School-Age Children Talk About Chess: Does Knowledge Drive Syntactic Complexity?

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Purpose: This study examined language productivity and syntactic complexity in school-age children in relation to their knowledge of the topic of discussion—the game of chess.
Method: Children (*N* = 32; mean age = 10;11 [years;months]) who played chess volunteered to be interviewed by an adult examiner who had little or no experience playing chess. Children's chess knowledge and experience was assessed, and each child was classified as a novice or an expert player. Each child participated in 3 speaking tasks: General Conversation, Chess Conversation, and Chess Explanation. Interviews were audiorecorded, transcribed into Systematic Analysis of Language Transcripts (J. F. Miller & R. Chapman, 2003), segmented into T-units, and coded for finite clauses. Each speaking task was analyzed for total T-units; mean length of T-unit; clausal density; and nominal, relative, and adverbial clause use.
Results: Total T-units, mean length of T-unit, clausal density, and the use of each type of subordinate clause was substantially higher in the Chess Explanation task compared with the Chess Conversation task or the General Conversation task. Compared with the novices, the experts knew more about chess, had played longer, and were stronger players. Nevertheless, the novices and experts did not differ on any of the language factors for any of the speaking tasks.
Conclusions: Language productivity and syntactic complexity in school-age children are strongly influenced by the speaking task. When children are presented with a motivating and challenging topic, they rise to the occasion to explain the finer details of it to a naïve adult.

KEY WORDS: school-age children, complex syntax, expository discourse, chess

During the school-age years, adolescence, and early adulthood, syntactic development is characterized by gradual increases in the length and complexity of utterances produced in spoken and written communication (Nippold, 2007). To document these changes, growth in syntax is commonly measured by determining mean length of T-unit. A *T-unit* is an utterance that must contain one main clause (e.g., "The dogs ran to the door") and optionally may contain one or more subordinate clauses (Hunt, 1970; Loban, 1976). Three primary types of subordinate clauses include *nominal* ("The dogs knew *their master had arrived*"), *relative* ("The dogs *that were hungry* ran to the door"), and *adverbial* ("*When they heard their master,* the dogs ran to the door"; Crews, 1977; Quirk & Greenbaum, 1973). A measure that is commonly used to capture growth in subordination is *clausal density* (i.e., the subordination index), which is "the average number of clauses (main and subordinate) per T-unit" (Scott, 1988, p. 58; also see Nippold, Hesketh, Duthie, & Mansfield, 2005). By 5 years of age, most children easily produce sentences containing all types of subordinate clauses (Diessel, 2004). What changes beyond this point is an increase in the efficiency with which complex structures are accessed; the production of longer T-units containing multiple and embedded subordinate clauses; and the integration of these utterances into organized and sustained pieces of discourse, including conversational, narrative, and expository (Bates, 2003; Berman & Verhoeven, 2002; Hunt, 1970; Loban, 1976; Nippold et al., 2005; Nippold, Mansfield, & Billow, 2007; Verhoeven et al., 2002).

Although later syntactic development has been well documented, little is known about factors that underlie its growth. However, over 40 years ago, education theorist James Moffett (1968) hypothesized that intellectual stimulation and an expanding knowledge base were factors primarily responsible for growth in syntax beyond the preschool years. He argued further that the acquisition of increasingly abstract thought enabled the child to integrate new information into existing knowledge systems that would support the production of dialogues (such as conversations) and, with greater maturity, the production of monologues (such as expositions). Expositions are particularly challenging because they require the production of an informative monologue, tapping the speaker's knowledge of the topic—however limited or extensive that may be (Nippold et al., 2007). Notably, studies have shown that when speaking in the expository genre, children, adolescents, and adults use greater syntactic complexity than when they are speaking in other genres, such as conversational or narrative (Berman & Verhoeven, 2002; Nippold et al., 2005; Nippold, Mansfield, Billow, & Tomblin, 2008; Scott & Windsor, 2000; Verhoeven et al., 2002). Moffett's view concerning the knowledge base as a key factor underlying syntactic development was later endorsed by Loban (1976), who conducted a longitudinal study of syntactic development in children (n = 211) who were interviewed and wrote essays every year from kindergarten through 12th grade. His findings suggested that students who were academically stronger (and presumably more knowledgeable) consistently produced longer sentences with greater amounts of subordination in speaking and writing compared with their academically weaker peers. Since his study was published, the relationship between syntactic development and the knowledge base has received little attention.

However, in a study that touched on this topic, Nippold et al. (2005) compared the level of syntactic complexity produced by speakers during conversational and expository discourse. Their study included 120 individuals, with 20 drawn from each of six age groups: two groups of children (mean ages = 8 and 11 years), two groups of adolescents (mean ages = 13 and 17 years), and two groups of adults (mean ages = 25 and 44 years). Each speaker participated in two tasks. The first task consisted of a general conversation about common topics, such as family, friends, and pets, and the second task consisted of an explanation of the rules and strategies of a favorite game or sport. The results of the study indicated statistically significant age-related increases in the amount of discourse produced and in the length and complexity of utterances in both genres. Additionally, all six age groups produced significantly longer utterances with greater amounts of subordination during the expository task compared with the conversational task. Informal observation of the participants during their interviews suggested that the expository task might have been more stimulating (e.g., "What are some key strategies that every good player should know?") than the conversational task (e.g., "Do you have any pets?" "Tell me about them"), possibly causing speakers to tap into their intellectual resources more fully. Moreover, when asked the identical questions about a particular game or sport, older speakers often provided more information than younger ones, suggesting that differences in topic knowledge impacted the results. For example, when asked to explain some key strategies needed to win a basketball game, an 8-year-old boy replied simply that one team needed to score more points than the other, whereas a 40-year-old man offered three different strategies and described each one in detail. These observations led the investigators to speculate that "complex thought is driving the development of complex language" (Nippold et al., 2005, p. 1048).

Subsequently, Nippold et al. (2008) examined conversational and expository discourse in a large cohort of adolescents (n = 444; mean age = 13;11 [years;months]) who were participating in a longitudinal study of language development. At kindergarten, each participant had been identified as having specific language impairment (SLI), nonspecific language impairment (NLI), or typical language development (TLD). At that time, standardized testing and language sampling had revealed that the SLI and NLI groups had poorer syntactic development than the TLD group. When the groups were reassessed at eighth grade, the procedures used for eliciting, transcribing, and analyzing the language samples were identical to those that had been employed in the developmental study (Nippold et al., 2005). Consistent with that study, mean length of T-unit and the use of all types of subordinate clauses were substantially greater in the expository genre than in the conversational genre for all three groups. It was also found that although the groups did not differ on the conversational task, the TLD group outperformed the SLI and NLI groups on the expository task. Thus, only the expository task was sensitive to lingering syntactic deficits in adolescents with a history of language impairment.

In the two previous studies (Nippold et al., 2005, 2008), no attempts were made to measure speakers' knowledge of the game or sport under discussion. Hence, it would be interesting to formally examine speakers' knowledge of the topic as a way of testing the hypothesis that complex thought, supported by the knowledge base, underlies the use of complex syntax, similar to what Moffett (1968) proposed. The present study was not designed as a developmental investigation. Rather, it was an attempt to learn about children's use of complex syntax in relation to their knowledge of the topic—the game of chess. It was expected that children having a deeper understanding of chess would have a greater need for complex syntax to express their thoughts when discussing the details of the game. Typically developing school-age children were asked to talk about chess, first in a conversational genre and then in an expository genre. Children's knowledge and experience with respect to chess were assessed, and they were classified as novice or expert players on the basis of their responses during the expository interview. The novices and experts then were compared for language productivity and syntactic complexity across speaking tasks. In keeping with the hypothesis that complex thought is driving the use of complex language, it was predicted that the experts, having greater knowledge of chess, would outperform the novices when talking about the game of chess, especially during the expository task, but not necessarily when talking about other topics.

Another purpose of the present study was to revisit the question concerning differences in syntactic complexity as a function of genre. In the two previous studies (Nippold et al., 2005, 2008), the conversational task was less formal than the expository task. For example, during the conversational task, the examiner was more flexible, following the speaker's lead in asking questions, whereas during the expository task, all participants were asked the same set of questions, regardless of their chosen game or sport. Additionally, the topics of discussion varied widely in each genre, driven by the speaker's expressed interests. It is possible that variations in formality and topic may have contributed to the results. A question to address is what might happen if both tasks, the conversational and the expository, are formal in that they involve a tightly structured interview and focus on the same topic. The present study was designed to address this question. Given that the expository genre places greater demands on a speaker through the expectation of an informative monologue (Berman & Verhoeven, 2002), whereas the conversational genre is a more interactive dialogue (Crystal, 2002), it was predicted that syntactic complexity would be greater in the expository genre than the conversational for both the novices and the experts, while controlling for formality and topic during the interview.

If syntactic complexity is found to be greater in the expository genre under these improved experimental conditions, this would provide additional support for the hypothesis that complex thought, supported by the knowledge base, is driving the use of complex language. The topic was the game of chess, discussed first in a conversational genre and then in an expository genre. In addition, each session began with a general conversation, similar to what was used in the previous studies (Nippold et al., 2005, 2008). This allowed for a comparison of syntactic complexity across three different speaking tasks: General Conversation, Chess Conversation, and Chess Explanation. It was predicted that the Chess Explanation would elicit greater syntactic complexity than the Chess Conversation, which, in turn, would elicit greater complexity than the General Conversation because of differences in cognitive stimulation across tasks and the need to tap into a sophisticated knowledge base.

All children who participated in the study considered themselves to be chess players. They were recruited because it was assumed they would have some knowledge of the game and an interest in talking about it. Chess is a popular game that has been played around the world for over 1,000 years, having originated in India around 600–700 A.D. (Fine, 1967). A complex activity requiring logic, foresight, and planning, the game of chess frequently has been the object of study by those seeking to understand the nature of human thought (Eales, 1985). Although it often requires years of competitive play, specialized training, and effortful study to become an expert chess player (Ross, 2006), children who are highly motivated can acquire the skills necessary to defeat many of their adult opponents (Chi, 1978). Of relevance to the present investigation is the research finding that stronger players rely on a structured knowledge base of positions and strategies that weaker players lack, enabling them to determine appropriate moves more efficiently (Ross, 2006). The importance of the knowledge base as a factor that distinguishes novices from experts makes chess an excellent choice for examining the relationship between topic knowledge and syntactic complexity as players of varying strengths talk about the game in different discourse genres—conversational and expository.

In keeping with the previous studies (Nippold et al., 2005, 2008), syntactic complexity was measured in terms of mean length of T-unit, clausal density, and the use of three types of subordinate clauses (nominal, relative, and adverbial). Given that these data were obtained for all speakers across three different tasks, it was of interest also to determine the extent to which these factors were associated with one another—for it has long been argued that mean length of T-unit (or C-unit) is a key marker of later syntactic development (Hunt, 1970; Loban, 1976). If it is found that these factors are closely associated in all three speaking tasks, this would suggest that in future research, a reasonable approach might be to confine the analyses to the identification of mean length of T-unit. It was predicted that this factor would represent syntactic complexity efficiently, on the basis of past studies that employed similar methods but presented fewer speaking tasks (Nippold et al., 2005, 2008).

In sum, the present study was conducted to address the following questions:

1. Do differences in topic knowledge impact language productivity and syntactic complexity in the speech of school-age children?
2. How do language productivity and syntactic complexity vary across conversational and expository genres when formality and topic are controlled?
3. How closely are traditional measures of syntactic complexity associated with one another in speaking tasks that involve conversational and expository discourse?

Method

Participants

School-age children (N = 32; mean age = 10;11; range = 7;3–15;4) who played chess volunteered to be interviewed for the study. The sample consisted of 29 boys and 3 girls who represented a range of ethnic backgrounds—including European American, African American, Asian American, and Hispanic—drawn from low-income to middle-income neighborhoods in western Oregon. All children spoke English as their primary language and were considered by their parents or teachers to be typically developing.[1] Most children were recruited by contacting the directors of public schools or community chess clubs, who in turn circulated flyers describing the study to the parents of children who attended those schools or clubs. Some children were recruited by word-of-mouth or through flyers that were posted in grocery stores, libraries, and fitness centers. To encourage children to participate, we offered them a gift certificate to an ice cream shop and a souvenir pen or pencil, which they received upon completing their interviews.

Interview Procedure

The interviews were conducted in a quiet room at the University of Oregon Speech-Language-Hearing Center or at the child's school or chess club. All interviews were audio recorded using an analog or digital tape recorder. Each interview required 30–50 min to complete. University students who were majoring in communication disorders and sciences, and fulfilling a course requirement, interviewed the children. These interviewers (1 man and 12 women) represented European American, African American, and Asian American backgrounds. They had little or no experience as chess players and were therefore considered to be "naïve adults." The purpose of selecting examiners who knew little about chess was to increase the ecological validity of the study, creating a situation in which the adult was likely to be genuinely informed by the child. On average, each examiner interviewed 2.46 children.

Before the interviews took place, the investigator trained the examiners in issues of confidentiality, interaction style, use of the tape recorder, transcription of the interview into Systematic Analysis of Language Transcripts (SALT; Miller & Chapman, 2003) format, and syntactic analyses. The examiners practiced interviewing each other under the supervision of the investigator, using procedures that are described below. During the practice sessions, the examiners received positive and corrective feedback from the investigator, as needed. One particularly critical aspect of the training was interaction style. This included suggestions on how to maintain a friendly and supportive demeanor; to pause after asking a question; to show interest in the child's responses; to make eye contact, nod, and smile as a way to encourage the child to continue talking; and to avoid interruptions and overlaps of speech.

Chess Interview Protocol

Throughout the interview, the examiner followed a printed "Chess Interview" protocol that provided step-by-step directions on what to say and do when talking with the child. This protocol included prompts for each of the three speaking tasks: General Conversation, Chess Conversation, and Chess Explanation. The tasks were always presented in this order because this followed a natural progression in which the child and adult would get to know each other initially before the child was presented with questions that might prove challenging. Procedures used for the General Conversation were similar to what had been used in previous studies (Nippold et al., 2005, 2008). This task contained five questions that focused on common topics (e.g., family, pets, TV shows) that are frequently addressed when speech-language pathologists interview children for the purposes of collecting conversational language samples (e.g., Hadley, 1998). Procedures used for the Chess Conversation and Chess Explanation tasks were designed specifically for the present study. In an effort to make these two tasks similar and well-structured, they each contained 11 questions that focused specifically on the

[1]The original sample included 34 children. However, 1 boy was reported by his teacher to have Asperger's syndrome, and another boy was suspected of having Asperger's syndrome on the basis of his behavior during the interview. Hence, their data were not included in the study.

topic of chess. However, the tasks differed in that the Chess Conversation emphasized the child's personal experience with respect to chess (e.g., "How often do you play chess, say, in a typical week?"), whereas the Chess Explanation emphasized the technical aspects of the game (e.g., "What are some key strategies that every good player should know?"). Thus, it was expected that the Chess Explanation task might be cognitively more stimulating, prompting the child to think about an infinitely complicated game (Eales, 1985) and, hence, to employ a higher level of syntactic complexity in an effort to articulate specialized knowledge of the topic.

Throughout the interview, the examiners were required to ask all questions and to present all prompts as written. After listening to a child's response, they were free to ask additional questions and to encourage the child to elaborate, as they judged appropriate. The purpose of allowing this degree of flexibility was to increase the naturalness of the interview and the amount of communication. After performing each required activity, the examiner made a checkmark on the protocol before moving to the next item on the list. The frequency with which the examiner asked additional questions or encouraged the child to elaborate was not recorded, as these were optional activities. During the Chess Conversation and Chess Explanation tasks, the child did not have access to a chessboard or chess pieces. Each section of the interview is presented below, as the examiner read it to the child, including the Introduction and Conclusion sections.

Introduction
Thank you for agreeing to talk with me today. In this study, I'll be interviewing you about chess. It will be like those interviews you see on TV where they talk with famous chess players and ask them different kinds of questions. When I ask you the questions, I just want to know what you think. If I ask you a hard question, it's OK if you don't know the answer. Just do your best and don't worry about anything, OK?

General Conversation
Before we talk about chess, I'd like to learn something about you. I'm going to ask you a few general questions. Then you can ask me some questions, too. OK?

A. Do you have any brothers or sisters? (if yes) What are their names? How old are they? What else can you tell me about them?

B. Do you have any pets at home? (if yes) Tell me about your pets.

C. Do you have a favorite TV show or movie? (if yes) Tell me about it.

D. Do you like to read books or magazines? (if yes) Which ones?

E. Now do you want to ask me anything? (allow 1–2 quick questions.)

Chess Conversation
Now I'd like to ask you about chess:

A. How long have you played chess? (years)

B. How old were you when you first started to play? (age)

C. Who taught you how to play chess? (person)

D. Do you have a chess rating? (if yes) What is it?

E. Do you have a chess coach or teacher? (if yes) Tell me about him/her.

F. Do you belong to a chess club? (if yes) Which one?

G. How often do you play chess, say, in a typical week?

H. Who do you play with the most?

I. Can you name any famous chess players? (if yes) Tell me something about him/her/them.

J. Do you ever play chess on a computer? Tell me about that.

K. Now tell me why you enjoy chess.

Chess Explanation
I'm not too familiar with the game of chess. You probably know a lot more about it than I do. So I'd like you to explain some things to me.

A. First of all, how many people may play a game of chess at one time?

B. I've heard of "simultaneous matches." Do you know what that is? Can you explain it to me?

C. Tell me about the different pieces and how they are supposed to move.

D. Now tell me about the goals of chess. In other words, what are the players trying to do?

E. Now tell me the rules that players need to follow. In other words, tell me everything you can think of about the game of chess so that someone who has never played before would know how to play.

F. Now I would like you to tell me what a player should do in order to win the game of chess. In other words, what are some key strategies that every good player should know?

G. How long does it usually take to play a game of chess?

H. What makes a game last a long time?

I. What makes a game end quickly (be short)?

J. Do you know how to use a chess clock? (if yes) Tell me about it.

K. Is there anything else you want to tell me about chess?

Conclusion:

A. Thanks again for talking with me today.

B. You've been very helpful and I enjoyed working with you.

C. Now I'd like to give you a souvenir pen/pencil from the UO [University of Oregon].

D. I also have a gift certificate for you from Dairy Queen.

E. Thanks again.

Transcription and Analyses

Soon after the examiners had completed their interviews, they transcribed them verbatim and brought them to class or the technology laboratory, where they entered them into SALT (Miller & Chapman, 2003). During class or laboratory time, the investigator was available to answer questions. Each section of the interview—General Conversation, Chess Conversation, and Chess Explanation—was entered into its own SALT file. Examiners were instructed to segment the child's utterances into T-units and to code each T-unit for its independent clause and all nominal, relative, and adverbial clauses. Only subordinate clauses that contained finite verbs were coded to be consistent with the previous studies (Nippold et al., 2005, 2008). Utterances that were less than a T-unit and that did not answer a question were classified as fragments and placed within parentheses so that they would be excluded from formal analyses. Maze behaviors that consisted of false starts (e.g., "um," "uh"), revisions (e.g., "the knight I mean the rook"), parenthetical utterances ("you know"), or repetitions ("she she said") were also parenthesized and excluded from formal analyses. In the case of revisions and repetitions, the final reformulation (e.g., "the rook," "she said") was allowed to stand and be counted as part of the T-unit.

To assist the examiners in completing this work accurately, the investigator provided them with written guidelines that contained definitions and examples of T-units, fragments, mazes, and all clause types—information that is available in Nippold et al. (2005, p. 1061), Nippold et al. (2007, p. 188), and Nippold et al. (2008). In addition, she answered all questions that they raised—either in person, on the telephone, or by e-mail. After the examiners had finished coding their SALT files, a graduate research assistant who had been trained in language sampling analyses relistened to the audio recordings and made any necessary corrections to the transcriptions. He also corrected any errors in T-unit identification or coding. After this work was completed, the investigator—an experienced coder—performed a final check of all SALT files, making any further corrections. Thus, all SALT files were reviewed at least three times.

Chess Knowledge and Experience

To obtain a quantitative estimate of each child's knowledge of chess, answers to specific questions that had been asked during the interview were recorded. It was assumed that an affirmative answer to each of these questions reflected a deeper level of understanding and a more serious interest in learning about the game of chess than would a negative one. For the following questions, one point was awarded for each "yes" reply (maximum = 5 points):

Do you have a chess rating?

Do you have a chess coach or teacher?

Do you belong to a chess club?

Can you name any famous players?

Do you know what a simultaneous match is?

Then, to estimate the child's level of experience with respect to chess, 1 point was assigned for every year of play in response to the following question: How long have you played chess? If a child had played chess for less than 1 full year, no point was assigned for this question.

Chess Expertise

In addition to these quantitative measures, each child's expertise in chess was assessed through a qualitative analysis of the expository portion of the interview that did not include any of the five questions that were used for the Chess Knowledge score. A 50-year-old man was employed to perform this specialized analysis. He was a U.S. Chess Federation Master with a tournament rating of 2243. Derived from a complex statistical formula, this rating compares with a median of 1200 for active U.S. tournament players (Ross, 2006), indicating his superior skill and knowledge regarding chess. In the past, this judge had coached young chess players professionally and had competed in numerous tournaments himself. He was blind to the purposes of the study and had received no formal training in linguistic analyses.

The judge was shown a segment of the transcript of each child's expository interview that covered responses to the questions concerning how the pieces move, the goals of chess, rules of play, and strategies needed to win a game (Questions C, D, E, and F). All identifying information (including the child's age and gender) had been removed from all transcripts. The judge was asked to read each transcript carefully and to evaluate the accuracy and appropriateness of the child's responses. After he had read through all 32 transcripts, he reviewed each one and assigned it to one of two groups on the basis of the child's expressed degree of chess expertise: relatively strong ("expert") or relatively weak ("novice"), writing comments to justify each assignment.

This process resulted in 14 experts and 18 novices. Following these activities, the judge rank-ordered each child within each group from strongest to weakest. These ranks then were used to determine each child's position in relation to all others on an "expert-to-novice" continuum, in which 1 was the strongest player, and 32 was the weakest one.

Results

Table 1 reports the background factors of Age, Chess Knowledge, and Years of Play for the novice and expert chess players. To compare the groups on these factors, a series of one-way analyses of variance (ANOVAs) were performed with each child's chronological age, raw score on the knowledge questions, and number of years of play serving as the dependent variables. Effect sizes were computed using the eta coefficient (Meline & Schmitt, 1997). The results indicate that the groups did not differ significantly in Age, $F(1, 30) = 1.45$, $p = .2375$, $\eta = .21$, but that the experts exceeded the novices on Chess Knowledge, $F(1, 30) = 17.04$, $p = .0003$, $\eta = .60$, and Years of Play, $F(1, 30) = 6.18$, $p = .0187$, $\eta = .41$. The effect sizes were large for both Chess Knowledge and Years of Play (Cohen, 1988). These findings confirm that the groups, although similar in age, differed in their knowledge and experience with respect to chess.

To determine whether these factors were interrelated, Pearson product–moment correlation coefficients were calculated using these same data. In addition, it was of interest to determine how closely these factors correlated with each child's individual rank (a number from 1 to 32 that served as the dependent variable). As shown in Table 2, all results are statistically significant. Hence, as children grew older, they knew more about chess, had played longer, and were ranked lower (i.e., were stronger players). The strong relationships seen between rank and Chess Knowledge (–.62) and between rank and Years of Play (–.53) serve to validate the judge's assessment of the children's expertise on the basis of their explanations of chess. To measure the amount of shared variance between rank (expertise) and each of the other factors, the Index of Determination was computed, yielding r^2 values of .17, .38, and .28, respectively, for Age, Chess Knowledge, and Years of Play. Thus, the factors of Chess Knowledge and Years of Play showed a greater degree of overlap with rank than did Age. This is consistent with a pattern in which some of the younger children were experts, whereas some of the older ones were novices.

Table 1. Age, Chess Knowledge, and Years of Play for novice ($n = 18$) and expert ($n = 14$) chess players.

	Novices		Experts	
Factor	*M*	*SD*	*M*	*SD*
Age (years;months)	10;6	2;00	11;5	2;00
Chess Knowledge[‡]	1.83	1.04	3.79	1.63
Years of Play[†]	2.89	1.41	4.50	2.24

[†]$p = .0187$. [‡]$p = .0003$.

Table 2. Pearson product-moment correlation coefficients calculated between background factors for all participants ($N = 32$).

Factor	Age	Chess Knowledge	Years of Play	Rank
Age	1.00	.47**	.41*	–.41*
Chess Knowledge		1.00	.44*	–.62***
Years of Play			1.00	–.53**
Rank				1.00

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3 reports the performance of the two groups of players on the three speaking tasks: General Conversation, Chess Conversation, and Chess Explanation. Total T-units are reported as a measure of speaker productivity. Mazes (false starts, revisions, parenthetical utterances, repetitions) are reported as the percentage of T-units containing this behavior. It was of interest to learn whether the groups differed in maze production and therefore in the amount of talk that had to be excluded from formal analyses. Measures of syntactic complexity include mean length of T-unit; clausal density; and nominal, relative, and adverbial clause use. Each type of subordinate clause is reported as the percentage of T-units containing that type. To examine the effects of task and group, a repeated measures ANOVA was performed on each dependent variable reported in the table. Given the large number of tests, a conservative level of alpha ($\alpha = .01$) was employed.

The results are reported in Table 4. For task, statistically significant main effects were obtained for total T-units; mean length of T-unit; clausal density; and nominal, relative, and adverbial clause use. However, statistically significant main effects were not obtained for mazes. The effect sizes were very large for total T-units, mean length of T-unit, clausal density, nominal clause use, and adverbial clause use; and they were large for relative clause use (Cohen, 1988). No statistically significant main effects were obtained for group, and no Task × Group interactions were statistically significant. The lack of any statistically significant effects for mazes indicates that the experts and novices did not differ in the amount of talk that had to be excluded from each speaking task.

Given the statistically significant main effects for task, a series of paired *t* tests were performed to determine

Table 3. Measures of language productivity and syntactic complexity for novices ($n = 18$), experts ($n = 14$), and all children combined ($N = 32$) during each speaking task: General Conversation (Gen), Chess Conversation (Con), and Chess Explanation (Exp).

	Novices						Experts						All children					
	Gen		Con		Exp		Gen		Con		Exp		Gen		Con		Exp	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Total T-units	24.17	18.17	24.94	15.96	74.50	51.91	29.93	17.67	31.93	14.04	105.57	59.97	26.69	17.90	28.00	15.32	88.09	56.84
Mazes[a]	19.29	18.12	24.97	22.21	22.92	15.62	20.94	17.69	25.13	18.18	24.49	13.41	20.01	17.67	25.04	20.23	23.61	14.49
Mean length of T-unit	6.77	0.94	7.78	1.58	10.96	1.84	7.52	1.26	8.92	1.71	12.22	2.75	7.10	1.14	8.28	1.71	11.51	2.33
Clausal density	1.15	0.14	1.27	0.16	1.60	0.20	1.16	0.11	1.35	0.18	1.63	0.24	1.16	0.13	1.31	0.17	1.61	0.21
Nominal clause use[a]	6.28	6.27	11.58	8.99	17.76	8.29	3.84	5.20	11.52	8.61	17.16	8.01	5.21	5.86	11.56	8.68	17.50	8.04
Relative clause use[a]	6.18	8.55	5.71	5.26	12.74	8.24	4.57	4.66	7.77	5.19	12.90	11.61	5.47	7.06	6.61	5.25	12.81	9.68
Adverbial clause use[a]	2.81	3.53	10.14	6.92	29.66	11.33	7.54	5.20	15.96	11.76	32.77	13.89	4.88	4.88	12.69	9.64	31.02	12.40

[a]Reported as percentage of T-units per sample.

Table 4. Repeated measures analysis of variance results for each dependent variable (α = .01).

Variable	F	p	η
Task			
Total T-units	30.07	< .0001[a]	.82
Mazes	1.35	.2752	.29
Mean length of T-unit	46.22	< .0001[a]	.87
Clausal density	53.84	< .0001[a]	.89
Nominal clause use	30.95	< .0001[a]	.83
Relative clause use	6.12	.0061[a]	.54
Adverbial clause use	71.74	< .0001[a]	.91
Group			
Total T-units	2.70	.1109	.29
Mazes	0.04	.8418	.04
Mean length of T-unit	5.66	.0240	.40
Clausal density	0.74	.3968	.16
Nominal clause use	0.27	.6039	.09
Relative clause use	0.02	.8995	.03
Adverbial clause use	4.56	.0410	.36
Interaction (Task × Group)			
Total T-units	1.12	.3399	.27
Mazes	0.05	.9549	.06
Mean length of T-unit	0.28	.7599	.14
Clausal density	0.76	.4787	.22
Nominal clause use	0.30	.7405	.14
Relative clause use	0.75	.4799	.22
Adverbial clause use	0.13	.8786	.09

Note. The degrees of freedom (*df*s) for Task = 2, 29; the *df*s for Group = 1, 30; the *df*s for Interaction (Task × Group) = 2, 29.

[a]Statistically significant at a conservative level of alpha.

where those differences occurred. For each dependent variable reported in Table 3 (with the exception of mazes, which was not statistically significant), performance was compared between the Chess Explanation and Chess Conversation tasks, and between the Chess Conversation and General Conversation tasks. Given the absence of statistically significant group effects, these tests were run using scores from all 32 participants combined, employing a conservative level of alpha (α = .01). The results, reported in Table 5, indicate that performance was significantly higher on the Chess Explanation task than on the Chess Conversation task for all variables. Effect sizes were very large for total T-units, mean length of T-unit, clausal density, and adverbial clause use; and they were large for nominal and relative clause use (Cohen, 1988). Performance was significantly higher on the Chess Conversation task than on the General Conversation task for mean length of T-unit, clausal density, nominal clause use, and adverbial clause use. However, performance was not significantly higher for total T-units or relative clause use. Effect sizes were large for mean length of T-unit,

Table 5. Paired t-test results for dependent variables (N = 32).

Variable	t	p	d
Chess Explanation versus Chess Conversation			
Total T-units	7.41	< .0001[a]	1.67
Mean length of T-unit	8.69	< .0001[a]	1.60
Clausal density	7.32	< .0001[a]	1.58
Nominal clause use	3.44	.0017[a]	0.71
Relative clause use	3.50	.0014[a]	0.83
Adverbial clause use	7.01	< .0001[a]	1.66
Chess Conversation versus General Conversation			
Total T-units	0.38	.7038	0.08
Mean length of T-unit	4.54	< .0001[a]	0.83
Clausal density	5.25	< .0001[a]	1.00
Nominal clause use	3.92	.0005[a]	0.87
Relative clause use	0.73	.4719	0.19
Adverbial clause use	5.13	< .0001[a]	1.08

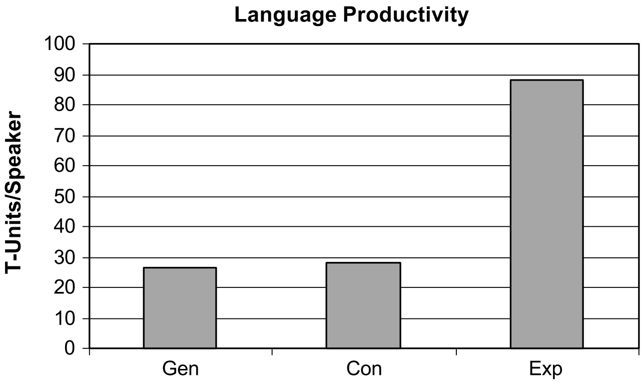
[a]Statistically significant at a conservative level of alpha.

clausal density, nominal clause use, and adverbial clause use.

In sum, language productivity and syntactic complexity were greater when children talked about chess in an expository genre than in a conversational genre, regardless of their status as novice or expert chess players. Moreover, during conversation, syntactic complexity was greater when they talked specifically about chess compared with other topics. These findings are illustrated in Figures 1, 2, 3, and 4. In addition, Appendix A contains excerpts from one speaker's interview, illustrating differences in language productivity and syntactic complexity across the three speaking tasks. Furthermore, Appendix B contains excerpts from a novice and an expert chess player during the Chess Explanation task, illustrating similarities between speakers in these factors.

Finally, it was of interest to examine the relationship between mean length of T-unit and each of the other syntactic measures because it has long been argued that mean length of T-unit is a key marker of later syntactic development (Hunt, 1970; Loban, 1976). For each speaking task, Pearson product–moment correlation coefficients were calculated, using each participant's mean length of T-unit, clausal density score, and raw percentage score on each type of subordinate clause. As reported in Table 6, all results are statistically significant and positive, and many of them are strong. This supports the view that mean length of T-unit is an efficient representative of syntactic complexity in conversational and expository discourse. Then, to determine whether syntactic complexity on each of the three speaking tasks was associated with the speaker's chronological age, Pearson product–moment correlation coefficients were calculated

Figure 1. Language productivity during the General Conversation (Gen), Chess Conversation (Con), and Chess Explanation (Exp) tasks ($n = 32$).



between Age and mean length of T-unit for each task. The results are statistically significant for the Chess Explanation task ($r = .60$, $p = .0003$) but not for the General Conversation ($r = .11$, $p = .5435$) or the Chess Conversation ($r = .29$, $p = .1066$) tasks. Thus, only the Chess Explanation task was sensitive to age-related differences in syntax.

Discussion

The major finding of this study was that both groups of chess players—the novices and the experts—produced substantially greater amounts of language and spoke with higher levels of syntactic complexity during the Chess Explanation task compared with the Chess Conversation and General Conversation tasks. Although the two conversational tasks elicited similar amounts of language, syntactic complexity was higher during the Chess Conversation task compared with the General Conversation task. The results with respect to complex syntax are consistent with the two previous studies that compared conversational and expository discourse (Nippold et al., 2005, 2008). Yet, the present study extends the findings from those studies by controlling for level of formality and topic of discussion across the Chess Conversation and Chess Explanation tasks, and by comparing performance on those tasks with the General Conversation task, similar to what had been employed in the two previous studies.

The present study provides support for the hypothesis that complex thought is driving the use of complex language because the children's best performance occurred when they were asked to discuss a complex topic and were questioned about it in a way that required specialized knowledge of the topic. This suggests that language and thought are inseparable and that syntactic competence can best be revealed by encouraging speakers to tap into their knowledge of a complex topic. Thus, when language samples are elicited from school-age children for the purpose of examining complex syntax, it is important to stress the speaker's knowledge base.

The psychological factors of interest and motivation may have been relevant as well. It is emphasized that

Figure 2. Mean length of T-unit during the General Conversation (Gen), Chess Conversation (Con), and Chess Explanation (Exp) tasks ($n = 32$).

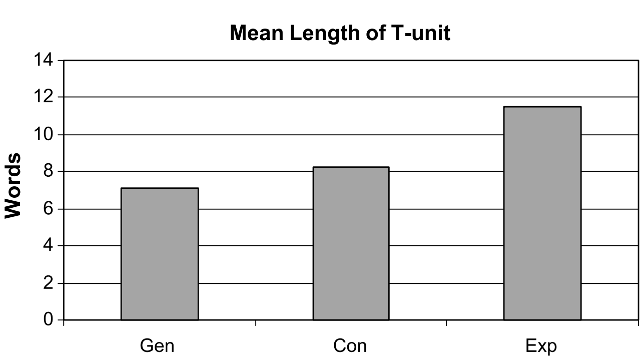


Figure 3. Clausal density during the General Conversation (Gen), Chess Conversation (Con), and Chess Explanation (Exp) tasks ($n = 32$).

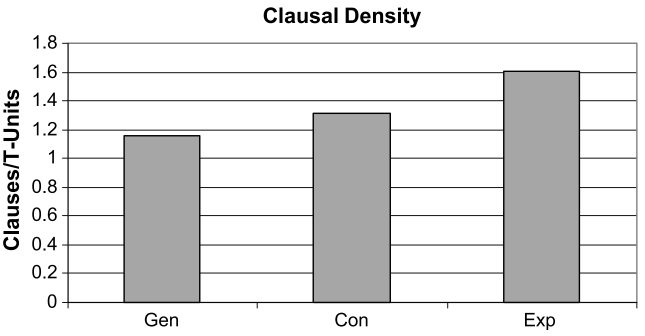


Figure 4. Subordinate clause use during the General Conversation (Gen), Chess Conversation (Con), and Chess Explanation (Exp) tasks ($n = 32$).

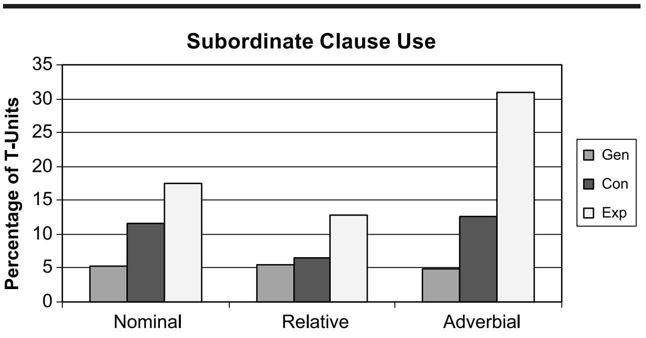


Table 6. Pearson product–moment correlation coefficients calculated between mean length of T-unit and each of the other syntactic variables for each speaking task: General Conversation (Gen), Chess Conversation (Con), and Chess Explanation (Exp).

Variable	Gen	Con	Exp
Clausal density	.70****	.76****	.89****
Nominal clause use	.39*	.61***	.44*
Relative clause use	.45**	.53**	.71****
Adverbial clause use	.70****	.52**	.71****

Note. $N = 32$.

*$p < .05$. **$p < .01$. ***$p < .001$. ****$p < .0001$.

during all three speaking tasks, the examiners followed a structured interview format that contained child-centered questions and prompts, but that they also attempted to encourage the children to elaborate on their responses. Nevertheless, informal observation of the interviews suggested that many of the children were less interested in talking about general topics—such as family, pets, and TV shows—and were simply tolerating the examiner's questions until they could talk about chess. This is consistent with the reality that the children were invited to participate in the study precisely because they were chess players.

These patterns can be seen in Appendix A, which contains excerpts from the three speaking tasks of 1 of the participants, a 12-year-old girl. During the General Conversation, her answers were polite but brief, with little elaboration. For this task, she produced a total of 25 T-units, with a mean length of T-unit of 8.24 words and a clausal density score of 1.12. During the Chess Conversation, however, she became more enthusiastic, answering the questions with greater syntactic complexity and a greater number of spontaneous comments. For this task, she produced 56 T-units, with a mean length of T-unit of 11.61 and a clausal density score of 1.36. Then, during the Chess Explanation, she became even more effusive, appearing to enjoy the opportunity to explain the finer details of chess to a naïve adult interviewer, producing 179 T-units, a mean length of T-unit of 14.51, and a clausal density score of 1.85. It should be mentioned that this child was not an isolated example but was one of many children, both novices and experts, who demonstrated this pattern of high productivity and syntactic complexity on the expository task compared with the other two speaking tasks. Indeed, this pattern in which children put forth great effort to explain the game of chess, and especially to teach the examiner how to defeat an opponent, was frequently observed. This sincere attempt to convey information was consistent with the status of the examiners as less experienced players and indicates that the task was ecologically valid.

These patterns suggest that questions posed during the Chess Explanation task offered greater cognitive stimulation, requiring children to call upon their knowledge of an infinitely complex and challenging game (Eales, 1985; Fine, 1967). Although questions asked during the Chess Conversation may have been stimulating as well (e.g., "Can you name any famous chess players?" "Can you tell me about your coach?" "Why do you enjoy chess?"), perhaps they did not require children to tap into their intellectual resources as fully as the expository questions (e.g., "What is a simultaneous match?" "Can you explain it to me?" "Do you know how to use a chess clock?"). Moreover, many of the questions asked during the General Conversation concerned issues that the children had probably discussed many times before, so these questions may not have required as much reflection (e.g., "Do you have any brothers or sisters?" "What are their names?" "How old are they?" "What else can you tell me about them?").

As discussed earlier, Moffett (1968) hypothesized that growth in syntax beyond the preschool years was driven by intellectual stimulation, an expanding knowledge base, and a greater capacity for abstract thought that enabled the child to produce sustained monologues, such as expositions—a view endorsed by Loban (1976). The present study was not a developmental investigation but a comparison of groups of children on the basis of their knowledge of a specific topic—the game of chess. It had been predicted that the experts would outperform the novices in language productivity and syntactic complexity, especially during the Chess Explanation task, because it was thought that the experts' greater knowledge, experience, and expertise with respect to chess would fuel their discourse as they tackled the examiner's questions concerning complex issues—such as rules, goals, and strategies—that are unique to the game of chess.

However, this prediction was not supported by the data, as there were no differences between the groups on any of the language measures. Remarkably, even the novices had a great deal to say about the issues, frequently answering the questions in elaborate detail, reflecting an understanding of chess that was more than adequate to perform the task. Moreover, speakers from both groups often exhibited excitement in their voices and an eagerness to inform the examiner during the expository task. However, despite the similarities in language productivity and syntactic complexity between the novices and experts, there was a central difference between the two groups of players. Recall that the judge who reviewed the expository transcripts, a U.S. master chess player, was asked to assign each child to the category of relative expert or relative novice on the basis of their responses to the questions concerning how the pieces move, the rules and goals of chess, and key strategies needed to win a game. According to the judge, who also wrote comments justifying each assignment, the experts evidenced greater accuracy and clarity in their responses than did the novices, a difference that perhaps only an experienced chess player might detect. Appendix B contains examples of 2 boys answering the same question concerning strategies. For Speaker 1, a novice, the judge wrote as follows:

> Much of his description of strategies is unclear or incorrect. For example, he says to not move pieces in front of the king and queen. This is sort of correct for the king, but not really correct for the queen. He rambles on about moving pieces out to the side and moving pieces so the king can only move forward. However, none of this is correct. He mentions mating the king with two rooks. This is somewhat unclear but I think correct.

In contrast, the judge described the response of Speaker 2, an expert, as follows:

> This child shows excellent knowledge of a wide variety of strategic principles, e.g., being ahead in development, controlling more space, having more material, having a better pawn structure, controlling the center, centralizing your king in the endgame, rooks behind passed pawns, bringing your rooks to the 7th rank, promoting pawns during the endgame, attacking the king if you have advantages in time, space, or force, etc.

As reported earlier, the judge's assignment of the children to the novice or expert groups and his subsequent ranking of them from strongest to weakest were consistent with their performance on the two quantitative measures: the Chess Knowledge task and Years of Play. Illustrating these connections, Speaker 1 earned only 2 points on the Chess Knowledge task, providing affirmative answers to Questions 2 and 3 only, and reported that he had played chess for only 1 year. In contrast, Speaker 2 earned a full 5 points on the Chess Knowledge task and reported that he had played chess for 4 years. It was interesting also that he was one of few children in the study who reported having a chess rating (1450) and could name more than one famous player, confidently calling out the names of six international grand masters ("Yeah, Kasparov, Karpov, Kramnik, Capablanca, Anand, Nimzowitsch … There's a lot more").

In sum, it had been predicted that the experts would evidence greater language productivity and syntactic complexity than the novices, especially during the Chess Explanation task, but there was no evidence to support this. Rather, the differences between the experts and the novices were reflected more in the accuracy and clarity of their answers to technical questions concerning how the pieces move, the goals of chess, the rules of play, and the strategies needed to win a game of chess. Although the novices had relatively less knowledge, experience, and expertise when compared with the experts, their understanding of chess was sufficient to perform the tasks rather well; furthermore, they appeared to make up for any limitations with their enthusiasm, embracing the challenge of explaining the game of chess to a naïve adult.

Future research is necessary to investigate other factors that may be influencing syntactic complexity during expository discourse, such as the child's level of language development and nonverbal intelligence. One limitation of the present study was that time restrictions prevented the administration of standardized tests of language and cognition that could be used to measure the contribution of these other factors to the children's performance on the three speaking tasks. In future studies of chess players, it may be useful to include a battery of standardized tests to measure these factors. Additionally, it may be worthwhile to objectively measure certain psychological factors, such as interest and motivation, regarding the questions and prompts on each of the tasks, for a subjective observation suggested that these factors were relevant.

In future studies of conversational and expository discourse in novice versus expert chess players, investigators may wish to examine additional domains of language, such as the lexicon. On the basis of the judge's report that the experts' explanations were clearer and more accurate than the novices', it might be enlightening to compare the groups in their use of technical terms (*castling, en passant, scholar's mate, stalemate*) and other types of literate words (see Nippold, 2007), such as abstract nouns (*confidence, defense*), metacognitive verbs (*anticipate, visualize*), or adverbial conjuncts (*similarly, fortunately*) across speaking tasks. In such a study, investigators may wish to systematically vary the presentation order of the conversational and expository tasks to eliminate the possibility that performance may improve as a function of spending time with the interviewer. In the present study, the Chess Conversation always preceded the Chess Explanation, a methodological limitation that should be controlled in future research.

Another major finding of the study was that for all three speaking tasks, mean length of T-unit was significantly and positively correlated with each of the other syntactic measures: clausal density, nominal clause use, relative clause use, and adverbial clause use. The correlation coefficients between mean length of T-unit and clausal density were especially strong. This suggests that, in future studies of syntactic complexity in school-age children, it may be sufficient to employ mean length of T-unit as the primary measure, for it appears to be an efficient representative of this construct, and one that requires far less time and training than individually coding all main and subordinate clauses in a language sample. It is noteworthy also that mean length of T-unit was significantly and positively correlated with Age only for the Chess Explanation task. This is consistent with the view that language-sampling tasks must involve a sufficient amount of cognitive stimulation to reveal developmental changes in syntax.

On the other hand, future studies that examine the relationship between the knowledge base and syntactic complexity may wish to include additional measures that may represent more fine-grained analyses of sentence structure than what was employed in the present study. For example, the coding of nonfinite in addition to finite clauses may be helpful. Moreover, Scott (2008) has designed a new measure, the Sentence Complexity Index, which assigns weights to specific aspects of clause production that are literate and later developing (e.g., depth of embedding, use of advanced conjunctions). Perhaps the Sentence Complexity Index may reveal subtle differences in syntactic complexity between novice and expert players during expository discourse.

Regarding the syntactic measures used in the present study, it is noteworthy that both groups of speakers showed considerable variability in performance, with particularly large standard deviations occurring for each type of subordinate clause, as reported in Table 3. This pattern of wide individual differences within groups is consistent with previous research that examined conversational and expository discourse in typically developing children, adolescents, and adults (Nippold et al., 2005) and may reflect the reality that the production of subordinate clauses is optional rather than obligatory in natural communication. For example, consider the following complex sentence, produced by Speaker 2 (see Appendix B), a 12-year-old expert:

> And if your advantages are [adverbial] time and space and force, then you really want [independent] to attack the king because if you go [adverbial] to the end game, those really do not matter [nominal] anymore.

This 32-word T-unit, which contains three subordinate clauses, expresses a number of complex thoughts quite clearly. However, the content could be restated any number of ways by the speaker—a competent language user who is capable of generating an infinite number of novel sentences (Chomsky, 1965). Although this speaker has packed a large amount of information into a single sentence, reflecting an efficient communication style, he had the option of breaking it into two or more sentences, each of which could contain its own set of subordinate clauses. Although expository discourse tasks stimulate greater syntactic complexity than conversational tasks, the specifics of how the meaning gets expressed are at the discretion of the speaker.

The most valuable message to be drawn from this study is that school-age children will speak at length and display a high level of syntactic complexity when they are asked to talk about a challenging topic of which they are knowledgeable, and when they are questioned in a way that stimulates reflection on complicated issues and the need to genuinely inform the listener. This has implications for assessment because speech-language pathologists frequently seek information about children's ability to use complex syntax in natural speaking situations. If language samples are elicited only in conversational speech and children are not prompted to talk about complex topics in an exacting manner, their linguistic competence may go unrecognized.

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Appendix A. Excerpts from an expert chess player (a girl aged 12;9 [years;months]).

Note that each excerpt has been coded for all independent (IC) and subordinate clauses (nominal [NOM], relative [REL], and adverbial [ADV]). For each task, her total T-units, mean length of T-unit (MLTU), and clausal density (CD) scores are reported.

General Conversation: T-units = 25; MLTU = 8.24; CD = 1.12.
Examiner: Do you have any pets at home?
Child: Two cats.
Examiner: What are their names?
Child: R and S.
Examiner: How old are they?
Child: They'll be [IC] three in May.
Examiner: Can you tell me more about them? What colors are they?
Child: They're [IC] gray and white tabbies. We got [IC] them from the cat adoption. So they were [IC] named after perfumes. So we couldn't really think [IC] of any names for them.
Examiner: Do you have any other pets?
Child: No.

Chess Conversation: T-units = 56; MLTU = 11.61; CD = 1.36.
Examiner: Now tell me why you enjoy chess.
Child: I enjoy [IC] it for the social part of it because I get [ADV] to talk to a lot of people and also because it can help [ADV] me in school. It's helped [IC] a lot in math. And also I get [IC] to go different places for the Nationals. This year I'll be going [IC] to Texas.
Examiner: Tell me how it helps you with math.
Child: With math, it's [IC] different things like understanding. So I'll have [IC] to understand how different things work [NOM] in chess. And then I'll also have [IC] to understand things like algorithms and things like that in math too.
Examiner: Do you have any other reasons why you enjoy chess?
Child: I just enjoy [IC] it because it's [ADV] something fun to do, and I can kind of enjoy [ADV] my time there, and it's [ADV] better than sitting at home and like watching TV or something.

Chess Explanation: T-units = 179; MLTU = 14.51; CD = 1.85.
Examiner: How long does it usually take to play a game of chess?
Child: Well, one move is [IC] where you make [NOM] a move and then your opponent makes [NOM] a move. So they can range [IC] anywhere up to 100. My games usually take [IC] about 30 moves. And you want [IC] all the pieces to be off the back rank into the squares by about the 12th to 15th move. And the middle games and the end games can be started [IC] anywhere after that depending on how quickly you trade [NOM] out the pieces.
Examiner: Like how long does that usually take?
Child: Well, after that, it depends [IC] kind of what opening you did [REL]. Like if you were doing [ADV] more aggressive openings and it would trade [ADV] off the pieces, then you would be [IC] closer to an end game very quickly. So you would probably be [IC] there by the 20th to 30th move. But if you were doing [ADV] more passive and closed openings, so there would be [ADV] more pieces on the board, and this would be [ADV] more favorable because they could jump [ADV] over different walls and things like that, then it would generally take [IC] a lot longer. You would have [IC] to study the positions more carefully and try to keep different attacks going at the same time. And there would be [IC] more pieces on the board for a long time. So that would be [IC] a longer game, like 40 moves at least.

Appendix B. Excerpts from a novice and an expert chess player during the Chess Explanation task, answering the same question.

Note that each excerpt has been coded for all independent (IC) and subordinate (nominal [NOM], relative [REL], and adverbial [ADV]) clauses. Each speaker's total T-units, mean length of T-unit (MLTU), and clausal density (CD) scores are reported for the task.

Examiner: Now I would like you to tell me what a player should do in order to win the game of chess. In other words, what are some key strategies that every good player should know?

Speaker 1: Boy, age 11;10 (novice); T-units = 140; MLTU = 12.99; CD = 1.83.

One of the things I do [REL] is [IC] I don't move [NOM] the pieces that are [REL] in front of the king and queen because that leaves [ADV] them open. So I move [IC] the pieces out more, close to the side. And you kind of want [IC] one of the first open areas to try to win the game is [NOM] when all the pieces around the king have not been moved [ADV] yet. So say [IC] a piece was [NOM] forced to move forward to protect a different one. You kind of want [IC] to get into position. Like say [IC] you moved [NOM] your pawn and then your other pawn like one, two, and then one, one. That leaves [IC] an open bishop area for it to attack. And so you kind of want [IC] to get that in where the king can't move [NOM] any direction except forward. And you want [IC] to try to get your rook moved out. And there is [IC] there. Before you take [ADV] a piece, like if there was [ADV] a rook right here, you kind of make [IC] sure because there is [ADV] a strategy that you can do [REL] to try to get a king in checkmate with two rooks.

Speaker 2: Boy, age 12;8 (expert); T-units = 126; MLTU = 13.13; CD = 1.57.

So in the opening, you try [IC] to get all your guys out because you'll probably have [ADV] more space. You attack [IC] the center in the opening because the center is [ADV] where all the pieces tend [NOM] to point at. And you have [IC] to keep your king safe. And the middle game, you have [IC] to see if your advantages are [NOM] material or pawn structure. You generally want [IC] to go to the end game because those are [ADV] more important in the end game. And if your advantages are [ADV] time and space and force, then you really want [IC] to attack the king because if you go [ADV] to the end game, those really do not matter [NOM] anymore. And so in the end game, the strategy is [IC] usually to get all your pieces on their best squares first, get your rook behind a pass pawn or on the seventh rank, get your king in the center of the board or to a good square. Well, those are [IC] some key strategies.