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Read-alouds in kindergarten classrooms: a moment-by-moment approach to analyzing teacher–child interactions

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ABSTRACT

The aim of the study was to explore teacher–child interaction in 24 whole-class read-aloud sessions in Chilean kindergarten classrooms serving children from low socioeconomic backgrounds. Fifteen sessions focused on story meaning, and nine focused on language coding/decoding. We coded teacher and child turns for their function (i.e., teacher initiation, child response, teacher follow-up), type (e.g., open/closed questions, directives; confirmation, elaboration), and complexity (i.e., literal/low vs. inferential/high language). We found considerable variability in reading approaches. Teachers in meaning-oriented sessions initiated more inferential conversations, whereas in code-oriented sessions the majority of initiations had low complexity. Confirmations were the most recurrent follow-up type, while elaborations occurred mainly during inferential conversations. Overall, teachers strongly determined the complexity of the conversation by means of their initiations. The study expands Anglo-American and European findings to the Latin American context, illustrating the commonality of read-alouds as early childhood education practice and underscoring that teachers can engage children from low socioeconomic backgrounds in cognitively challenging conversations.

Introduction

Teacher–child interactions in routine classroom activities may be one of the most relevant mechanisms affecting children's development in educational settings. As proximal processes of development (Bronfenbrenner and Morris 2006), teacher–child interactions determine the quality of the learning opportunities that children are exposed to in the classroom (Hamre and Pianta 2007). Among the diverse dimensions of learning opportunities in early childhood education (ECE) classrooms, those pertaining to the instructional dimension are the strongest predictors of children's outcomes (Mashburn et al. 2008). In spite of its relevance, the instructional dimension is persistently the lowest-scoring domain in measures of quality of learning opportunities in ECE classrooms (e.g., La Paro et al. 2009).

One of the most widespread and recurrent instructional activities in ECE classrooms is the read-aloud. This practice involves reading to a child or group of children and engaging

in a conversation or discussion related to the text (Hindman et al. 2008). Although previous studies are not conclusive, the literature suggests that good-quality shared reading can be linked to improvements in child language development and phonological awareness (Dickinson, McCabe, and Anastasopoulos 2003; Hindman et al. 2008; What Works Clearinghouse 2006a). Evidence suggests that the presence of cognitive challenges (Massey 2004) or cognitive demands (Dickinson and Smith 1994) during the reading session may be the mechanism that accounts for children's language gains.

Here we focus on the quality of the instructional interactions during whole-class shared reading sessions, in the context of an early education intervention in Chilean kindergarten classrooms. We take a micro-analytic observational approach, in order to gain deeper insights into the mechanisms of action of naturally occurring instructional interactions. Our approach is also sequential, which means that we attempt to capture the unfolding of interaction as it occurs and how it concatenates into temporal structures (Bakeman and Quera 2011). The research questions were: (1) What are the most recurrent types of teacher and child interactional turns during whole-class reading sessions in kindergarten classrooms?; (2) Do turn types vary as a function of the general instructional goal of the reading session?; and (3) How strong is the sequential relationship between the level of cognitive challenge of teacher initiations and the level of complexity of child responses?

Quality of teacher–child interactions during book reading

In spite of dissimilar findings regarding the magnitude of the effects of shared reading on children's developmental outcomes (e.g., Dickinson and Smith 1994; Scarborough and Dobrich 1994; What Works Clearinghouse 2006a), there is consensus that this practice has the potential to be an effective instructional activity. The crucial success factor seems to be how the teacher approaches the session in order to make it a powerful learning experience (Teale 2003). Read-alouds can be understood as an interactive experience involving the adult – in this case, a teacher – the children and the text. Previous research has described how different reading techniques and styles may have differential effects on child language development. For example, dialogic reading is a reading technique in which the adult and the child share the story-telling task by switching roles during the activity (What Works Clearinghouse 2006b). Intervention studies in ECE classrooms indicate that this book-reading technique leads to positive gains in children's vocabulary (Hargrave and Senechal 2000). Also a variety of adult reading styles or approaches have been identified in naturally occurring reading sessions (Dickinson and Smith 1994; Reese and Cox 1999; Reese et al. 2003). An adult adopting a describer style (Reese et al. 2003) typically asks questions related to the illustrations during the reading, e.g., requesting labels for objects depicted. In a similar vein, a didactic-interactional style (Dickinson and Smith 1994) generally combines the reading with immediate recall questions or management interventions. In contrast, a performance-oriented adult (Dickinson and Smith 1994; Reese et al. 2003) usually reads the story without interruptions and asks prediction- or comprehension-related questions before and after the story reading. Performance-oriented styles have been associated with children's vocabulary gains (Dickinson and Smith 1994), however none of these styles can be characterized as universally effective (Teale 2003). Experimental evidence suggests that the describer style is more beneficial for children with lower initial language skills, whereas a performance-oriented style

may favor language development of children with higher initial skills (Reese and Cox 1999).

The analysis of reading approaches or interactional styles provides a general characterization of features of reading interactions that may have an effect on the development of child language. At a more fine-grained level it is possible to identify common dimensions that these approaches distinguish, and that can be analyzed in further detail. Taking a micro-analytic approach to analyze such dimensions 'may better capture enduring aspects of teachers' approaches to discussing books' (Dickinson and Smith 1994, 117). We focus here on four dimensions that have been shown to be relevant to the quality of the instructional interactions during read-alouds: First, the level of *cognitive challenge* of the verbal interaction; related to this, the level of *constraint of teachers' questions*; and third, the *characteristics of follow-ups* that teachers provide to children in initiation/response/follow-up (IRF) cycles (Mehan 1979; Sinclair and Coulthard 1975). We frame these three dimensions within a fourth one, which is the general *instructional goal* of the reading session.

A first focused aspect of the quality of teacher–children interactions is the level of cognitive challenge that the discussion about the book poses to children. Authors agree that read-alouds can potentially host rich and challenging conversations (e.g., De Temple and Snow 2003). However, not all verbal interactions during book-reading sessions are equally challenging. More cognitively challenging conversations are those that transcend the information that is immediately available in the here and now. We use the label *inferential language* (Van Kleeck, Vander Woude, and Hammett 2006) for this type of verbal exchange, but authors have also referred to them as non-immediate talk (De Temple and Snow 2003), decontextualized talk (Hindman, Wasik, and Erhart 2012; Snow 1983), representational language (Sigel 2002), and abstract language (Van Kleeck 2003). Examples of this type of language are verbal exchanges that require making predictions, inferring cause–effect relationships, or explaining others' points of view. Engaging in this type of verbal interaction requires the child to take psychological distance from the book and its literal content, in order to provide an answer or take part in the conversation (Sigel 2002). On the other side of the continuum lies literal language, which corresponds to less cognitively challenging verbal exchanges about information that is directly available to perception (Van Kleeck et al. 2006), such as labeling elements of book pictures, or immediate recall of information. While it demands less cognitive effort, literal language does provide children with opportunities for basic understanding of the contents at hand (Hindman et al. 2012).

Previous research indicates that the frequency of cognitively challenging conversations during book readings in ECE settings is associated with vocabulary gains (e.g., Hindman et al. 2012), an effect that has been observed to persist up to fourth grade (Dickinson and Porche 2011). Moreover, interactional studies indicate that when teachers prompt inferential language exchanges, children can take part in complex conversations using elaborated language (Danis, Bernard, and Leproux 2000; Zucker et al. 2010). Literal language, on the other hand, has been found to have a particular role in fostering language development of children with low initial language skills, a result that suggests that literal talk may play an enabling function for more complex language development (Hindman et al. 2012). These findings suggest that cognitive challenge may be described as a relative concept, and that for children with low initial skills, literal questions may be challenging

enough to promote language development. The same applies in cases where the high complexity of the text requires assuring understanding by means of literal questioning, or when a text is read to very young children who are not yet developmentally ready to take part in inferential conversations.

There is a close link between the level of cognitive challenge of conversations during book readings and the characteristics of teacher questions. Instructional interaction is intentionally directed (Pianta 2006), and one of its most crucial tools is the use of questions, which account for approximately one third of teachers' verbalizations (Massey et al. 2008). Teacher questions are also the main triggers of child language production in ECE classrooms (Deunk 2009). We distinguish between open and closed questions (e.g., De Rivera et al. 2005). Teachers can initiate cognitively challenging conversations by using open questions, which pose low constraints on child responses and allow for more sustained dialogs (Massey et al. 2008). Due to their predetermined answering possibilities, closed questions are less likely to initiate cognitively challenging conversations (Sigel 2002). Although open questions tend to be less frequent (Harrop and Swinson 2003), studies indicate that teachers in good quality classrooms employ them more regularly (La Paro, Pianta, and Stuhlman 2004). There is also evidence suggesting that preschoolers formulate more complex, sophisticated answers following open questions (De Rivera et al. 2005), and that shared reading sessions usually contain more open questions than other routine ECE activities (Massey et al. 2008).

The follow-up or third move produced by teachers after a child contribution in the IRF cycle is an important element in teacher-directed interaction. This turn reflects the fact that often in educational interaction the teacher is predominantly the primary knower of the contents (Nassaji and Wells 2000), although this is different in the case of genuine questions about the child's experiences, thoughts or plans. Follow-ups may have either an evaluative or a discoursal, elaborative role (Cullen 2002). Simple evaluative follow-ups, such as 'very good' or confirmatory repetitions, are much more prevalent in early childhood classrooms than elaborative follow-ups (Dickinson et al. 2003). Interventions intended to improve teachers' read-aloud practices indicate that incorporating elaborative forms of follow-up is a difficult challenge for teachers (McKeown and Beck 2003). However when systematic elaborative interactions are implemented, they can lead to significant improvements in children's vocabulary outcomes (Wasik and Bond 2001).

Finally, the main instructional goal of the read-aloud can vary enormously. On the one hand, the reading session can focus on children's meaning/comprehension-related skills (e.g., vocabulary, listening comprehension), that is, on the identification and/or construction of meaning from the book (Connor et al. 2011; Snow and RAND Reading Study Group 2002). On the other hand, the reading session can be more strongly oriented toward fostering code-related skills such as phonological awareness, alphabet knowledge, or initial word-spelling (Connor et al. 2011; Snow and Juel 2008). Teachers in early childhood classrooms tend to focus read-alouds on meaning-comprehension much more regularly than on code-related skills, even when the text contains salient code-related features (e.g., rhyming books) (Hindman et al. 2008). While good quality, meaning-oriented shared-reading may have a positive effect on vocabulary development (De Temple and Snow 2003; Dickinson et al. 2003; What Works Clearinghouse 2006a), there is evidence suggesting that explicit print referencing during book reading can promote the development of alphabet knowledge,

among other literacy skills (Justice et al. 2009). Considering all this, we can expect that inter-actions in meaning- and code-oriented sessions will differ. Thus, in this study we compare sessions with different instructional goals.

Method

Context of the study

The study addresses teacher–child interactions that take place in Chilean, urban kinder-garten classrooms attended by children from low socioeconomic levels. These classrooms belong to public schools, which attract mostly students from the bottom third of the family income distribution (García-Huidobro 2007). Children from low-income Chilean families present rates of socioemotional problems and language delays that at least double those of children from the most affluent families (Behrman, Bravo, and Urzúa 2010). Unfortunately, the public ECE provision offers scarce instructional time and poor opportunities for language and literacy development (Eyzaguirre and Fontaine 2008; Strasser and Lissi 2009). In response to this situation, *Un Buen Comienzo* (UBC, A Good Start) (Yoshikawa et al. 2015) – a large scale, cluster randomized intervention aimed at offering good quality ECE education to children from urban, disadvantaged socioeconomic backgrounds – has been developed and implemented. In total, three cohorts of schools participated in the two-year program, which covered pre-kindergarten and kindergarten years (i.e., around ages four to six). The main element of the interven-tion was an intensive teacher professional development program, with the primary focus on improving teacher skills to promote child language and literacy, and child socioemo-tional adjustment.

Sample

We analyzed videos of naturally occurring read-aloud sessions in 24 Chilean kinder-garten classrooms. These classrooms belong to 18 different schools of the UBC program. As part of the program's measurements, the classrooms participated in three waves of video recording: at the beginning of pre-kindergarten (before ran-domization), at the end of pre-kindergarten, and end of kindergarten. The reading ses-sions examined here correspond to this last measurement of the second cohort of the intervention.

The mean age of children per classroom ranges from five years and nine months to six years and one month. All children are monolingual, Spanish speakers. The mean class size on the day of the video recording was 21.22 ($SD = 7.80$).

As part of the larger UBC project, active consent was requested from the primary care-taker of each child in the study. This consent referred to several research activities linked to the evaluation of the program, among which was the filming of classroom activity. The focus of the filming was on the teacher practices and general classroom processes rather than on children. Therefore, the footage shows only whole-group activities, and does not identify individual children in the captures, nor does it allow linking children to other datasets. Moreover, the video data has been handled carefully, only by the authorized researchers who have previously signed a confidentiality agreement.

Video data

One full day (4 hours) of natural classroom activity was recorded and from there whole-class read-aloud sessions were identified. These occurred in 24 of the 47 classrooms observed.[1] We defined the boundaries of the reading session as follows: the session began when the teacher introduced the activity, and when the group is in the classroom setting in which the reading took place. The session typically contained an introduction, a reading part, and a discussion section; however, this structure was not necessarily present in all the sessions. Extra whole-group, reading-related activities (e.g., vocabulary discussion, writing a new word from the text) that were conducted in the same classroom setting were also coded as part of the read-aloud session. Other text-related activities such as arts and crafts or individual writing of a word from the story were not considered in the coding, because the characteristics of the activity and/or the recording made capturing the instructional interactions between teacher and children difficult.

Due to technical issues, some video clips are not complete. In order to observe a sufficient amount of interaction, we defined a minimum of five minutes of video data as an inclusion requirement. Table 1 shows the variation in the duration of the available 24 sessions and the saturation of the interaction (i.e., number of codes or data points and rate per minute). As naturally-occurring instructional activities, the reading sessions differed also in the book or text that was used, and the general instructional approach taken by the teacher. A main distinction here is the overall *instructional goal*: most of the sessions ($n = 15$) were primarily focused on meaning-related goals, while the others ($n = 9$) worked mainly on code-related content. This distinction does not imply a total absence of meaning-oriented interaction in code-oriented sessions, and vice versa, but it identifies the predominant focus of the session.

Coding

Coding scheme

Taking a microanalytic approach, we developed a coding scheme to tackle the interactions between teacher and children during the shared-reading sessions. We drew on existent definitions and coding schemes from several authors (Cullen 2002; Massey et al. 2008; Pentimonti and Justice 2010; Pentimonti et al. 2012; De Rivera et al. 2005; Zucker et al. 2010). The coding scheme was exhaustive and multidimensional, and its unit of analysis was the utterance. In this study we focus on three dimensions: the type of each single verbal turn, its focus, and its complexity. Table 2 presents a summary of the codes considered in this study.[2]

Table 1. Descriptives of reading sessions ($N = 24$).

		Duration (minutes, seconds)	Data points	Rate data points per minute
Meaning-comprehension	Mean	12 m 30s	192.07	15.96
($n = 15$)	Minimum	6 m 40s	39	3.86
	Maximum	22 m 28s	301	25.92
Coding-decoding	Mean	12 m 30s	249.22	21.17
($n = 9$)	Minimum	5 m 9s	124	14.73
	Maximum	23 m 00s	451	27.70

Table 2: Coding scheme and reliability estimates (Cohen's Kappa) of the main dimensions

	Coding dimensions		
Code groups	Type	Focus	Complexity*
Teacher Initiation	Closed question	Meaning-oriented	→ Literal / Inferential
	Open question	/	
	Directive	Code-oriented	→ Low / High
	Other (pseudo) initiation		Ø
Child(ren) Response	Answer	Meaning-oriented	→ Literal / Inferential
		/	
		Code-oriented	→ Low / High
Teacher Follow-up	Confirmation	Meaning-oriented	Evaluative
	Evaluation	/	
	Falsification	Code-oriented	
	Answering		
	Elaboration		/ Elaborative
	Hint		
	Other follow-up		Ø
	κ = .78	κ = .93	κ = .79

Note: *Complexity was coded for teacher initiations and child responses; in the case of follow-ups, complexity corresponds to a grouping of types of follow-ups rather than to a code.

The main code groups reflect the *Type* of teacher initiations, child responses[3] and teacher follow-ups. Teacher initiations correspond to utterances that prompt a response from the child or group of children. The main codes here are closed and open questions. *Closed questions* have predetermined answering options (e.g., yes–no questions: 'Was his mom angry at him?'; or closed alternatives: 'Is this teddy bear big or small?'). *Open questions*, on the other hand, minimize constraints on the possible responses and allow for further elaborations (e.g., 'What will happen to the cicada in the winter?'). Teachers can also prompt a child's response by means of a *directive*, which corresponds to a request to perform a task or participate in a given activity (e.g., 'Read here'). Children typically react to teacher initiations with an *answer*. In the final step of the IRF cycle, we distinguish types of teacher follow-up: a *confirmation* implies that the child's answer was acceptable, either by repeating the answer in a confirmatory manner or by saying 'yes', 'right' or another confirmatory utterance; on the contrary, *falsification* rejects the child's response without offering the right answer (e.g., 'No, that's not correct'); an *evaluation* positively or negatively judges the quality of the answer or effort of the child (e.g., 'You'll get a star for that!', 'How smart of you!'); *answering* is coded when the teacher provides the answer herself, typically after the child has responded incorrectly; in an *elaboration* the teacher expands the child's answer adding further information or reframing it into a more abstract formulation (e.g., teacher: 'what did the child do to buy the toy he wanted?' / child: 'he sold all the nuts to get the money' / teacher's elaboration: 'so he worked hard to obtain what he wanted'); finally, a teacher can follow up a child's answer with a *hint*, which typically occurs when there is no answer from the child or the answer is not correct.

All these moves can have either a *meaning-* or *code-oriented Focus*. Moreover, the *Complexity* of meaning-oriented turns (initiation and response) was coded with the *literal-inferential* distinction. Consistent with the literature, we coded a turn as literal when it referred to perceptually available information from the text or illustrations, or to immediate information recall (e.g., 'The elephant is blue', 'What was his name?'). An

inferential turn implies taking distance from the text or illustrations, and reflecting on the information available (e.g., 'What do you think will happen next?', 'I have seen mermaids only on TV'). We extended this distinction to code-oriented turns, whose complexity was defined as either *low* or *high*. To define the complexity of code-oriented turns we considered a broad standard of children's literacy skills by the end of kindergarten (MINEDUC 2008; Snow 2008). Low complexity turns focus on labeling letters or very small units or text, such as final or initial sounds (e.g., 'What letter is this?'). Higher complexity turns demand further reflection and integration of small units of text (e.g., 'What other words rhyme with table?', 'How do you write school?'). Follow-up moves were grouped based on their complexity: a simple, *evaluative* form only confirms or disconfirms information and does not activate further sustained thinking (i.e., confirmation, falsification, evaluation, answering); an *elaborative* form adds to the dialogue, either by extending the information available (elaboration) or by providing further thinking opportunities (hint).

Coding procedure

The first author and a research assistant – both native Spanish speakers – double coded 25% of the video data to explore the inter-rater agreement. The Cohen's Kappa coefficients for each of the dimensions involved in the present study – indicated in Table 2 – were considered sufficient for further analysis. The process to obtain an acceptable level of agreement took three rounds of coding, followed by an analysis of the disagreements, and refinement of the coding rules. After each round, the previous coding was revised independently and new video data was coded. In order to avoid an extra source of disagreement, the first author segmented the verbal interaction into coding units (i.e., utterances), and the research assistant only assigned codes to each unit. The coding was done with the software The Observer XT (Noldus Information Technology 2011). The units of analysis were continuously coded in order to capture behavioral streams, that is, sequences of verbal behavior over time (Bakeman and Quera 2011).

Results

Descriptive results

Table 3 shows the type and complexity of meaning-related initiations in meaning-oriented sessions and of code-related initiations in code-oriented read-alouds. Although there were initiations of the other type in sessions of each focus, we will set the attention on the initiations that determine the focus of the sessions.

Teachers in meaning-oriented sessions tended to initiate interactions by using questions rather than directives, with a slight predominance of closed questions versus open ones. In code-oriented sessions, on the other hand, *directives* were by far the most typical. The association between the focus of the session and the type of initiation used by teachers is significant and strong ($\chi^2[2] = 317.12$, $p < .001$, $\varphi = .56$).

Regarding complexity of initiations, in meaning-oriented sessions there were on average more *inferential* (52%) initiations than *literal* ones, whereas the in code-oriented read-alouds, the complexity of initiations was predominantly *low* (81%).

Table 3. Distribution of initiation types per level of cognitive challenge in meaning- and code-oriented sessions.

	Meaning-related initiations			Code-related initiations		
	Literal N (%)	Inferential N (%)	subtotal	Low N (%)	High N (%)	subtotal
ClosedQ	185 (77.7)	53 (32.3)	238	55 (67.9)	26 (32.1)	81
OpenQ	13 (6.4)	189 (93.6)	202	3 (16.7)	15 (83.3)	18
Directive	39 (67.2)	19 (32.8)	58	271 (87.7)	38 (12.3)	309
Total	237 (47.6)	261 (52.4)	498	329 (80.6)	79 (19.4)	408

Note: ClosedQ = closed question; OpenQ = open question.

Table 3 also reveals the association between the type of initiation and its complexity. Given a closed question in meaning-oriented sessions, the conditional probability of it being *literal* was $P(clq|lit) = .72$; given an open question, the conditional probability of it being *inferential* was $P(opq|inf) = .94$. This was significant and large in magnitude ($\chi^2[1] = 224.4$, $p < .001$, $\varphi = .71$). In code-oriented sessions, there was also an overall significant association between the type of initiation and its level; however, its magnitude was moderate ($\chi^2[2] = 65.47$, $p < .001$, $\varphi = .40$). In this case the most remarkable trend was the concentration of directives of a low level – $P low|dir) = .88$ – as compared to the high level of complexity.

The complexity of child responses shows also differences between the types of sessions. In meaning-oriented sessions child responses showed a slight predominance of literal level ($n = 269$, 58.5%, versus $n = 184$ inferential responses). In code-oriented sessions, on the other hand, there was a large predominance of child responses of low complexity ($n = 276$, 86.3%, versus $n = 44$ high complexity responses).

The characteristics of teacher follow-ups differed greatly in the two types of reading sessions. A total of 457 follow-up utterances were registered in meaning-oriented sessions and 221 in code-oriented sessions. Figure 1 depicts the proportions of the total amounts of follow-up moves that are represented by each type. In meaning-oriented sessions it is evident that simple, evaluative follow-ups (i.e., confirmation, falsification, evaluation, answering) were the preferred type of teacher follow-up with 69% of the total occurrences. Elaborative follow-ups occurred 21% of the times in these sessions. The proportions of follow-up types in code-oriented sessions were slightly more evenly distributed than in meaning-oriented sessions, with simple, evaluative follow-ups accounting for 60% of the total follow-up turns, and elaborative adding up to 28% of the follow-ups coded in these sessions.

Sequential relationship of interactional complexity

Table 4 shows the 1-lag transition matrix between teacher meaning-related initiations and child responses. The rows refer to the teacher initiation (given behavior) and the columns to the child's response in the next turn (target behavior). In other words, the matrix represents only those cases when initiations were immediately followed (i.e., in the next turn) by a child's response.
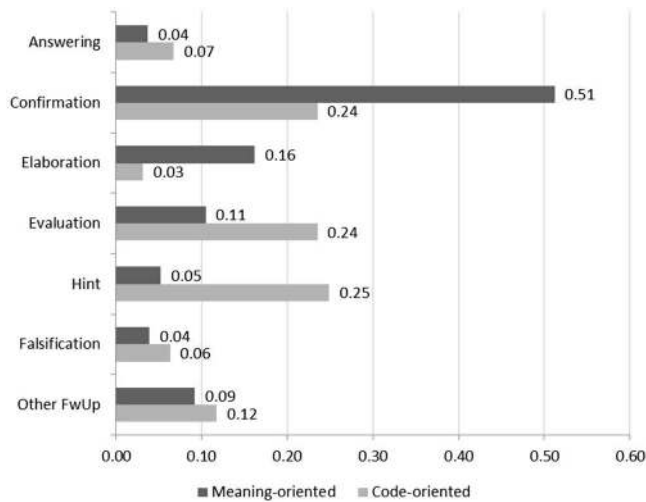
Figure 1. Relative frequencies of different types of teacher follow-ups in meaning- and code-oriented sessions.Note. Total number of follow-ups in meaning-oriented sessions was $n = 457$, and in code-oriented sessions was $n = 221$.

Considering the meaning-oriented sessions first, transitional probabilities indicate that when there was an Initiation-Response sequence started with a literal initiation the probability of the child's response at the same level was $P(RLit|InLit) = .96$. The relationship at this level is almost deterministic. On the other hand, given an inferential initiation by the teacher, the probability that the child's response was at the same level of complexity was $P(RInf|InInf) = .72$. This means that in 28% of the Initiation-Response sequences at this level, children did not provide a response at the level that was intended by the teacher's initiation. Overall, the sequential association derived from this matrix is significant and strong ($\chi^2[1] = 155.64$, $p < .001$, $\varphi = .72$), but children were significantly more prone to respond at the level elicited by the teacher when the initiation was literal ($OR = 9.08$; 95% CI [3.89; 21.21]). Also a 2-lag association (table not shown) was detected between the complexity of teacher initiations and children's response ($\chi^2[1] = 21.73$, $p < .001$, $\varphi = .55$). This considered the initiations that were followed by a child response in the second consecutive turn.

The right-hand side of Table 4 shows equivalent information for code-oriented sessions. A similar pattern arises, which indicates that given a low-level initiation the likelihood of a low-level response was $P(RLow|InLow) = .99$. In the case of high-level initiations,

Table 4. Complexity of teacher initiations and of child responses in meaning- and code-oriented sessions: Lag-1 frequencies and transitional probabilities.

Meaning-oriented sessions				Code-oriented sessions			
	R-Literal	R-Inferential	Total		R-Low	R-High	Total
I-Literal	166	7	173	I-Low	216	2	218
	(.96)	(.04)			(.99)	(.01)	
I-Inferential	36	94	130	I-High	11	18	29
	(.28)	(.72)			(.38)	(.62)	
Total	202	101	303	Total	227	20	247

the probability of the consecutive response being of a high level was $P(RHigh|InHigh)$ = .62. Therefore, in 38% of the code-oriented Initiation-Response sequences, children provided an answer that did not match the level prompted by the teacher. Children were much more likely to respond at the level elicited by the teacher when the initiation was low ($OR = 66.0$; 95% CI [13.57; 320.92]). Overall, the Initiation-Response association in code-oriented read-alouds was also significant and of a moderate magnitude ($\chi^2[1] = 65.47$, $p < .001$, $\varphi = .40$). Initiation-Response sequences at second lag were not frequent enough ($n = 11$) to establish an association.

Finally, we explored whether follow-ups of different complexity (low or evaluative, and high or elaborative) were more likely to occur after initiation-response sequences that had either one or the two turns of a high/inferential level. The comparison (not shown) indicated that low level follow-ups were much more likely to occur in general, and no significant association was detected with the level of the previous initiation-response sequences. In meaning-oriented classrooms follow-ups were almost equally likely to be evaluative, either after literal ($P(FUpEval|IRLit) = .80$) or inferential exchanges ($P(FUpEval|IRInf)$ = .78, $OR = 1.17$, 95% CI [0.58; 2.38]). A stronger expression of this trend was observed in code-oriented sessions, where low-level (evaluative) follow-ups were much more likely to occur than elaborative ones, both after low ($P(FUpEval|IRLow) = .91$) and high complexity exchanges ($P(FUpEval|IRHigh) = .84$, $OR = 1.88$, 95% CI [0.29; 11.66]).

Discussion

In this study we explored the teacher–child interactions in the context of 24 whole-class read-aloud sessions in Chilean kindergarten classrooms serving children from low socio-economic backgrounds. We questioned about the most recurrent types and complexity of teacher initiations, child responses and teacher follow-ups; their differences between reading sessions of different focus (i.e., meaning- and code-oriented); and the sequential association between the complexity of interactional moves of both teachers and children. The major findings emerging from this study were:

- Teachers in meaning-oriented sessions used on average more inferential initiations than literal ones, whereas in code-oriented sessions the majority of teacher initiations were of low complexity;
- There is a strong sequential association between the complexity of teacher initiations and the complexity of child answers;
- Simple confirmations were by far the most preferred teacher follow-up type in meaning-oriented sessions; Elaborative follow-ups were scarce, both in meaning- and code-oriented sessions;
- Kindergarten children from low-socioeconomic backgrounds in Chile are able to participate in cognitively challenging conversations when properly prompted.

Our main findings revealed that there is strong variability in the way teachers approach the reading sessions. Clear differences were detected between meaning- and code-oriented sessions; however, strong variability was also identified in the context of similar instructional goals. Previous research has acknowledged the existence of diverse reading-styles (Reese et al. 2003). Although repeated reading sessions would be needed in order to

ascertain the presence of diverse reading styles in our sample, the micro-analytic approach we took may help unmasking regularities in the interaction given a one-time observation (Dickinson and Smith 1994). Thus, the diverse concentrations of move-types across classrooms may be indicators of the learning opportunities these teachers regularly offer to children when reading books.

Interestingly, we found that, within the meaning-oriented group, there were proportionally more teacher initiations at the inferential than the literal level. Previous studies on read-alouds have found dissimilar results in this respect: some indicate that teacher literal talk is predominant in reading sessions with young children (Danis, Bernard, and Leproux 2000; Dickinson et al. 2003), whereas others report a higher prevalence of teacher decontextualized (i.e., inferential) talk during these activities (Hindman et al. 2008; Zucker et al. 2010). If we consider both teacher initiations and child responses together, the proportion of literal talk in our sample of meaning-oriented sessions was slightly larger than that of inferential talk. Although not exactly the same concepts apply, talk during code-oriented sessions was primarily of low-complexity, for both teachers and children. This means that code-related talk focused mainly on aspects that we could assume – in theory – not to be novel for children by the end of their kindergarten year. Other researchers have also found that code-related talk in book-reading sessions is mainly of a low-level of complexity, suggesting that teachers may not consider cognitively challenging code-talk as possible or that they regard it as ineffective (Hindman et al. 2008). Acknowledging that a more definite conclusion could be drawn by observing the same teachers conducting meaning- and code-oriented read-alouds, these differences at least suggest that teachers tend to prompt more cognitively challenging conversations in the context of meaning-oriented sessions than in code-oriented ones.

Moreover, the scarcity of elaborative follow-ups as opposed to evaluative ones, both in meaning- and code-oriented sessions, seems to correspond with previous research (McKeown and Beck 2003). This implies that follow-ups are not being systematically used by teachers as a tool for helping children think further. This represents an opportunity for the improvement of the classroom practice, as the current situation results in a potential loss of learning opportunities for children who need more systematic stimulation.

We explored the sequential association between the level of cognitive challenge that the teacher poses to children in her meaning-related initiations, and the level of complexity of children's responses. This approach can help reveal regularities of interaction as a proximal process that occurs in the *micro-time* (Bronfenbrenner and Morris 2006). We found that this sequential association was significant and strong. Similar findings have been reported in previous studies (Danis et al. 2000; Zucker et al. 2010), confirming that the level of competence contained in the teacher prompt acts as an *attractor* (Van Geert and Steenbeek 2005) of the level of the child's verbal provision. When responding to an inferential initiation, children significantly more often provided information at the same level than at a literal one. There is, however, a stronger probability of not meeting the requirements of the prompt than when following literal initiations. This relates to previous findings that indicate that children tend not to raise the level of the conversational exchanges (Danis et al. 2000). We speculate that not meeting the requirements of the prompt may be more related to the characteristics of the prompt than to the actual ability of children. In these cases it might be that the teacher's elicitation embodied a

level of information that was not cognitively accessible to (all) children at that moment, which led to the provision of an answer based on immediately available information. In other words, the gap between the teacher prompt and the current level of understanding of the child may have been too large, suggesting that the teacher elicitation was not *fine-tuned* to the child's current understanding (Snow, Perlmann, and Nathan 1987). Exploring such hypothesis requires information about the dynamics of the child's level of understanding that we cannot infer from our data, therefore follow up research in that line is suggested.

Implications for practice

Although the present study does not inform us about the effects of interaction quality on child developmental outcomes, the findings signal important lines for the improvement of classroom practices. A relevant implication of our findings is the confirmation that when teachers prompt children's responses at a high level of complexity, kindergarten children from low-socioeconomic backgrounds in Chile are able to participate in cognitively challenging conversations. As we already discussed, there are exceptions, but these may not necessarily be attributed to the child's ability. Given these children's home and school environments – characterized by a low exposure to language and literacy instruction, and by low expectations of their learning potential – these findings suggest that children are receptive to cognitively challenging conversations and that these should be more systematically encouraged. Our findings highlight not only the relevance of initiating challenging interactions but also of sustaining them. The interactional sequences in our data reveal that an important area of improvement of classroom interaction is the current use of follow-up turns. Early childhood educators need support in order to make a more purposeful use of these turns as tools to expand content and elicit further thinking. Intentionally increasing the complexity of verbal exchanges around read-alouds and other classroom activities may not only have cognitive benefits, but it may also help promote children's participation in the classroom interaction. Eliciting conversations around attractive contents increases the opportunities for children to make connections with their own experience and facilitates their sustained engagement in the classroom activity.

Finally, the methods used in our study for examining the characteristics of verbal interaction might be useful in professional development activities oriented to improve teachers' conversational skills. Analyzing others' and own examples of verbal interaction can better convey notions that may be otherwise too abstract, such as cognitive challenge or fine-tuning. Such analysis can also help educators reflect on their own practices and identify (missed) opportunities for stimulating children's understanding.

Limitations

Throughout our discussion we have revealed several of the limitations of our study. The fact that our data derive from a single observation represents a clear limitation to our conclusions. Although our micro-analytic approach partially compensates for this weakness, a different design that allows a comparison of how teachers approach read-alouds at different moments of the year, with diverse instructional goals (i.e., code- vs. meaning-focused),

and with texts of diverse type and complexity, would help generate more solid conclusions about the quality of the learning opportunities that children are exposed to in these sessions. More observation occasions would also help connect our insights at the micro-time level with children's developmental process at short and longer terms, so as to better capture the transactional nature of interaction and learning (Bronfenbrenner and Morris 2006). An additional limitation is related to the whole-class format in which all these sessions were conducted. This format is widely used in ECE read-alouds, and consequentially its study embodies ecological validity. Nevertheless, it has the drawback that it does not allow distinguishing children's individual participation and engagement in the interaction. Identifying how children with particular characteristics differentially participate in the classroom interaction would provide important information to assess mechanisms such as fine-tuning, which may have a strong potential to inform the improvement of early education practice.

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Notes

1. The absence of book-reading during an entire day in almost half the classrooms confirms the picture provided by Strasser, Lissi, and Silva (2009) of low levels of educational activity in Chilean kindergartens.
2. A full description of the coding scheme is available upon request.
3. The coding scheme considered also other types of child utterances, such as initiations and elaborations, however teacher-initiated exchanges were by far the most predominant type. For this reason we focus on teacher-initiated IRF sequences.

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