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Explicit knowledge and learning in SLA: A cognitive linguistics perspective

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Abstract

SLA researchers agree that explicit knowledge and learning play an important role in adult L2 development. In the field of cognitive linguistics, it has been proposed that implicit and explicit knowledge differ in terms of their internal category structure and the processing mechanisms that operate on their representation in the human mind. It has been hypothesized that linguistic constructions which are captured easily by metalinguistic descriptions can be learned successfully through explicit processes, resulting in accurate use. However, increased accuracy of use arising from greater reliance on explicit processing may lead to decreased fluency. Taking these hypotheses as a starting point, I present a case study of an adult L2 learner whose development of oral proficiency was tracked over 17 months. Findings indicate that explicit knowledge and learning have benefits as well as limitations. Use of metalinguistic tools was associated with increased accuracy; moreover, there was no obvious trade-off between accuracy and fluency. At the same time, resource-intensive explicit processing may impose too great a cognitive load in certain circumstances, apparently resulting in implicit processes taking over. I conclude that explicit and implicit knowledge and learning should be considered together in order to gain a full understanding of L2 development.

1. Introduction

The first decade of the 21st century has seen a number of publications concerned with applications of cognitive linguistics to second language (L2) learning and teaching (e.g. Achard & Niemeier, 2004; Boers & Lindstromberg, 2006; Robinson & N. Ellis, 2008), thus establishing this theoretical approach as a framework for second language acquisition (SLA) research. In the field of SLA, the role of explicit knowledge and learning is an important area of investigation that has received much attention from researchers and practitioners alike (DeKeyser, 2003; Dörnyei, 2009; Doughty, 2003; Norris & Ortega, 2001). Up to now, the role of explicit knowledge in L2 learning and teaching has scarcely been considered from a cognitive linguistics perspective, however. In order to address this gap, I put forward a theoretically informed research agenda (Roehr, 2008). The present paper begins with a brief up-to-date review of the theoretical analysis detailed in that article. I then offer two

hypotheses arising out of the theoretical argumentation. The remainder of the present paper deals with an empirical study whose findings speak to these hypotheses.

2. Theoretical background: Explicit and implicit knowledge and learning from a cognitive linguistics perspective

Explicit knowledge is defined as knowledge that is represented declaratively, can be brought into awareness and can be verbalized, while implicit knowledge is defined as knowledge that cannot be brought into awareness and cannot be articulated (Anderson, 2005; R. Ellis, 2004; Hulstijn, 2005). Accordingly, explicit learning refers to situations "when the learner has online awareness, formulating and testing conscious hypotheses in the course of learning". Conversely, implicit learning "describes when learning takes place without these processes; it is an unconscious process of induction resulting in intuitive knowledge that exceeds what can be expressed by learners" (N. Ellis, 1994: 38-39).

Explicit and implicit knowledge and learning are separable and distinct; at the same time, they are thought to be engaged in interplay, so one can influence the other (N. Ellis, 1993; R. Ellis, 2005; Segalowitz, 2003). This point is crucial when considering explicit knowledge and learning in the context of SLA. During fluent language use, we draw on implicit processes, and our attention is focused on meaning rather than form. When comprehension or production difficulties arise, however, explicit processes take over (N. Ellis, 2005). We then deliberately focus our attention on language form, and we make conscious efforts to analyze input or to construct or monitor output, utilizing internal or external resources.

Considered from a cognitive linguistics perspective, language can be understood as essentially functional and usage-based (e.g. Bybee & McClelland, 2005; Evans & Green, 2006; Goldberg, 2003). The key assumptions which are common to most, if not all approaches under the umbrella term of cognitive linguistics are that interpersonal communication is the main purpose of language, that language is shaped by our experience with the real world, that language ability is an integral part of general cognition, and that linguistic phenomena can be explained by a unitary account embracing the traditional domains of morphology, syntax, semantics, and pragmatics.

Language as represented in the human mind can be understood as "a structured inventory of conventional linguistic units" (Langacker, 2000: 8). Conventional linguistic units, or constructions, are seen as inherently symbolic (Kemmer & Barlow, 2000; Taylor, 2002), so all constructions are pairings or associations of form and meaning (Goldberg, 2003). These key assumptions about language refer to implicit linguistic knowledge and are complemented by a usage-based approach to language learning which refers to implicit processes of acquisition and use.

Cognitive linguists explain language learning and use in terms of entrenchment and categorization. Entrenchment can be understood as the strengthening of memory traces through repeated activation. Categorization refers to seeing sameness in diversity (Taylor, 1998, 2003) or, expressed more technically, to a comparison between an established structural unit functioning as a standard and an initially novel target structure (Langacker, 2000).

In view of strong evidence from the field of cognitive psychology (Murphy, 2004; Rosch, 1978; Rosch & Mervis, 1975), it is widely accepted that cognitive categories are subject to prototype effects. Categorization is influenced by the frequency of exemplars in the input as well as the recency and context of encounters with specific exemplars (N. Ellis, 2002a, 2002b); memory traces can be more or less entrenched and thus more or less available for retrieval (Murphy, 2004). By the same token, category members are potentially more or less prototypical, category membership may be a matter of degree, and category boundaries may be fuzzy (Langacker, 2000).

In a usage-based approach, all learning is initially exemplar-based (Abbot-Smith & Tomasello, 2006; Langacker, 2000). In other words, learning begins with the entrenchment of specific instances encountered in the input. After prolonged experience and a proportionately greater number of repeated encounters with certain exemplars, our mental representations gradually change: Abstractions over instances are derived, that is, schemas are formed (Kemmer & Barlow, 2000; Taylor, 2002; Tomasello, 2003). Schema formation can be defined as "the emergence of a structure through reinforcement of the commonality inherent in multiple experiences", so a schema is "the commonality that emerges from distinct structures when one abstracts away from their points of difference by portraying them with lesser precision and specificity" (Langacker, 2000: 4). Schemas can facilitate further learning, since they allow for more efficient categorization of newly encountered exemplars.

In a usage-based account, representations of specific exemplars may be retained alongside more general schemas, so the same linguistic construction may be represented at different levels of abstraction. This results in a complex, hierarchical, redundantly organized network of form-meaning associations which represent our implicit knowledge of linguistic constructions.

Implicit knowledge is subject to similarity-based processing, which is flexible, dynamic, open, and susceptible to contextual variation (Diesendruck, 2005; Markman et al., 2005). In similarity-based processing, a large number of an entity's properties can be taken into account; moreover, a partial match with the properties of existing representations is sufficient to allow for successful categorization (Pothos, 2005).

To exemplify the theoretical line of argument, consider the acquisition of verbs in L1 English. The learner begins by learning specific exemplars of verbs they encounter in the input, e.g. *eat*, *sleep*, *put*. These early, frequent verbs are represented as specific constructions. At the same time, the learner implicitly tracks the distributional properties of words like *eat*, *sleep*, and *put* (Tomasello, 2003, 2005). Gradually, commonalities in both form and function become apparent, e.g. position in the sentence, combination with certain inflectional morphemes (e.g. *-s*), predicative syntactic role, profiling of a process or, expressed more formally, "a relationship mentally scanned sequentially – instant by instant – in its evolution through time" (Langacker, 1998: 19). This allows the learner to eventually abstract away from specific exemplars and form the schema VERB. Once this schema is available, new members can be assigned to the category. Importantly, however, frequency and context are taken into account, and prototype effects are in evidence. For instance, *eat* and *put* are likely to be central members of the category VERB, while *quarry* and *constitute* are likely to be more marginal members. Not only are they less frequent, but they can also be used as nouns (*quarry*) or are distant from the prototypical meaning of a verb as a process (*constitute*).

To summarize, implicit knowledge is characterized by flexible and context-dependent category structure which is subject to prototype effects. By the same token, implicit processing is similarity-based, flexible, and susceptible to contextual variation. Implicit learning is primarily exemplar-based or bottom-up.

Explicit language knowledge and learning can be contrasted with implicit language knowledge and learning in terms of both representation and processing. Explicit knowledge appears to be characterized by stable, discrete, and context-independent categories with clear boundaries, i.e. by what has been labelled Aristotelian category structure (Anderson, 2005; Taylor, 2003; Ungerer & Schmid, 1996). Aristotelian categories do not take prototype effects into account; instead, all category members have equal status, regardless of frequency, recency of encounter, or context.

Explicit knowledge is subject to rule-based processing. Rule-based processing is conscious (Cleeremans & Destrebecqz, 2005; Hampton, 2005; Smith, 2005), and it is characterized by compositionality, systematicity, commitment, and consistency (Diesendruck, 2005; Pothos, 2005; Sloman, 2005). Compositionality refers to the fact that simpler components can be combined to form more complex representations without changing the meaning of the component parts. Systematicity means that a process or operation is applied in the same way to different classes of entities (Pothos, 2005). Rule-based processing entails commitment to specific kinds of information, while contextual variations are neglected. A strict match between the properties of an exemplar and the properties specified in the rule that is being applied has to be achieved (Diesendruck, 2005; Pothos, 2005). Accordingly, rule-based, explicit learning is always top-down.

Explicit knowledge consists of either a schematic category or a relation between two categories, specific or schematic. Such a relation is expressed by means of a proposition, i.e. a rule. In SLA, explicit knowledge is typically drawn on when classroom instruction or self-study activities rely on metalinguistic descriptions which appear in the form of pedagogical grammar rules in language textbooks.

To exemplify with reference to L2 German, a metalinguistic description may state that 'in a subordinate clause, the verb needs to be placed at the end'. This rule takes the form of a proposition which expresses a relationship between two schematic categories, 'subordinate clause' and 'verb'. In order to apply this rule, the learner needs to make clear-cut decisions as to whether a certain multi-word construction is a subordinate clause and as to whether a certain word is a verb. Unless such a decision is taken, the rule is of little use. Accordingly, the explicit category 'verb' needs to be Aristotelian. In the simplest terms of pedagogical grammar, 'a verb is a doing-word'.

This rule captures the more prototypical members of the cognitive category VERB such as *essen* (*eat*) and *gehen* (*go*). In order to capture more marginal members such as *darstellen* (*constitute*), more detailed rules are required, e.g. 'a verb is a content word that denotes an action, occurrence, or state of existence' and 'a verb is the word class that serves as the predicate of a sentence' (<http://wordnetweb.princeton.edu/perl/webwn?s=verb>, retrieved 19/02/10). These rules consist of further propositions specifying categories and relations between categories; they capture the cognitive category VERB more fully, but at the same time are more complex than the initial simple rule.

As rule-based processing is controlled, conscious processing (Cleeremans & Destrebecqz, 2005; Hampton, 2005; Smith, 2005) which draws on limited working memory capacity (Baddeley, 2000; Baddeley & Logie, 1999; Just & Carpenter, 1992), it is costly in terms of resources. Put differently, the more complex the rule, the more difficult it is for the learner to process and utilize it.

At least two hypotheses about explicit knowledge and learning in SLA arise out of the theoretical line of argument which I have briefly reviewed above.

Hypothesis 1:

A linguistic construction which can be captured relatively easily by an Aristotelian rule will be acquired faster and used more accurately if the learner draws on explicit knowledge than a linguistic construction which cannot easily be captured by an Aristotelian rule. Given the costliness of explicit processing, a rule that is high in schematicity, low in conceptual complexity, low in technicality of metalanguage, and high in truth value will be most favourable (DeKeyser, 2005; R. Ellis, 2006; Roehr & Gánem-Gutiérrez, 2009). Schematicity refers to whether a rule concerns a schematic or a specific linguistic construction. A rule is low in conceptual complexity if it consists of few Aristotelian categories and relations between categories. Technicality of metalanguage refers to the relative familiarity and abstractness of the metalanguage used to formulate the rule. A rule is high in truth value if it applies without exception.

Hypothesis 2:

A language learner's overall performance will be affected by reliance on explicit knowledge and learning. On the one hand, explicit knowledge and learning will help the learner use linguistic constructions captured by Aristotelian rules successfully. On the other hand, the costliness of explicit processing will slow down their language use. Thus, explicit knowledge and learning will be associated with increased accuracy and/or complexity of language on the one hand and decreased fluency on the other hand.

3. Empirical evidence: A case study of an adult L2 learner

In what follows, I present empirical evidence from a case study of an adult L2 learner which speaks to the hypotheses above.

3.1 Research design

The evidence presented is based on a case study of an individual adult learner of L2 German. The study had a longitudinal design, with data collected on 56 occasions over a period of 17 months. The resulting data set consisted of 56 recordings of learner-tutor interactions, which were subsequently transcribed and analyzed using the CHILDES tools (see next section for details). The tutor is the researcher; the learner is an L1 English male in his forties who will be referred to as H.

From 1977 to 1980, the participant learned German at school. In 1978, he additionally learned some French. Moreover, when his family was residing in Saudi Arabia from 1974 to 1976, H acquired basic Arabic in an immersion setting. He used neither of these languages after exposure had ended. H recommenced his learning of German in July 2006, i.e. about 25 years after encountering the language at school. Learning took place in the context of one-to-one classes. Normally, a class was held once a week and lasted from 60 to 120 minutes. Teaching and learning activities targeted all four skills, with a particular emphasis on oral communication, grammar, and reading. Focus on form was a regular feature both in class and in self-study activities.

From July 2006 to March 2007, the learner's core textbook was *Willkommen!* (Coggle & Schenke, 1998), a general-purpose beginners' course for adult learners often used in evening classes and other non-specialist language courses. From March 2007 onwards, the *Passwort*

Deutsch series (Albrecht et al., 2001; Albrecht et al., 2002) was used, starting with volume 2. This is a more academically oriented course which is normally employed in language classes at university level. All textbooks are accompanied by CDs and offer practice in all four skills; moreover, they contain form-focused exercises and metalinguistic descriptions in the form of pedagogical grammar rules.

In addition to exercises from the core textbooks, H used self-study material such as listening exercises from the *Hören Sie mal!* series (Hümmeler-Hille & von Jan, 1993, 1999) and stories from the *Easy Reader* series of edited and/or shortened works of literature for L2 learners (European Schoolbooks Publishing Ltd). According to H's own estimate, he spent an average of about two hours per week on self-study. In the course of the data collection period, H had naturalistic exposure to the L2 on two occasions during holidays in German-speaking countries lasting about ten days each.

Data collection began in February 2007 and ended in June 2008. During this period, a specific section of each of H's German classes was audio-recorded. This section always dealt with the same task, that is, the participant was asked to recount what he did the day before. This resulted in a learner-tutor dialogue in which the learner was expected to take a leading role and the tutor a supporting role, prompting with questions or comments, responding to learner requests for input, and offering implicit or explicit feedback on the learner's oral L2 performance, as required. Based on the resulting 56 audio-recordings of learner-tutor interactions, four research questions were addressed:

RQ1: How does the learner's oral L2 proficiency develop over time in terms of accuracy, complexity, and fluency?

RQ2: How does the learner's overt use of metalinguistic tools develop over time?

RQ3: What is the relationship between measures of oral L2 proficiency and overt use of metalinguistic tools?

RQ4: How does the learner's accuracy develop over time with regard to a selected linguistic construction which can be captured by a rule that is high in schematicity, low in conceptual complexity, low in technicality of metalanguage, and high in truth value?

The answer to RQ4 provides evidence that is relevant to the first hypothesis put forward above.¹ The answer to RQ3 speaks to the second hypothesis. RQ1 and RQ2 are included to

prepare the ground for RQ3, since, to the best of my knowledge, there is no existing research which has tracked the development of oral L2 proficiency in conjunction with overt use of metalinguistic tools in an L2 learner over as long a period of time as covered in the present study.

3.2 Construct definitions, operationalization, and data analysis

The 56 audio-recordings which constitute the data set had a mean length of approximately 14 minutes each; the entire data set comprised 13 hours and 25 minutes of dialogue. All recordings were transcribed into CHAT format, the transcription system which allows for use of the CHILDES analysis programme CLAN (see <http://childes.psy.cmu.edu/> for details). The resulting corpus of 56 transcripts was coded to facilitate quantitative analysis as well as qualitative analysis of selected sections. The constructs of interest were oral L2 proficiency, overt use of metalinguistic tools, and use of a selected linguistic construction which can be captured by an Aristotelian rule.

3.2.1 Oral L2 proficiency

Oral L2 proficiency was defined as the accuracy, complexity, and fluency² of the participant's productions.

Accuracy refers to "the ability to produce error-free speech" (Housen & Kuiken, 2009: 461). Error-free speech was measured by calculating the number of errors per 100 words (R. Ellis & Barkhuizen, 2005). A target-like use (TLU) measure was employed; this measure takes into account learner errors produced in both non-obligatory and obligatory contexts (Gass & Selinker, 2008; Iwashita et al., 2008), so both overgeneralization errors and errors of omission are included. Lexical, morphosyntactic, and pragmatic errors were counted in order to arrive at a global accuracy measure. Lexical errors were operationalized as the semantically inappropriate choice of a word/words or a missing word/words at sentence level. Morphosyntactic errors were operationalized as sentence-level errors relating to morphology or syntax. Pragmatic errors were operationalized as discourse-level errors or use of constructions that were semantically and morphosyntactically correct at sentence level, but clearly indicative of non-nativelike selection. Examples can be found in the Appendix.

Complexity refers to the extent to which language is elaborate and varied (Housen & Kuiken, 2009). Measures of lexical and morphosyntactic complexity were computed. Lexical complexity was operationalized as type-token ratio (Eskildsen, 2009) of the first 50 utterances in a transcript. The number of utterances was held constant in order to avoid any effect of sample length (R. Ellis & Barkhuizen, 2005; Larsen-Freeman, 2006). Morphosyntactic complexity was defined as amount of subordination, which was operationalized as the total number of separate clauses divided by the total number of c-units; c-units are any utterances providing referential or pragmatic meaning (R. Ellis & Barkhuizen, 2005: 155).

Fluency refers to the speed and ease with which linguistic representations are accessed in order to communicate meanings in real time (Housen & Kuiken, 2009). In the present study, fluency was operationalized as the participant's contribution to the L2 interaction, measured in number of L2 words produced per minute of a recorded session.

3.2.2 Overt use of metalinguistic tools

Use of metalinguistic tools refers to the use of explicit knowledge about language and occurs during explicit learning. Explicit knowledge about language is characterized by conscious awareness, and it includes knowledge of pedagogical grammar rules (R. Ellis, 2004; Roehr, 2008). In the present study, overt use of metalinguistic tools was operationalized as episodes of learner requests for input per 100 words and episodes of learner acknowledgement of tutor input per 100 words.

Learner requests for input were a combined measure of requests for L2 input and requests for metalinguistic input. Learner requests for L2 input included explicit questions about how to express a meaning in the L2, the coining of words which was interpreted as an implicit question about how to express a meaning in the L2, and explicit requests for repetition of tutor utterances. Requests for metalinguistic input included learner requests for explanation or clarification of L2 lexis or morphosyntax as well as explicit or implicit requests for feedback. Explicit requests for feedback were direct questions such as "Is this right?", while implicit requests for feedback were utterances in statement form, including incomplete utterances, which ended with a rising intonation.

Learner acknowledgement of tutor input was a combined measure of general acknowledgements of tutor input ("right", "yes", "mmhm", etc.) and specific acknowledgements which took the form of verbatim repetition or rehearsal of tutor input. In order to contextualize learner acknowledgements, episodes of tutor input per 100 words were taken into account. Tutor input was a combined measure of input of L2 utterances in response to a learner request, implicit feedback on learner performance in the form of recasts (Egi, 2007), and explicit feedback on learner performance or responses to learner questions in the form of metalinguistic comments or explanations.

3.2.3 Selected linguistic construction: Subject-verb agreement

The linguistic construction selected as a focus point is subject-verb agreement. This construction was chosen because it can be captured easily by an Aristotelian rule that is high in schematicity, low in conceptual complexity, low in technicality of metalanguage, and high in truth value. Moreover, this construction was very frequent in the learner's speech, enabling robust and meaningful quantitative analysis.

German language textbooks make learners aware that German verb "endings change according to the subject used" (Coggle & Schenke, 1998: 20), thus providing a pedagogical grammar rule. The inflectional paradigm of German verbs is typically presented in table format rather than in the form of rule-like propositions. Nonetheless, it is of course possible to formulate rules describing these inflectional paradigms. Such rules would consist of a number of simple propositions, e.g. 'In the first person singular present tense, the verb ends in *-e*. In the second person singular present tense, the verb ends in *-st*. In the third person singular present tense, the verb ends in *-t*.' etc.

Subject-verb agreement is presented early on in textbooks, typically via the introduction of personal pronouns together with present tense verb endings. In the case of the participant's first textbook, *Willkommen!*, the present tense inflectional paradigm is introduced step-by-step over the first three units. In subsequent units, the inflectional paradigms of modal verbs and of verbs which frequently appear in the *Präteritum* (simple past) and the perfect tense are added; these are typically the verbs *haben* (have) and *sein* (be), which are listed as exceptions to the regular 'verb stem plus ending' pattern. The inflectional paradigm for other verbs in the *Präteritum* is introduced in the participant's second textbook, *Passwort Deutsch 2*.

The core rule that German verb endings change according to the subject used is high in schematicity since it applies to all verbs and all nominal and pronominal subjects, i.e. schematic constructions. It is low in conceptual complexity, since the learner needs to relate only two categories to each other, subject and verb. Technicality of metalanguage is likewise low because the only notions referred to are the basic concepts of subject and verb. Finally, the rule has very high truth value; subject-verb agreement is compulsory and there are no exceptions.

3.2.4 Analysis procedures

The data set was analyzed quantitatively using CLAN. Measures of the variables defined and operationalized above were obtained and entered into SPSS version 14.0 for statistical analysis. Moreover, selected episodes involving subject-verb agreement were analyzed qualitatively.

4. Results and discussion

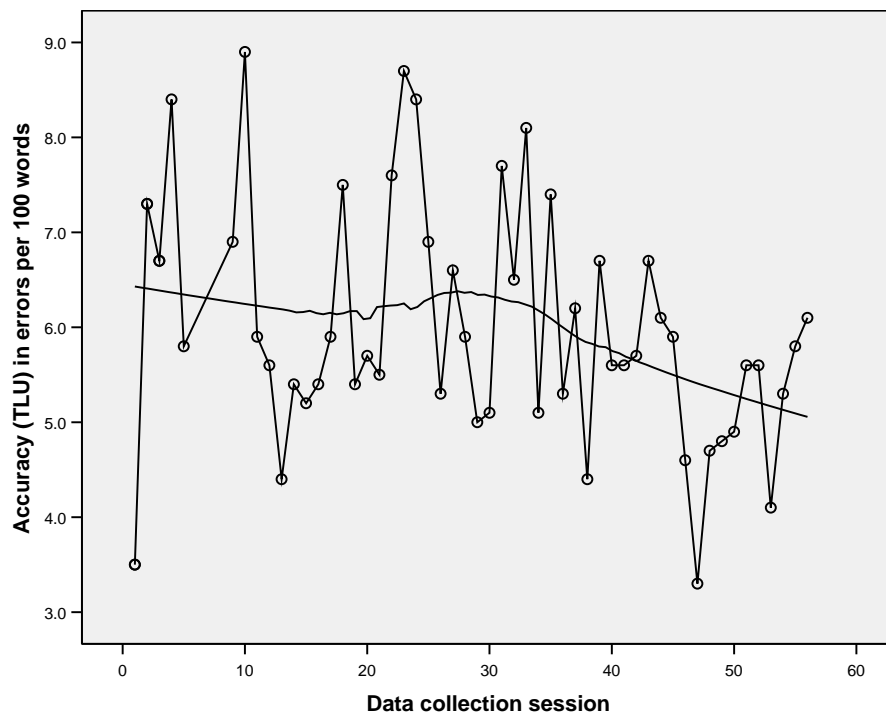
In order to answer research questions 1 and 2, non-parametric correlation coefficients (Spearman's rho) were calculated. Moreover, scatterplots for variables of interest were created and scrutinized with the aim of identifying any relationships which are not captured by bivariate correlations. To facilitate this, an interpolation line was superimposed and a Loess line was fitted to each scatterplot. The Loess line is based on a locally weighted polynomial regression and shows the underlying trend that is in evidence in the data set (Phil Scholfield, personal communication, 09/02/10).

RQ1: How does the learner's oral L2 proficiency develop over time in terms of accuracy, complexity, and fluency?

This research question was addressed by considering measures of accuracy, complexity, and fluency in relation to time (data collection session). The correlation between global accuracy and time approached significance ($\rho = -0.26$, $p = 0.05$; recall that accuracy was operationalized as number of errors per 100 words, so the coefficient is negative). The interpolation line superimposed on the scatterplot in Figure 1 tracks H's development from

session to session; clearly, there is considerable variation between data points. However, the Loess line which indicates the underlying trend in the data shows with equal clarity that the learner's error rate gradually decreases after an initial slight rise. This suggests that H's speech is slowly improving in terms of global accuracy.

Figure 1: Development of global accuracy over time



Calculations based on separate measures of lexical, morphosyntactic, and pragmatic accuracy yielded a weak significant correlation for morphosyntactic accuracy ($\rho=-0.34$, $p=0.01$). Thus, H's speech improved slightly but significantly in morphosyntactic accuracy over time. There was no significant improvement or backsliding with regard to either lexical or pragmatic accuracy.

Measures of lexical and morphosyntactic complexity did not result in significant correlations either, indicating that H's speech did not show any significant improvement or backsliding in terms of complexity. Figures 2 and 3 suggest that there are trends in evidence, however.

Figure 2: Development of lexical complexity over time

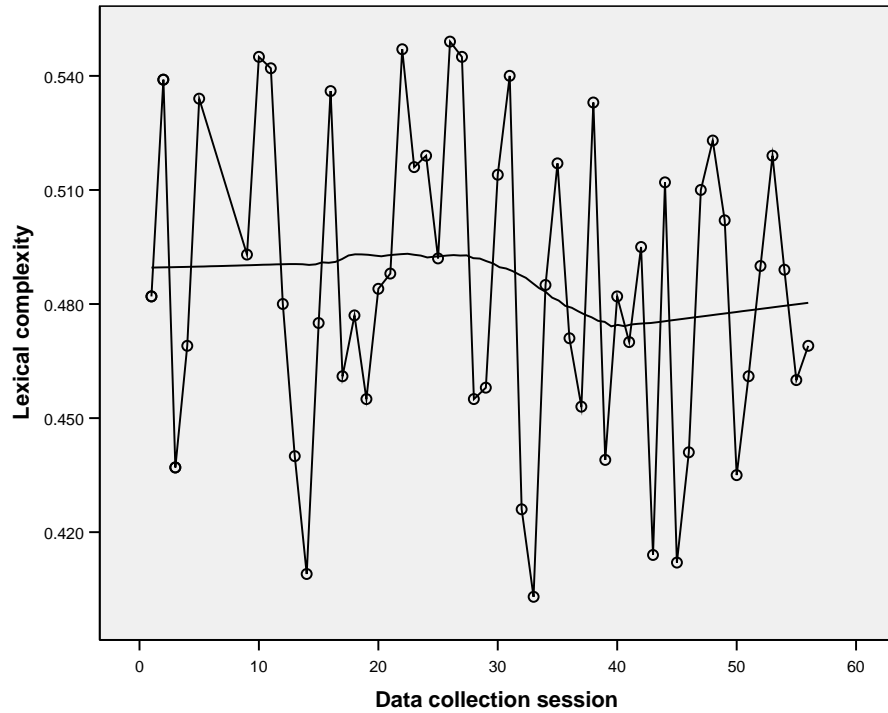
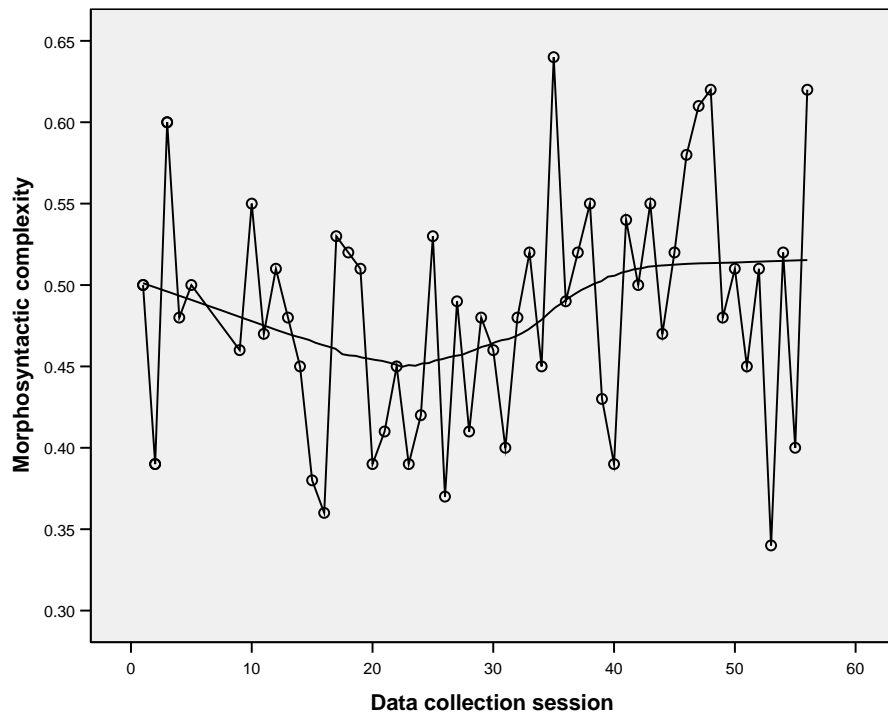


Figure 3: Development of morphosyntactic complexity over time

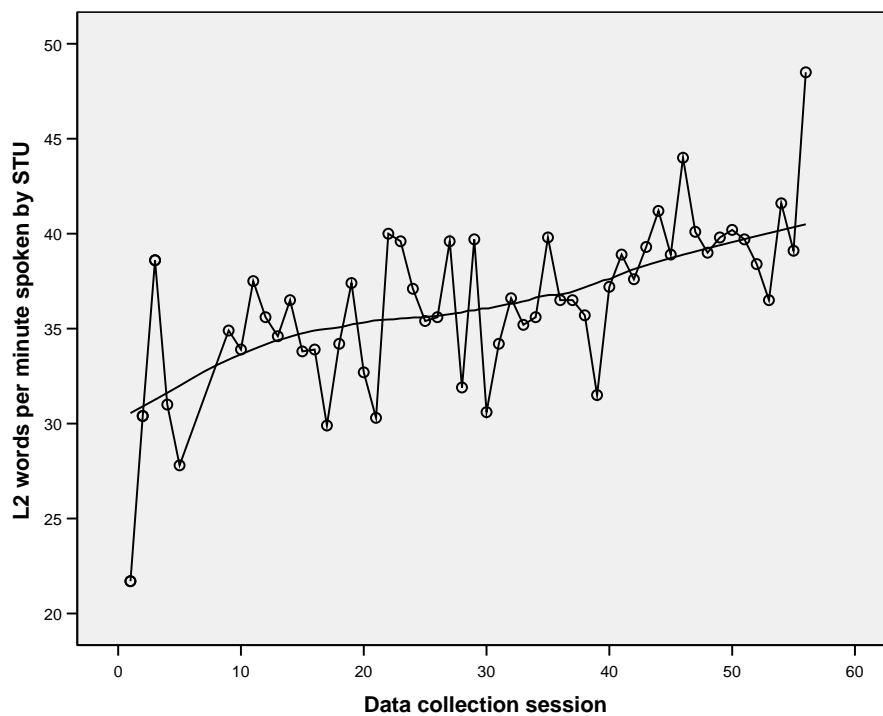


Apart from considerable variation between sessions as shown by the interpolation lines in both Figure 2 and Figure 3, the Loess line in Figure 2 implies that there was a decrease in lexical complexity after an initial period of very gradual increase. Two thirds into the data

collection period, the trend appears to change, with utterances becoming more lexically complex again. The Loess line in Figure 3 suggests that morphosyntactic complexity was on a downward trend until roughly halfway into the data collection period; there is a rising trend from then onwards.

The participant's fluency of speech as measured by L2 words spoken per minute of a recorded interaction increased significantly during the data collection period ($\rho=0.67$, $p<0.01$). The relationship is of quite considerable strength, suggesting that fluency as operationalized in the present study was the main factor accounting for H's development in oral L2 proficiency. Figure 4 illustrates the participant's progress.

Figure 4: Development of fluency over time

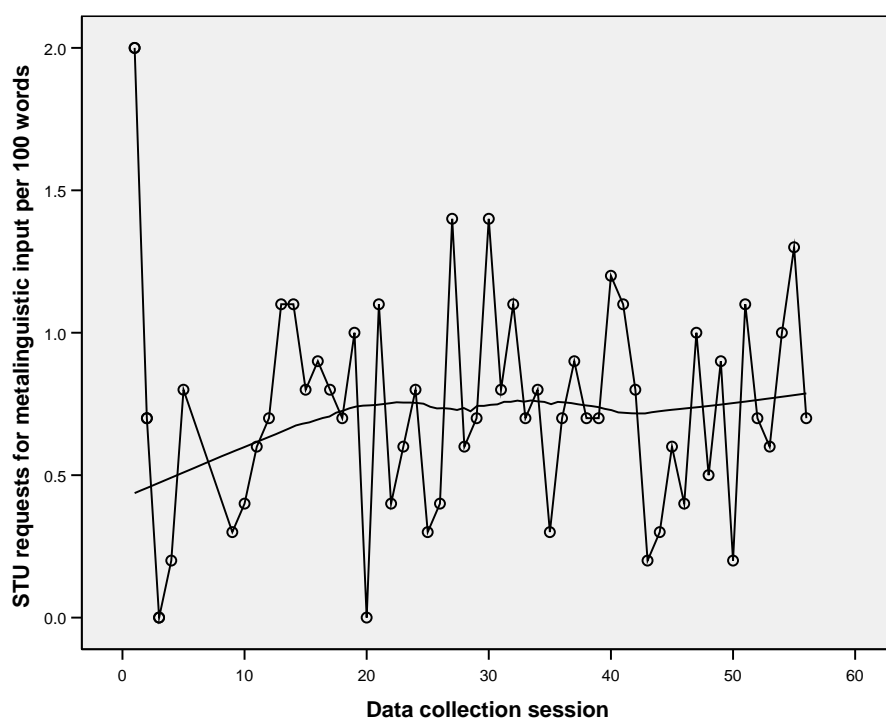


RQ2: How does the learner's overt use of metalinguistic tools develop over time?

This research question was addressed by considering measures of learner requests for input and learner acknowledgement of tutor input in relation to time.

The participant's requests for L2 input decrease significantly over time ($\rho=-0.40$, $p<0.01$); crucially, the number of requests for metalinguistic input does not decrease, however. While there is no significant correlation between number of requests for metalinguistic input and time, the Loess line in Figure 5 suggests a slight upward trend: Interestingly, the participant seems to very gradually request more metalinguistic input in the course of the data collection period.

Figure 5: Requests for metalinguistic input over time



Learner acknowledgement of tutor input cannot be interpreted meaningfully without measuring tutor input. Overall, tutor input decreased significantly over time ($\rho=-0.44$, $p<0.01$); learner acknowledgement likewise decreased significantly over time ($\rho=-0.60$, $p<0.01$). If the different types of tutor input are scrutinized individually, it becomes clear that the decrease is due to a reduction in L2 input ($\rho=-0.50$, $p<0.01$) and a more moderate reduction in recasts ($\rho=-0.27$, $p<0.05$). These results are consistent with learner development in terms of accuracy of speech and requests for tutor input. As H's global accuracy shows a trend for improvement and as his morphosyntactic accuracy improves significantly during the data collection period, it is not unexpected that the tutor will supply less corrective feedback in the form of recasts. Moreover, the number of H's requests for L2

input also decreases significantly, so less L2 input provided by the tutor is a plausible reaction.

It has also been noted that the number of learner requests for metalinguistic input does not change significantly over time, with the trend line indicating a slight increase. Accordingly, it does not come as a surprise that the quantity of metalinguistic input offered by the tutor does not change significantly either.

Acknowledgement of tutor input appears to be one of H's preferred metalinguistic tools. There is a strong correlation between overall tutor input and overall learner acknowledgement ($\rho=0.82$, $p<0.01$). If individual measures are considered separately, it becomes clear that the relationship remains significant for all three types of tutor input, i.e. L2 input ($\rho=0.60$, $p<0.01$), metalinguistic input ($\rho=0.51$, $p<0.01$), and recasts ($\rho=0.47$, $p<0.01$).

RQ3: What is the relationship between measures of oral L2 proficiency and overt use of metalinguistic tools?

In order to address research question 3, non-parametric correlation coefficients for measures of oral L2 proficiency and overt use of metalinguistic tools were calculated. With regard to measures of oral L2 proficiency, results show two significant relationships: There is a positive correlation of moderate strength between fluency and morphosyntactic complexity ($\rho=0.36$, $p<0.01$) and a weak negative correlation between lexical and morphosyntactic complexity ($\rho=-0.29$, $p<0.05$). The latter finding suggests an apparent trade-off between lexical and morphosyntactic complexity, i.e. one increases at the expense of the other. Apart from this, however, there seem to be no trade-off effects. In particular, it is noteworthy that there is no significant negative relationship between accuracy and either complexity or fluency. Most interestingly perhaps, fluency and morphosyntactic complexity are positively correlated, so the greater the learner's contribution to the L2 interaction, the greater the amount of subordination in his utterances and vice versa. In other words, fluency and morphosyntactic complexity grow together.

Two significant relationships between measures of oral L2 proficiency and overt use of metalinguistic tools were found. First, learner requests for L2 input correlate negatively with both fluency ($\rho=-0.36$, $p<0.01$) and morphosyntactic complexity ($\rho=-0.31$, $p<0.05$). These

correlations are admittedly weak, but nonetheless they seem to indicate that fewer requests for L2 input were associated with greater fluency and greater morphosyntactic complexity in the learner's speech. Second, a significant, though moderate correlation between global accuracy and learner requests for metalinguistic input was revealed ($\rho = -0.39$, $p < 0.01$). Put differently, as the number of requests for metalinguistic input increases, the overall number of errors decreases.

In order to ascertain whether these relationships could be explained simply by the fact that several of the variables involved were correlated with time (data collection session), partial correlations controlling for time were run. The results indicate that time was a factor in two cases: The negative correlation of learner requests for L2 input with fluency and morphosyntactic complexity and the negative correlation between lexical and morphosyntactic complexity arose because these variables changed with time. Conversely, the correlation between learner requests for metalinguistic input and global accuracy and the correlation between fluency and morphosyntactic complexity remained significant even when time was partialled out. Thus, only these two relationships are discussed further.

4.1 Interim summary

The results so far can now be summarized and interpreted with reference to the second of my initial two hypotheses. I hypothesized that a language learner's overall performance will be affected by reliance on explicit knowledge and learning. More specifically, I predicted that explicit knowledge and learning will be associated with increased accuracy and/or complexity of language on the one hand and decreased fluency on the other hand. The empirical findings partly confirm and partly disconfirm this hypothesis.

The participant used overt metalinguistic tools throughout the data collection period, including requests for L2 input, requests for metalinguistic input, and acknowledgement of tutor input. Thus, there is evidence of explicit knowledge and learning. Furthermore, the learner's use of metalinguistic tools changes over time. While requests for L2 input decrease significantly, acknowledgement of tutor input remains a preferred tool, as demonstrated by the strong positive correlation between measures of tutor input and measures of learner acknowledgement. In addition, there is a trend towards a slight increase in requests for metalinguistic input.

My prediction that explicit knowledge and learning will be associated with increased accuracy and/or complexity was borne out with regard to accuracy. A significant correlation of moderate strength between number of requests for metalinguistic input and global accuracy was identified, indicating that error rates fell with increasing use of a metalinguistic tool.

Conversely, the prediction that there would be a trade-off between accuracy and/or complexity on the one hand and fluency on the other hand was not borne out. Over time, the participant improved significantly in terms of both fluency and morphosyntactic accuracy; moreover, global accuracy showed an upward trend. What is more, fluency and morphosyntactic complexity were significantly correlated, indicating not only the absence of a trade-off effect, but a mutually supportive association: Greater fluency and greater morphosyntactic complexity went hand in hand.

Taken together, the findings suggest that the participant may be on the way to an overall more fluent and at the same time more controlled performance. Importantly, the learner generally appears to benefit from explicit knowledge and learning, with little trade-off in evidence.

RQ4: How does the learner's accuracy develop over time with regard to a selected linguistic construction which can be captured by a rule that is high in schematicity, low in conceptual complexity, low in technicality of metalanguage, and high in truth value?

The linguistic construction selected as a focus point is subject-verb agreement. As argued above, the core pedagogical grammar rule capturing this construction is highly schematic, low in conceptual complexity and technicality of metalanguage, and high in truth value.

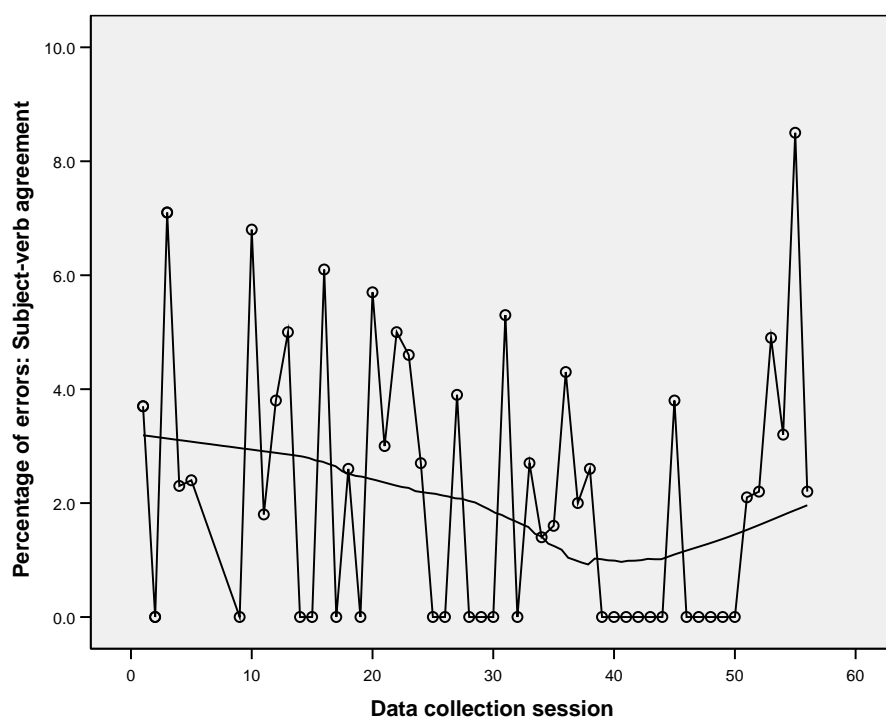
According to the first of my two hypotheses put forward above, subject-verb agreement represents the kind of linguistic construction that should be particularly amenable to being learned explicitly.

As the use of subjects and verbs is obligatory in German sentences, subject-verb agreement is ubiquitous. Unsurprisingly, the construction is likewise very frequent in the participant's speech, with a total of 2,572 occurrences in the corpus. At 2.2%, the mean error rate for this construction is low³; it ranges from 0 to 8.5%.

The learner requests metalinguistic input relating to subject-verb agreement in only four of the 56 sessions; unsurprisingly, there is no significant relationship between his error rate and requests for input. Nonetheless, there is other evidence of explicit learning opportunities in connection with subject-verb agreement: the tutor provides fairly consistent feedback on H's performance, resulting in a significant positive correlation of medium strength between error rate and tutor input ($\rho=0.55$, $p<0.01$). What is more, the participant almost always acknowledges tutor input with regard to this linguistic construction ($\rho=0.87$, $p<0.01$).

Regarding the development of H's accuracy on subject-verb agreement, correlational analysis shows that there is no significant improvement or backsliding over time. Perhaps this is not entirely surprising; accuracy was high from the start, so there is arguably little room for improvement. The developmental trend is shown in Figure 6.

Figure 6: Development of accuracy on subject-verb agreement over time



The Loess line in Figure 6 indicates a steady downward trend in terms of errors for a substantial period of time; towards the end of the data collection period, the trend appears to reverse, showing a gradual rise in error rate. This suggests that although the participant's use

of subject-verb agreement is often highly accurate, it is not perfect and, more interestingly perhaps, it is not stable (yet). Whilst the generally favourable properties of the core pedagogical grammar rule describing subject-verb agreement can help explain high levels of accuracy achieved through explicit learning, they cannot easily explain the observable fluctuation in the participant's performance. Therefore, it appears that there are other factors at play. In what follows, a qualitative analysis aimed at identifying these factors is presented. In summary, the qualitative analysis shows that a range of variables renders accurate use of subject-verb agreement more challenging than anticipated.

Scrutiny of instances of inaccurate subject-verb agreement suggests that H's errors fall into three main categories. The first group accounts for around 35% of all subject-verb agreement errors and comprises mistakes with nominal or pronominal subjects in the third person. Some of the errors in this category may be attributable to inappropriate transfer from the L1, e.g. in the case of collective nouns that behave differently from English cognates (*Familie* = singular; *family* = singular or plural); other errors may be attributable to the fact that the forms of the nouns involved are the same in the singular and the plural, e.g. *Fahrer* (*driver/drivers*), *Gebäude* (*building/buildings*), or *Schuppen* (*shed/sheds*). Moreover, indefinite pronouns seem to be problematic, e.g. *alle* (*all*), *beide* (*both*), or *einige* (*some, several*). Finally, it is noteworthy that the verbs most frequently appearing in this category are *sein* (*be*) and *haben* (*have*), both of which, though highly frequent, are listed as exceptions with irregular inflectional paradigms in H's textbooks.

The second group accounts for another 35% of all subject-verb agreement errors and comprises mistakes with pronominal subjects and verbs in the *Präteritum* (simple past). The inflectional paradigm of verbs in the *Präteritum* is slightly less transparent than in the present tense, which may be a possible source of errors. For instance, verbs in the first and third person singular have the same ending in the *Präteritum*, whilst they are clearly distinguished in the present tense.

The third group accounts for about 20% of all subject-verb agreement errors; it exclusively consists of errors involving the verb *gefallen* (*be pleasing to*). Before discussing this category in detail, it is worth noting that the remaining small percentage of errors comprises mistakes involving perfect tense verbs. These mistakes are rare and counterbalanced by literally hundreds of instances of correct usage. Their common characteristic seems to be their

appearance in linguistic contexts which are particularly challenging for the participant, lexically, syntactically, or both, as exemplified in (1) and (2).⁴

(1)

STU: Die [/] der Spaziergang [pause]. I'm sorry, I can't think of the words.

Gloss: The walk.

STU: Mach [/] macht durch zwei anderen Dorf.

Gloss: Makes through two other village.

TEA: Ja, der Spaziergang war ein Rundgang durch drei Dörfer, ja? Also M. und noch zwei andere Dörfer.

Gloss: Yes, the walk was a circular walk through three villages, right? M. and two other villages.

STU: Ja.

TEA: Also der Spaziergang ging durch drei Dörfer.

Gloss: So the walk went through three villages.

STU: Okay.

TEA: Ja.

STU: So bald hat wir nach nächste [/] nächstes Dorf gekommen.

Gloss: So soon we came to the next village.

TEA: Ja, bald sind wir zum nächsten Dorf gekommen.

Gloss: Yes, soon we came to the next village.

STU: Can you say that again?

TEA: Bald sind wir zum nächsten Dorf gekommen.

STU: Bald sind wir zum nächsten Dorf gekommen. (Session 22)

(2)

STU: Ich [/] ich wollte noch [/] noch eine Paar Schuhe. **Die gleiche, das [/] die ich letztes Mal gekauft hat.**

Gloss: I wanted another pair of shoes. The same ones that I bought last time.

TEA: Habe.

STU: Habe. (Session 55)

In (1), it is clear that the participant is struggling to express intended meanings in the L2. After hesitating, stating that he does not have the means to say what he would like to say, and then making an unsuccessful attempt, the tutor provides L2 input. The participant then takes up the thread of the narrative, producing the utterance in bold. The tutor recasts the inaccurate sentence, correcting several errors simultaneously, including subject-verb agreement. The participant asks the tutor to repeat the recast and subsequently rehearses it accurately.

With regard to the targeted utterance shown in bold, H's self-correction indicates that he was monitoring the use of adjectival inflection which depends on number, gender, and case of the

noun that is being qualified. The gender of the noun *Dorf* (village) is neuter, so the self-corrected inflection *nächstes* (next) is closer to the target than the original form of the adjective (*nächste*), but the learner fails to take dative case into account, which would yield the correct form *nächsten*. Furthermore, *nach* (to) is the incorrect preposition, since it is only used with proper names of geographical locations; *zu* (to) is required for locations such as *Dorf* (village). In addition, the verb *kommen* (come) requires the auxiliary *sein* (be) in the perfect tense rather than *haben* (have). Finally, subject and verb are correctly inverted; if a sentence begins with an adverbial such as *bald* (soon), the finite verb appears in second position and the subject is moved to third position.

The last four sentences in the preceding paragraph recite pedagogical grammar rules which H had encountered in his textbooks and his classes. Thus, together with subject-verb agreement, no fewer than five rules would have to be retrieved and applied in order to formulate the targeted utterance accurately with the help of explicit knowledge. In addition, the correct lexical items had to be called up as well. All in all, this represents a considerable cognitive load – too great a load in this case, as the relatively large number of errors and the participant's deliberate repetition of the tutor's recast indicate.

In (2), H constructs a relative clause. This structure was introduced fairly late in the learner's third textbook *Passwort Deutsch 3* and is correspondingly infrequent in the participant's speech as recorded in the corpus. The pedagogical grammar rule pertaining to relative clauses is conceptually far more complex than the rule covering subject-verb agreement, with a number of categories and relations between categories to be taken into account. The rule in H's textbook states that the relative pronoun has the same gender as the noun in the main clause, while the case of the relative pronoun is determined by the verb and/or preposition in the relative clause (translated from Albrecht et al., 2002: 67). As H's self-correction indicates, it is likely that the participant tried to draw on this conceptually complex metalinguistic description when constructing the relative clause in the targeted sentence. At the same time, explicit monitoring of subject-verb agreement was neglected, resulting in the inaccurate production of *hat* as opposed to the correct form *habe*.

In summary, it seems that in challenging linguistic contexts as exemplified in (1) and (2), successful explicit processing is not always possible. Online processing of a large number of

pedagogical grammar rules and/or of a conceptually complex rule can constitute too great a cognitive load.

The final group of subject-verb agreement errors comprises mistakes involving the verb *gefallen* (*be pleasing to*). As *gefallen* constructions alone account for about 20% of all subject-verb agreement errors, they arguably merit more detailed consideration, both with regard to incorrect and correct patterns of usage. Scrutiny of errors with *gefallen* suggests that the source of difficulty may be found outside what is covered by the core pedagogical grammar rule describing subject-verb agreement. In fact, all errors display the same pattern: A subject in the third person plural is combined with a verb marked for the third person singular, as exemplified in (3) and (4).

(3)

TEA: Aber leider hast du keine Schuhe gefunden für dich?

Gloss: But unfortunately you didn't find any shoes for you?

STU: **Nein, die Schuhe gefällt mir nicht.**

Gloss: No, I don't like the shoes. (Literally: No, the shoes is not pleasing to me.) (Session 5)

(4)

STU: Ich habe zwei Paar Hosen anprobiert.

Gloss: I tried on two pairs of trousers.

TEA: Mhm.

STU: **Aber die gefällt mir nicht.**

Gloss: But I don't like them. (Literally: But they is not pleasing to me.) (Session 33)

Differences between L1 and L2 might be a potential source of difficulty surrounding subject-verb agreement in the *gefallen* construction and others like it. The constructional schema in L2 is SUBJECT-*gefallen*-DATIVE OBJECT(-NEGATION). Conversely, the most common L1 translation equivalent is the constructional schema SUBJECT(-NEGATION)-*like*-DIRECT OBJECT. In the English construction, the human agent is in subject position; in the corresponding German construction, however, the human agent is in object position whereas the entity that is pleasing to the human agent is in subject position. This contrast in the two constructional schemas could have role to play: Instead of inflecting the verb in accordance with person and number of the subject, H's errors in (3) and (4) are consistent with inflection according to the number, though not the person, of the human agent in object position.

Whilst this explanation is plausible, further analysis indicates that L1-L2 contrast is probably not the main factor impacting on the participant's performance. Instead, H's developing use of the *gefallen* construction in the course of the data collection period suggests that exemplar-based, bottom-up learning rather than explicit, top-down learning may be the key explanatory variable in this case. As detailed in what follows, the participant seems to have acquired the item-based schema *X gefällt mir (nicht)* (*X is (not) pleasing to me*) first. From this, *X gefällt Y (nicht)* (*X is (not) pleasing to Y*) is quickly abstracted. Then a second item-based schema for past reference is acquired, that is, *X hat Y (nicht) gefallen* (*X was (not) pleasing to Y*). The fact that these item-based schemas are structured around singular verbs means that subject-verb agreement errors occur whenever the subject is in the plural.

The first step in H's developmental sequence is illustrated in (5) and (6).

(5)

TEA: Es war sehr scharf.

Gloss: It was very spicy.

STU: Sehr scharf, mmhm. **Es gefällt mir, aber nicht dir [//] dich?**

Gloss: Very spicy, mmhm. I like it, but you don't?

TEA: Dir.

STU: Dir. (Session 27)

(6)

TEA: Und denkst du, dass das eine gute Überraschung war für S., eine gelungene Überraschung?

Gloss: And do you think it was a good surprise for S., a welcome surprise?

TEA: Oder denkst du <er war ein bisschen> [//] ja, er war nicht so begeistert?

Gloss: Or do you think he was a bit, well, that he wasn't so enthusiastic about it?

STU: **Nein, ich [//] ich denke, dass es [//] es gefällt ihm.**

Gloss: No, I think he likes it. (Session 28)

Excerpts (5) and (6) exemplify instances of use of the *gefallen* construction initiated by the participant, i.e. there was no prior input or modelling from the tutor. Both instances are representative of correct subject-verb agreement, with both the subject and the verb in the third person singular. Note that H uses the schema *X gefällt mir (nicht)*, with the more abstract schema *X gefällt Y (nicht)* emerging. In both (5) and (6), the perfect tense would have been required, but the participant's apparent reliance on a schema based around the present tense verb form *gefällt* does not yet allow for use of the appropriate tense. In (6), moreover, the finite verb should appear at the end of the subordinate clause (*dass es ihm*

gefällt). Apart from application of a pedagogical grammar rule, such compliance with conventional word order would require a wholly abstract constructional schema, however. The item-based schema *X gefällt Y (nicht)* cannot accommodate changes in word order; accordingly, the finite verb remains in second position.

The item-based schema for *gefallen* constructions with past reference is used from session 21 onwards. Excerpt (7) shows the participant's first unprompted use of the construction; excerpt (8) exemplifies a later occurrence.

(7)

TEA: Ja, es gab nur drei Filme, nicht?

Gloss: Yes, there were only three films, weren't there?

(...)

STU: **Ja, die [/] die hat uns nicht gefallen.**

Gloss: Yes, we didn't like them. (Literally: Yes, they was not pleasing to us.) (Session 21)

(8)

STU: Die Kneipe heißt H.

Gloss: The pub is called H.

TEA: Ja.

STU: **Aber sie hat uns nicht gefallen.**

Gloss: But we didn't like it. (Session 45)

In (8), the subject is in the singular, so the singular verb is appropriate and no subject-verb agreement error occurs. In (7), however, subject and verb do not agree, with the previously identified error pattern of third person plural subject plus third person singular verb in evidence, as illustrated in (3) and (4) above. All other subject-verb agreement errors occurring in the *gefallen* construction with past reference display the same pattern. At the same time, the object seems to have as little impact on the verb form as the subject: The plural object *uns* (*to us*) in (7) and (8) does not prompt any change in verb inflection. This circumstance weakens the argument that L1-L2 contrast may be responsible for subject-verb agreement errors with the *gefallen* construction. It is, however, fully consonant with the use of an item-based schema of the form *X hat Y (nicht) gefallen*.

Up to now, the discussion of the *gefallen* construction has focused on instances of use which were initiated by the participant himself. Scrutiny of H's use of the *gefallen* construction in

tutor-initiated discourse provides further corroborating evidence for the argument of exemplar-driven learning resulting in the use of item-based schemas. Table 1 displays the participant's responses to direct tutor questions regarding his likes or dislikes of certain attitude objects.

Table 1: The *gefallen* construction in tutor-initiated discourse

TEA	STU	Item-based schema	Session
Hat es dir gefallen?	Ja, es gefällt mir.	X gefällt mir (nicht)	1
Hat es dir geschmeckt?	Ja, es gefällt mir.	"	5
Hat dir der Film gefallen?	Ja, es [//] er gefällt mir.	"	10
Hat es dir gefallen?	Ja, es gefällt mir.	"	14
Das hat dir nicht geschmeckt?	Nein, es gefällt mir nicht.	"	18
Und hat dir der Film gefallen?	Ja, der Film gefällt mir.	"	32
Hat dir der Film gefallen?	Ja, der Film hat mir gefallen.	X hat mir (nicht) gefallen	36
Hat es dir gefallen?	Ja, <es gefällt mir> [//] es [/] es hat mir gefallen.	"	39
Hat dir der Film gefallen?	Ja, der Film hat mir gefallen, aber das Ende <hat mir> [/] hat mir nicht gefallen.	"	42
Hat dir der Film gefallen?	Ja, der Film gefällt mir.	X gefällt mir (nicht)	53
Hat dir das Haus gefallen?	Ja, es gefällt mir.	"	56

Even though all tutor questions refer to past events and are thus formulated in the perfect tense, it is not until session 36 that the learner responds in the same tense. As mentioned above, the corresponding *X hat Y (nicht) gefallen* schema emerges in session 21 after initially being modelled by the tutor in session 18, but Table 1 indicates that the use of this schema remains unstable throughout, with the earlier *X gefällt Y (nicht)* schema still dominant. Tutor questions employing the verb *schmecken* (*taste*) further substantiate the argument that H's item-based schemas are anchored around forms of the verb *gefallen*. The verb *schmecken* behaves in the same way as *gefallen*, with the tutor's questions explicitly modelling the required constructional pattern (sessions 5 and 18); however, H continues to employ the *gefallen* construction in his answers, apparently as yet unable to abandon the item around which the schema is structured in his mental representation.

4.2 Interim summary

The findings concerning H's use of subject-verb agreement can now be summarized and interpreted with reference to the first of my initial two hypotheses. I hypothesized that a linguistic construction which can be captured relatively easily by an Aristotelian rule will be acquired faster and more accurately if the learner draws on explicit knowledge than a linguistic construction which cannot easily be captured by an Aristotelian rule. Given the costliness of explicit processing, a rule that is high in schematicity, low in conceptual complexity, low in technicality of metalanguage, and high in truth value will be most favourable.

The analysis focused on a selected linguistic construction, subject-verb agreement, which is captured by a core pedagogical grammar rule that should be highly amenable to explicit processing. In view of the constraints of the present paper, the participant's performance on subject-verb agreement was not compared directly with his performance on other linguistic constructions, so the available evidence is indirect and cannot be regarded as final. The findings so far provide some interesting indications, however.

Overall, the participant's generally high accuracy with regard to subject-verb agreement – an ubiquitous construction appearing in many different linguistic contexts – was noted. Likewise, overt use of metalinguistic tools in conjunction with subject-verb agreement was in evidence, as exemplified by occasional learner requests for metalinguistic input, quite regular tutor feedback in response to learner errors, and above all highly consistent learner acknowledgement of tutor input with respect to the selected linguistic construction.

The apparent amenability of subject-verb agreement to explicit, top-down processing and the apparent use of metalinguistic tools neither explain the fluctuations in H's performance from session to session nor the overall developmental trend, however. Indeed, qualitative analysis of the learner's usage patterns revealed that a range of factors appears to influence accuracy with subject-verb agreement.

First, situational context is likely to impact on performance. Subject-verb agreement errors occurred when the participant's cognitive resources were taxed either by the need to simultaneously apply a number of pedagogical grammar rules or by the need to use a conceptually complex metalinguistic description in conjunction with the subject-verb agreement rule.

Second, the error patterns identified suggest that both the nature of the verbal inflectional paradigm and the form of nominal subjects have a role to play. Specifically, exceptions to regular inflectional patterns and non-transparent form-function mappings may lead to inaccuracies. Previous research has reported that transparent one-to-one form-function mappings are easier to acquire than more opaque mappings of one form marking many functions or one function being marked by many forms (Collins et al., 2009; DeKeyser, 2005; Kempe & MacWhinney, 1998). In German subject-verb agreement, non-transparent mappings occur more often with regard to verbs in the *Präteritum* than verbs in the present tense, with the form *-e* marking both the first person and the third person singular *Präteritum*. Moreover, non-transparent mappings occur with regard to certain nouns such as *Fahrer* and *Gebäude* where singular and plural are expressed by the same form. While transparency of mapping has been discussed in connection with implicit learning (DeKeyser, 2005; Roehr & Gánem-Gutiérrez, 2009), it nonetheless seems to have an impact in this case. This implies that implicit and explicit processes occur alongside one another and, ultimately, may only be fully understood if they are considered together.

Indeed, detailed analysis of H's productions involving the *gefallen* construction yielded considerable evidence for exemplar learning resulting in the use of item-based schemas. This type of bottom-up learning has been identified as a key acquisition process in both L1 (Abbot-Smith & Tomasello, 2006; Tomasello, 2003) and L2 learning (N. Ellis, 2002a, 2003; Eskildsen, 2009). The present findings strongly suggest that in addition to using explicit knowledge and learning, the participant also relied on fast and cognitively efficient bottom-up processes.

While this is perhaps unsurprising in itself, the analysis showed that these bottom-up processes can apparently override comparatively slower and more costly top-down processes. Interestingly, this seems to happen even in a learner such as H whose performance is otherwise strongly indicative of explicit learning. Hence, it is likely that implicit processes not only subserve fluent and effortless language use (N. Ellis, 2005), but may also take over again by default when the cognitive resources available for explicit processing are pushed to their limits – because of the time pressures inherent in meaning-focused oral communication (R. Ellis, 2005, 2006) and/or because of cognitive overload, as argued above.

5. Conclusion

In this paper, I put forward two hypotheses concerning the potential role of explicit knowledge and learning in SLA; these hypotheses were informed by a cognitive linguistics perspective on language representation and processing. I then presented empirical evidence from a longitudinal case study of an adult L2 learner which spoke to these hypotheses.

Linking the bird's eye view of theoretical argumentation with the fine-grained detail of an individual learner's oral L2 performance led to a number of instructive insights. Evidence of explicit learning was found throughout the data set: direct evidence in the form of overt use of metalinguistic tools by the learner, including requests for and acknowledgement of tutor input, and indirect evidence in the form of performance patterns which showed the hallmarks of resource-intensive explicit processing.

Possible benefits of explicit knowledge and learning in SLA were uncovered: The number of learner requests for metalinguistic input and global accuracy of speech were significantly correlated, indicating that decreasing error rates were associated with increasing use of a metalinguistic tool. Claims about cause and effect in this relationship cannot be made, but other evidence points in the direction of a beneficial role for explicit knowledge and learning with regard to accurate language use: The absence of a trade-off between accuracy and fluency is an indicator; moreover, greater fluency and greater morphosyntactic complexity showed a mutually supportive association.

Potential limitations of explicit knowledge and learning in SLA emerged with equal clarity, though. The learner used a linguistic construction that was hypothesized to be particularly amenable to explicit processing with a high level of accuracy. Yet, analysis of specific usage situations suggested that the properties of pedagogical grammar rules describing linguistic constructions may be inadequate predictors in the context of communicative language use. If the cognitive load imposed by explicit processing becomes too onerous, even rules that are highly amenable to explicit learning may no longer be beneficial: With resources depleted, they are either not applied successfully, or they are not applied at all because implicit, exemplar-based processing takes their place.

Last but not least, the limitations of the present study should be acknowledged and avenues for future research highlighted. The key strength of a longitudinal case study is its amenability to detailed analysis at the level of specific linguistic constructions. This is offset by the main weakness of such a research design: Comparisons across learners cannot be made, and generalizability is limited. Thus, future research should seek to address hypotheses about explicit knowledge and learning informed by a cognitive linguistics perspective in a group of participants in order to allow for direct comparison between different linguistic constructions and across different individuals. Findings would complement the present study and provide researchers, teachers, and learners with more robust evidence about the role of explicit knowledge and learning in SLA.

Notes

¹ Due to space limitations, only one linguistic construction is focused on in the present paper, so a comparison with other linguistic constructions is not provided.

² Accuracy, complexity, and fluency have been defined and operationalized in different ways (R. Ellis & Barkhuizen, 2005; Housen & Kuiken, 2009). Thus, it is worth bearing in mind that the use of different measures could potentially lead to different results.

³ The error rate was calculated as the percentage of incorrect instances out of all instances of use of the construction. This approach was taken because the number of occurrences of subject-verb agreement varied between sessions. Percentage-based error rates were likewise calculated for other selected constructions which are not discussed in the present paper. The mean error rates were higher, e.g. use of correct auxiliary with the perfect tense 7.0%, form of the past participle 5.3%, case inflection 12.7%.

⁴ STU refers to the learner, TEA to the tutor. The constructions under discussion are shown in bold. Further details about CHAT transcription conventions can be found in the Appendix.

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Appendix

Transcript excerpts are presented in edited format to ensure maximum readability. The symbol [/] is CHAT code for retracing; [//] refers to self-correction; [///] refers to reformulation. Angled brackets < > are placed around the retraced expression if it comprises more than one word.

Accuracy: Examples of lexical, morphosyntactic, and pragmatic errors

Wir sind *in Debenham's gegangen. (Session 41)

Gloss: We went to Debenham's.

Lexical error: A word that is incorrect at sentence level was chosen; the correct preposition is *zu* in this case.

Aber [/] aber wir konnten nicht im Garten Picknick *gemacht. (Session 9)

Gloss: But we could not have a picnic in the garden.

Morphosyntactic error: The learner uses the past participle of the verb (*gemacht*) when the infinitive form (*machen*) is required.

Und wir haben eine Tasse Tee *gekauft. (Session 52)

Gloss: And we bought a cup of tea.

Pragmatic error: Although *gekauft* is a semantically accurate description of the event H is referring to, the verb is inappropriate in the given German discourse. The pragmatically appropriate choice would be *getrunken*.