before and after intervention. Success of an intervention would be demonstrated by lower ratings for conflict and isolation and higher ratings for comfort, cooperation, and cohesion.

Thirdly, the CPCQ may lead to concrete suggestions of what aspects of the peer context of a classroom deserve attention in an intervention. For example, teachers in classrooms with low levels of cooperation and high levels of conflict will want to enhance positive interactions and reducing negative interactions. Teachers in classrooms with low levels of both cooperation and conflict may just want to focus on improving positive interactions.

To conclude, the CPCQ assesses children's perceptions of comfort, positive and negative peer interactions, and cohesion and isolation in the classroom. The CPCQ demonstrated good psychometric properties, including reliability of the scales, construct and concurrent validity, and long-term stability. Therefore, it is a valuable instrument for researchers and practitioners to achieve a quick, yet comprehensive view of children's experiences with their classroom peers.

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