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The use of lexical inferencing strategies by learners of German as a third language in Spain

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Lexical inferencing strategies are considered a relevant factor in second and third language vocabulary acquisition and reading comprehension. This article covers a case study that focuses on two underrepresented aspects in existing research: inferencing by learners of German as an L3 with a background in Spanish and strategy use at a beginner's level. Eight participants taking beginner's level German courses at the University of Salamanca (Spain) were asked to read through an authentic text and infer the meaning of unknown words while speaking their thoughts out loud. The analysis of the gathered think-aloud data suggests that the most frequently used strategies were those that rely on the immediate context and word form. However, there are significant differences among the learners as regards overall inferencing attempts and preferred strategies. This study also indicates that perceived strategy use and actual strategy use differ.

1. Introduction

Processes and strategies in vocabulary learning are an important field of research in second and third language acquisition and teaching. Noticing and determining the meaning of a new word are the first steps in acquiring a new lexical item. This is why language researchers and teachers emphasize the importance of vocabulary determination strategies to successfully expand the mental lexicon of learners (Nation 2013; Neveling 2004). The ways in which learners approach unknown words have been found to be related to their ability to recall and use them later (Ender 2016; Nation 2013). With reading being one of the most important sources of vocabulary learning (Nation 2013), many research projects focus on how learners derive the meaning of new lexical units they encounter when reading foreign language texts (e.g., Ender 2004, 2016; Fraser 1999; Haastруп 1991; Nassaji 2003; Wesche & Paribakht 2009; for an overview see Kienberger 2020b: 82-94; Nation 2013: 348-388). By analysing the lexical inferencing strategies learners know and are both able and willing to apply in a given reading situation, researchers attempt to gain a better understanding of vocabulary acquisition processes and how to support them.

This article presents the results of a think-aloud study on the use of lexical inferencing strategies by L3 learners, including several underrepresented aspects in existing research: strategy use at beginner's level, working with authentic material, and the context of German as an L3 in Spain. Moreover, significant differences on a collective and individual level are found between perceived and actual strategy use.

1.1 Lexical inferencing strategies

Lexical inferencing can be defined as “making informed guesses as to the meaning of a word in light of all available linguistic cues in combination with the learner’s general knowledge of the world, her awareness of the co-text and her relevant linguistic knowledge” (Haastrup 1991: 13). In the case of first language (L1) acquisition, new words, especially the most frequent few thousand words, are learnt through exposure to them in their oral form. After acquiring reading skills, written texts become an important source of vocabulary growth. This also applies to L2 learning, where in actual fact the importance of reading may be even greater (Wesche & Paribakht 2009: 3-4). In order to support successful inferencing, teachers and researchers focus on the strategies used by learners in their inferencing attempts (for more information on the concept of *learning strategies* see Macaro 2006; Oxford 2017).

Often, inferencing strategies are separated into categories according to the cues (or clues) a word or its context provides and/or the knowledge sources learners can rely on. Following Carton (1971), many researchers distinguish between:

- intralingual cues: use of the knowledge of the target language,
- interlingual cues: comparison with L1 or any other known language, and
- extralingual/contextual cues: use of the context in combination with world or topic knowledge.

The review of both empirical studies on inferencing strategies and educational literature shows a large number of individual strategies that can also be classified according to this scheme (Kienberger 2020b: 59-98, 98-101).

1.2 Research on the use of lexical inferencing strategies by learners

Research in the field of L2 inferencing strategies focuses mainly on two aspects: the investigation of strategy use in certain learner groups and the analysis of successful strategic behaviour or the usefulness of specific strategies (Nyikos & Fan 2007; Wesche & Paribakht 2009). To gain insight into the strategic behaviour of learners, researchers

analyse either perceived or actual strategy use. Studies on the former usually aim to collect data on general strategy use in a range of situations. The use of questionnaires as the preferred research instrument allows for data from large groups of learners to be collected and analysed. Studies on the latter focus on specific contexts in which the strategies are applied. The research methodology includes introspective methods (e.g. think-aloud protocols by learners carrying out language tasks that require lexical inferencing), retrospection (e.g. interviews after completing a specific task), and observation. Due to the time-consuming ways in which data is collected, normally only relatively small groups of students participate. The limitations of these various approaches mean that mixed designs are desirable (Nation 2013: 334-335; cf. White et al. 2007). Nevertheless, only a few studies combine analysis of perceived and actual strategy use (Kienberger 2020b: 103-119).

The findings of large-scale studies on general (perceived) vocabulary strategy use among L2 learners (e.g. Fan 2003; Gu & Johnson 1996; Catalán Jiménez 2003; Mizumoto 2010; Schmitt 1997; Targońska 2014; Wang 2009; cf. Kienberger 2020b: 108-119) suggest that *Guessing from context* is one of the most frequently used vocabulary determination strategies, besides *Using (bilingual) dictionaries*. As for different kinds of inferencing strategies, the use of contextual cues seems to be more important for learners than the use of intra- or interlingual cues. Moreover, learners tend to use strategies on a sentence and text level more than word-level strategies. However, findings on the use of specific strategies differ, and the reported standard derivations in some studies (Fan 2003; Gu & Johnson 1996; Mizumoto 2010; Wang 2009) suggest significant differences in strategy application depending on the individual.

There are only a few studies that focus more specifically on lexical inferencing strategies, with Kienberger (2020b) perhaps undertaking the most in-depth large-scale survey on the topic. In her dissertation project, Kienberger explored the use of inferencing strategies by learners of German as an L3 at 19 Spanish universities. Between 2017 and 2019, a questionnaire created by the author, with items on a five-point Likert scale based on the author's classification scheme, was administered to participants of university German courses in the form of an online survey (N=401). The results illustrate the importance of lexical inferencing strategies for the majority of the surveyed students. They also show general trends in frequently used strategies; however, there are significant differences between the learners. On average, the most

frequently used cognitive inferencing strategies are: *Using world knowledge; Comparing with English; Using orthographical clues; Lexical familiarisation; and Using visualisations, pictures, etc.* The strategies with the lowest levels of perceived average use are: *Using knowledge of sound shifts; Visual text form; Paradigmatic relations; Acoustic similarity; and Using languages other than English.* Students differ significantly in their stated strategy use. A cluster analysis shows the profiles of ten different strategy users: it includes learners who report high use of various kinds of strategies; learners who prefer to use certain strategies more often than other students; and learners who use just a few strategies on a regular basis (with the latter being the exception).

A large amount of research has been undertaken in the field of actual use of inferencing strategies, exploring various language combinations, learning environments, tasks, and student groups (cf. Kienberger 2020b: 103-108; Wesche & Paribakht 2009). However,

“the diverse methodological variations on a number of parameters likewise make comparisons and synthesis of findings across studies extremely difficult, even while common principles appear to underlie successful lexical inferencing in its many contexts.” (Wesche & Paribakht 2009: 29)

One clear finding is that the application of inferencing strategies depends on a number of factors such as the learners’ prior knowledge, their L2 proficiency, the learning environment, or the task and material (Gu 2015; Wesche & Paribakht 2009: 10-18). What is more, a range of studies (e.g., Fraser 1999; Haastrup 1991; Hu & Nassaji 2014; Nassaji 2003) illustrates the principles of successful inferencing, which include using different kinds of clues, combining various inferencing strategies, not relying only on the (sometimes misleading) word form, and applying metacognitive controlling strategies (cf. Nation 2013: 366-367; Wesche & Paribakht 2009: 10-18).

While research on perceived strategy use investigates general patterns of strategy application in various situations, research on actual strategy use must focus on one or a limited number of specific contexts in which strategies can be applied. For this reason, differences in the findings of studies from these two fields can be expected. Qian (2004) demonstrates that perceived and actual strategy use do indeed vary. In his study, a survey on inferencing strategies was administered to 61 participants in an intensive ESL program at a Canadian University whose L1 was either Korean or Chinese. Subsequently, a subsample of 12 students was asked to complete a reading task where they had to find the meaning of unfamiliar words. Directly after the task, they reported their

strategy use and their statements were compared to their answers in the survey study. While the strategy classes of *Global meaning* and *World knowledge* ranked high in perceived strategy use, they appeared to be less useful for students when actually completing the task. On the other hand, *Syntagmatic cues* and *Morphological cues* were used more frequently when compared to their relative perceived application.

1.3 Research questions

The present case study explores actual strategy use by learners of German as an L3 in beginner's level language courses (level A1–A2 according to the Common European Framework of Reference for Languages) at the University of Salamanca (Spain) when working on an authentic text. It focuses on two aspects that are underrepresented in existing research: inferencing by learners with a background in Spanish studying German and the use of inferencing strategies at beginner's level in general (Kienberger 2020b; Nyikos & Fan 2007: 272).¹ As a follow-up study of Kienberger (2020b), which focused on perceived strategy use among learners of German as an L3 at 19 Spanish universities, the results might also be compared to the findings of the same students' perception of their strategy use.

In particular, the research questions are:

1. What kind of strategies do learners of German as an L3 in beginner's level university language courses in Spain use to interpret the meaning of unknown words in an authentic text?
2. Which differences can be observed in the use of lexical inferencing strategies related to individual learners and target words?
3. How do perceived and actual strategy use differ?

2. Methodology

2.1 Participants

The participants of the present study are a subsample of students surveyed in the dissertation project of Kienberger (2020b) on perceived inferencing strategy use. The participants of several beginner-level and lower intermediate German courses (A1.2 to

¹ Due to the fact that L2 proficiency and text complexity influence inferencing success and that teachers generally use material adapted to their learners' language competence, most studies investigate inferencing for intermediate or high language levels, and studies on beginner's level usually do not use authentic materials. Nevertheless, language students will need strategic skills, especially when faced with texts *in the real world* which are not adapted to their proficiency level.

A2.2) at the University of Salamanca were asked to take part in the follow-up study on actual strategy use. Eight students from different courses volunteered, including some taking obligatory language classes for students enrolled on Modern Languages courses as well as students taking extracurricular classes for different audiences. Unfortunately, as one of them had difficulties to verbalise his thoughts (cf. Heine & Schramm 2010: 176), his answers could not be included in the analysis of strategy use. The remaining seven participants were between 18 and 26 years old, speak Spanish (and in one case also French) as their L1 and between three and six additional languages (with English being the first L2 for all of them).

The participants are experienced multilingual language learners and, according to their answers to the inferencing strategy survey, frequent strategy users (for more details see Kienberger 2020a). All of them indicated a broad range of strategies that they often use, although there were some differences related to strategy categories, especially interlingual strategies and those that rely on the immediate context. For the majority of the participants, lexical inferencing strategies are an important issue in their German classes, and they also use them frequently outside the classroom. They find inferencing strategies useful to expand their vocabulary and to gain better text comprehension. All but one agreed that those strategies should be taught in class, and they see themselves as rather successful strategy users.

2.2 Procedure

Individual think-aloud sessions were carried out with each of the participants. In each session, after a brief introduction to the purpose of the study and to the think-aloud technique for data collection, the students practiced verbalising their thoughts in Spanish with the help of specific exercises (following Ericsson & Simon 1993 and Bowles 2010). They were then asked to read through a short newspaper article, mark the words that were unfamiliar to them and subsequently try to interpret their meaning without the use of dictionaries or any other supportive material (target text and instructions available in https://github.com/martinakienberger/LIS_2018-2020). Additionally, they were asked to write down the new words and their possible meaning in a list provided with the text. While working on the task for a maximum of 30 minutes, they were asked to say out loud everything that went through their mind. The whole process was audio- and video-recorded. Meanwhile, the researcher sat behind the student and noted observations.

The material chosen for the inferencing task was taken from the Austrian newspaper *Heute*, a free daily paper directed to a broad audience with very short articles that are accompanied by pictures and use relatively simple vocabulary. The article “Darf eine Mutter ihr Kind im Internet vermarkten?” (Is a mother allowed to market her child on the Internet? *Heute*, 18-12-2018, p. 3) was selected firstly due to the text topic (influencers, Instagram), which was familiar to the students. Secondly, an analysis of its vocabulary² suggested that even on beginner’s level, readers could find enough known words as to get an idea of the text’s meaning and to carry out the inferencing task. This assumption was confirmed by piloting the material with two students similar to the target group.

After the think-aloud task, the participants were interviewed on their inferencing experience, especially on factors that might have influenced their strategy use (as the think-aloud technique itself or the presence of the researcher, cf. Bowles 2010). The researcher also asked about certain words or moments of the inferencing process for clarification, e.g., when students seemed to guess the meaning of a lexical item but did not write it down in the list.

2.3 Analysis

For the analysis, the think-aloud protocols were transcribed with two degrees of precision: Overall, a basic transcription convention was used, whereas relevant parts of strategy use were transcribed as GAT2 *Minimaltranskript* (Selting et al. 2009). Whenever necessary, the recorded videos were used to add clarifying details to the audio-transcripts, e.g., comments on the students’ activities during long pauses or the word they underlined while thinking aloud. The process of transcribing, coding and analysing was carried out with the help of MAXQDA (VERBI GmbH 2018).

Based on the taxonomy of lexical inferencing strategies and the survey of Kienberger (2020b), a coding scheme was created to classify the incidents of strategy use by the participants (available in https://github.com/martinakienberger/LIS_2018-2020). The think-aloud protocols were coded several times whereby the coding scheme was adapted to the collected data. In the final version, not clearly recognisable strategies

² The text was analysed with the help of the Language Level Evaluator German (Editorial Klett, <https://lle.derdiedaf.com/>), that calculates the percentage of words belonging to the CEFR levels. Also, two teachers of German beginner’s level courses at the University of Salamanca were asked to mark the lexical items they had taught in class.

were eliminated, and three new strategies were included, following an inductive approach: the use of the meaning of complex words to infer the meaning of recognised parts of them (an adaption of *Using the partial meaning of known words*), the *Exclusion principle*, and the use of knowledge about phraseologisms (see Results).

Hereafter, three short examples illustrate how students' utterances were coded:

- (a) *as they are talking about money, I feel that "Sparbuch" is like his (---) like his (--) I don't know, like bank account (book), a thing like that (ST7, 43)*³

Coding: *Semantic relations*

- (b) *Visi Visier (1.4) is (--) in (.) in "das Visier ihrer Kritik" (--) ((points at the word "Visier")) is view [spanish: vista] (ST1, 28)*

Coding: *L1 – Spanish*

- (c) *"Ralphie (1.3) präsentier[t]e Babymode" [next word: "Kinderspielzeug"] Kinder is child (.) (that means) (1.8) Kinderspiel (--) hm something with/for play (.) with/for something with/for play (---) and zeug I don't know (-) I think that was (.) was thing (--) ((laughs)) thing with/for child's play (---) (ST3, 26)*

Codings: *Word formation rules, Partial meaning of complex words*

As example (c) demonstrates, segments were often coded with several codes due to combined strategy use. If an incident identified as a strategy application could not be coded as a specific inferencing strategy, the code of the main category (e.g., *Immediate context*) was used instead. In some cases, it seemed reasonable to combine two categories (e.g., *Word level* for intra- and interlingual strategies on a word level). If the kind of strategy used in an inferencing attempt was unclear (e.g., due to very vague verbalisations), the observed incident only counted for the analysis of treated words, but not for the analysis of used strategy types.

The reliability of the coding was partially assessed through the discussion of a selection of think-aloud passages by researchers from the University of Vienna's Department of German as a Second/Foreign Language.

Additionally, the material used in the inferencing task, i.e. the target text and the word lists with the students' marks and annotations were included in the analysis, to support

³ The examples are taken from the think-aloud protocols transcribed and analysed in MAXQDA. "ST" stands for "Student" and corresponds to "TN" ("Teilnehmer/in") in the original German protocol. The indicated numbers refer to the sections in the protocol. The passages in quotation marks are parts of the original German target text. Verbalisations in Spanish were translated to English by the author.

the transcription and coding process and to determine the number of unknown words and (partially) successful inferencing attempts.⁴

To address the research questions, the number of segments coded as a specific strategy was calculated. The number per strategy category for each participant and the whole group were also calculated as well as the percentage of the codes with regard to the total of coded segments (see Kienberger 2020a). The results regarding overall inferencing attempts and general lexical inferencing use can be found in chapter 3.1 and 3.2. To search for differences in strategy use related to individual learners and target words, the words that the participants focused on were compared. Subsequently, the words all students worked on were filtered out and a detailed analysis of inference strategies relating to these nine words was carried out (see chapter 3.3). Furthermore, the findings of this study were compared to the subsample's results in the survey study of Kienberger (2020b), especially the reported frequency of strategy use and the computed strategy profiles (see chapter 3.4).

3. Results

3.1 Unknown words and overall inferencing attempts

According to the word lists and the think-aloud protocols, between 16 and 50 words of the target text were unfamiliar to the participants, the average being 36.⁵ Nine words were indicated by all participants, 20 by seven of them. The comparison of word lists, think-aloud protocols and the students' answers in the post-task interviews shows that the participants were not aware of every new word in the text and sometimes they forgot to write down the unfamiliar words they focused on. This happened mostly when inferencing a new word's meaning was very easy for the students; e.g. student 1 and 4 did not write down "präsentierte" (to present) nor did their protocols show a clear inferencing attempt. Nevertheless, in the interviews they stated that they had not seen the German word before but immediately knew its meaning because of the similarity to the Spanish word "presentar". On the other hand, some participants did ignore particular words because they thought they already knew them (which was not the case); e.g.

⁴ The analysis of inferencing success is not part of this article, but is provided in Kienberger (2020a).

⁵ Student 2's data was only included in this part of the analysis, the exploration of unknown words' listings.

student 4 and 6 did not indicate “verheize” (to burn sb out). When they were asked about the word and its meaning in the interview, it turned out that one of them had mistaken it for “heiße” (be called) and the other one thought it meant “variado” (various), maybe because of the similar German word “verschieden” (various).

To discover the unfamiliar words’ meanings, the participants made between one and four inferencing attempts per item, often combining different strategies. Not every incident could be coded as a specific strategy use due to the methodological issues mentioned before. Also, the analysis of the proposed solutions in the word lists and the interviews suggest that there were far more inferencing attempts than recorded in the think-aloud protocols. For the quantitative analysis, a total of 786 instances of lexical inferencing strategy use was taken into account, between 47 and 177 per participant. The strategy *Acoustic similarity/Sound* was examined separately due to methodological difficulties in coding and counting these incidents.

3.2 General findings on lexical inferencing strategy use

Based on the analysis of strategy use during the whole think-aloud task, the most important sources for lexical inferencing are: the use of intralingual cues on a word level and the analysis of the immediate context, i.e. the sentence (or part of it) that includes the unfamiliar lexical item. Table 1 contains the total number of coded segments, the relative frequency and the rank of each strategy type. It also includes the results of the seven participants in the survey study of Kienberger (2020b) to facilitate the comparison of perceived and actual strategy use.

Strategy category	Actual strategy use			Perceived strategy use	
	Absolute numbers	Percentage	Rank	Mean	Rank
Word level, intralingual (S1)	278	35,4	2	3,3	3
Word level, interlingual (S2)	70	8,9	4	3,2	4
Word level (S1/2)	14	1,8			
Immediate context (S3)	305	38,8	1	3,1	5
Wider context (S4)	99	12,6	3	3,7	2
Immediate or wider context (S3/S4)	1	0,1			
Extralingual context (S5)	19	2,4	5	4,0	1

Table 1: Lexical Inferencing Strategy Use by Strategy Category

The individual numbers differ considerably; e.g. there can be found between 17 and 72 as S1 coded segments per student (23,4 – 50%) or between three and 20 coded as S2

(4,8 – 11,3 %). At the same time, the intralingual strategies, both on a word level and with focus on the immediate context, rank between 1 and 2 for all participants.

As for the specific inferencing strategies, Table 2 demonstrates the total number of coded segments, the relative frequency and the rank of the ten most used lexical inferencing strategies. Again, the results of the survey study are included for further comparison.

Strategy	Actual strategy use			Perceived strategy use	
	Absolute numbers	Percentage	Rank	Mean	Rank
Word formation rules (S1)	145	18,6	1	3,4	15
Syntactic relations (S3)	105	12,9	2	3,1	18
Semantic relations (S3)	94	11,8	3	2,7	20
Partial meaning of complex words (S1)	74	9,8	4	3,3	17
Orthography (S1+S3) ⁶	36	5,2	5	3,6	13
Thematic knowledge (S4)	35	4,2	6	3,9	7
L2 – English (S2)	35	4,2	7	4,4	3
World knowledge (S4)	29	3,9	8	4,6	1
L1 – Spanish (S2)	28	3,3	9	2,7	21
Word order (S3)	18	2,2	10	2,9	19

Table 2: Lexical Inferencing Strategy Use

All but three of the strategies (*L1*, *Thematic knowledge*, *Orthography*) were used by all of the participants. Each student also made use of the numbers provided in the text. Lexical inferencing strategies that were not explicitly applied are *the use of etymological clues and/or sound shifts* and *Lexical familiarisation*; just one or two inferencing attempts were coded as *Analysing the communication situation*, *Focusing on the visual text form* and *Using knowledge about the text type*. Also, several other context-based strategies like *the use of cultural knowledge* and *Textual coherence* ranked very low.

Two strategies (plus an adapted version of another one) were subsequently included in the coding scheme: the use of knowledge about phraseologisms and a strategy called *Exclusion principle* by the author (see examples d – g). Even though they are not described in literature on vocabulary learning, they seem to be relevant in practice and thus deserve attention.

- (d) “Drohungen folgten”, *that’s really (-) (well/it’s) a phrase, surely that’s a phrase like (---) like Sacré Bleu or something like that in French* (ST7, 46)

⁶ In order to compare actual and perceived strategy use, the strategies related to the use of orthographical clues on a word and sentence level were analysed as one strategy.

Student 7 focuses several times on the unfamiliar words “Drohungen” (threats) and “folgten” (followed). She interprets that they form one lexical item, referring to it as a “frase” (sentence or phrase) and “expresión” (expression). Clearly, the student thinks about a phraseologism because she mentions the example “Sacré Bleu”. Also, she considers the possibility that it might be a culture-specific expression: “*I don’t know if it’s [...] from the people who speak German or just from Austria*” (ST7, 41). She therefore searches for a meaning of the perceived lexical item “Drohungen folgten”, proposing “no le tema” (she doesn’t fear it) as a first idea. Student 1 and 3 also use this strategy when they search for the meaning of “ins rechte Licht gesetzt” (shown in a positive light) and “der kleine Brite” (the little Briton):

- (e) “Licht” *maybe [...] like something about light* (-) äh (--) *something to do with* (--) °hh (-) *with cameras or mobile phones* (--) “rechte” *yes I think that was right* (1.9) äähh *the light* (---) “gese” (1.8) *maybe has been* (.) *what do I know* ((laughs)) <<laughing> *illuminated by something (has to be) illuminated*> °hh *I don’t know* (-) äh *something about light* (1.8) *right* (1.6) *m was rechts* (---) *I don’t know* (2.0) *maybe an expression* (-) (ST3, 41)
- (f) “wurde” (--) “*der kleine Brite von seiner Mutter*” (2.0) ah *Brite* (---) [...] *okay it could be small bread* (.) *Brot Brite* (--) *like they also say here in Spain* (--) (to have an arm a bread under the arm) (ST1, 36)

In these cases, the students use their knowledge about the existence of phraseologisms in German and other languages to detect possible multi-word units and to reflect on probable metaphorical meanings.

Example (g) illustrates a strategy that was classified as application of the *Exclusion principle*:

- (g) ((focusing on “vermarkten”)) *I think it is* (.) *like* (--) <<questioning intonation> *to sell it*> (--) *I don’t know* (--) *no* (--) *that’s verkaufen* (---) *well, I don’t know* (2.8) hm (3.0) <<questioning intonation> *to expose*> (-) *I don’t know* (ST4, 66)

Student 4 thinks of a possible meaning for “vermarkten” (to market/sell). Right before, she had separated the word parts and found a similarity between “markt” and “market” in English. Possibly also with the help of context knowledge she finds the meaning “to sell”. However, as she already knows another German word with that significance, “verkaufen”, she rejects that option and searches for an alternative. Students 3, 5 and 7 show similar behaviour searching for some words’ meanings.

As mentioned before, the strategy *Acoustic similarity/Sound* has to be treated as a case of its own. Due to the fact that the participants were asked to think aloud during the

whole task, they spoke a huge number of words out loud, probably more than they would have done under *normal* circumstances. If a student pronounced a word repeatedly, that was seen as a possible indication of a deliberate attempt to activate the sound as a source for inferencing, although this behaviour also could be related to the student's way of verbalisation. Anyway, several participants mentioned that verbalising their thoughts and thus hearing the sound of the words helped them to complete the inferencing task. Deliberately applied or not, this strategy appeared useful for the students.

3.3 Strategy use by student and lexical item

According to the detailed analysis of the nine words that all participants shared, among the most used strategies in general are intralingual strategies on a word level and strategies that rely on the immediate context. However, considerable individual differences can be found: see Table 3 with the number of coded segments for each strategy category and student.

Strategy category	ST1 ⁷	ST3	ST4	ST5	ST6	ST7	ST8	All
Word level, intralingual (S1)	19	10	9	15	15	6	14	88
Word level, interlingual (S2)	2	1	4	4	1	7	0	19
Word level (S1/2)	0	0	2	2	0	0	0	4
Immediate context (S3)	18	17	9	19	12	18	18	111
Wider context (S4)	2	5	3	3	2	7	8	30
Immediate or wider context (S3/S4)	0	0	0	0	1	0	1	2
Extralingual context (S5)	0	0	0	1	1	0	1	3
All	41	33	27	44	32	38	42	257

Table 3: Inferencing Strategy Use by Strategy Category and Student (Subsample)

Students 3, 7, 8 and 5 seem to focus more on the immediate context, the first three of them also using context knowledge (*Wider context*). Students 1 and 6 mainly use strategies from category S1 and S3 with a slight preference for the word-level strategies. Student 4 shows the most balanced inferencing strategy use with the lowest number of coded inferencing attempts compared to the other participants. Student 7 is an interesting case due to her comparatively infrequent use of intralingual strategies on a word level. She uses interlingual strategies and the wider context slightly more, in comparison to the other participants relatively frequently.

⁷ “ST” stands for “Student”. Please note that in the analysis and additional material provided in Kienberger (2020a), the corresponding abbreviation is “TN” (for “Teilnehmer/in”).

The analysis that focuses on the target words also shows important differences in strategy application. In the case of “Babynahrung” and “Familienmitgliedern”, the participants tried to determine the meaning mainly by separating the complex words, using their (in some cases incomplete) knowledge of word formation rules and the meaning of the familiar word parts (“Baby”, “Familie”, “mit”). For “kassierte”, “Wirkung”, “Visier” and “Drohungen” the analysis of the immediate context accounted for most of the inferencing attempts, especially with the focus on syntactic and semantic relations, often in combination. To derive the meaning of “Werkzeug” and “lauteten” students relied both on intralingual and immediate context cues. This also was true for “vermarkten”, but in that case the majority of the participants also compared word parts with known words in other languages: English (“market”) and Spanish (“mercado”). “Babynahrung” and its context seemed to offer a wide variety of accessible clues for the students because they tried various strategies, including *Paradigmatic relations*, *Thematic knowledge*, *World knowledge* and *Visualisations* (looking at the accompanying photo for hints).

3.4 Comparison of actual and perceived strategy use

Table 1 and 2 demonstrate significant differences in actual and perceived lexical inferencing strategy use on the group level: In general, students stated to use strategies based on the wider and extralingual context more frequently than their think-aloud protocols of actual strategy use suggest. They also rated strategies focusing on the immediate context, e.g., *Syntactic relations* and *Semantic relations*, as comparatively less important in the survey study whereas in the concrete situation they relied heavily on these strategies. Moreover, intralingual strategies on a word level appear comparatively more important in actual than in perceived strategy use. The importance of interlingual strategies, however, was found to be similar in both studies.

The comparison of the individual strategy patterns (results of a cluster analysis in the survey study) and the actual-task performance confirms the impression that perceived and actual strategy use differ. Especially students 1 and 7, who stated general low use of the immediate context to infer unfamiliar meanings, acted differently. In general, students made less use of extralingual cues than their individual survey answers suggested. On the other hand, some patterns were reflected both in the survey data and the think-aloud protocols, e.g. student 8, classified as an overall frequent strategy user, indeed tried a lot of different inferencing strategies. Another example is student 4: According to her profile in the questionnaire study, she uses some strategies from

different categories, with intralingual strategies being relatively less important. During the think-aloud task, she showed fewer inferencing attempts than the other participants, using different strategies which also included intralingual strategies, but less frequently compared to others.

4. Discussion

This article has reported the results of a think-aloud study on the use of lexical inferencing strategies by multilingual university learners of German as an L3 at a beginner's level.

The analysis of the strategy types used and the comparison between actual and perceived strategy use support existing research on the topic. Whereas context-based strategies rank very high in perceived strategy use, in the actual-task situation, as also shown in Qian's study (2004), students seemed to draw on the immediate context and intralingual cues on a word level more often than on the wider context. This also holds true for strategies that make use of extralingual cues, which were not taken into account in Qian's study. The think-aloud data show that not every inferencing strategy suggested by educational literature or included in surveys of perceived strategy use – such as Kienberger (2020b) – was explicitly used by the participants. What is more, even some of the apparently popular strategies, which include making use of pictures or knowledge about the communication situation, were found no more than a few times. Qian suggests that the observed differences between actual and perceived strategy use could be “related to learners' metacognitive strategies for L2 learning” (p. 167), as well as their teacher's influence. This is because they tend to promote context-based strategies, which could make learners believe “they were already doing it this way” (ibid.). Qian also takes into account that the study design, and above all the material chosen for the task, may influence the outcome. This may explain why students did not use the strategy of *Lexical familiarisation* (the use of examples or definitions given by the author of the text) in the present study, as the short journalistic text did not contain this kind of clues. However, there are two more relevant factors: the difference between the situation(s) students refer to in studies about actual and perceived strategy use and the influence of the research methodology, introspection.

As for the first issue, in questionnaires about perceived strategy use, students generally are asked to think about various situations in which they would apply certain language

learning strategies. As there is a broad range of different reading and learning situations, text material and language tasks where students can apply inferencing strategies, the survey answers show their average strategic behaviour, which is perhaps influenced by their subjective theories about language use and learning.

The second issue may be even more important: research on language learning strategies claims that learners apply strategies in an automatic and not necessarily conscious manner (Macaro 2006; Oxford 2017). Thus, introspective methods like think-aloud protocols may not be able to capture automatised strategy use, given that it does not occupy working memory and therefore is not verbalised (White et al. 2007). The limitations of the research methodology could explain, to some extent, why strategies based on the wider or extralingual context do not appear frequently in the think-aloud protocols of the present study. Additionally, interlingual strategies, especially the use of comparison with the learner's L1, may be used unconsciously. This is suggested in the cited examples of "präsentierte"/"presentar". To determine the reasons for the discrepancies between actual and perceived strategy use, further research is necessary.

Interestingly, the present study found two strategies that were not considered in the lexical inferencing strategy taxonomy provided by Kienberger (2020b) which were used by the students: the *Exclusion principle* and the use of knowledge about phraseologisms. The former appears to be the application of the "principle of contrast" in L1 acquisition described by Clark (1995: 241). This strategy may not appear in educational literature on vocabulary learning or reading strategies (e.g. Nation 2013) because it is not very useful when reading authentic texts in which synonyms are frequently used in order to avoid repetition (Williams 1985: 127), although it might seem efficient at a beginner's level in learning environments with controlled input. Nevertheless, there is clear evidence that students applied this strategy; for this reason, it should be taken into account by researchers and teachers.

The second strategy, however, may lead to inferencing success. It is possible that it is not included in popular strategy inventories because specific linguistic knowledge is required to apply it. Students must be aware of the concept of phraseologisms and have some basic grammatical knowledge of the target language. It also might be seen as a strategy when searching for lexical units as opposed to determining meaning. However, the use of this strategy in the present study shows that learners draw conclusions from the meaning of the word group, which is based on their knowledge about the

metaphorical use of phraseologisms. This reinforces the claim that multi-word units should play a more important role in vocabulary learning and teaching (Köster 2010: 1023-24; Nation 2013: 481-485).

The study's findings on the differences in strategy use by individual learners and target words are in line with other research on language learning strategies and inferencing. As a number of researchers point out (e.g. Frantzen 2003; Wesche & Paribakht 2009; cf. Nation 2013), correctly determining the meaning of an unfamiliar word depends on its characteristics and the clues provided by the surrounding context. The analysis of inferencing attempts by students to determine the meaning of various words in the present study also illustrates this. However, the analysis of individual strategic behaviour suggests that the students' prior knowledge and other individual differences, such as language learning experience and the level of metacognitive awareness, also play an important role. Further analysis of the think-aloud data should focus on metacognitive strategy coordination and control, in order to draw valid conclusions from the inferencing success, above all.

Finally, the present study presents with some apparent limitations. In addition to the above-mentioned methodological issues of the think-aloud technique, the proposed task also strongly influences the outcomes of the study (Bowles 2010; Nation 2013: 367). Here, the analysis demonstrates what learners are able to do – not what they would normally do. According to the post-task interviews, the participants applied the strategies they would also use in other situations. However, several stated that they concentrated more and tried harder to come up with a meaning in the present study (cf. Bowles 2010: 109). Also, some of the participants were already familiar with the strategy of speaking unknown words out loud, while three were not, but applied it in this think-aloud setting. In order to draw conclusions on students' *normal* inferencing behaviour, other methodological approaches – including introspection, qualitative interviews and observation – should be combined, and a range of text types and tasks should be considered.

Furthermore, the results of this study are limited to a small number of participants and a specific learner population, namely university students with prior language learning experience. Additionally, the eight participants who volunteered to take part in the think-aloud study – which required time and considerable cognitive effort – were highly motivated individuals. While the results on the differences between perceived and actual

strategy use may not be affected by this limitation, the findings on frequency of applied inferencing strategies should not be generalised without further research.

5. Conclusion

This article presents the results of a think-aloud study among university learners of German as an L3 in Spain, focusing on their use of lexical inferencing strategies when working on an authentic text. With the help of a coding scheme adapted from the taxonomy proposed in Kienberger (2020b), it was possible to identify a range of different strategies applied by the students. The most frequently used strategies were:

- Separating word parts by applying word formation rules and searching for known elements
- Analysing syntactic and semantic relationships
- Using orthographical clues
- Using thematic and world knowledge
- Transfer from other languages (English and Spanish).

The present study confirms the effectiveness of the taxonomy used to investigate actual strategy use, with two new strategies being added, namely: the *Exclusion principle* and the use of knowledge about idiomatic phrases.

The analysis of individual differences and target words confirm the results of previous research. The differences in strategy use at an individual level support the claim that language-learning strategies should be taught in foreign language classes; a learner-focused approach that takes students' prior knowledge and individual techniques into account should be used as the starting point for reflection and exchange.

The findings of a follow-up study of learners' perceived strategy use were comparable: during the think-aloud task, students most frequently applied strategies based on word-level intralingual cues and analysis of the immediate context. By contrast, strategies based on the wider context and extralingual cues ranked higher in perceived strategy use. It is still unclear which factors may cause these discrepancies, with further research on this question being required.

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