Effects of crosslinguistic awareness-raising

on vocabulary learning

A quasi-experimental study on correspondence-rule exploration
with Swiss German learners of English as a foreign language

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AFFIDAVIT

Ich erkläre ehrenwörtlich, dass ich meine Masterarbeit selbständig und ohne unerlaubte fremde Hilfe verfasst habe.

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ABSTRACT

German and English share several thousand similar or identical words due to their common Germanic root as well as the influence of loan words and internationalisms. Guiding foreign language learners in the discovery of lexical similarities has been recommended to support them in taking advantage of their linguistic repertoire. This thesis explores the efficiency of explicit crosslinguistic awareness-raising activities as a means to enhance vocabulary learning. A total of 260 Swiss German learners of English as a foreign language participated in a quasi-experimental study. All groups completed three vocabulary learning activities, but 7 of the 17 classes additionally took part in a 90-minute intervention on orthographic similarities. The results show that students benefitted from instruction, with the intervention group progressing significantly more and retaining almost 20% more partial cognates compared to the control group. Learners' initial vocabulary size neither affected the progress nor intervention uptake. Students' feedback was largely positive, and task appreciation was not associated with their improvement. The intervention and the test battery are critically reflected on and future implications for research and teaching are suggested.

CONTENTS

1   INTRODUCTION

The Council of Europe's declaration of "plurilingual and pluricultural competence" (Council of Europe, 2001, p. 133) as a main goal of language education has affected language policies across Europe in two major ways. Firstly, an increasing number of children now learn at least one foreign language – with English as the clear front-runner in terms of frequency – in an instructional setting, often starting as early as ages 6 to 8 (European Commission / EACEA / Eurydice, 2017). Secondly, interest in research on and implementation of linguistic awareness-raising activities has increased. These pluralistic approaches encourage learners to compare and contrast new languages to those in their existing linguistic repertoire based on the assumption that this will facilitate and expedite the learning process (Candelier et al., 2012). In the early 20th century, crosslinguistic similarities were considered a risk factor due to the possibility of negative transfer (Weinreich, 1953). Since then, these parallels have been acknowledged as a useful strategy or asset since transfer is often positive, especially in receptive tasks – although less obvious to observe – among closely related languages (Jarvis & Pavlenko, 2007; Odlin, 1989).

Due to their common Germanic root as well as the influence of the lingua franca of the time, German and English share several thousand identical or similar words (Braun, 1990). This commonality forms a vast basis on which German learners of English or vice versa could build up on. Yet several researchers have observed that students often fail to recognize and take advantage of these similarities (e.g., Banta, 1981; Kellerman, 1983; Ringbom, 2007). Recent papers explored factors affecting the ability to infer the meanings of decontextualized words (Vanhove & Berthele, 2015b) or texts (Lambelet & Mauron, 2017) in an unknown but related language, exposing large differences in performance among participants. Hence, the question emerges whether explicit instruction and practice can enhance students' ability to recognize and use these similarities. However, in a study focusing on intercomprehension, Dutch middle school students were not able to utilize explicitly taught correspondences to improve their understanding of Frisian (Bergsma et al., 2014). Apart from possible metalinguistic constraints at that early age, a major challenge emerges from the unpredictability of changes between word pairs among historically related languages. These shifts can often only be explained through a historical rather than synchronic perspective. It has been suggested that learners might therefore be able to take advantage of declarative knowledge of specific similarities rather as a vocabulary learning strategy (Berthele et al., 2011), although this hypothesis remains to be investigated.

The purpose of the present thesis is to fill this gap by focusing on the teachability of crosslinguistic awareness. More precisely, the project aims at exploring whether middle school students are capable of exploiting explicitly taught consonant shifts and correspondence rules as a strategy to more efficiently memorize German-English cognates. Additionally, the influence of individual factors such as previous vocabulary knowledge and attitude toward the intervention will be taken into consideration. Finally, whether item characteristics such as the extent of the similarity between two words or the frequency in a given language affect the likelihood of a word being memorized will be examined.

To address these topics, a quasi-experimental design was chosen. The study took place in spring 2019 with 17 classes of Swiss German English as a second foreign language learners attending Grades 5 and 6 in the canton of Berne. All participants took a pre-test, followed by an intervention of 2 weeks, which guided the students of the experimental group in the discovery of specific similarities between German and English. Afterwards, all participants took a post-, as well as a delayed-post-test. Additionally, the intervention group filled out a short questionnaire about their experience and attitude toward the program.

This thesis consists of three main parts. The first part defines basic concepts and recent findings in crosslinguistic lexical similarities and foreign language vocabulary learning. The second part presents the empirical study, starting with a description of the method, followed by the results and discussion. The final chapter offers some concluding remarks.

2   LITERATURE REVIEW: CROSSLINGUISTIC LEXICAL SIMILARITIES

Language contact and use trigger alteration and assimilation processes between languages, resulting in crosslinguistic structural and lexical similarities between and within language families (Otwinowska, 2015). This chapter focuses on the lexical aspect, which will be discussed from three perspectives: theoretical conceptualizations of lexical similarities, their influences on the plurilingual learner's lexicon, and implications for language education. Previous studies on the role of cognates in the foreign language vocabulary learning process will then be summarized, and research questions for the current project stated.

2.1   THEORETICAL CONCEPTUALIZATION

De Saussure's (1916) Theory of Sign states that language is a symbolic system of linguistic units (Figure 1). Each of these consists of an arbitrary and inseparable link between a form (*signifier*) and a meaning (*signified*). This view of words forms the foundation of this section, which explores similarities among lexical units between languages from a theoretical point of view.
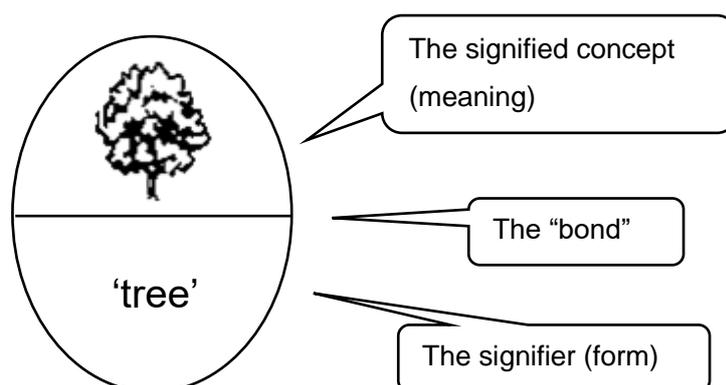
Figure 1: The form-meaning composite (Payne, 2011, p. 6, building on de Saussure, 1916).

2.1.1 Cognates

In a general sense, cognates include any "words with similar form and meaning in two or more languages" (de Bot, 2004, p. 19). The term is derived from the Latin *cognatus*, which is defined in the Oxford Latin Dictionary (1968) as *akin* or *having affinity with*. Historical linguistics therefore emphasizes the common origin of cognates. However, foreign language learners adapt a synchronic point of view and thus rarely recognize distinctions between flavors of cognates: historically related words, loanwords, and accidentally similar words. Several authors suggest that any type of crosslinguistic lexical similarity may have the same effect on the learning process (Carroll, 1992; Helms-Park & Dronjic, 2016; Jarvis, 2009). Hence, Ringbom's (2007) definition from a language acquisition research perspective will be adopted:

Related languages, and to a minor extent also unrelated languages because of possible loanwords, share a number of cognates. Cognates in two languages can be identified as historically related, formally similar words, whose meanings may be identical, similar, partly different, or occasionally, even wholly different. (Ringbom, 2007, p. 73)

Note that this definition acknowledges the historic relation of similarities among words, but does not restrict them to common roots. The emphasis lies on two components, *form* and *meaning* (signifier and signified; de Saussure, 1916). If these two are delineated across the three suggested distinctions (*same*, *similar* or *partially different*, *dissimilar*), nine possible combinations emerge (Table 1).

		Form		
		same	similar	Dissimilar
Meaning	same	Ger. *Finger* / Eng. *finger*	Ger. *Vater* / Eng. *father*	Ger. *Baum* / Eng. *tree*
	similar	Ger. *Student (college)* / Eng. *student*	Ger. *Pinsel (paintbrush)* / Eng. *pencil*	Ger. *Hahn (rooster; faucet)* / Eng. *rooster*
	dissimilar	Ger. *Strand (beach)* / Eng. *strand*	Ger. *aktuell (current)* / Eng. *actual*	Ger. *Wolke (cloud)* / Eng. *hill*

■ true cognates ■ partial cognates ■ deceptive cognates ■ profile words

Table 1: Cognate relationships with German and English examples (adapted from Jarvis, 2009, pp. 107–108).

True cognates are word pairs which have identical meaning and form, whereas partial cognates overlap to a lesser extent. To exemplify this, *finger* can be considered a true cognate since the spelling and meaning (body part) are identical in both languages. It is even used consistently in sayings such as *'to twist someone around one's finger'* and '*jemanden um den Finger wickeln'*. Conversely, while *student* is spelled identically in both languages, its meaning somewhat differs: whereas in English the term can refer to a person attending any school level, in German it is exclusively used for university attendees. Deceptive cognates – commonly called false friends – only share formal similarities but refer to different concepts. These cause the most obvious interferences, as in the anecdote of the German learner of English who orders in a restaurant by asking, *'Could I become a steak, please?'*, deriving from *'Könnte ich bitte ein Steak bekommen?'*. Words with no formal overlap but identical or similar meanings are classified as profile words, also known as translation equivalents.

As with many languages, words in the Germanic family are polysemic, in that each word can have several meanings and/or be used in a variety of contexts. Therefore, the relations of Table 1 should be considered as a continuum with fuzzy boundaries (Berthele, 2011; Swan, 1997). The fact that the meanings have often diverged historically poses an additional challenge. For example, while *pencil* and *Pinsel* can both be traced back to the Latin *peniculus* (English *brush*), scholars might disagree on whether this word pair should be categorized as partial or deceptive cognates.

2.1.2 Levenshtein distance

The congruence between the forms of two words can be calculated using the Levenshtein distance (Levenshtein, 1966), which counts the minimum number of single-character edits required to transform one word into the other. Possible modifications are deletions (removing a letter), insertions (adding an additional letter), and substitutions (exchange a letter for another one). For example, the English *eighty* can be transformed into its German cognate *achtzig* with a minimal total transformation cost of six when considering their orthographic form, as shown in Figure 2.

1	2	3	4	5	6	7	8	9	
e	i	g	h	t		y			
	a	c	h	t	Z	i	g		
D	S	S			I	S	I		= 6

Figure 2: Example of a Levenshtein distance computation (D: deletion, I: insertion, S: substitution)

To account for the word length, the normalized Levenshtein distance can then be computed in a next step, as described in Equation 1. For the items *eighty* and *achtzig* as exemplified in Figure 2, this yields a value of $(9 - 6) \div 9 = 0.3$. Thus, the normalized Levenshtein distance assigns a score to each word pair ranging between 0 (profile words with no overlap, e.g., *tree* and *Baum*) and 1 (true cognates with full overlap, e.g., *finger* and *Finger*, but also deceptive cognates, e.g., *strand* and *Strand*).

$$score = \frac{length - distance}{length}$$

$$length = \max(length\ of\ source\ expression, length\ of\ destination\ expression)$$

$$distance = \min(number\ of\ insertions, deletions, and\ substitutions)$$

Equation 1: Levenshtein distance normalized for word length (Schepens, Dijkstra, & Grootjen, 2012, p. 11).

2.1.3 Similarities between German and English

English and German both belong to the Germanic family and are descendants of a common ancestor (Marx & Hufeisen, 2007; W. Schmidt, 2007). Both languages were affected by the first Germanic consonant shift, also known as Grimm's law, which happened around 500 BC and separated Proto-Germanic from other Indo-European families. This shift mostly changed the voicing contrasts among plosives, namely [b] to [p], [d] to [t] and [g] to [k]. For example, Proto-Indo-European *leb-* as in Latin *labium* evolved into English *lip* and German *Lippe*. However, German went through a second Germanic consonant shift between the 3rd and 8th century, which did not occur in English and other continental West Germanic languages (Figure 3). The first two phases shifted plosives to fricatives and affricates, as in [p] to [f] and [pf]. A third phase yet again modified voicing contrasts among plosives. Finally, other changes are sometimes bracketed within this shift, with the most common being [ð] to [d] as in *thorn* and *Dorn*. In extension, these two consonant shifts explain changes such as from Proto-Indo-European **duwo* to English *two* (first shift) and German *zwei* (first and second shift).

Plosives to fricatives or affricates	Voiced to voiceless plosives	Other shifts
[p] → [f] or [pf]	[b] → [p]	[ð] → [d]
ship – Schiff or *apple – Apfel*	*rib – Rippe*	*thorn – Dorn*
[t] → [s] or [ts]	[d] → [t]	[v] → [b]
eat – essen or *tongue – Zunge*	*middle – Mitte*	*seven – sieben*
[k] → [χ] or [ç]	[g] → [k]	[ɣ] → [g]
make – machen or *milk – Milch*	*bridge – Brücke*	*yesterday – gestern*

Figure 3: Sound changes of the second Germanic consonant shift with English – German examples.

Both German and English were heavily influenced by the lingua franca of their time; Latin throughout the Middle Ages and French during the 17th and 18th centuries. However, French had a larger impact on the English lexis due to the additional influence after the Norman invasion in the 11th century. Recently, German – as many other languages – has additionally seen a large increase in loanwords from English as the current lingua franca (Banta, 1981; W. Schmidt, 2007).

Traces of these influences have been explored in a variety of studies: Braun (1990) found 3500 to 4000 internationalisms in German-French-English student dictionaries. An analysis of the orthographic similarity of European languages based on a normalized Levenshtein distance revealed that English shares the most cognates with all other languages considered (Schepens et al., 2012). Around 50% of these items are shared with French and

40% with German. While the percentage of word overlap would indicate a higher similarity between English and French as opposed to English and German, one additionally needs to factor in word frequency. The effects of frequency in relation to the origin of English words are reported in Bird's (1987) conclusion on the sources of the most frequent 7,476 entries of the Lancaster-Oslo-Bergen corpus (Johansson & Hofland, 1989), summarized in Table 2. According to his analysis, 97 of the 100 most frequent words can be traced back to Germanic roots; thereafter, the ratio declines to 36% beyond the top 2000. Conversely, the influence from the Italic family (e.g., Latin and French) increases from about a third among the 1000 most frequent items to about half beyond that. In other words, highly frequent words are likely to derive from Germanic origins, whereas less common words often stem from Italic roots.

	1st 100	1st 1000	2nd 1000	from then on
Germanic	97%	57%	39%	36%
Italic	3%	36%	51%	51%
Others	0	7%	10%	13%

Table 2: Sources of the most frequent 7,476 English word type entries (adapted from Bird, 1987).

However, historical relations between words may not reflect the synchronic perception of learners. Friel & Kennison's (2001) analysis of the ratings and translations of 563 German nouns by English native speakers only yielded 20% true cognates, whereas 15% were classified as deceptive cognates and the remainder as profile words. While a part of this discrepancy may be due to the part of speech since a large chunk of highly frequent words are not content words, these results reveal the large impact of learners' subjective perception.

2.2 THE PLURILINGUAL LEARNER

The term *multilingualism* has been used and defined in a variety of contexts (Cenoz, 2013). In this paper, individual multilingualism, or *plurilingualism* (Council of Europe, 2001), will be treated as an "umbrella term to include first-, second- and third-language-learning processes and products" (Jessner, 2017, p. 27). *First language* (L1) will be used for the native language, *second language* (L2) for any subsequent language(s), and *foreign language* (FL) specifically for any additional language(s) studied in a school setting in addition to the primary language of instruction (R. Ellis, 1997, p. 3).

The following sections focus on the interactions within the mental lexicon of plurilingual learners leading to lexical transfer, and explore factors affecting the subjective perception of crosslinguistic similarities.

2.2.1 Lexical competence and aspects of word knowledge

Laufer (2005) distinguishes four components of lexical competence: aspects of vocabulary knowledge, the willingness to use vocabulary, the speed of lexical access or retrieval, and strategic competence to compensate for deficiencies such as comprehension strategies.

form	meaning	use
pronunciation	concept - form	grammatical functions
orthography	concept - referents	collocations
word form	associations	register, frequency, formality
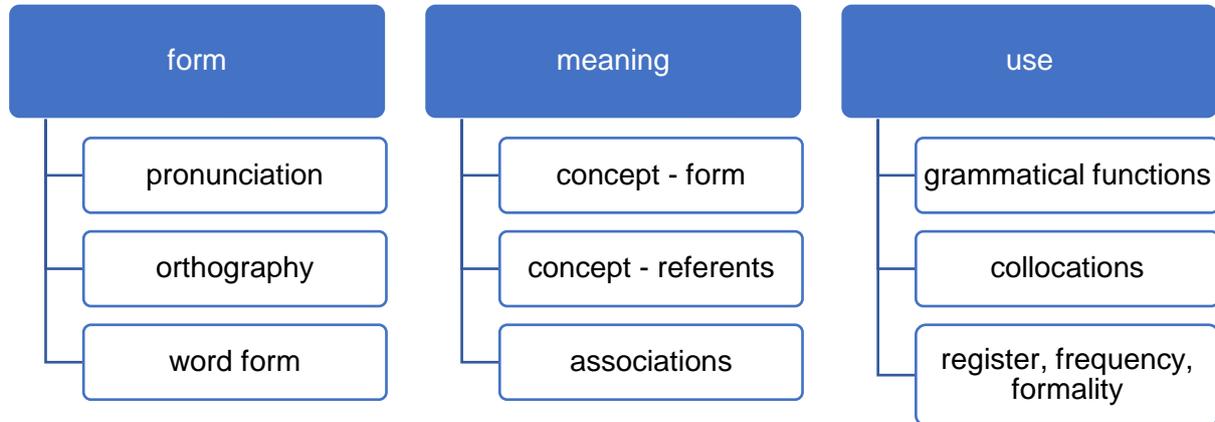
Figure 4: Aspects of vocabulary knowledge (adapted from Nation, 2001, p. 27).

The different aspects of vocabulary knowledge are summarized in Nation (2001): (a) formal aspects including pronunciation, orthography and word form, (b) the meaning, comprised of the connection between a concept and its form or referents, as well as association, and (c) the use, which takes into account grammatical functions and collocations, as well as register, frequency, and formality (Figure 4).

Assessment of a learner's vocabulary can tap into various components of their knowledge (Laufer, 2005). The size refers to the number of different words a learner is familiar with, measured through a form-meaning test within a certain frequency range (e.g., yes/no vocabulary test, Meara, 1992). Furthermore, a distinction can be made between receptive (passive) and productive (active) knowledge. The former is generally known to be larger (Webb, 2008) and can be assessed either through recognition by offering multiple choice options or recall by asking for the L1 translation. Finally, depth looks at the number of features about a specific item an individual possesses, as measured in the Vocabulary Scale from not recognizing an item to the ability to appropriately and accurately use it (Wesche & Paribakht, 1996). Developing depth is an incremental process; as a result, people usually only possess partial knowledge of each word (Schmitt, 2000, p. 177).

2.2.2 The mental lexicon

Current theories envision the mental lexicon as a network in which the lexical entries are interconnected through mental links (Jarvis & Pavlenko, 2007). These ties bridge words within and across languages as well as various levels of representations.

Atkinson and Shiffrin's (1968) model of memory can be used to illustrate these links. The authors describe three stages: encoding, storage, and retrieval.

Encoding refers to the registration of sensory information. In language learning, noticing is considered essential during this initial stage for input to become intake (R. Schmidt, 1990). There is generally a consensus that the likelihood of an item being encoded and retained increases with the amount of engagement a learner has, since this establishes more and stronger connections (Schmitt, 2008). For example, if a word is encountered in various contexts and modalities, there is a higher chance that it will be memorized.

The storage of lexical items is modeled as consisting of three distinct levels of representation (Jarvis & Pavlenko, 2007, building on Levelt, 1989), although the distinction between lemma and concept is not consistently made in the literature (Jarvis, 2009). The lexeme – referred to as *form* aspects in Nation (2001) - entails phonological as well as morphological characteristics, whereas the lemma adheres to semantic and syntactic specifications. In addition, thoughts and experiences are stored as mental concepts (Figure 5).

Concepts

Mental images, schemas, and scripts related to going

Lemma

[GO]

Lexemes

go   goes   going   gone   went
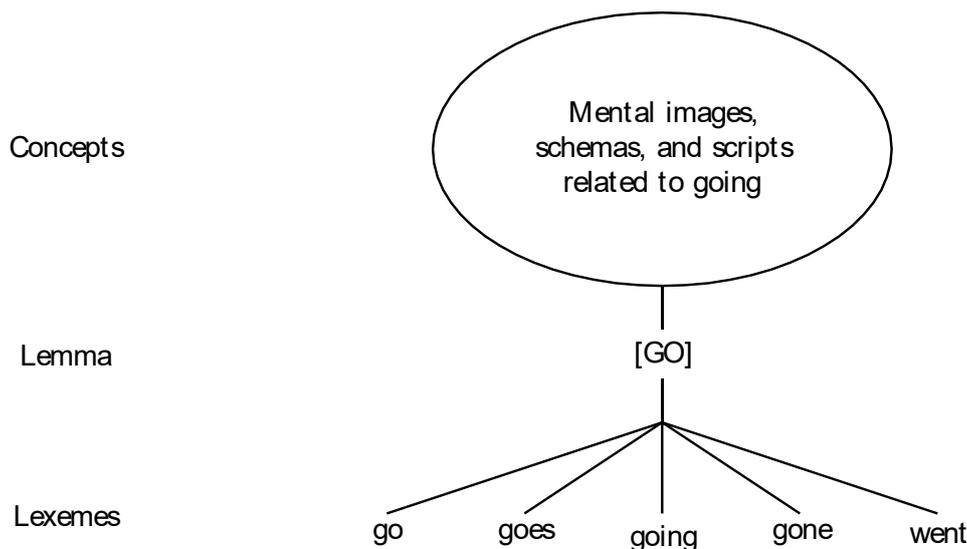
Figure 5: Three Levels of Lexical Representation (Jarvis & Pavlenko, 2007, p. 82).

Finally, the retrieval stage – in language learning referred to as lexical access – is influenced by the activation level of each entry. Based on Grosjean's (2001) idea of language modes, it is assumed that entries in any language stored in the mental lexicon are never completely turned on or off, but rather remain on a continuum of activation. Lexical access is considered non-selective, meaning that lexical units of any language stored in the mental lexicon are activated and compete for selection (Dijkstra & Heuven, 2018). However, the extent of crosslinguistic activation may depend on a – still to be defined – minimal level of proficiency in each language (de Bot, 2004). Therefore, the processing of words results in continuous and multi-directional interactions within the system.

Various models address the mechanisms by which connections are established on the formal and conceptual level between words of different languages. In an attempt to unify two of the most cited models, the Bilingual Interaction Activation Model (Dijkstra & Van Heuven, 2002) and the Revised Hierarchical Model (Kroll & Stewart, 1994), a tentative framework incorporating a developmental perspective was created by Grainger et al. (2010). The timeline takes into account the exposure to the L2 and starts with an initial representation between the form and its meaning of a linguistic unit in the learner's L1 (Figure 6, from left to right). When confronted with a new word in the L2, the meaning is thought to be encoded initially via the L1 form. Over time, a direct link between the L2 form and the concept emerges. With increasing proficiency, words can then be accessed and/or acquired via either language, the underlying concept, or the links between the lexicon of both languages. It is thus assumed that beginning learners rely more on formal aspects between word pairs in different languages, whereas they can establish direct connections to the conceptual level at more advanced stages of their learning process. Although designed with adult learners in mind, Bedore et al. (2010) assume a similar development in children.
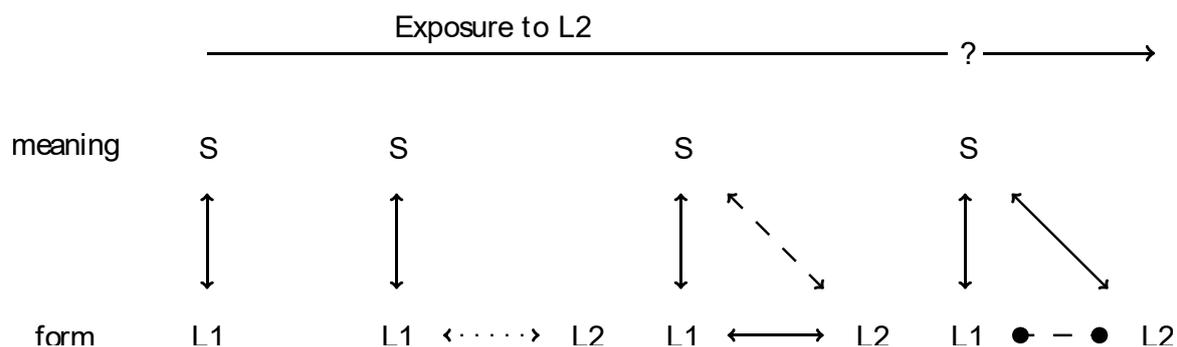
Figure 6: Tentative Framework for uniting RHM and BIA models (Grainger et al., 2010, p. 276).

2.2.3 Lexical transfer

Transfer is the influence resulting from similarities and differences between the target language and any other language that has been previously (and perhaps imperfectly) acquired. (Odlin, 1989, p. 27)

Originally, transfer – also referred to as crosslinguistic influence (Jarvis & Pavlenko, 2007) – was analyzed from a deficit perspective focusing on interferences as deviations from the norm (Weinreich, 1953). The *Contrastive Analysis* aimed at generating predictions about which elements would be easy or difficult for L2 learners by assuming that similarities would have a facilitating effect while divergences would hinder acquisition (Lado, 1957). While research has since refined these simplified expectations, crosslinguistic influences are generally acknowledged as a valuable asset when learning an additional language since

transfer is often positive, especially among closely related languages and during receptive tasks (Ringbom, 1987, 2007). Therefore, Odlin (1989) distinguishes between *positive* and *negative* transfer, based on its outcome. Jarvis and Pavlenko (2007, p. 20) additionally categorize types of transfer by the area of language knowledge and use, directionality, cognitive level, intentionality, mode, channel, and form.

Lexical transfer is a type of crosslinguistic influence in the area of vocabulary, defined as "the influence of word knowledge in one language on a person's knowledge or use of words in another language" (Jarvis & Pavlenko, 2007, p. 72). This transfer can affect any area of word knowledge at any processing stage. The strength and likelihood of the influence depend on the intensity of connections among the entries in the mental lexicon (Nation, 2001).

Ringbom (2007) distinguishes between *formal* and *semantic* lexical transfer, thus either occurring at the lexemic or lemmatic/conceptual level (see 2.2.2). The former is affected by graphemic and phonological structures and can lead to the use of false cognates, as in the example of the English *become* and German *bekommen* described in 2.1.1. The latter is inclusive of lemma and concept, and refers to instances where the use of an L2 word reflects influences of a corresponding meaning in another language. For example, a German learner of English might say, '*I love the colorful sheets of the trees in the fall'* as translated from '*ich liebe die bunten Blätter der Bäume im Herbst*', since the German *Blatt* can be used for both a *sheet of paper* and a *leaf*. While formal transfer can often be observed among beginning FL students, semantic transfer usually occurs among more proficient learners. This is in line with the stages of Grainger et al. (2010) model for word learning depicted in Figure 6.

Jarvis (2009) views the origins of lexical transfer as either stemming from the formation of learned crosslinguistic associations, processing interference, or strategic and intentional uses of language. In the case of a learned association, the student would have established an erroneous link between two words in their mental lexicon, leading to consistent misuse of a certain word. The other two incidents happen at the stage of lexical access (see 2.2.2). Processing interference arises unintentionally, like when a speaker accidentally activates a word in another language. However, a language switch can also be strategically chosen to fill in gaps, which then falls under strategic and intentional uses.

2.2.4 The cognate facilitation effect

Several reaction time experiments have demonstrated that cognates are recognized faster and more accurately than non-cognates, a phenomenon known as the *cognate facilitation effect* (for an overview see Helms-Park & Dronjic, 2016). Kroll and de Groot (1997) created the Lexical/Conceptual Feature Model (Figure 7) to account for the possibly different

representation of true and partial cognates in the mental lexicon as opposed to other words (profile words in the example given). According to their illustration, words from two or more languages share various degrees of congruence among the conceptual and/or lexical level (see 2.2.2). Since the nodes of cognates share more overlap on both ends, they can be recognized and processed at a faster rate.
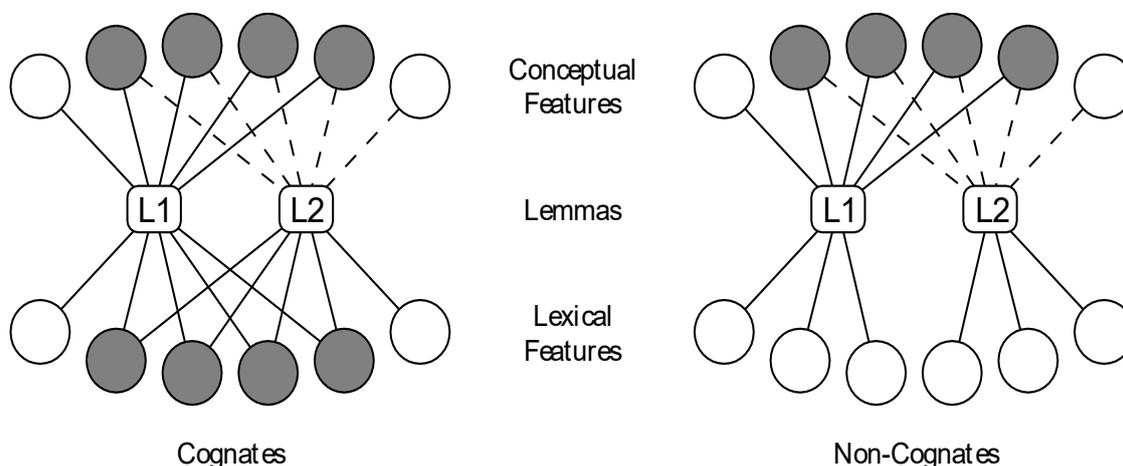
Figure 7: Lexical/Conceptual Feature model (Kroll & de Groot, 1997; adapted by Otwinowska, 2015).

In addition to the extent of formal overlap, the strength of the cognate facilitation effect has been shown to vary with respect to a variety of parameters. Knowledge of additional languages increases the effect in that identical cognates across three languages were processed faster than equivalents across only two languages (Lemhöfer et al., 2004). The effects of age and proficiency have not been conclusive. In studies with 5- to 8-year-old children, the cognate advantage positively correlated with age (Bosma et al., 2019) and low proficiency learners showed less crosslinguistic activation (Poarch & van Hell, 2012). Contrarily, when comparing elementary and secondary school level, younger students were more sensitive to the cognate status than older ones (Duñabeitia et al., 2016). The authors ascribe this decrease in cognate sensitivity to the increased exposure to print and enhanced ability to suppress language interference due to maturation mechanisms. Finally, the list compilation has an influence, with longer reaction times when false friends were included among the stimuli (Brenders et al., 2011).

While such insights allow for a better understanding of how cognates and other words are recognized, stored, and retrieved, research has so far mostly focused on the variety of factors influencing this automatic process. It remains to be investigated whether and if possible how this cognate advantage can be supported through deliberate linking among the nodes in different languages during the initial encoding stage, for example by fostering additional engagement of a learner with a particular item.

2.2.5 Factors affecting the influence of crosslinguistic lexical similarities

The influence of crosslinguistic lexical similarities on the learning process depends on a variety of factors which can be grouped into word-related, learner-related and contextual factors (Jarvis & Pavlenko, 2007, pp. 174–210; Otwinowska, 2015, pp. 94–119).

Word-related factors can be classified as either intra- or interlingual (Haastrup, 1991, pp. 46–57). The intralingual influence emerges from complexities of the language itself and leads among others to overgeneralization. These complexities can relate to form, meaning, or usage aspects of vocabulary knowledge (Nation, 2001, see 2.2.1). Formal aspects include sound-script congruence, salience, length, and markedness. Learners might rely more on consonants than vowels, presumably since they carry more information and vowels are more prone to change (Gooskens et al., 2008; cf. Vanhove & Berthele, 2015a). Word onset might additionally play a role as opposed to word end. In regards to meaning, concreteness has been shown to facilitate retention (A. M. de Groot & Keijzer, 2000), although the extent depends on the familiarity of the learner with the concept itself (Laufer, 1997). Other meaning-related factors include prototypicality and polysemy. Finally, usage aspects play a role, such as frequency and part of speech, with nouns generally being easier than verbs, adjectives and adverbs. To summarize, an unmarked, frequent, concrete noun with only one meaning referring to a universal concept will be remembered better and more easily.

The interlingual influence, on the other hand, stems from to the transfer of linguistic factors from one language to another (Haastrup, 1991). The extent of the influence depends on the typology, or the extent of the similarity between two words. It can be expressed objectively on a formal level by calculating the Levenshtein distance (see 2.1.2), and has been shown to influence the rate of acquisition (Odlin, 1989), proficiency (Schepens et al., 2020), and intercomprehension (Gooskens & van Heuven, 2019). However,

> [t]he actual similarity or dissimilarity of forms and meanings is only one factor
> at work in transfer; the *judgment* of each individual learner matters as much.
> (Odlin, 2002, p. 260, original emphasis)

Hence, the determining influence of crosslinguistic similarities and differences in language acquisition and use is dependent on the perceived or assumed similarity of the individual (Kellerman, 1983; Ringbom, 2007). This *psychotypology* is a major factor among the learner-related aspects. Another component of this second subgroup is the previous linguistic knowledge of the learner. The number and proficiency of languages in the mind of the plurilingual learner has an effect on both an intra- and interlingual level. Initially, learners tend to rely on the L1 phoneme-grapheme correspondences when inferencing the meaning of

unknown L2 words (Möller, 2011), and words containing unfamiliar graphemes are harder to learn and more prone to forgetting (A. M. de Groot, 2006). With increasing proficiency in the L2, learners get more accustomed to typical letter-string combinations, which facilitates retention of new words (N. C. Ellis, 1997). Interlingually, knowing additional languages might be beneficial, but mostly when they are closely related to the target language (Berthele, 2011). A certain level of proficiency might be necessary for learners to take advantage of pre-existing linguistic knowledge (Processability Theory, Pienemann, 2003; research by Swarte et al., 2013). Furthermore, recency, intensity, and frequency of exposure and use affect the extent of the influence. Linguistic units that have recently been used are thought to retain a higher level of activation in the mental lexicon, which increases the likelihood of these items being triggered again (see 2.2.2). Another subgroup of learner-related aspects includes (meta-)cognitive variables such as cognitive maturity, language learning ability, and attention to and awareness of language. Finally, attitudinal aspects may have an influence (Gooskens & Swarte, 2017; cf. Schüppert & Gooskens, 2011). In short, learner-related aspects consist of the psychotypology, previous linguistic knowledge and experience, and (meta-)cognitive factors. Many of these are heavily influenced by age (Vanhove & Berthele, 2015b).

The last group, labeled as contextual aspects, includes social, situational, and task-related factors. Although known to have an impact, these will not be addressed here; see Haastrup (1991) for further reading in this direction.

2.2.6 Language awareness

The Association for Language Awareness (n.d.) defines language awareness as "explicit knowledge about language, and conscious perception and sensitivity in language learning, language teaching, and language use." The term is rooted both in educational linguistics and developmental psychology (Jessner, 2017). Garrett and James (2000) view the benefits of well-developed language awareness along five domains: affective (curiosity), social (intercultural awareness), power (language as an instrument), cognitive (explicit meta- and crosslinguistic awareness), and performance (proficiency).

Jessner (2006, 2008) considers linguistic awareness as an emergent property of the plurilingual learner consisting of at least two components: meta- and crosslinguistic awareness. Metalinguistic awareness refers to the "ability to focus attention on language as an object in itself or to think abstractly about language" (Jessner, 2006, p. 42), allowing students to manipulate or play with language. This means that learners are able to analyze and explicitly depict linguistic knowledge, but also to control linguistic processes, thus deliberately choose and make use of their linguistic repertoire (Bialystok, 1987). These skills are affected by the

cognitive development, which is dependent on the age and proficiency (Otwinowska, 2015). Edwards and Kirkpatrick (1999) observed a major shift in the metalinguistic abilities among 7- to 8-year-old children, compared to slightly younger or older pupils – however, adults still outperformed them on all tasks. The second component of this concept is crosslinguistic awareness, defined as an "awareness of pattern, contrast, system, units, categories, rules of language in use and the ability to reflect upon them" (Donmall, 1985, p. 7). This suggests that learners are explicitly and tacitly aware of the links between the languages in their repertoire and can deliberately utilize them (Jessner, 2008).

Several authors have emphasized the essential role of the teacher as a promoter of students' meta- and crosslinguistic awareness and the necessity of incorporating awareness-raising activities in language education (e.g., Jessner, 2006, 2008; Otwinowska, 2015; Swan, 1997).

2.3 THE PEDAGOGICAL CONTEXT

Plurilingual education has become the norm in our globalized world, with the majority of European pupils learning at least one FL as early as elementary school (European Commission / EACEA / Eurydice, 2017). In Switzerland, the vast majority of students start learning a first FL in third grade (at age 8) followed by a second FL in fifth grade (at age 10). Swiss German students in the *Passepartout[1]* area learn standard German as an extension to the dialect when entering school, followed by French as a first FL and English as a second FL. According to the corresponding curriculum, this order allegedly offers students considerable advantages (Bertschy et al., 2015, p. 3). However, observations show that learners often do not take advantage of similarities or even deliberately ignore them (Banta, 1981; Odlin, 1989; Ringbom, 2007). Therefore, an ongoing field of inquiry asks how educators can best support their students in taking advantage of their previous linguistic knowledge.

2.3.1 Integrated didactic approach

Pluralistic approaches are based on the idea of systematically integrating crosslinguistic transfer into language teaching whenever lexical, structural, content-related, and strategic connections can be established, and aims at optimizing the acquisition of closely related FLs (Martinez & Reinfried, 2006, p. XI).

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[1] Passepartout is a joint project founded in 2004 by six cantons bordering the French speaking part of Switzerland (BE, BL, BS, FR, SO, VS) to unify the FL education within this area in terms of hours invested, curriculum, teaching material, and teacher training. A special emphasis lies on the establishment of connections among languages taught within the curriculum, the use of authentic texts, and the overall aim of communicative competence. Further information can be found at http://www.fremdsprachenunterricht.ch.

Candelier et al. (2012, p. 6) categorize these pluralistic approaches to languages and cultures into intercultural approach, awakening to languages, intercomprehension, and integrated didactic approach. The integrated didactic approach is probably the best known and most commonly applied in instructional contexts. It aims at establishing links among a limited number of languages, especially those taught within the school curriculum. The overall concept assumes that the process of learning an L2 can be facilitated and accelerated by building up on previous knowledge. A core component is the fostering of language awareness (see 2.2.6) through learner-oriented, inductive, contrastive, and comparative activities (Neuner, 2003). It is hypothesized that by heightening the meta- and crosslinguistic awareness, students are enabled to take advantage of crosslinguistic similarities more consciously, allowing them to understand more difficult texts through the ability to infer meanings of unknown words. While these approaches have seen a rise in interest and implementation in the last decade, research has only started to investigate the extent to which especially children can measurably benefit from a multilingual boost (Berthele & Udry, 2019).

2.3.2 EuroComGerm

EuroCom is a recent project established to enhance multilingualism, in particular receptive intelligibility among languages of an Indo-European family by fostering meta-linguistic awareness (EuroComCenter, 2008). On the basis of the *Seven Sieves*, learners are guided to improve their intercomprehension by filtering through internationalisms, common Germanic vocabulary, phoneme-grapheme correspondences, function words, and syntactic structures (e.g., EuroComGerm for Germanic languages: Marx & Hufeisen, 2007).

After the first implementation of EuroComGerm projects, the authors themselves drew interim conclusions (Berthele et al., 2011), pointing out that the Germanic languages vary in extent of relation and are thus not equally suitable for the process. The inconsistency of changes adds an additional challenge, since correspondences can often only be explained from a diachronic or evolutionary perspective rather than a synchronic analysis, which impedes inferencing tasks. The authors thus state that the sieves cannot replace the learning effort, but rather simplify the process of language learning. Students could employ the sieves as a strategy to learn and/or arrange new vocabulary, thus progressing on previous knowledge. To fulfill the purpose of a practically oriented and scientifically-founded approach, the amount of input should be reduced by focusing on one new language at a time and selecting only a few consonant shifts or correspondence rules to be studied in depth. Finally, a mixture of explicit instruction and discovery-based learning is recommended to optimally support students in the discovery of crosslinguistic similarities.

2.3.3 Teaching vocabulary

Vocabulary learning is an incremental process (Schmitt, 2000). Similar to the crosslinguistic influence overall (see 2.2.5), the difficulty of learning a particular word is determined by word-related, learner-related, and contextual factors (Laufer, 1997; Peters, 2020). To recap, word-related aspects include among others the similarity in form and meaning, concreteness, and part of speech. Learner-related aspects consist of the psychotypology, prior linguistic knowledge and use, as well as (meta-)cognitive factors. It is assumed that the size of the pre-existing vocabulary knowledge and the working memory are decisive predictors for the number of new words that can be memorized. Finally, contextual aspects refer to opportunities to encounter and use a particular word, as well as the quality of teaching, course design, and assessment method. The instruction and course material can enhance noticing or retrieval, and encourage creative or generative use of lexical items (Nation, 2001, pp. 60–113). Repetition plays an important role. It can either be achieved implicitly through repeated encounters, which are heavily determined by the word frequency in a language, or explicitly through spaced practice. While repeated practice has repeatedly proven to increase retention, the effect of word frequency on deliberate vocabulary learning has not been conclusive among adults (e.g., significant effects in Lotto & de Groot, 1998; cf. negligible effects in A. M. de Groot & Keijzer, 2000; Otwinowska & Szewczyk, 2017).

Based on a cost/benefit analysis and the observation that the 2000 most frequent words cover about 80% of the vocabulary used in texts and oral conversation, Nation (2001, pp. 6–22) argues that these most frequent items deserve initial attention and should be taught explicitly. However, in order to expand various aspects of word knowledge (see 2.2.1) and to acquire less frequent items, varied and repeated exposures as well as opportunities for enhancement are recommended. Therefore, a balance between intentional (explicit) and incidental (implicit) instruction is needed (R. Ellis, 2009). In L2 education, intentionality is associated with a sustained and targeted attentional focus, high levels of attentional control, as well as assistance in the discovery of patterns in the input (Kormos, 2020). Overall, explicit instruction has been found to be more efficient than implicit instruction (Norris & Ortega, 2001), especially in early stages of learning (S. Gass et al., 2003). However, most studies have been conducted with adults and investigated only a single form-meaning link. Children may rely more on chunks or formulaic language and therefore require a naturalistic approach, although possibly to a lesser extent in a limited-input environment such as the instructional setting (Butler, 2019).

A second balance is suggested among form-focused and meaning-focused instruction. Rich input and meaningful, contextual, and communicative use of the L2 are the cornerstones

of meaning-focused instruction. In contrast, *form-focused instruction* entails some attempt to draw learners' attention to linguistic form (R. Ellis, 2001). Theoretically, it can be related to noticing (R. Schmidt, 1990), limited processing capacity (Pienemann, 2003), and skill acquisition (Anderson, 1982). As discussed in the context of encoding as a first step of memory (input and intake, see 2.2.2), form-focused instruction aims to increase the attention given to a particular aspect of language, thus reducing the amount of information to be processed and increasing the likelihood of a learner noticing this targeted characteristic. Furthermore, the possibility of turning declarative into procedural knowledge and finally automizing it through controlled practice is acknowledged. There are two types of form-focused instruction: *focus on form (FonF)* and *focus on forms (FonFs)*. In FonF, the learner incorporates the role of a language user employing language as a tool, whereas in FonFs, the language becomes an object of study in itself (R. Ellis, 2001). According to Housen and Pierrard (2005, p. 10), FonFs is predetermined, planned and obtrusive, presents target forms in isolation, and uses metalinguistic terminology. Explicit FonFs can be implemented *inductively*, wherein learners analyze the input and infer the rule themselves, or *deductively*, with the teacher presenting the rule (DeKeyser, 1998). Laufer (2005) argues for a form-focused component in vocabulary learning, stressing its necessity to foster all aspects of lexical competence (see 2.2.1), and presents evidence on benefits of FonFs and contrastive elements for vocabulary learning with secondary students (Laufer & Girsai, 2008).

In addition to a combination of intentional and incidental as well as meaning- and form-focused instruction, the importance of strategies to enhance vocabulary learning is emphasized (e.g., Nation, 2001, p. 217). Recently, the use of vocabulary strategies by young learners has received more attention in research, and deliberate training in these strategies has been suggested (e.g., Thekes, 2017). Schmitt's (1997) distinguishes between discovery (i.e. getting to know the meaning of a word) and consolidation (i.e. actively integrating an item in the mental lexicon) in his taxonomy (Figure 8). He cautions that although cognates can be a valuable "resource for both guessing the meaning and remembering new words (…) learners do not automatically accept cognates as equivalent" (Schmitt, 1997, p. 209).

| Discovery	• Translation: use dictionary, ask a teacher or peers • Compensation: guessing
Consolidation	• Contextual: verbal (audio, visual) vs. nonverbal (gesture, picture) • Cognitive: oral/written rehearsal, word lists, examine errors • Meta-cognitive: regular practice, planning, critical evaluation
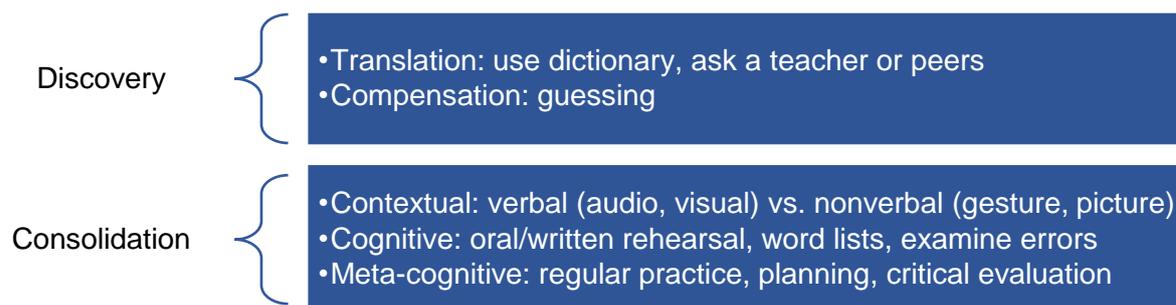
Figure 8: Vocabulary Learning Strategies (adapted from Schmitt, 1997).

2.4 PREVIOUS RESEARCH

The following section summarizes previous research on cognates with children and teenagers, first in relation to their overall vocabulary and reading development, then focusing on laboratory settings, and finally presenting results from interventional classroom-based studies. The term *bilingual* will be used specifically for students in immersive settings, such as children growing up speaking Spanish with their parents but living in the US and attending the school system with English as the main language of instruction.

2.4.1 Cognates in relation to the L2 vocabulary and reading comprehension

The role of cognates in relation to overall vocabulary development and reading comprehension has been intensively investigated in the context of Spanish-English bilinguals in the US. While revealing a large variability among students' ability to recognize and accurately use cognates, the results have consistently shown correlations between cognate awareness and reading comprehension (e.g., Jiménez et al., 1996), as well as overall vocabulary knowledge in the L1 and L2 (e.g., Cunningham & Graham, 2000). A study by García and Nagy (1993) tested 74 fourth to sixth graders to investigate the link between cognate awareness and reading comprehension. After answering multiple choice questions about four text passages, participants received a short explanation of the cognate concept and were then asked to circle corresponding words in the excerpts. On average, participants only recognized half of the cognates. The ability to identify true or partial cognates correlated with pupils' reading comprehension score and Spanish word knowledge. According to Kelley and Kohnert's (2012) study with 30 second through eight graders, bilinguals scored higher on cognates than non-cognates of comparable difficulty on a standardized vocabulary test. However, this cognate advantage was dependent on age, with older students performing better than younger ones. Furthermore, for a given child, the cognate advantage was likely to be equally present or absent across both receptive and productive modes of testing. Both studies reported considerable individual variation in performance. In light of these results, projects such as *Enhancing Vocabulary through Cognate Awareness* (EVoCA, Center for Applied Linguistics, 2016) were developed to support students in taking advantage of their repertoire. Studies examining the effectiveness of such programs will be discussed in section 2.4.3.

Lambelet and Mauron (2017) explored Swiss French pupils' intercomprehension, which refers to the ability to infer the meaning of words or a text in unknown, but closely related languages (Doyé, 2005). 180 secondary school students answered reading comprehension questions about a short text in Italian. Their performance was associated with the task difficulty, school level, and interest in the text topic, but not with the self-reported language

skills, attitudes, or personality traits. Thus, higher scores were obtained on simple questions by students on a higher school level who were interested in the topic. Furthermore, task appreciation was not related to learners' success, but to the attitude toward learning overall.

Two studies analyzed the effectiveness of vocabulary learning depending on word type (cognate vs. non-cognate) and method (picture- vs. word-based). Comesaña et al. (2012) observed that their Portuguese sixth graders were able to memorize more new items in the word-based condition and that cognates were translated faster and more accurately when faced with an unfamiliar language. Contrary, the Italian fourth and eighth graders in Tonzar et al. (2009) remembered more words in the picture-based condition overall, although the word-learning method tended to be more effective for cognates. Participants were tested in both German, which had not been taught, and English, which the eighth graders had been studying since Grade 6. Non-cognates were generally harder to learn than cognates for both grades and languages. The only exception was the eighth graders' performance in English during the delayed post-test, which was similar among both word types. Thus, the difference between cognates and non-cognates decreased over time with increasing proficiency.

2.4.2 Cognates in experimental settings

In an experimental study on intercomprehension conducted by Vanhove and Berthele (2015a, 2015b), 159 Swiss German participants aged 10 to 86 guessed the meaning of decontextualized Swedish words with English, French or German cognates. The study found that inferencing skills were largely affected by age, sharply increasing until age 20 and gradually augmenting until age 50. While translation accuracy for written stimuli continued to slightly increase thereafter, the performance decreased among the oral condition. In other words, children were much less likely to provide a correct guess than adults. L1 vocabulary knowledge was found to be the strongest predictor for successful translation in the written modality, whereas fluid intelligence correlated with translation accuracy among orally presented stimuli. In terms of item-related factors, the orthographic distance was found to be the most important predictor for translation accuracy, as well as frequency in German and English to a lesser extent. However, neither the consonantal nor word-initial changes were found to have a significant impact (cf. Möller, 2011).

Age effects were also found by Schüppert et al. (2015), who analyzed the comprehension of isolated spoken words among 154 Danish and Swedish first through ninth graders in the respective other language. While the ability to decode words increased with age, the attitudes became slightly more negative, although the attitude was found to only have a limited effect on intelligibility as measured by task performance.

To the best of the author's knowledge, only one study has so far explored the effects of correspondence rule learning in an experimental setting. Therefore, Vanhove's (2016) study will be included in this discussion, despite having been conducted with young adults. In this experiment, Swiss German young adults translated 48 Dutch words, of which 10 cognates either contained a Dutch-German ‹oe›-‹u› (condition 1, *n* = 43) or ‹ij›-‹ei› (condition 2, *n* = 37) correspondence. They were given explicit feedback through the immediate display of the correct word after each translation attempt. It was observed that participants were more successful during the following testing phase at correctly translating cognates exhibiting the same pattern compared to their respective controls. Young adults were therefore not only able to detect a correspondence rule quickly, but also capable of transferring the acquired knowledge to other similar words. Nevertheless, it remains unclear to what extent these results are replicable in a classroom setting, how many strategies can be taught at a time, and whether more complex correspondences can also be acquired.

2.4.3 Cognates in quasi-experimental studies with FL learners

While studies with adults revealed that cognate-awareness raising interventions can lead to measurable improvements in vocabulary learning (Amini & Salehi, 2017), reading skills (Treville, 1996), and intercomprehension (Hedquist, 1985), evidence from projects with children and teenagers has not been conclusive.

Positive effects were reported in the context of Spanish-English bilinguals in the US when cognate-awareness raising was one component of a more extensive intervention on vocabulary learning and reading. After a 4 week long intervention focusing on eight reading passages with an emphasis on cognate relationships presented through a computer program, the 16 bilingual fourth graders scored overall lower on a vocabulary test, but similarly on cognates in comparison to their 14 monolingual peers (Proctor & Mo, 2009). The project deliberately focused on students that were considered to be weak readers. Another study evaluated a 15 week long strategy training, of which 3 weeks were dedicated to cognate awareness-raising (Dressler et al., 2011). Based on think-aloud protocols of 12 fifth-grade pupils, the authors concluded that the strategy training had given them a distinct advantage in inferring the meaning of unknown words. Students often relied on word stems and sound similarities in cognates based on the Spanish pronunciation. Furthermore, the use of the cognate strategy correlated with the extent of phonological and orthographic overlap and the Spanish frequency. Finally, Arteagoitia and Howard's (2015) 40-hour intervention with 230 sixth to eighth graders focused on crosslinguistic similarities, comparing roots and affixes, as well as reviewing general learning strategies. The study revealed positive effects of knowing Spanish cognates on both English academic vocabulary as well as reading comprehension.

While these three studies suggest positive evidence, it should be kept in mind that they refer to a very specific group of students, namely children with a Hispanic background, often from a lower socio-economic origin. Nevertheless, these pupils can be expected to have a comparatively large L2 vocabulary size as opposed to beginning FL learners due to immersion. Furthermore, some methodological gaps should be discussed. No pre-tests were conducted, which limits claims of whether the observed differences in performances can be attributed to changes due to the intervention as opposed to pre-existing discrepancies as discussed section 2.4.1. Additionally, the first two studies discussed (Dressler et al., 2011; Proctor & Mo, 2009) only included a small number of participants.

White and Horst (2012) worked with 155 Canadian French middle schoolers from six classes in an English immersive setting. The intervention focused on cognates, with five sessions (one 60-minute and four 25-minute) over the course of 15 weeks. While on average, both groups improved significantly in the cognate recognition task, a nonsignificant tendency was found in favor of the intervention group in comparison to the control group. The lack of significance could be attributed to the selection of common words which could have been familiar to learners already, the sound pedagogical practice of teachers to make students aware of similarities independent of the intervention, or ceiling effects already present at the pre-test. Overall, full cognates were recognized better than partial ones, and sixth graders performed better than fifth graders. Although "learners in the experimental group were observed to generalize the taught patterns to new exemplars" (White & Horst, 2012), this claim could not be verified numerically due to differences at the pre-test. The authors reported that students of the intervention group exhibited a higher cognate awareness, although this claim was based on a single question and without a pretest for comparison.

Regarding FL learning, positive effects were reported by Otwinowska (2015) in two studies with lower-secondary Polish learners of English aged 14 and 15 in a three month long intervention based on crosslinguistic awareness-raising. In the small-scale project, both groups recognized a similar number of cognates in the text in the beginning, but the experimental group ($n = 8$) significantly outperformed the control group in the post-test ($n = 6$). Furthermore, the author claims that students' cognate awareness had increased based on participants' estimate of the number of cognates between Polish and English. The following quasi-experiment corroborated these findings in that the intervention was able to balance out the initially huge discrepancy in performance between students of the experimental group (School A, $n = 55$) and control group (School B, $n = 56$). In both studies, the teenagers showed strongly positive attitudes toward the program.

Two other studies did not find significant effects. During a 50-minute intervention, Bergsma et al. (2014) discussed the eight most common Frisian-Dutch sound correspondences with 12 Dutch middle schoolers. Despite the instruction, the students' receptive listening skills did not improve measurably, neither at the word nor at the text level. However, the attitudes toward the language changed significantly; whereas the experimental group perceived Frisian as more beautiful compared to the beginning, the opposite was observed among participants of the control group. The authors attributed the lack of measurable improvement in intelligibility to the short time of the intervention, the young age and low internal motivation of the pupils, and the choice of easily detectable correspondences in the intervention.

Molnár (2010) assessed Hungarian high school students to explore the possible transfer from their first FL Romanian to their second FL English. The pupils to whom orthographic and suffix correspondences were pointed out immediately before the vocabulary test ($n = 15$) obtained slightly higher scores on the following vocabulary test across all frequency levels, though the difference to the control group ($n = 11$) was not significant. Possible explanations include the short instruction time and small sample sizes. Independent of instruction, a positive correlation was found between pupils' Romanian proficiency and English test score. Two thirds of the participants considered the awareness-raising of structural crosslinguistic lexical similarities as helpful, and half of them indicated that they used the cognate material when completing the vocabulary test.

2.5 IMPLICATIONS FOR THE CURRENT STUDY

The following paragraphs summarize the literature review before outlining the scope of the current project and stating research questions and hypotheses.

2.5.1 Conclusions from the literature review and scope of the current project

Vocabulary is considered a core aspect of language proficiency (Nation, 2001), and especially at early stages of instruction an explicit FonFs as well as a contrastive component have been advocated for (Laufer, 2005). The need for such activities is underlined by the observation that learners differ in the way they perceive similarities between languages (García & Nagy, 1993), and that children perform worse at inferencing tasks than adults (Vanhove & Berthele, 2015b). Pluralistic approaches have been suggested as a means to raise awareness and, in extension, facilitate and accelerate the learning process (Candelier et al., 2012). Yet results with children in classroom settings have been mixed (see 2.4.3), and concerns have been expressed regarding possible Matthew effects (Lambelet & Mauron, 2017), the constraints of cognitive abilities as opposed to multilingual advantages (Berthele & Udry, 2019), and the

appropriate number of rules that can be taught and learned (Berthele et al., 2011; Vanhove, 2016). Thus, there is a general agreement that

> the more aware learners are of the similarities and differences between their mother tongue and the target language, the easier they will find it to adopt effective learning and production strategies. (Swan, 1997, p. 179)

Yet the question of whether students are susceptible to increase crosslinguistic awareness by exploring specific similarities remains to be investigated. Therefore, this project explores the effects of explicit contrastive FonFs activities, focusing on whether deliberately drawing learners' attention to a limited number of consonant shifts between German and English can help them memorize corresponding partial cognates more efficiently. This study is thus limited to a certain set of words exhibiting these particular correspondences. The instructional setting is form-focused and not embedded in a larger communicative frame. Hence, the intervention is not supposed to reflect the scope of a general language course or even the vocabulary learning portion. The program is designed to provide an additional, different approach to complement the existing course material in the hope of providing students with a new insight. While the instruction is designed to trigger an explicit learning process, the vocabulary learning activity assesses the knowledge implicitly. Participants do not have to verbalize the rule; instead, they have to transfer their knowledge to new examples by recognizing the learned consonant shift in unfamiliar word pairs, which should help them to remember more items. This reasoning is based on the assumption that explicit instruction can lead to procedural knowledge (Anderson, 1982; R. Ellis, 2009). As opposed to previous projects focusing on intercomprehension (Bergsma et al., 2014; Vanhove, 2016), this study examines the effect on vocabulary learning, as recommended by Berthele et al. (2011) due to the inconsistency of changes between cognates of languages with common roots.

In terms of item characteristics, the study will consider orthographic similarity since it has consistently emerged as a major factor in studies on crosslinguistic transfer (Bosma et al., 2019; White & Horst, 2012). Additionally, at the suggestion of previous inconclusive results (e.g., Lotto & de Groot, 1998; cf. A. M. de Groot & Keijzer, 2000), the analysis will factor in word frequency. The effect of various consonant shifts will also be explored. Other item-related factors such as concreteness or word onset (see 2.2.5) will not be included in the project. Even though it has been shown that the cognate facilitation effect in lexical tasks increases for triple cognates (Lemhöfer et al., 2004), the influence of French – the participants' first FL – will not be addressed since the crosslinguistic similarities focus on correspondences between German and English only.

Additionally, L2 vocabulary knowledge will be assessed, as well as attitudes toward English class in general and the intervention in particular measured. In contrast, L1 vocabulary knowledge will not be included as a factor due to time constraints even though it has been shown to impact performance (García & Nagy, 1993; Vanhove & Berthele, 2015b).

2.5.2 Research questions and hypotheses

Based on previous research conducted regarding the influence of crosslinguistic similarities on the language learning process, the following research questions and hypotheses will be addressed in this project.

RQ1. Can Swiss German middle school learners of English exploit explicitly targeted correspondences among crosslinguistic lexical similarities to enhance FL vocabulary learning?

It is hypothesized that Grade 5 and 6 learners of English as a second FL benefit from the intervention. Therefore, it is expected that participants of the intervention group (henceforth referred to as IG) will show greater improvement on the post- as well as delayed-post-test, in comparison to the control group (hereafter abbreviated as CG).

RQ2. Is the intervention-uptake correlated with other variables?
a) Does the improvement depend on students' overall vocabulary knowledge or attitude toward exploring similarities?
b) Does the uptake vary among testing modes and/or types of correspondence?

Presumably, the success of the intervention is correlated with students' proficiency in that learners with a bigger initial vocabulary will perform better in the vocabulary learning activities – as described in Bedore et al. (2010, p. 103), "the more words children already know, the more words they are likely to learn." Furthermore, these students are also expected to benefit more from instruction due to stronger and more numerous links among the entries in their mental lexicon. However, it is assumed the activities will be perceived as interesting and helpful independent of success (Lambelet & Mauron, 2017; Otwinowska, 2015). The effects of the intervention are expected to be more accentuated among receptive items due to the order in which the rules are taught (e.g., ‹t›-‹s›[2] as in *water* and *Wasser*). It is predicted that students benefit more from instruction on less obvious correspondences and less familiar graphemes (Bergsma et al., 2014). For example, students should be more accustomed to the

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[2] Consonant shifts and correspondences in the written form will be indicated by angles as in ‹th›-‹d›, as opposed brackets when referring to phonetic sounds, as in [ð]-[d].

‹c›-‹k› correspondence because it occurs more frequently than other shifts according to the list of partial cognates compiled for the purpose of this project (see 3.1.3 and 3.1.4) and because they can correspond to the same phoneme in German. Finally, it is hypothesized that students of the IG will be able to pick up on the ‹k›-‹ch› consonant shift (which is not taught in the intervention) better than the CG, presumably due to their heightened crosslinguistic awareness.

> RQ3. Which item characteristics (i.e. orthographic similarity, frequency in the L1 and L2, word type, testing mode, and consonant shift) affect the translation accuracy?

More similar words will be memorized better, and the frequency may additionally have an influence as well (Peters, 2020). Pupils are expected to translate more items from English to German correctly than the other way around, since the receptive vocabulary knowledge is generally known to be larger than the productive one (Webb, 2008). In line with previous findings (Comesaña et al., 2012; A. M. de Groot & Keijzer, 2000), better retention is expected for cognates than profile words. Furthermore, it is hypothesized that the type of consonant shift affects the results due to the learners' familiarity with graphemes in the L1 and L2 (e.g., N. C. Ellis, 1997; see 2.2.5). Participants should overall perform better on more familiar consonant strings such as ‹th›, which does not exist in German.

3 EMPIRICAL PART: QUASI-EXPERIMENTAL STUDY

3.1 METHOD

A quasi-experimental design was chosen to address the research questions. The following paragraphs provide a detailed description of the design: the participants, procedure, material created for the intervention, and test development and analysis. Any teaching and instructional material as well as the list of partial cognates, data and analyses are accessible online at https://tinyurl.com/MAThesisMueller2020.

3.1.1 Participants

The *Passepartout*-curriculum encourages plurilingual approaches and describes a shift toward more form-focused activities in the transition to secondary school (Bertschy et al., 2015). Furthermore, crosslinguistic comparison activities are particularly recommended when learning a second foreign, especially closely related language (Neuner, 2003) and during initial stages, presumably since learners have to rely more upon prior knowledge when they are less familiar with the target language (Ringbom, 1987, p. 155). This led to the choice of implementing the project with Swiss German English as a second FL learners attending Grades 5 and 6 (HarmoS 7/8) in the canton of Berne. In the selected canton, pupils start learning French in third grade, followed by English in fifth grade.

Initially, the principals of every Bernese primary school were contacted via email with an inquiry outlining the general research proposal. 17 English and/or homeroom teachers volunteered to participate in the study with their classes. Based on the number of lessons they were able to dedicate to the project, 10 classes were assigned to the CG and seven classes to the IG. Overall, 299 students received their parents' approval to participate in the project; 162 pupils from the CG and 137 from the IG. Due to absences and technical difficulties, a complete data set was obtained from 260 participants (Table 3).

	Intervention Groups *(7 classes)*	Control Groups *(10 classes)*
Participants n	*n* = 120	*n* = 140
Age M (SD)	11.8 (0.70)	11.9 (0.78)
Sixth grade n (ratio)	76 (63%)	104 (74%)
Female n (ratio)	60 (50%)	65 (46%)
German only n (ratio)	85 (70%)	86 (61%)

Table 3: Participants.

Participants were 9 to 14 years old, with similar averages in both groups (M_{CG} = 11.9, M_{IG} = 11.8). Only a quarter of the CG were fifth graders, but over a third of the IG. The IG was gender-balanced, whereas there were slightly more boys in the CG. According to their own statement, 65% of all participants converse only in German at home, while 16 participants do not use German with family members. 77 students speak a second, 10 a third, and 2 a fourth additional language. A wide variety of languages was listed by participants (Table 4). Since students who indicated speaking English at home performed similarly across the whole test battery as students with German and/or other languages, their data was included in the analysis.

Languages as listed by participants	
- English (*n* = 16) - Albanian, French (*n* = 13) - Portuguese (*n* = 7) - Kurdish, Tamil, Turkish (*n* = 6) - Arabian, Italian (*n* = 4)	- Polish, Russian, Spanish, Tigrinya (*n* = 3) - Persian, Romanian, Serbian (*n* = 2) - Bosnian, Dari, Finnish, Croatian, Norwegian, Pular, Somali, Thai, Hungarian, Urdu (*n* = 1)

Table 4: Languages known as listed by participants.

3.1.2 Overall design and timeline

The project was implemented in May and June of 2019. Based on personal teaching experience, this last quarter between spring and summer break was deemed ideal from an organizational perspective, since in Grades 6 the selection process for the imminent transition into secondary school is complete, and more time can be scheduled for special projects.

An individual appointment was arranged with each teacher, which took about 20 minutes for the CG and about 45 minutes for the IG. During this meeting, all instructors learned about the computer-based test battery by completing an abbreviated example version of the activities[3]. Additionally, they were familiarized with the time-frame of the overall project (Figure 9). They had the liberty to start anytime between the spring and summer break but were asked to keep the spacing of the three tests constant. Overall, the project spanned 6 weeks, starting with a pre-test in Week 1, followed by 2 weeks during which the intervention took place in the IG and regular English classes were held in the CG. An immediate post-test was completed at the end of Week 3 and a delayed-post-test in Week 6. In order to make the tests easy to identify, child friendly names were assigned: *Red* for the first test, *Moon* (CG) and *Star* (IG) for the second test, and *Dog* for the third test. All teachers received an

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[3] This version can be accessed online at http://kognaten.com/example/ using the sample ID Z717.

appreciation gift for themselves as well as for each of their students to be distributed after the completion of each computer-based test.

The intervention was discussed meticulously with corresponding teachers. They received an instruction manual with detailed lesson plans, which were reviewed with the possibility of clarifying questions. All handouts and games required in the classroom were prepackaged and distributed to instructors ahead of the study, with the necessary number of copies required for the size of their class.

The test battery as well as the teaching material for the intervention was piloted in a different Grade 6 class of the same canton. Based on the performance as well as students' and teacher's feedback, it was decided that the material was level-appropriate.

Pre-test week 1 (45min)
Background questionnaire, vocabulary learning activity 1 ("Red"), yes/no vocabulary test

Intervention weeks 1+2 (1×45min + 3×15min)	
Intervention groups (IG): focus on crosslinguistic lexical similarities	Control groups (CG): regular English classes

Post-test week 3 (30-35min)	
IG: vocabulary learning activity 2 ("Star") + evaluation form on intervention	CG: vocabulary learning activity 2 ("Moon")

Delayed post-test week 6 (30min)
Vocabulary learning activity 3 ("Dog")

Figure 9: Timeline of the study.

3.1.3 Compilation of the cognate list

The selection of German-English word pairs was based on a variety of sources (Banta, 1981; Kursiša & Neuner, 2006; Neuner et al., 2009; Nikolayev & Starostin, n.d.; "Wiktionary Appendix: List of German cognates with English", n.d.). The list[4] neither includes true or deceptive cognates, nor profile words. Instead, the focus lies on partial cognates from a synchronic perspective and therefore on word pairs sharing some formal overlap that can be explained through consonant shifts (e.g., ‹p› to ‹f›, see 2.1.3) or phoneme-grapheme

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[4] The list can be accessed online at http://tinyurl.com/kognaten

correspondences such as ‹c›-‹k›[5]. This process proved difficult due to the fuzzy boundaries between true, partial, and deceptive cognates (see 2.1.1). For example, should *Knecht* and *knight* be included due to the formal similarity and frequently observed correspondence between ‹gh› and ‹ch›, even though their meanings have diverged historically? To reduce the subjective judgment by the author, only word pairs which are in at least one way translation equivalents according to the Cambridge English-German Dictionary (Cambridge University Press, 2014) were added to the list. The cognates were then categorized by part of speech, correspondence or consonant shift, as well as theme such as *food and drinks* or *body parts* to facilitate the creation of the teaching material. Additionally, words included in *New World,* the English as a FL teaching material for Grades 5 and 6 in the Passepartout cantons (Arnet-Clark et al., 2013; Frank Schmid et al., 2014), were marked accordingly. These items were included in the intervention to help students discover patterns among already learned word pairs and establish declarative knowledge that can then be transferred to new examples, but excluded from the vocabulary learning activities to avoid testing for words that the students had previously been taught.

3.1.4 Selection of rules

Previous didactic material focusing on crosslinguistic awareness-raising was examined, in particular *Deutsch ist easy!* (Kursiša & Neuner, 2006)*, Deutsch als zweite Fremdsprache DaFnE* (Neuner et al., 2009)*,* and *EuroComGerm* (Marx & Hufeisen, 2007) since these books aim at establishing links between German and English or Germanic languages overall. Based on previous experiences from a similar intervention conducted for a seminar paper with Californian high school learners of German as a FL (Müller, 2018), it was decided to only teach four rules. This is in line with recommendations by Berthele et al. (2011), who argued for a reduction in the number of rules. These patterns of lexical similarities were chosen from a synchronic perspective and are therefore based on the frequency of combinations in the cognate list compiled, by counting the number of examples for each correspondence or shift. Out of the 801 items on the list, these correspondences appeared 274 (‹c›-‹k›), 164 (‹th›-‹d›-‹t›), 115 (‹t›-‹s›/‹z›), and 60 (‹p›-‹f›) times, respectively. Based on the selection of these rules and the consulted didactic material, an overview was outlined for the intervention and the topics for the activities selected. Subsequently, detailed lesson plans were written, and the teaching material created. Finally, the vocabulary learning activity was designed based on items that exhibited the correspondences introduced in the intervention.

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[5] Henceforth, the terms *(consonant) shift* and *(phoneme-grapheme) correspondence (rule)* will be used interchangeably to refer to the patterns of crosslinguistic similarities addressed in this project.

3.1.5 Intervention

As suggested by Laufer (2005) for early stages in FL vocabulary learning, a discovery learning approach mixed with explicit form-focused instruction (see 2.3.3) was chosen for the intervention. Following the *select, order,* and *systemize* guidelines proposed by Neuner et al. (2009), students were encouraged to explore similarities and differences among German and English word pairs, discuss their hypotheses with peers, generate rules by generalizing their observations, and finally apply the acquired knowledge to new examples. The intervention consisted of two parts: During an initial 45-minute period, the correspondence rules were introduced. Then, over the course of three 15-minute sessions, students consolidated their knowledge. The teacher's manual as well as corresponding materials are depicted in Figure 10 and can be found in Appendix 6.2.
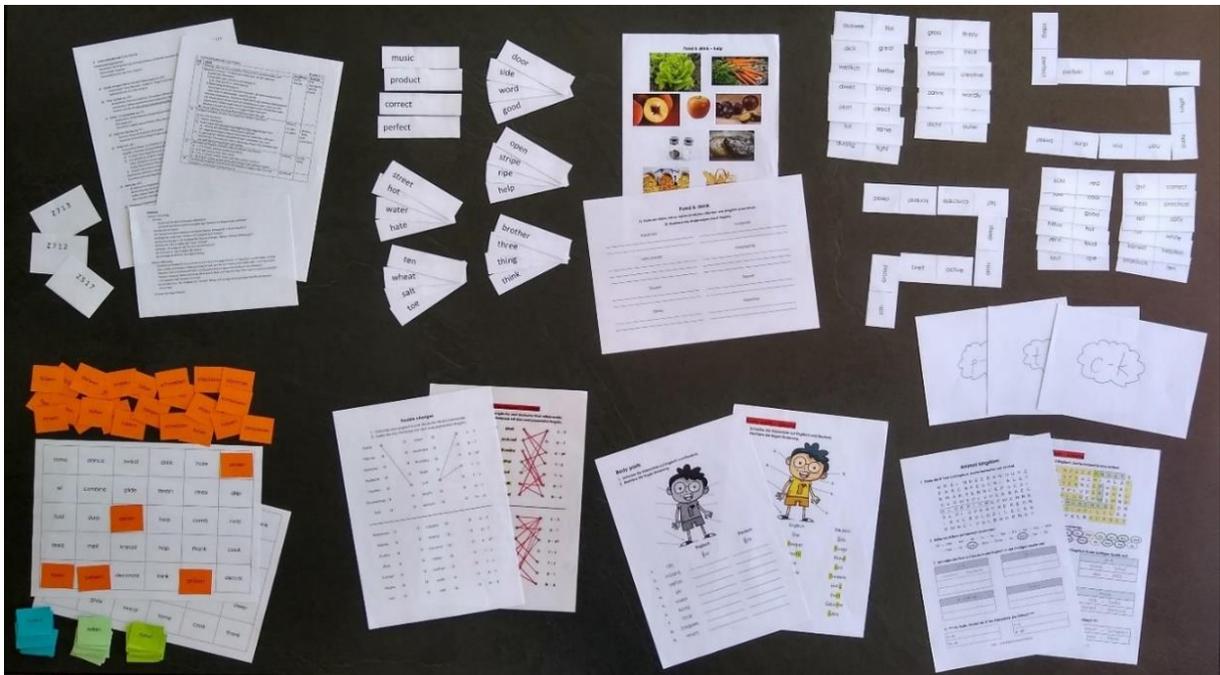
Figure 10: Material for the intervention.

The first lesson started with a plenary discussion on cognates. Throughout the intervention, the term *parallel words* was used as this was the terminology already employed in the English course book used by students (Arnet-Clark et al., 2013; Frank Schmid et al., 2014). Teachers talked about similarities on a form and meaning level (see 2.1.1), pointing out that formal overlap can refer to oral aspects (as in *shoe* and *Schuh*) or written ones (as in *name* and *Name*). They also mentioned deceptive cognates and discussed the fuzzy boundaries and thus perception (*psychotypology,* see 2.2.5) and individual judgment when accepting or rejecting words as cognates. The instructor stated that the aim of the lesson was to investigate and discover patterns among these similar word pairs.

c - k
• music - Muisk
• correct - korrekt
• product - Produkt
• perfect - perfekt

p - f
• open - offen
• ripe- reif
• help - helfen
• stripe - Streifen

t - s / t - z	
• water - Wasser	• salt -Salz
• hate - hassen	• toe - Zeh
• street - Strasse	• ten - zehn
• hot - heiss	• wheat - Weizen

th - d / d - t	
• word - Wort	• thing - Ding
• door - Tür	• three - drei
• side - Seite	• brother - Bruder
• good - gut	• think - denken

Figure 11: Words used to introduce rules during the first lesson.

An inductive FonFs approach was used to encourage learners to develop metalinguistic awareness, explicitly directing their attention to certain features (R. Ellis, 2009; as discussed in 2.3.3). Students were arranged in groups of two or three, each receiving small strips of paper with overall 20 English words (Figure 11) that they had already learned according to the coursebook. The groups were given three tasks to complete cooperatively. First, they wrote the German translation next to each given word. Then, students marked the change(s) between the English word and its German equivalent. Finally, they grouped word pairs with the same change(s) and formulated a rule based on their observations. As a bonus task, new words following the same patterns could be searched for in the course books. Students were told to start with word pairs that only differ by one character (e.g., ‹c›-‹k› in *music* and *Musik*) and use these as a foundation to find other cognates with the same pattern. Additionally, they were instructed to pay attention to consonants as opposed to vowels. Teachers rotated among the groups and supported learners where necessary. Afterwards, the groups' hypotheses were collected in class, ensuring that the rules that students had inferred were correct. Each group then created a poster with the rules and examples (Figure 12).
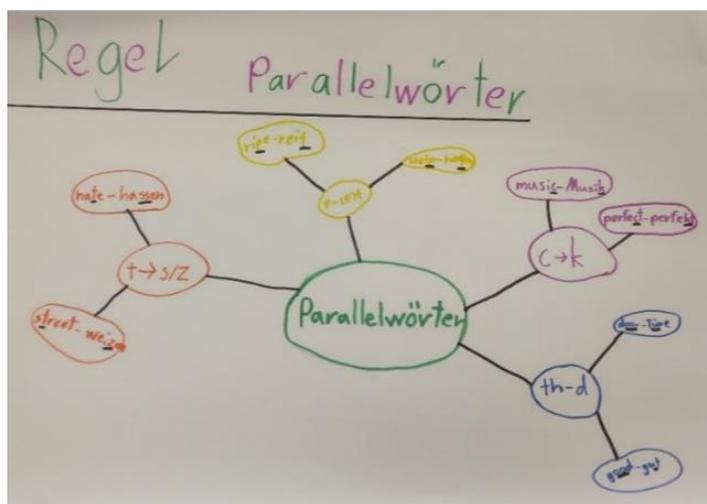

Figure 12: Examples of posters created on the four rules of consonant shifts.

During each of the following three English sessions, 15 to 20 minutes were devoted to recap the rules and consolidate the learners' knowledge. Since both fifth and sixth graders participated, seven different tasks (Table 5) were created, and teachers were given the opportunity to select appropriate exercises to cater to students' individual needs. A variety of item types were included to offer differentiation (ALTE, 2005). To that end, some tasks included selection items, where students had to match word pairs with the corresponding rule (e.g., worksheet *Double changes*), whereas others consisted of candidate-supplied items, requiring students to answer more openly and allowing more creative solutions (e.g., worksheet *Food & drink*). Some activities forced students to explicitly state the rule and thus openly display that they were capable of transferring their declarative knowledge to the new word pair (e.g., worksheet *Animals*), whereas others didn't require them to do so (e.g., domino *Adjectives*). It was recommended that teachers start with more limiting, explicit exercises before expanding to more demanding, open, or implicit tasks. Additionally, alternation was guaranteed by providing worksheets as well as games, and offering various social settings so that students could work alone, in pairs, or in groups. Finally, solutions were provided to instructors, with most worksheets offering autocorrection. To take into account the possible influence of the types of activities completed, each participant filled out a questionnaire at the end of the second test. A specific query of the survey asked how many and which activities the student had worked on.

	Theme	Tasks
Worksheet	Double changes	Connect the German word with its English equivalent and the two corresponding consonant shifts, as in *cat – Katze – c-k / t-z*
	Animals	Word search (English terms), combine syllables (German terms), fill pair in table with corresponding consonant-shift rule
	Body parts	Word scramble (English terms), translate to German, assign correct body part in picture, mark correspondence rule
	Food & drink	Invent a full menu (appetizer, main course, dessert, drinks) using as many cognates as possible, mark consonant shift
Games	Adjectives	Domino with German and English word pair, available in two versions: one to review known vocabulary and one to expand it
	Verbs	Bingo: board with English terms, cards with German terms; act verbs out as charades, play in groups
	Recap	Cooperating in a group, collect as many German-English word pairs as possible for a given rule

Table 5: Consolidating activities of the invention.

3.1.6 Test battery

The tests were designed using jsPsych for Javascript (de Leeuw, 2019), based on work by Vanhove (2017). Overall, the test battery consisted of four elements: the vocabulary learning activity and test, a background questionnaire, a general vocabulary knowledge test, and for the IG an additional feedback form on the intervention.

At the core of the test battery lies the vocabulary learning activity, where participants learned new English words through the word-method by which the items were presented as German-English translations. After a distraction task for which students had to solve age-appropriate math problems, learners had to provide the correct translation for half of the items productively (German to English) and the other half receptively (English to German). This activity was deemed appropriate to examine the efficiency of explicit crosslinguistic awareness-raising activities for two main reasons. First, it was observed that not all Germanic languages are equally suited for intercomprehension (Gooskens & Swarte, 2017), and that knowledge of consonant shifts might therefore be more beneficial for vocabulary learning as opposed to intercomprehension tasks (Berthele et al., 2011). To exemplify this, let us look at the word pairs *love* and *lieben* versus *live* and *leben*. Assuming that a German learner of English discovers the consonant shift ‹b› to ‹v›, they would probably wrongly infer that the word *live* corresponds to *lieben* instead of *leben*. However, one could imagine that on the basis of knowing this shift, they would be able to better memorize the word pair once the correct translation had been provided. The basic assumption therefore is that teaching students consonant shift rules leads to increased thoughtful processing since they will link new items to previous knowledge, which in turn will make vocabulary learning more effective (Nation & Meara, 2002). Second, although sometimes criticized for its limited focus on a single form-meaning link as only one part of various aspects of vocabulary knowledge (see 2.2.1), deliberate vocabulary learning and the use of the L1 to convey and test word meaning has proven efficient (Lotto & de Groot, 1998; Nation, 2001, p. 351; Schmitt, 2008). The written word form has also been shown to support the learning process of a new word (referred to as orthographic facilitation effect, see e.g., Colenbrander et al., 2019), especially in the case of cognates (Tonzar et al., 2009).

The selection process for the test items was based on the aim of yielding three lists with partial cognates of comparable objective difficulty based on a variety of criteria. To that end, a balance was sought based on the type of correspondence, orthographic similarity, additional changes (e.g., endings or vowels), part of speech, and frequency in German (based on DeReWo, Perkuhn et al., 2012) and English (based on the BNC/COCA list, Nation, 2017). Several steps were taken to fulfill these criteria by picking and choosing word pairs from the

initial list compiled as described in section 3.1.3. Firstly, all words not displaying one of the consonant shifts introduced in the intervention as well as words that students were already familiar with due to the course book (Arnet-Clark et al., 2013; Frank Schmid et al., 2014) were removed. Then, the normalized Levenshtein distance was calculated for each pair (Equation 1, see 2.1.2). From the remaining items, groups of three words with similar features were selected and each respectively assigned to one of the three tests. For example, the triple *rattle-Rassel, kettle-Kessel* and *nettle-Nessel* was chosen as all are nouns with a ‹t› to ‹s› correspondence and exhibit an additional switch at the end (‹-el› in German and ‹-le› in English). This extraction process yielded 22 partial cognate pairs per test. The only five words taught during the intervention were assigned to T1. It was ensured that for each rule introduced in the program there would be at least two pairs assessed per test. This was necessary so that every rule was tested at least once in both the productive and receptive translation modes. Furthermore, two items displaying a ‹k›-‹ch› shift were included based on the assumption that participants would not only be able to apply taught rules but also show increased awareness of a new pattern. Additionally, four profile words and two deceptive cognates were included, despite previous results indicating that the inclusion of false friends led to an inhibitory effect for processing true and partial cognates (Brenders et al., 2011). The justification for this decision stems from the observation that lists included in the coursebook usually contain a variety of words, and thus the lists compiled for the test reflect more closely a typical learning burden for students. Following Nation and Meara's (2002) guidelines for efficient vocabulary learning, additional attention was paid to avoid interference by excluding related words regarding form and/or meaning within the same test.

In addition to the vocabulary learning activities, all participants filled out a background questionnaire and thus provided information on their age, grade, gender, and languages spoken at home. They also rated statements regarding their attitude toward school in general, the English language, as well as English classes and language learning.

Furthermore, a passive word recognition test was included as a measurement of students' general vocabulary knowledge and overall proficiency in general since they often correlate (Qian & Lin, 2020). Despite certain limitations (Chapelle, 1999), the yes/no test as developed by Meara (1992) was selected for its efficiency. Test items each consist of either a word or a pseudoword, and participants indicate whether or not they know this lexical unit.

Finally, students of the IG also evaluated the intervention. They indicated which activities they had completed and rated the overall experience regarding pleasantness, necessity, novelty, and usefulness for future vocabulary learning. An open comment section provided an opportunity for additional remarks.

3.1.7 Procedure

Before the test, the teachers went over the test procedure and explained the steps as depicted in Figure 13. Then, students received an anonymized ID and worked individually on a computer. The first test (T1) or pre-test consisted of five parts. Students started by filling out the background questionnaire.

Afterward, they watched a presentation of 30 German-English word pairs. Simultaneous presentation of both words is recommended for first encounters with new items and can be related to a noticing type of processing (Nation, 2001, p. 79). During a previous similar project, it was observed that when students were provided with the complete list, they tended to focus on only the first few word pairs (Müller, 2018). Consequently, it was decided to present the words individually in a timed manner to control for attention span given to each lexical item. Each pair appeared for 8 seconds with a 0.8 second gap before the next one. The presentation was shown twice, once starting with the German word (e.g., *Apfel – apple*), then with the English one (e.g., *apple – Apfel*). The order the items were presented in was randomized across participants and presentations to avoid serial effects (Nation & Meara, 2002). Overall, the presentation phase took 10 minutes. Although more repetitions would have been beneficial (around five to eight according to Nation, 2001, p. 81), this would have prolonged the presentation, possibly lowering participants' motivation and pushing their attention span. Students were informed that they would have to translate the words later on and should thus pay close attention to the spelling. Therefore, the activity was intentional from both an experimental psychology perspective (i.e. test announcement) as well as from a language education point of view (i.e. explicit FonFs and awareness of what has to be learned) (Hulstijn, 2001). Participants were further told that although 30 items would possibly be too many to memorize, they should do their best.

After the presentation, participants had to solve math problems as a distraction task (tapping into different aspects of working memory, Daneman & Merikle, 1996), writing down their solutions on a piece of paper. The exercises appeared on the screen for 5 minutes before redirecting them automatically to the next task.

The fourth part asked the students to translate the words previously presented – half of them productively (German to English) and the other half receptively (English to German). Including both active and passive recall was deemed appropriate since it reflects the demands of the vocabulary learning processes in the classroom, and because they represent different strengths of vocabulary knowledge (Laufer & Goldstein, 2004). The instructor pointed out to students that they did not have to worry about capitalization, but that they should pay attention to spelling. In order to avoid accidentally skipping items, the program forced participants to

enter at least one letter before continuing to the next word. Students were encouraged to guess even if they did not remember the item from the presentation.

The final part of the first test battery was a yes/no vocabulary test consisting of 40 words and 20 pseudowords (Meara, 1992). Students were shown each item individually in randomized order and had to indicate if they knew the word. It was pointed out in advance that some words are made up while others actually exist.

The second test (T2) and third test (T3) – or post-test and delayed post-test – generally followed the same pattern, although students only had to specify their ID instead of completing a full questionnaire at the beginning, and did not have to take an additional vocabulary decision test. At the end of the second test, students from the IG additionally provided feedback on the intervention.

Test 1 ("Red")	Test 2 ("Moon" / "Star")	Test 3 ("Dog")
•Background questionnaire •Presentation •Math exercises •Translation •Vocabulary test	•ID •Presentation •Math exercises •Translation •IG: Evaluation of intervention	•ID •Presentation •Math exercises •Translation

Figure 13: Overview of the procedures.

3.1.8 Scoring

For the vocabulary learning activity, the lexical items were checked and graded on a true or false basis. As announced to participants, capitalization was not taken into account. First, the results were graded strictly in that only completely correctly spelled words were accepted. To account for partial knowledge, a sensitive scoring was then performed since it has been argued that this form of scoring provides a more accurate picture of the effects of learning, particularly with cognates (Webb, 2008). Misspellings were accepted as long as they did not imply another existing word, and as long as the correspondence rule was visible. There was no hard rule for determining spelling errors; cases were judged individually by collecting given solutions in a separate list before determining their acceptability. The rubric with examples for accepted and rejected answers can be found in Appendix 6.6.

The yes/no vocabulary test was graded according to the most recent recommendations by its developer (Huibregtse et al., 2002). Yes-responses to real words were counted as hits, whereas yes-responses to pseudowords resulted in a false alarm count. Then, the rates for observed hits and false alarms were determined, and based on these results the *Index of Signal Detection* calculated (Equation 2), yielding a value between 0 and 1.

$$I_{SDT} = 1 - \frac{4h(1-f) - 2(h-f)(1+h-f)}{4h(1-f) - (h-f)(1+h-f)}$$

h = number of hits divided by total number of real words

f = number of false alarms divided by total number of pseudowords

Equation 2: Index of Signal Detection I_{SDT} for the yes/no vocabulary test (Huibregtse et al., 2002, p. 238).

The background questionnaire collected data on gender (male or female), grade (fifth or sixth), and age. For languages, standard and Swiss German or dialect were clustered as one. Every other language a student mentioned was counted as an additional one, independent of which one it was. The answers to the attitudinal statements were graded on a 4-point Likert scale (0 = strongly disagree, 3 = strongly agree), before calculating the mean of the three statements related to English to yield one overall value for attitude.

Finally, the evaluation of the intervention was scored by counting the number of tasks completed. The program was rated regarding novelty, pleasantness, fun, and helpfulness, each again on a 4-point Likert scale. For each student, an average of their rating across these four categories was calculated. Additional comments were collected separately and clustered following the guidelines for qualitative content analysis by Mayring (2015).

Data was handled using *Excel*. The data analysis was performed with *R* (R Core Team, 2017; RStudio Team, 2015). The library packages *tidyverse* (Wickham, 2016, 2017) and *lme4* (Bates et al., 2015) were used to create plots and perform statistical analyses. The linear mixed effect regression analysis incorporated random effects to account for clusters (Vanhove, 2019). Data and R code are available online at https://tinyurl.com/MAThesisMueller2020.

3.2 RESULTS

3.2.1 Data inspection

Vocabulary learning activity

As evidenced by the lack of ceiling or floor effects, the task appears to have generally been of appropriate difficulty (Table 6, graphs in Appendix 6.6). Participants were able to memorize roughly half of the overall 30 tested items, with means ranging from 14.08 to 15.20 words across the three tests. Similar results can be reported when restricting to the score on cognates: out of 24 tested partial cognates, participants scored between 11.72 and 14.42 points on average. Individual performances varied greatly at all test times, ranging from none to all correct answers given, both in the category of all words and limited to cognates. All of the items were translated correctly at least once, and none were translated correctly by every student. Therefore, all items were included in further analyses.

		IG M (SD)	CG M (SD)	Total M (SD)	range
Test 1	*all items*	14.55 (5.08)	15.76 (5.90)	15.20 (5.57)	3-30
	cognates	12.18 (4.26)	13.11 (4.58)	12.68 (4.46)	2-24
Test 2	*all items*	17.73 (5.54)	16.30 (6.95)	16.96 (6.38)	0-29
	cognates	15.20 (4.43)	13.75 (5.66)	14.42 (5.18)	0-24
Test 3	*all items*	15.00 (5.41)	13.33 (6.18)	14.08 (5.89)	0-29
	cognates	12.54 (4.56)	11.02 (5.29)	11.72 (5.03)	0-24

Table 6: Performance on the vocabulary learning activity by test, word type, and treatment.

The large individual variation among participants' performance on cognates can be seen in Figure 14. Kruskal-Wallis tests followed by pairwise comparisons through Wilcoxon rank sum tests were used to analyze for differences between test times among each treatment group. Despite careful matching of the item characteristics across the three tests, the CG performed similarly in T1 and T2 but significantly worse in T3, $\chi^2 = 20.29$, $df = 2$, $p < .001$. In comparison, the IG scored significantly higher in T2 than in T1 and T3, $\chi^2 = 32.10$, $df = 2$, $p < .001$. This spike in performance at T2 among the IG is clearly visible on the right side in Figure 14.

Figure 14: Performance on cognates by test and treatment.

Yes/no vocabulary test

The scores on the yes/no vocabulary test were normally distributed, ranging from none to 93% correct answers with a mean of 0.48 (*SD* = 0.19). The corresponding histogram can be found in Appendix 6.6.

Attitude

The attitudes, computed as the average of the scores for English language, class, and learning, ranged from 0.00 to 3.00, with a mean of 2.33 (*SD* = 0.59). In each of the four categories inquired, over 80% of students indicated a rather or fully positive attitude (Figure 15). The highest rating was obtained for appreciation of the English language (65% completely agree), followed by English class and English learning. The enjoyment of school overall received the lowest score (31% completely agree).
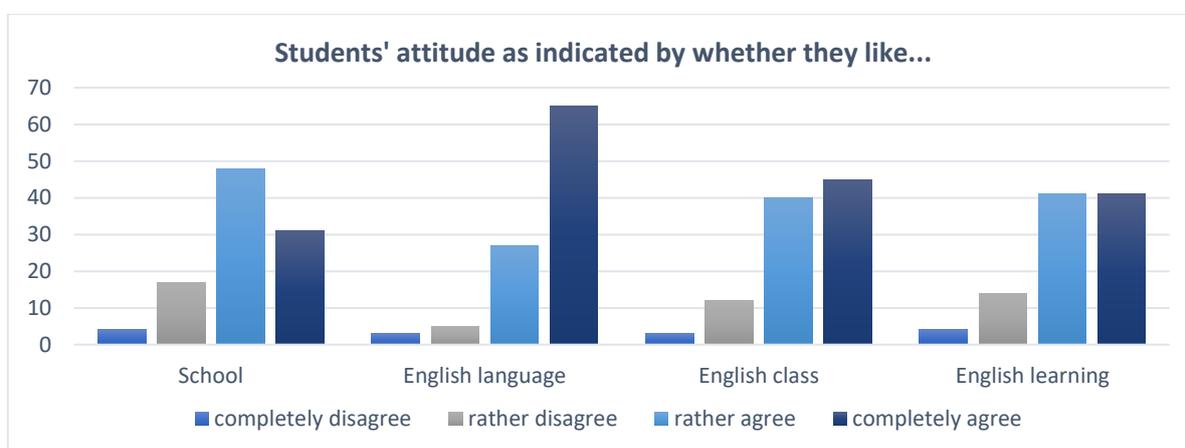
Figure 15: Attitudes as rated by students (in %).

Relationships between variables

Pearson product-moment correlation coefficients were computed to assess the relationship between the overall score on the three vocabulary learning activities and other variables (graphs in Appendix 6.6). The overall performance was strongly correlated with the yes/no vocabulary test score across all participants ($r = .62, p < .001$). Hence, pupils with larger initial vocabularies were more likely to memorize a higher number of new words. The attitude was slightly associated with the overall performance only among the IG ($r = .38, p < .001$). Furthermore, the students' performance across the three tests were strongly correlated ($r = .71, p < .001$ for T1 and T2; $r = .67, p < .001$ for T1 and T3). Thus, learners with high scores in T1 were likely to perform better in T2 and T3 as well.

Furthermore, effects of gender, grade, and knowledge of other languages were analyzed (Table 7, graphs in Appendix 6.6.). Two sample t-tests were conducted to determine grade effects. Fifth graders memorized marginally fewer items across the three vocabulary learning

activities compared to sixth graders, $t(161) = -2.04$, $p = .04$. There was also a significant difference between the fifth graders' initial vocabulary size and the sixth graders' lexicon, $t(162) = -3.25$, $p = .001$. However, the attitudes were similar among both grades. This suggests that while older students had a larger initial vocabulary and were able to pick up more words, they felt similarly about learning English. Gender effects were explored by Wilcoxon rank sum tests. Girls performed slightly better than boys on the three vocabulary learning activities ($p = .04$). There were no significant gender effects in initial vocabulary knowledge or attitudes.

Finally, pupils' linguistic repertoires were categorized into four groups based on which languages they indicated speaking at home with family members: exclusively standard and/or Swiss German (German-only, $n = 170$), German and an additional language other than English (German-plus, $n = 59$), English ($n = 16$), and exclusively a language other than German and/or English (no-German, $n = 15$). Kruskal-Wallis tests were conducted to analyze for effects of linguistic knowledge on performance. The four groups differed significantly, both in regard to the overall score on the vocabulary learning activities, $\chi^2 = 8.42$, $df = 3$, $p = .04$, and to the yes/no vocabulary test, $\chi^2 = 9.94$, $df = 3$, $p = .02$. The discrepancies among the different sub-groups were further inspected through pairwise comparisons using Wilcoxon rank sum tests. Children who indicated conversing in English at home did not outperform the other groups in either test. There was a tendency in that the German-plus group scored highest on average on the vocabulary learning activities followed by students with German-only and no-German, although this only approached statistical significance ($p = .07$). In terms of initial vocabulary size, a significant difference was only found between the German-plus and German-only group, with the former outperforming the latter ($p = .02$).

		Vocabulary learning activities M (SD)	Yes/no vocabulary test M (SD)
Gender	*Female*	49.61 (12.36)	0.50 (0.17)
	Male	44.87 (16.20)	0.47 (0.21)
Grade	*Fifth*	44.00 (14.90)	0.42 (0.17)
	Sixth	49.12 (14.09)	0.51 (0.17)
Languages	*German-only*	45.35 (15.90)	0.46 (0.17)
	German-plus	51.03 (15.17)	0.55 (0.20)
	English	44.75. (18.16)	0.51 (0.20)
	no-German	39.20 (14.78)	0.47 (0.23)

Table 7: Performance by gender, grade, and languages spoken at home.

3.2.2 Intervention effects and interaction with other variables

Improvement by treatment

In a first step, the intervention effects were explored through descriptive analysis by creating graphs visualizing the improvement from the pre-test to the post-test (T2-T1) as well as from the pre-test to the delayed post-test (T3-T1) by treatment group and individual classes. Despite large individual variation among both groups, the IG showed overall greater improvement on cognates (Figure 16). On average, out of 24 cognates presented, students from the IG remembered 2.38 (T2-T1) and 2.45 (T3-T1) more items in comparison to the CG. Whereas the improvement among the IG reached a positive value in both T2 ($M = 3.02$, $SD = 3.25$) and T3 ($M = 0.36$, $SD = 3.66$), the CG slightly progressed in T2 ($M = 0.64$, $SD = 3.82$) but regressed in T3 ($M = -2.09$, $SD = 3.78$).
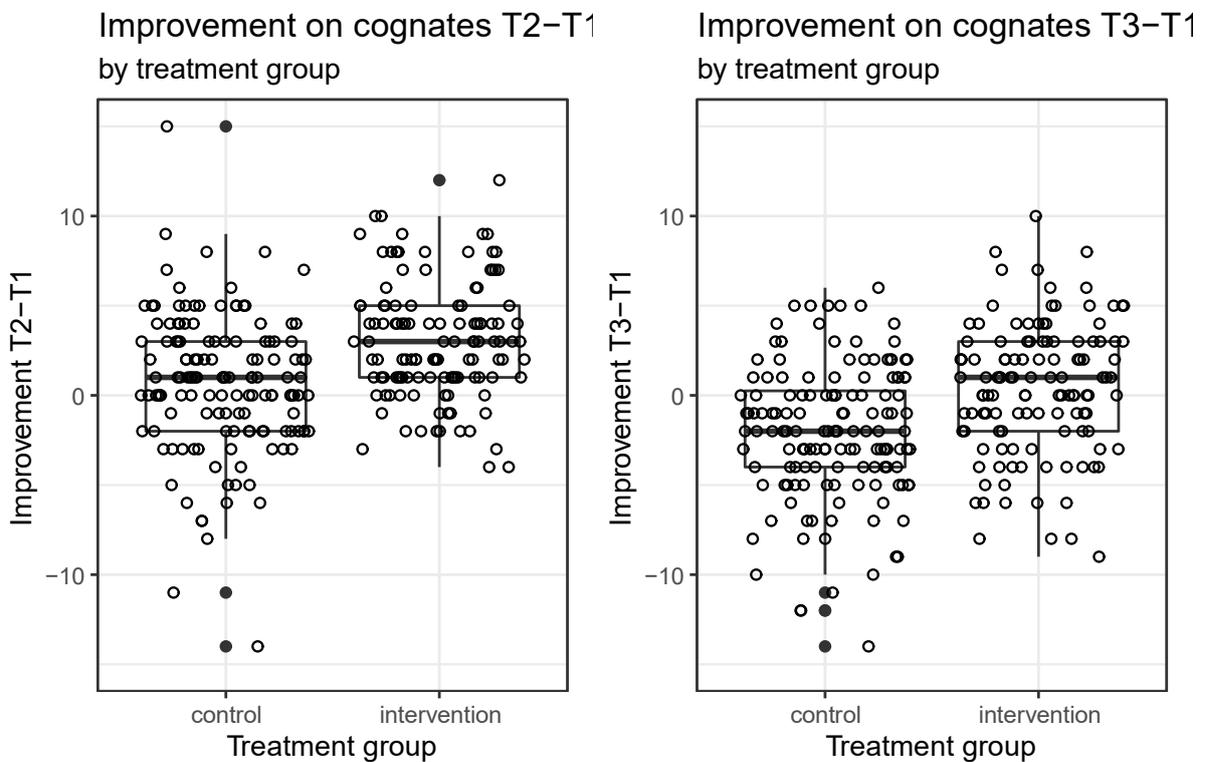
Figure 16: Improvement on cognates by treatment (T2-T1 left, T3-T1 right).

The progress among individual classes was also inspected. The color patterns of the graphs for the individual classes reveal a strong tendency in favor of the IG classes (Figure 17). Five of the seven experimental classes surpassed the control classes in T2, and only one intervention class was outperformed by control classes in T3. Again, large variation can be observed, as the improvement on average among each class ranged from -0.89 to 4.78 (T2-T1) and -4.20 to 3.17 (T3-T1) items.

Improvement on cognates from T1 to T2
by class

Improvement on cognates from T1 to T3
by class
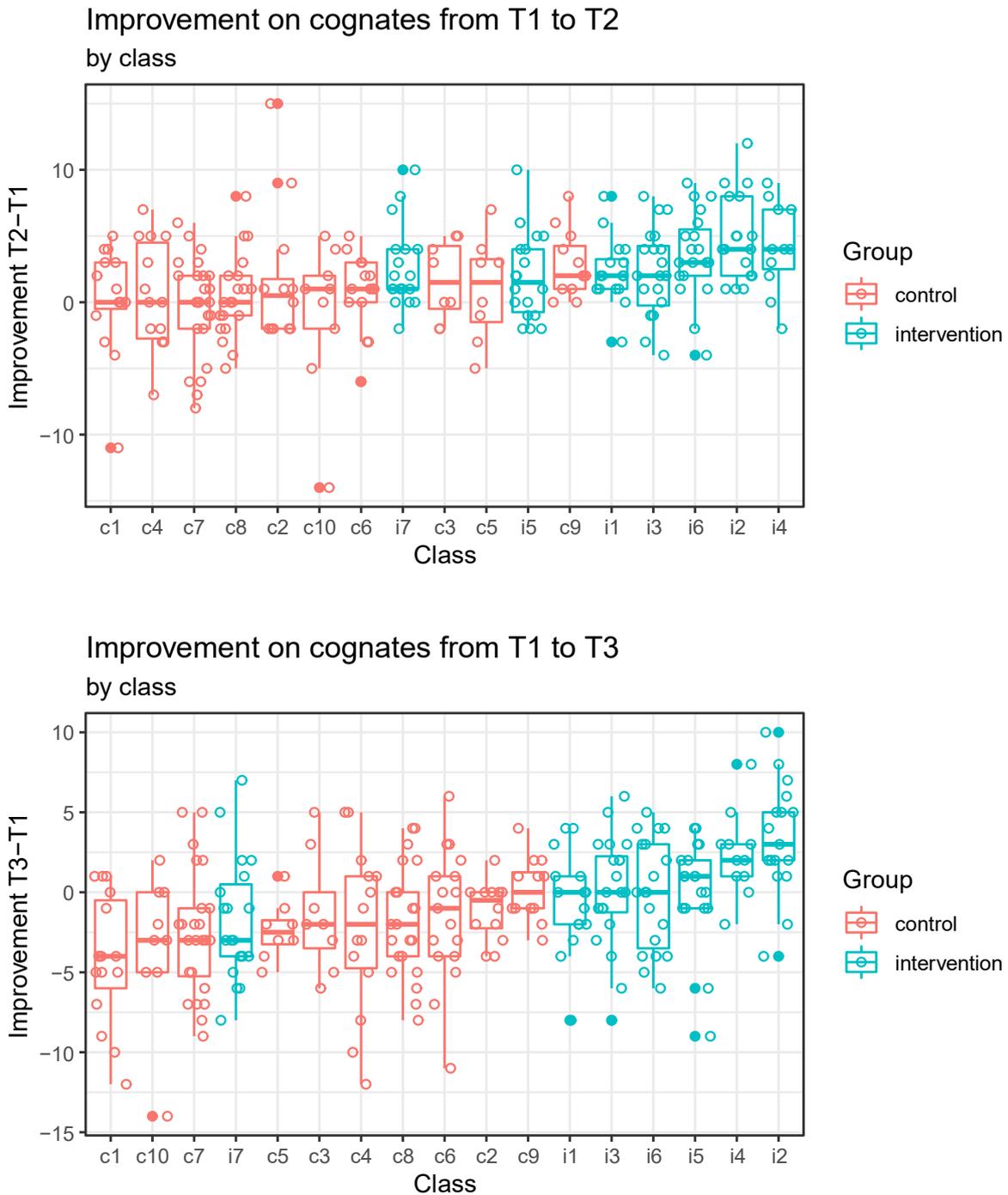
Figure 17: Improvement on cognates by class (T2-T1 top, T3-T1 bottom).

Improvement by treatment and initial vocabulary knowledge

In a second step, a linear mixed-effect regression analysis (Winter, 2013) of the relationship between treatment group and improvement on cognates was performed. The treatment group as well as performance on the yes/no vocabulary test were entered as fixed effects (with interaction term), whereas the intercept for the individual classes was taken into account as the random effect variable. Furthermore, *p*-values were obtained through Satterthwaite approximations (Luke, 2017).

Linear mixed-effect model: Improvement from T1 toT2

Fixed effects

	Estimate ± SE	p
Intercept	0.70 ± 0.36	0.07
Group (CG/IG)	2.34 ± 0.53	<0.001
Yes/no vocabulary test	2.03 ± 1.49	0.17
Group : Yes/no test	-2.78 ± 2.43	0.25
Random effects		
	σ^2 (SD)	
Random intercept by class	0.34 (0.58)	

Linear mixed-effect model: Improvement from T1 to T3

Fixed effects

	Estimate ± SE	p
Intercept	-2.07 ± 0.46	<0.001
Group (CG/IG)	2.51 ± 0.69	0.003
Yes/no vocabulary test	-1.13 ± 1.53	0.46
Group : Yes/no test	-0.99 ± 2.50	0.70
Random effects		
	σ^2 *(SD)*	
Random intercept by class	1.11 *(1.05)*	

Table 8: Linear mixed-effect regression modelling improvement by treatment and initial vocabulary knowledge.

The intervention affected the improvement on cognates significantly from T1 to T2, $t(13) = 4.42$, $p < .001$, increasing the number of items remembered by 2.34 ± 0.53 (*SE*) in comparison to the CG. A similar result was obtained comparing the outcome from T1 to T3, $t(14) = 3.63$, $p = .003$, with an improvement in cognate retention of 2.51 ± 0.69 (*SE*). In other words, the intervention had a significant impact on students' progress in terms of how many new items they were able to memorize in a short amount of time, and emerged as a main predictor of learners' improvement.

Initial vocabulary size as measured by the yes/no vocabulary test was not found to have a statistically significant influence on the progress at either post-test. The interaction between treatment and vocabulary knowledge did not reach statistical significance at either test time.

Thus, there were no Matthew effects: students with initially larger vocabulary sizes did not show greater improvement and were not able to benefit more from the intervention in comparison to their peers with smaller vocabularies.

Improvement by treatment and testing mode

The difference in improvement on cognates between the CG and IG was examined through Wilcoxon rank sum tests and was found to be highly significant among both receptive and productive modes, and at both test times (Table 9). While the difference in progression was balanced across both testing modes in T2, the discrepancy was more accentuated in the productive assessment in T3.

		Improvement on cognates T2-T1			Improvement on cognates T3-T1		
		receptive	*productive*	*overall*	*receptive*	*productive*	*overall*
IG	M (SD)	2.14 (2.17)	0.88 (2.19)	3.02 (3.26)	-0.12 (2.14)	0.48 (2.50)	0.36 (3.67)
CG	M (SD)	0.94 (2.46)	-0.29 (2.31)	0.64 (3.83)	-1.04 (2.36)	-1.05 (2.39)	-2.09 (3.80)
Diff.	M	~ 1.20 ***	~ 1.17 ***	~ 2.37 ***	~ 0.92 ***	~ 1.53 ***	~ 2.45 ***

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

Table 9: Improvement on cognates by treatment and task type.

Improvement by treatment and consonant shift

The data was also examined at a finer level to measure the variance of improvement with respect to the different consonant shifts included in the intervention (Table 10). The number of word pairs tested per category varied for the taught correspondences: four ‹p›-‹f›, five ‹c›-‹k›, six ‹t›-‹s›/‹z›, and seven ‹th›-‹d›-‹t› items were assessed in each of the three tests. Additionally, two ‹k›-‹ch› items were included which had not been explicitly addressed in the program. To account for the varying number of items assessed, a mean score was computed, yielding a per-item improvement average for each category. Wilcoxon rank sum tests revealed that participants of the IG progressed significantly more compared to the CG on all correspondence rules included in the intervention. The disparity was most accentuated among the ‹p›-‹f› shift, with the IG improving 17% and 18% more in comparison to the CG in T2 and T3, respectively. Conversely, the gap was smallest for the ‹c›-‹k› correspondence in T2 (eight percent more) and the ‹th›-‹d›-‹t› shift in T3 (six percent more). Performance on ‹k›-‹ch› word pairs remained similar across both groups and thus did not show a statistically significant difference.

			‹c›-‹k›	‹p›-‹f›	‹t›-‹s›/‹z›	‹th›-‹d›-‹t›	‹k›-‹ch›
T2-T1	IG	M (SD)	0.13 (0.26)	0.12 (0.29)	0.22 (0.24)	0.05 (0.24)	0.11 (0.81)
	CG	M (SD)	0.05 (0.26)	-0.05 (0.31)	0.13 (0.26)	-0.04 (1.56)	0.07 (0.78)
	Diff.	M	~ 0.08 *	~ 0.17 ***	~ 0.09 **	~ 0.09 **	~ 0.04
T3-T1	IG	M (SD)	-0.01 (0.28)	-0.01 (0.32)	0.16 (0.26)	-0.04 (0.22)	-0.09 (0.41)
	CG	M (SD)	-0.12 (0.30)	-0.19 (0.28)	0.03 (0.24)	-0.10 (0.23)	-0.12 (0.44)
	Diff.	M	~ 0.11 **	~ 0.18 ***	~ 0.13 ***	~ 0.06 *	~ 0.03

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

Table 10: Improvement on cognates by consonant shift per item.

Improvement by attitude toward the intervention

The majority of participants in the IG evaluated the program positively (Figure 18). Four out of five pupils stated that they enjoyed the intervention, and thought it was important for their learning process. Furthermore, 90% believed it would be helpful for future vocabulary learning. However, a third of the participants claimed that they had already been familiar with at least some of the contents.
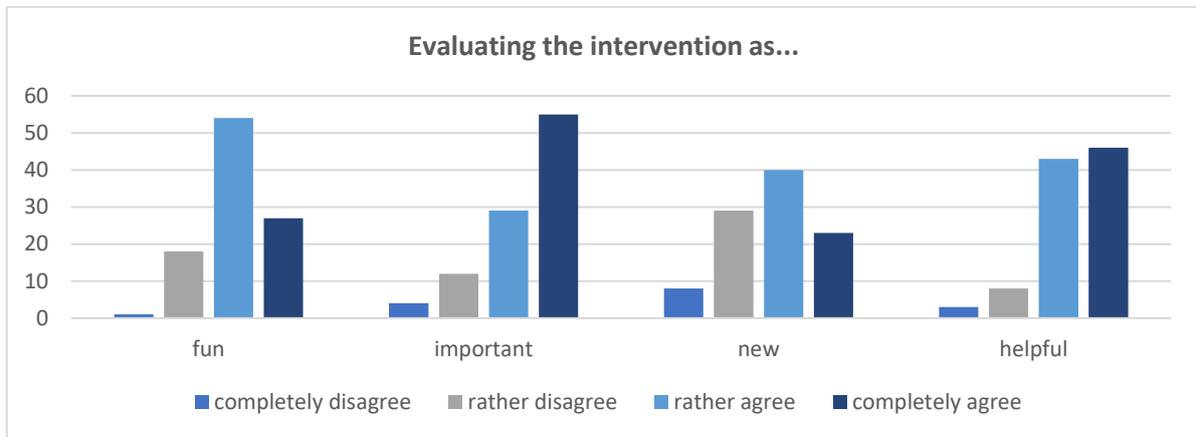
Figure 18: Evaluation of the intervention by students (in %).

Students additionally had the option of giving feedback in an open question format. Out of the 120 pupils in the IG, 54 provided remarks about their learning experiences. About two-thirds of them were positive, such as:

Es hat mir mega viel Spass gemacht und es gab auch einmal eine Abwechslung zwischen dem normalen Englisch. Dank dem kenne ich jetzt auch mehr Wörter, das hilft mir sehr und ich bin auch froh darüber! Und ich fände es super, wenn wir das noch mehr machen können, das hilft mir auch beim Lernen. Manchmal habe ich es nicht gewusst, da ist es gut, wenn ich die Wörter jetzt mit den Regeln

lernen kann! Ich glaube, dass ich so mehr Fortschritte mache und ich so viel mehr Spass daran habe es zu lernen... Danke.

[It was a lot of fun for me and also a change to regular English classes. Thanks to this, I now know more words as well, that helps me a lot and I am also happy about it! And I think it would be great if we could do that more often, this also helps with learning. Sometimes I did not know it, then it is good if I can learn the words with the rules! I think I will progress more and have much more fun learning it this way… Thanks.]

Others were more critical and mentioned difficulties in understanding or processing the rules introduced in the intervention:

Für mich war der Test sehr schwierig und ich verstehe diese Regel immer noch nicht so gut. Die Matheaufgaben waren auch nicht gerade einfach.
[For me the test was very difficult, and I still do not quite understand these rules. The math problems were not that easy either.]

Negative comments regarded the length of the presentation ($n = 6$), having to solve math problems ($n = 4$), boredom during the tests ($n = 4$), and the tests being too difficult ($n = 5$) or too easy ($n = 2$). English as a subject was mentioned three times, twice positively and once negatively. In positive comments, students emphasized that the tasks were fun ($n = 28$) and helpful ($n = 8$). They appreciated learning new words ($n = 4$), new strategies ($n = 4$), generally doing something different in English class ($n = 2$), and specifically participating in a study ($n = 4$).

The impact of the attitude toward learning about lexical similarities was inspected visually before calculating Person's product-moment correlation. No statistically significant connection was found between the IG's progress and their stated appreciation of the intervention at either post-test. Thus, task appreciation did not affect improvement.

Regarding the exercises completed, every activity displayed in Table 5 (section 3.1.5) was selected at least once. The most frequently chosen tasks were the worksheets *Animals* ($n = 80$), *Body* ($n = 76$), and *Double changes* ($n = 68$). The open task *Menu* was used less ($n = 33$). Of the games, the domino *Adjectives* ($n = 48$) was selected more often than the bingo *Verbs* ($n = 27$). Finally, 49 pupils completed *Recap* to consolidate their knowledge. On average, learners completed 3.41 activities, excluding the 10 students that did not provide feedback on the types of exercises they had worked on. The number of tasks as indicated by learners was not associated with their progress at either post-test as determined by Pearson's product-moment correlation.

3.2.3 Item Characteristics

In order to investigate the influence of item characteristics, the translation accuracy was determined for each item across the three tests, yielding a value between 0 (never correctly translated) and 1 (correctly translated by all participants). Only the data of the CG was included in further analyses to avoid interference from intervention effects. It should be kept in mind that items were not matched across the tests, meaning that every student completed a test that was identical in terms of words to be learned and testing mode.

The success rate for item translation varied considerably across all three tests, but was overall normally distributed. Visual data inspection through scatterplots only revealed a connection between the translation success rate and the orthographic similarity (see Appendix 6.6), and even then only among the productive testing mode. To confirm the relationship between the translation success rate and other variables, Pearson product-moment correlation coefficients were calculated. As expected, no association was found between translation accuracy and frequency in German or English. However, the normalized Levenshtein distance was found to significantly correlate with the translation success rate. In line with visual data inspection, the extent of formal overlap was associated with larger scores exclusively among the productive translations ($r = .44$, $p = .002$).

Next, effects of word type and testing mode were inspected (Figure 19). The influence of word type on translation accuracy was analyzed using Kruskal-Wallis tests. Deceptive cognates and partial cognates were equally likely to be memorized, whereas profile words were remembered less often; $\chi^2 = 6.34$, $df = 2$, $p = .04$. However, this difference was only significant between profile words and partial cognates ($p = .04$) as determined by pairwise comparisons using Wilcoxon rank sum tests. Students tended to be more successful at translating items receptively from English to German than the reverse, although this was not significant according to a Welch Two Sample t-test.
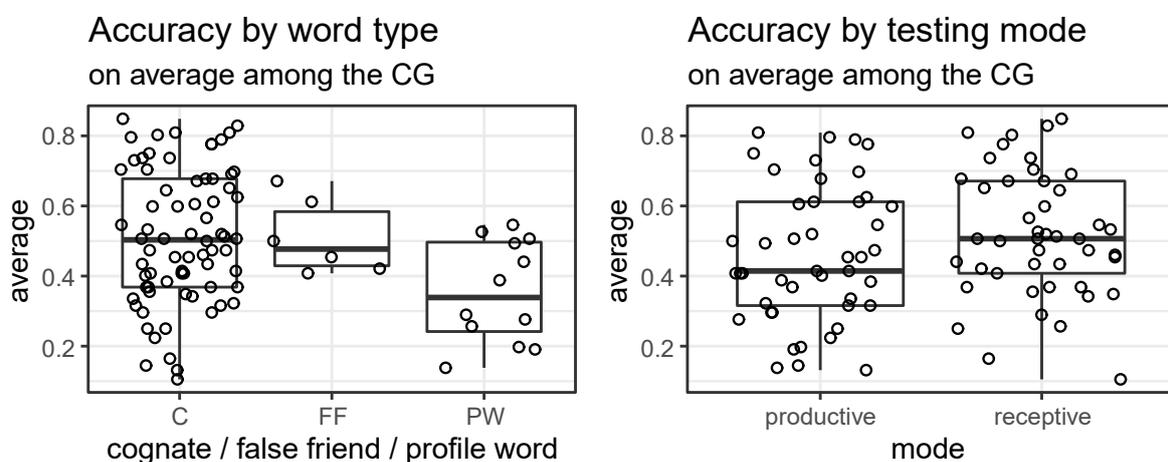
Figure 19: Translation accuracy by word type (left) and testing mode (right).

Finally, the impact of the various consonant shifts was visually explored (Figure 20). There was a gap among partial cognates in that word pairs with a ‹th›-‹d›-‹t› or ‹t›-‹s›/‹z› consonant shift were less likely to be translated correctly than items exhibiting a ‹c›-‹k›, ‹k›-‹ch›, or ‹p›-‹f› correspondence. A Kruskal-Willis test confirmed a significant difference among the types of correspondences overall; $\chi^2 = 11.63$, $df = 5$, $p = .04$, although none of the pairwise comparisons reached statistical significance.
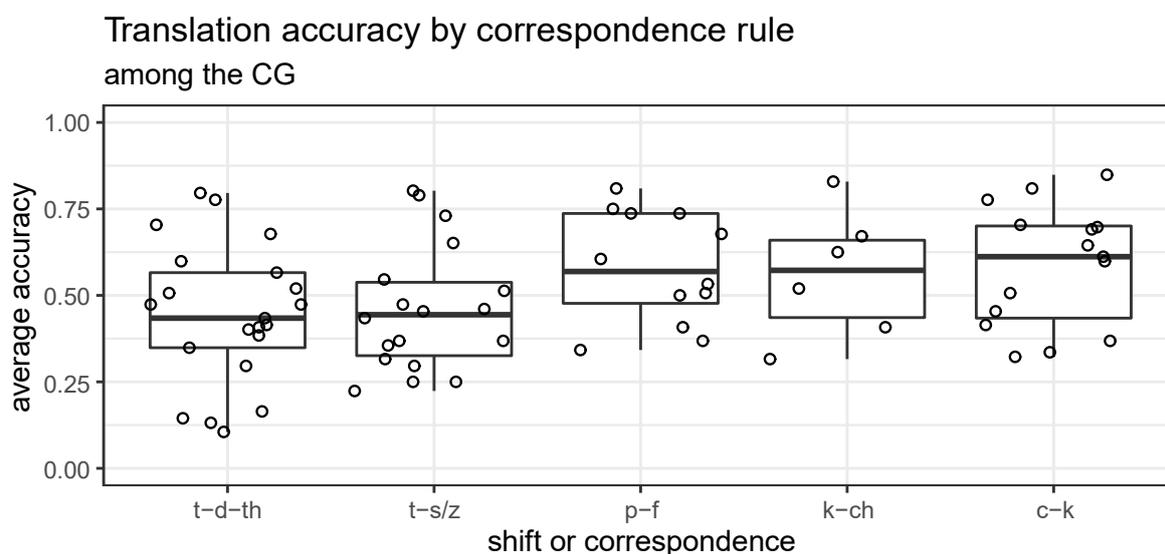
Figure 20: Translation accuracy by correspondence rule across all participants

3.3 DISCUSSION

3.3.1 General observations

Across the three vocabulary learning activities, students on average memorized about half of the items presented. The CG performed similarly in T1 and T2 but worse in T3. These differences were observed despite careful matching of items across the three tests based on a variety of criteria. As discussed in sections 2.2.5 and 2.3.3, there are an abundance of other item-related factors that affect transfer and vocabulary learning. It is conceivable that students' psychotypology did not align with the objectively selected criteria, and/or that other factors which had not been considered such as concreteness exerted a more decisive influence on the learning burden. Alternatively, attentional and motivational aspects could have played a role. As such, students could have performed slightly better in T2 because they knew what to expect and which aspects they should devote attention to, whereas in T3 they might not have been as motivated anymore due to the repetitive nature of the procedure.

As observed in previous studies on cognates in language learning (e.g., García & Nagy, 1993; Kelley & Kohnert, 2012; Otwinowska, 2015; Vanhove & Berthele, 2015b), there was considerable variation among participants' performance in the vocabulary learning activity.

This may again be attributed to large individual differences in their ability to recognize and take advantage of similarities and previous linguistic knowledge, and possibly cognitive capacities of students (Berthele & Udry, 2019).

The performance on the vocabulary learning activity was strongly correlated with the score on the yes/no vocabulary test, which matches predictions by Bedore et al. (2010) in that a larger initial vocabulary size allows for a higher number of words to be memorized. From a theoretical viewpoint of the mental lexicon, this relation between proficiency and uptake of new words could be justified on the basis of additional links of individuals with more lexical entries (see 2.2.2). This hypothesis is corroborated by the observation that fifth graders achieved slightly lower scores on both tests, although this could also be attributed to age effects (Schüppert et al., 2015; Vanhove & Berthele, 2015b). These relationships among initial vocabulary size, grade, and performance on memorizing new words could also stem from previously existing knowledge. While words taught in the coursebook were thoroughly excluded in the vocabulary learning activities, it is still possible that students had been familiar with some of the items already, even more so if their mental lexicon was bigger at the beginning of the study.

Based on the belief that students benefit from previous linguistic knowledge in other languages (Bertschy et al., 2015), it was expected that multilingualism would be associated with higher scores. Although there was a tendency on the vocabulary learning activities in favor of children who indicated speaking German in addition to another language other than English at home over pupils only conversing in German with family members and students without German exposure at home, this difference was not significant. This contradicts the result by Vanhove and Berthele (2015b), where the number of FL played a modest but significant role in guessing written items. A plausible explanation is the reliability of the measurement of previous linguistic knowledge in the current study: the middle schoolers only indicated which languages they speak at home, not how proficient they are in them, and proficiency in a L2 has been shown to affect transfer (Swarte et al., 2013). This likely discrepancy between usage and proficiency is further corroborated by the observation that students who allegedly use English with family members performed similarly across the test battery – including the yes/no test as a measure of initial vocabulary size, which is unexpected. Supposedly, pupils indicated presence of a FL at home from experiences of completing FL homework with family members instead of a language being passed down from parents to children. In any case, these observations put the reliability of the measurement of previous linguistic knowledge seriously into question, thus restricting any reliable claims regarding multilingual benefits.

3.3.2 RQ1. Effects of crosslinguistic awareness-raising on vocabulary learning

The main goal of this study was to explore whether middle school students could exploit explicitly addressed consonant shift rules between German and English as a means to learn corresponding vocabulary more efficiently. Overall, the IG retained about 2.38 (T2-T1) and 2.45 (T3-T1) additional items in comparison to the CG. Considering that on average 12.68 cognates were correctly translated in T1, this yields an improvement of 19% in both post-tests. The vast majority of the 7 individual classes of the IG outperformed the 10 classes of the CG. This progress was visible after 90 minutes of instruction over the course of 2 weeks.

From a theoretical perspective, these results support recommendations for a form-focused component in vocabulary learning (Laufer, 2005) and confirm that learners can benefit from comparative and contrastive FonFs activities (Marx & Hufeisen, 2007; Neuner, 2003). Participants did not only acquire declarative knowledge about the consonant shift, they were also able to memorize new items better than the CG, presumably because they were capable of exploiting this knowledge as a new strategy through practice (Anderson, 1982; R. Ellis, 2009). It is possible that additional links were created within the mental lexicon of students through explicit guidance in the discovery of crosslinguistic lexical similarities (see 2.2.2). This helped them memorize new word pairs efficiently.

The outcome of this study corroborates positive effects found in previous interventional studies with Spanish-English bilinguals focusing on crosslinguistic similarities (Arteagoitia & Howard, 2015; Dressler et al., 2011; Proctor & Mo, 2009). In comparison to these previous projects, a pre-test was additionally included in the current study, allowing the difference between the IG and CG to be more reliably attributed to the intervention. The results also support White and Horst's (2012) claim of heightened metalinguistic awareness based on their analysis of students' diaries, which their numerical data on the cognate recognition task failed to back up. The decisive factor could be the intensity of teaching, since White and Horst's 160-minute program was spread across 15 weeks, whereas the 90-minute intervention presented in this paper was completed within 2 weeks. Moreover, the task differed (recognition as opposed to vocabulary learning), and the authors questioned the appropriateness of their item selection. Overall, the results of this study show that not only bilinguals – with apparently larger L2 vocabularies – but also FL learners at early stages can benefit from crosslinguistic awareness-raising activities.

Compared to other studies with FL learners, the results are in line with Otwinowska's (2015) findings, expanding the class of students which can benefit from crosslinguistic awareness-raising activities to middle schoolers. There are several possible explanations for the contrast to Molnár's (2010) nonsignificant results. First, Molnár analyzed

L2 to L3 transfer; since the students' L2 vocabulary size is not as big as their L1 mental lexicon, the transfer base is much smaller. Second, Molnár's intervention was extremely short since it only consisted of an instruction given right before the vocabulary test. Third, whereas the current study analyzed students' uptake of new words, the Romanian high schoolers were tested on their existing vocabulary knowledge, which was presumably influenced by other factors and was not deliberately linked to similarities during the encoding stage (see 2.2.2).

Interventional studies explicitly addressing consonant shifts are scarce; only two studies were described earlier, which reported contradicting results. While both focused on intercomprehension, Vanhove (2016) focused on orthographic similarities among decontextualized word pairs, whereas Bergsma et al. (2014) tried to increase contextualized oral comprehension. The outcome of this study is in line with positive evidence found in Vanhove's (2016) experimental study, whose young adults benefitted measurably from immediate feedback on a straightforward correspondence rule. Expanding on those findings, the current project was able to show positive short- and long-term effects in a classroom setting with younger participants while also addressing several and more complex consonant shifts. In contrast, Bergsma et al.'s (2014) Dutch middle school students' Frisian intercomprehension skills did not noticeably improve, whereas students of the same age in this study showed significant progress. However, the number of correspondences was reduced from eight in Bergsma et al. to four in this study. The intervention of the current project was twice as long, spread across 2 weeks as opposed to a single day, and included a review to consolidate the aspects introduced earlier. Furthermore, the assessment differed; oral contextualized intercomprehension as opposed to written decontextualized vocabulary learning. This supports Berthele et al.'s (2011) assumption that the teaching of consonant shifts might be more advantageous for vocabulary learning.

One critical observation should be pointed out before proceeding to other influencing variables. While these rules clearly helped students, they sometimes also led them astray due to the inconsistency of changes. A good example is the German translation *Pilz* given by a participant for the English stimulus *felt*. While this is a reasonable guess considering that they were made aware of the consonant shifts ‹p›-‹f› (although reversed) and ‹t›-‹z›, this exemplifies the possibly confusing pitfalls of overgeneralizing these rules.

3.3.3 RQ2. Factors influencing the intervention-uptake

The study also examined whether other factors influenced the uptake of the program. Considered were the initial L2 vocabulary size, testing mode, type of rule, and attitude toward crosslinguistic similarities affected the uptake of the intervention.

First, it was assumed that the initial size of the L2 vocabulary would have an impact on students' progress (Bedore et al., 2010). While the score on the yes/no vocabulary test indeed correlated with the overall performance on the vocabulary learning activities, it did not emerge as a predictor for improvement. Hence, students with initially larger vocabularies were generally able to memorize more new lexical items, but there were no Matthew effects. Participants who had an advantage at the beginning due to their initially bigger linguistic repertoire did not progress and/or benefit more from the instruction than their peers with smaller vocabulary sizes. Conversely, weaker students were not able to compensate for an initially smaller mental lexicon due to explicit teaching, which is in contrast to previous results obtained with Polish secondary pupils (Otwinowska, 2015). However, these two projects differ in terms of task and the extent of explicitness in the rules. Whereas the Polish secondary students circled cognates in a text and thus had to recognize them, the Swiss middle schoolers had to memorize new items, which is likely to be constrained more by cognitive capacities. Furthermore, while the fifth and sixth graders deliberately focused on four correspondence rules, Otwinowska's longer intervention included a much wider range of similarities.

Second, the improvement was hypothesized to be more accentuated in the receptive mode as the intervention focused on looking for similarities strictly in the L2 and introduced the rules accordingly in the intervention (e.g., ‹p›-‹f› as in *ship* and *Schiff*). Previous studies have mostly focused on recognition (e.g., Arteagoitia & Howard, 2015; White & Horst, 2012). Instead, results showed similar improvement across both modalities in T2, and in T3 the progress was even more emphasized among the productive mode. Once students were aware of particular crosslinguistic similarities, they were thus able to both recognize and use them. This is in line with Kelley and Kohnert's (2012) observation that the cognate advantage for a given child was either present across both modalities or equally absent.

Third, students were expected to benefit more from instruction on more complex and less frequent rules such as ‹t›-‹s›/‹z› as opposed to ‹c›-‹k›. While the young adults in Vanhove's (2016) study benefitted from feedback on a single straightforward correspondence, Bergsma et al. (2014) attributed the lack of their middle school students' improvement among others to the correspondence rules having been too obvious and numerous. Participants in the current study profited significantly from the instruction across all four taught correspondences, although the increase varied between 6% and 18% per type. The number of items assessed per category differed and the overall compilation of the tests was likely of varying difficulty, which could have affected the results. The difference between the two groups was largest for the ‹p›-‹f› rule, where they outperformed the CG by almost 20%. This could be due to a design flaw: the example shown in the instruction before the presentation and translation was always

the same – *apple* and *Apfel* – it is conceivable that participants of the IG were therefore reminded of this particular rule, which affected the activation level within the mental lexicon (see 2.2.2). Unexpectedly, the difference was smallest among the ‹t›-‹d›-‹th› correspondence, perhaps because this shift is more complex, and the letters remain too similar.

Furthermore, it was hypothesized that due to heightened crosslinguistic awareness, students of the IG would be better able to detect the ‹k›-‹ch› correspondence rule. The data did not support this claim. There are several plausible explanations: Only two items were tested for this shift, out of which the learners already correctly translated 1.20 items on average in T1. Additionally, the participants of this study could be more sensitive to this particular correspondence because it can be observed between standard and Swiss German, as for the term *child* in [*kind*] and [*χind*], or *cat* in [*katsə*] and [*χats*]. Alternatively, students of the IG could have devoted more attention to the word pairs exhibiting shifts they had learned, and were thus lacking additional processing capacities to pick up on a new rule (Pienemann, 2003).

Finally, it was assumed that the attitude toward the intervention – its pleasantness, importance, helpfulness and novelty – would not impact the progress. This hypothesis was confirmed. The majority of students provided positive feedback, which matches results from previous studies with secondary and high school students (Lambelet & Mauron, 2017; Molnár, 2010; Otwinowska, 2015). Furthermore, the evaluation of the intervention was not correlated to students' attitudes toward English as measured by the background questionnaire at the beginning of the project. Pupils thus enjoyed activities which foster comparing and contrasting languages independent of the impact these have on their performance, and independent of their overall attitude toward the English language, class and learning. It is unclear whether the intervention positively affected their attitude toward the language, as was shown in Schüppert et al. (2015). A third of the middle schoolers in this study claimed that the contents were not new to them. However, they progressed comparably to their peers, suggesting that explicit instruction was useful regardless of assumed prior knowledge. A further analysis, possibly through interviews with participants, could have shed light onto which aspects they already were – or thought they were – aware of. The value for the overall feedback was based on only four questions; a more extensive measurement would have been desirable, but unfortunately not feasible due to time constraints.

3.3.4 RQ3. Item characteristics affecting translation accuracy

In terms of item characteristics, orthographic similarity and frequency were first considered, followed by testing mode, word type, and consonant shift. To avoid interference effects from the intervention, only the data of the CG was considered in these analyses.

Surprisingly, orthographic similarity as determined by the normalized Levenshtein distance was only a significant predictor of translation accuracy among the productive testing mode. This is in contrast to previous findings on intercomprehension (Vanhove, 2014) and inferencing tasks among bilinguals (Dressler et al., 2011), where the extent of overlap heavily determined the success in recognition. However, Tonzar et al. (2009) observed that the cognate status became less relevant with increasing proficiency: their eighth graders who had studied English for more than a year performed similarly among words of various orthographic overlap in the delayed post-test. It could thus tentatively be hypothesized that students are more likely to recognize any word type after a few encounters, whereas they rely more on similarities when they are forced to actively provide a translation for an item in the L2. An alternative explanation looks at the compilation of the lists of productive and receptive items in that they could have differed in difficulty since the items were not cross-matched among the three tests and/or participants, meaning that all participants translated the same items receptively or productively.

Frequency did not affect translation accuracy in this project, neither in the L1 nor in the L2. There are several possible reasons. For one, previous results of frequency effects have not been conclusive. Whereas studies on intercomprehension and general vocabulary knowledge have reported a rather large influence of frequency in the L1 and/or L2 (Dressler et al., 2011; Vanhove & Berthele, 2015a), evidence from vocabulary learning among adults has shown hardly any effect (A. M. de Groot & Keijzer, 2000; Otwinowska & Szewczyk, 2017; cf. Lotto & de Groot, 1998). In line with these contrasting observations among varying tasks, the results of the current project support the idea that while frequency may have a larger impact in intercomprehension, incidental vocabulary acquisition, and overall vocabulary knowledge, its impact lessens in explicitly instructed vocabulary learning when repeated encounters are forced upon the participants. In addition, many of the items included in the vocabulary learning activities were not frequent, since the learners were already familiar with the language and previously taught items had to be excluded from the stimuli. Learners might not be as sensitive anymore to differences in frequencies among items beyond the most common 2000 words, and therefore performed similarly across the items tested. Since some items were of very low frequency, it is possible – although unlikely – that learners had not yet been familiar with the underlying concept in the L1 (Dressler et al., 2011; Laufer, 1997). Alternatively, frequency lists count types, but since lexical items in the Germanic family are polysemic (see 2.1.1), the translation equivalent included might not refer to the most frequent item in both languages. One example is the English word *set*, which can be a noun, verb, or adjective, whereas in German *setzen* is only a verb.

Regarding testing mode, the expectation that participants would perform better on receptive than productive items was not confirmed, which is contrast to previous studies on vocabulary learning (A. M. de Groot & Keijzer, 2000) and overall L2 vocabulary sizes (Webb, 2008). This could be ascribed to the compilation of the list and test design in that the words were not cross-matched for mode across participants and/or tests. A design flaw provides additional support for the theory of the items being of various difficulty among the testing modes: the word pair *ladder* and *Leiter* was included in both T1 for participants to be translated receptively and again in T3 but this time in the productive test mode. Despite more encounters and an active retrieval search, the translation accuracy was higher the first time (48%) than the second time (42%).

In terms of word type, translation accuracy was similar for deceptive and partial cognates but worse for profile words. This corroborates previous evidence from a large number of studies on the cognate advantage in vocabulary learning (Comesaña et al., 2012; A. M. de Groot & Keijzer, 2000; Lotto & de Groot, 1998; Tonzar et al., 2009), overall vocabulary knowledge (Otwinowska & Szewczyk, 2017), as well as the cognate facilitation effect (see 2.2.4). The difference among cognates and profile words might be attributable to the type of overlap: whereas deceptive and partial cognates overlap on a formal level, profile words only share a similar or identical meaning. Grainger et al.'s (2010) model portrays L2 vocabulary learning as a two-step process which starts with the establishment of an initial link on the form level and only then proceeds to a link on the meaning-level. Thus, links among word pairs with formal would be established more quickly, accelerating the encoding and storage stages for these items (see 2.2.2). Alternatively, it is conceivable that due to the fact that the lower concentration of deceptive cognates in the stimulus list drew the attention of the learners to these items since they contradicted their basic assumption of similarity.

Finally, the effect of correspondences was explored. Translation accuracy was significantly lower for items containing a ‹th›-‹d›-‹t› or ‹t›-‹s›/‹z› shift than for consonant shifts among ‹c›-‹k›, ‹p›-‹f› and ‹k›-‹ch›. The lower performance could be attributed to the complexities of the rules as they each address two similar correspondences. Additionally, these two rules were more frequent in the test items. The ‹th› grapheme caused more difficulties, allegedly due to its inexistence in German which makes it more challenging for these English learners (N. C. Ellis, 1997). The high accuracy on ‹c›-‹k› items was expected and could be attributed to students' familiarity with the phoneme-grapheme correspondences as the two letters can share the same pronunciation in German. This shift also occurs most frequently according to the compiled list of partial cognates (see 3.1.4), so students have likely encountered it more often than others before the study. Furthermore, these items often share a

French cognate, such as *aktiv – active – actif* or *Onkel – uncle – oncle*, and triple cognates have been shown to enhance the cognate facilitation effect (Lemhöfer et al., 2004). The comparatively high performance on the ‹p›-‹f› shift could be due to a design flaw during the presentation phase described earlier (see 3.3.3), since learners were exposed more to this particular shift which could have increased the chances of them noticing it. As for the ‹k›-‹ch› items, these were not only fewer in number, but also more similar in terms of orthographic distance than pairs of the other rules, which was shown to affect the performance. Furthermore, participants of this study could be more familiar with this shift since it also appears between Standard German and Swiss German, as discussed previously (see 3.3.3).

3.4 LIMITATIONS AND FUTURE DIRECTIONS

In addition to the considerations regarding the scope of this project (see 2.5.1) and observations mentioned in the discussion section, there are a few limitations to be contemplated as well as suggestions for future research endeavors.

First, the test battery in itself should be reflected upon, starting with the vocabulary learning activity. Ideally, the three tests should be of equal difficulty, with an identical number of items per consonant shift – neither of which were the case. The compilation of these list could have been improved in two ways. A different group of students with a similar background could have provided feedback on a large number of possible items. This subjective rating of the learning burden could then have provided the basis to create three tests of similar difficulty. Alternatively, in order to generate robust claims about the influence of testing modes or particular consonant shifts, the items could have been cross-matched between the three tests and/or among each participant. While the yes/no vocabulary test was very efficient and resulted in a normal distribution, the longer length of pseudowords than control words may have led to false positives. As for the background questionnaire, the reliability of the data collected has been put into question regarding previous linguistic knowledge, with allegedly English speaking students performing similarly to their peers on both the vocabulary learning activities and yes/no vocabulary test. Teachers might have been able to provide a more realistic account of their pupils' languages. It would also have been desirable to include a larger number of queries regarding their attitudes to obtain a more reliable account. Finally, in order to allow for reliable recommendations, the consolidating activities of the intervention could have been more standardized in that every student has to solve the same exercises, although this probably would have increased variance in time spent on-task as well as interest. This modification would have additionally solved the problem of individuals not providing feedback on which exercises they had worked on.

A second limitation concerns the ecological validity of the vocabulary learning activity. In this study students were presented with computer-generated word pairs for 10 seconds each, whereas vocabulary is usually taught within context and can include guidance in pronunciation. Acknowledging the fact that pronunciation has been shown to affect word recognition (Dijkstra et al., 1999) and taking into consideration the difficulty of the English spelling, future studies could include phonological information during the presentation phase. Furthermore, as discussed in many other vocabulary studies, only a single decontextualized form-meaning link was taught and assessed. It is unclear whether students would be able to exploit the benefits of strategy training in context, for example during intercomprehension tasks.

A third point worth mentioning is that students learned a different set of words in the delayed post-test. Therefore, students were only tested on whether they could still apply the acquired principles, not on whether the strategies helped them retaining the words over a longer period of time. This aspect should be considered in future studies.

Fourth, while the significant improvement of the IG compared to the CG and examples such as the *Pilz* guess for *felt* imply that at least some learners obviously used the shifts introduced in the intervention, it would be interesting to learn more about the participants' thought processes. Under the assumption that students acquired explicit knowledge and were able to transfer the rules to new examples, learners should be able to verbalize their reasoning (R. Ellis, 2009). Therefore, qualitative data would be desirable, for example by conducting intro- or retrospective interviews with a few individual learners.

Finally, while the IG outperformed the CG, it should be emphasized that this improvement was only in regard to a specific set of correspondence rules which had been previously taught. While students of the IG did benefit from instruction among all four shifts, their performance on a new correspondence was similar to that of the CG, indicating that they were not able to transfer their awareness to a new rule. More importantly though, to the author's best knowledge, there is currently no computer-generated list of partial cognates between German and English which exhaustively analyzes similarities between the word pairs. It thus remains unknown to how many examples each rule actually is applicable, and how misleading it could be or possibly resulting in overgeneralization. For example, how often is ‹t›-‹s›/‹z› actually represented as opposed to ‹t› remaining constant, as in *tea-Tee* or even accidentally as in *table-Tisch*? In extension, while a collection of word pairs as gathered for the purpose of this study presents an estimation, a comprehensive list would allow to determine which rules appear most frequently and are therefore most suitable to teaching.

4 CONCLUSION

4.1 SUMMARY

Supporting language learners in taking advantage of their previous linguistic repertoire through comparative and contrastive activities has been recommended, in particular since students have been observed to vary considerably in their ability to recognize and exploit crosslinguistic similarities (Banta, 1981; Ringbom, 2007). As a core aspect of language learning and proficiency, vocabulary promises a particularly fruitful area to exploit such similarities among closely related languages such as German and English, which share several thousand similar words due to their common root and the influence of loanwords.

This thesis therefore explored the effects of explicit metalinguistic awareness-raising exercises by deliberately focusing on a few crosslinguistic orthographic similarities between German and English on vocabulary learning. 260 Swiss German fifth- and sixth- grade learners of English as a second FL from the canton Berne participated in the quasi-experimental study. All students of the overall 17 classes participated in three vocabulary learning activities, during which they memorized and translated new English words. The seven classes of the IG also discovered similarities during a specially designed 90-minute program. During the initial 45 minutes they inferred four consonant shift rules. In the following three 15 minute sessions participants consolidated their knowledge by applying the acquired rules to new examples.

On average, participants were able to retain about half of the 30 word pairs presented. With regards to improvement from pre-test to post- and delayed post-test, students of the IG progressed significantly more relative to the CG in that they were able to memorize almost 20% additional items. This improvement was found across both receptive and productive translation modes and all four consonant shifts introduced. However, the similar performance on items exhibiting the unfamiliar ‹k›-‹ch› shift suggests that the IG were not able to better detect a new correspondence. There were no Matthew effects: students with initially larger vocabulary sizes did not progress and/or benefit more from instruction. Learners' feedback on the intervention program was overwhelmingly positive, but their appreciation of the project was not related to their improvement. In terms of item characteristics, orthographic similarity as determined by the normalized Levenshtein distance emerged as a reliable predictor for the likelihood of a word being memorized only in the productive mode. The frequency in German or English did not affect performance. Finally, translation accuracy was lower for items exhibiting a ‹th›-‹d›-‹t› or ‹t›-‹s›/‹z› shift than for word pairs differing on ‹c›-‹k› or ‹p›-‹f›.

4.2 IMPLICATIONS

The results agree with previous research (e.g., Lambelet & Mauron, 2017; Otwinowska, 2015) in that crosslinguistic awareness-raising activities are perceived as interesting and helpful by students. This suggests that incorporation of such tasks when teaching and learning closely related languages seems desirable, as has been done in recent development particularly geared toward improving intercomprehension (e.g., Marx & Hufeisen, 2007; Neuner et al., 2009). However, research has exposed large differences among intercomprehension abilities (e.g., Vanhove & Berthele, 2015b), and studies measuring obtainable changes have been scarce and inconclusive (e.g., Bergsma et al., 2014; cf. Vanhove, 2016). The current study presents evidence that crosslinguistic similarities can instead be exploited as a vocabulary learning strategy, as was suggested by Berthele et al. (2011), and that despite doubts regarding age-constraints even middle schoolers can measurably benefit from a short-term intervention aimed at comparing and contrasting languages. However, further research will be necessary to gain a better understanding of how learners process various similarities and to develop reliable recommendations as to which correspondences deserve valuable classroom time.

5   LISTS

5.1   LIST OF REFERENCES

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6 APPENDIX

6.1 CONSENT FORMS

UNI FR

UNIVERSITÉ DE FRIBOURG
UNIVERSITÄT FREIBURG

11.04.2019

Liebe Eltern

Als gelernte Primarlehrerin habe ich nach sechs Jahren Praxiserfahrung das Masterstudium Fremdsprachendidaktik an der Universität Freiburg (CH) begonnen. Im Rahmen meiner Abschlussarbeit untersuche ich das Thema „Sprachliche Ähnlichkeiten und Vokabellernen". Dadurch möchte ich herausfinden, ob sprachliche Ähnlichkeiten das Erlernen von neuen Wörtern in Englisch als zweiter Fremdsprache erleichtern und beschleunigen können.

An dem Projekt beteiligen sich insgesamt 18 Lehrpersonen von 5./6. KlässlerInnen aus dem Kanton Bern. Über einen Zeitraum von 6 Wochen werden die SchülerInnen dreimal Aufgaben am Computer bearbeiten (1x 45min, 2x 30min). Dabei werden deutsch-englische Wortpaare gezeigt, die sie im Anschluss übersetzen. Die Kinder erhalten eine zufällige ID. Dadurch werden die Daten anonymisiert, so dass keine Rückschlüsse auf einzelne Kinder oder die Schule möglich sind.

Um dieses Vorhaben umzusetzen, bin ich auf Ihre Unterstützung – oder besser gesagt die Ihres Kindes – angewiesen. Die Aufgaben werden von allen SchülerInnen der Klasse gelöst. Die Daten werden jedoch nur in die Auswertung miteinbezogen, wenn Sie als Eltern damit einverstanden sind. Diese Entscheidung ist freiwillig. Ich würde mich sehr darüber freuen, die Arbeit Ihres Sohnes oder Ihrer Tochter in die Auswertung miteinbeziehen zu dürfen. Falls Sie einverstanden sind, geben Sie bitte Ihrem Kind die ausgefüllte Einverständniserklärung mit.

Bei Fragen stehe ich Ihnen jederzeit gerne zur Verfügung.

Herzlichen Dank für Ihre Unterstützung und freundliche Grüsse.

Nina Müller
076 433 1901
nina.mueller2@unifr.ch

Einverständniserklärung

Für das Projekt bearbeiten alle SchülerInnen der Klasse individuell Aufgaben am Computer (1x 45min, 2x 30min). Die Daten Ihres Kindes werden jedoch nur in die Auswertung miteinbezogen, wenn Sie damit einverstanden sind. Diese Entscheidung ist freiwillig. Sie können ihre Erlaubnis für die Teilnahme Ihres Kindes jederzeit ohne Angabe von Gründen vor der Durchführung der Studie zurückziehen. Sämtliche Daten werden anonymisiert, so dass keinerlei Rückschlüsse auf Ihr Kind oder die Schule möglich sind. Alle erhobenen Daten werden vertraulich behandelt, ausschliesslich für Forschungszwecke verwendet und nur in anonymisierter Form veröffentlicht.

Mit meiner Unterschrift bestätige ich, dass meine Tochter / mein Sohn _____ (Name des Kindes) am Projekt „Sprachliche Ähnlichkeiten und Vokabellernen" teilnehmen darf.

_____   _____

(Datum)   (Unterschrift)

6.2   INTERVENTION

6.2.1   Lesson plans

Erste Unterrichtsaktivität (1x 45min)   **Woche 1**

Zeit	Inhalt	Sozial	Material
10'	Einstieg: *„Was ist ein Parallelwort? Versuche es zu beschreiben und Beispiele zu finden."* → think-pair-share, evtl. an WT notieren - Aspekte der Definition: 1) mündlich oder schriftlich ähnlich/gleich (z.B. shoe-Schuh vs. name-Name) 2) Bedeutung ähnlich/gleich (ansonsten ist es ein «falscher Freund», z.B. become (D: werden) - bekommen (E: get) oder bald (D: glatzköpfig) – bald (E: soon)) - Grenzen schwammig: subjektive Wahrnehmung, teilweise überlappend, z.B. sheep-Schaf: ist das noch ein «Parallelwort» oder schon zu weit auseinander? Oder knight-Knecht: Eselsbrücke über Pferde/Stall oder falscher Freund? → es gibt nicht <u>eine</u> richtige Antwort! → Heute nehmen wir diese Ähnlichkeiten unter die Lupe	EA-PA-Plenum	Evtl. Wand-tafel (WT) & Kreide
15'	Aufgabe erklären, Streifen mit englischen Wörtern austeilen	Plenum	

	In 2er-/3er-Gruppen:
	1) Wörter übersetzen
	2) Änderungen bei <u>Konsonanten (erklären falls nötig)</u> beobachten:
	    a) Wörter mit derselben Änderung gruppieren
	    b) Regel formulieren: Welche Konsonanten verändern sich wie?
	3) Zusatzaufgabe: Weitere Beispiele finden – entweder frei, nach bestimmten Themen (z.B. Zahlen, Nahrung, Körperteile, Farben) oder aus dem Wortschatzteil des Lehrmittels
	
	Mögliche Hilfestellung für SuS: Beginnt mit den Wortpaaren, bei denen sich nur ein Buchstabe ändert (d.h. salt-Salz, open-offen, water-Wasser, word-Wort, thing-Ding, music-Musik) und sucht dann andere Paare mit derselben Änderung. Die «c-k» Wörter sind am einfachsten, da sie sich nur systematisch ändern (in diesen Beispielen).
	Eine Herausforderung besteht darin, dass die SuS die Änderungen bei den Vokalen ignorieren «müssen», da diese sehr willkürlich sind, und sich wirklich nur auf die 4 Regeln konzentrieren.
		2er/3er-Gruppen	Streifen, Stifte, evtl. Lehr-mittel

10'	Mit allen SuS Regeln sammeln und auf 4 Postern festhalten: 1) c → k (music, correct, product, perfect) 2) p → (p)f (stripe, help, ripe, open) 3) t → s / z (hate, street, water, hot / ten, wheat, toe, salt) 4) th → d → t (door, good, word, side / thing, three, brother, think) *Regel gross formulieren und Beispiele dazu festhalten. Diese Poster sollten in jeder Einheit danach (3x 15min) wieder als Einstieg kurz angesprochen werden («Erinnert ihr euch noch...»)* *Eine Bemerkung zur «Reihenfolge» (c – k oder k – c): Ich würde empfehlen, die Regeln von Englisch nach Deutsch einzuführen (wie oben bei 1-4), weil die SuS die grössten Chancen haben, diese Strategie so später zu nutzen (z.B. wenn sie in unbekanntes Wort in einem Englischtext sehen). Es ist fast unmöglich, ein Wort von Deutsch nach Englisch richtig zu erraten (auch mit Regeln), weil sich die Vokale sehr zufällig verändern.*	Plenum	Poster, Stifte
10'	Vertiefende Aufgaben (empfohlen: AB «Double changes», «Animal Kingdom» oder «Body» zu Beginn, da diese sehr stark gelenkt sind und die Regeln gezielt aufgezwungen werden, siehe Unterrichtsaktivität 2)	EA / PA / GA	

Zweite Unterrichtsaktivität (mind. 3x 15min, auch länger möglich)   Woche 2

Umsetzung entweder als Werkstatt alle Angebote gleichzeitig erklären, entweder komplett frei oder mit einzelnen Pflichtaufgaben – oder Reihenfolge vorgeben oder einzelne Aufgaben auswählen; versch. Sozialformen mögl.

a) Double changes: Wörter mit zwei Änderungen (ca. 10')
Arbeitsblatt: Wort Deutsch + Englisch + Regel verbinden, Selbstkontrolle mit Folie

b) Tiere: Suchsel (ca. 10')
Arbeitsblatt: Suchsel (englische Tiernamen; Wörter sind nur vorwärts versteckt, waagrecht und senkrecht) + Silben zusammensetzen (deutsche Tiernamen) + Wortpaare den Regeln zuordnen. Das Suchsel wurde erstellt mit http://tools.atozteacherstuff.com/word-search-maker/wordsearch.php

c) Körper: Schüttelwörter (ca. 5')
Arbeitsblatt: Schüttelwörter (Englisch) zum Körper; auf Deutsch und Englisch schreiben und Nummer im Bild ergänzen. Zusätzlich möglich wären Muskel, Blut, Bart und Warze

d) Adjektive: Domino (ca. 5')
Domino: Deutsch-Englische Wortpaare. Optional: Regel-Änderungen benennen lassen

e) Verben (ca. 15')
Pantomimen-Bingo: als Stafette im (Sport-)Unterricht umsetzen. In 3er-Gruppen mit 1 Blatt (englische Begriffe), Kärtchen (deutsche Begriffe) auf der gegenüberliegenden Seite umgedreht hinlegen. i) Gruppen lesen Begriffe durch und erschliessen gemeinsam die Bedeutung, gff. Unklarheiten klären. ii) 1 Kind läuft zur anderen Seite, holt ein Kärtchen, läuft zurück und spielt es vor; die anderen zwei raten. Sobald es erraten wurde, läuft das nächste Kind los. Währenddessen legen die anderen zwei Kinder das erratene Wort auf das Blatt. iii) Sobald 3/4/5 Wörter in einer Reihe gefunden wurden: "BINGO!"
Alternative: Kärtchen schneiden und a) Memory spielen oder b) deutsches und englisches Wort zuordnen und nach Regeln gruppieren

f) Menu (ca. 10')
Ein Menu mit möglichst vielen systematisch ähnlichen Wörtern zusammenzustellen
Unterstützung: Bilder mit Beispielen - Kaffee, Wasser, grüner Salat, Karotte, Pfirsich, Brot, Salz & Peffer, Kekse, Apfel, Nüsse, Pflaume, Kamillentee
Auch als Mini-Wettbewerb möglich (z.B. mehr als LP oder in PA im Vgl. zur Klasse etc.)

g) Gemeinsam Regelwissen sammeln (ca. 8')

Die SuS sitzen in 4er- oder 6er-Gruppen (je nachdem, ob die th-d/d-t und t-s/z Regeln getrennt oder auf einem Blatt formuliert werden.
Jede/r SuS beginnt mit einem Regelblatt (Wolke in der Mitte) und notiert innerhalb von 1 Minute so viele Wörter wie möglich zu dieser Regel. Danach wird das Blatt im Kreis weitergegeben und die SuS haben wieder 1 Minute Zeit, um zu dieser neuen Regel Wörter zu ergänzen. Ggf. am Ende sammeln.
Alternativ kann auch thematisch gesammelt werden (Regelwörter zu Essen, Körper, etc.)

Laufend: Poster ergänzen und als Einstieg gemeinsam wiederholen

Die Poster, welche zu Beginn erstellt wurden, können laufend mit neuen, von den SuS besonders beliebten Wortpaaren ergänzt werden – vielleicht finden sie ja auch eigene Beispiele.

Weitere Informationen für die Lehrperson

Beispiele für Parallelwörter

- Internationalismen (div. Sprachen): Nahrung (Kaffee, Mango, Schokolade, Pizza, Banane), Erfindungen (Sauna, Computer, Telefon), Sport (Ski, Tennis, Basketball)
- Deutsch – Englisch, z.B. Körperteile (Arm, Finger, Fuss, Zunge, Ellbogen), Zahlen, Farben
- Französisch – Englisch, z.B. colour-couleur, different-différent, animal, bicycle-bicyclette, experience-expérience, flower-fleur, vegetables-végétales
- Deutsch – Englisch – Französisch, z.B. Aktivität, korrekt, Distanz, Familie, Zootiere

Wörter mit regelmässigen Änderungen

Eine ausführliche Liste mit den regelmässigen Änderungen kann online abgerufen werden: tinyurl.com/kognaten. Dort gibt es 481 c-k, 69 t-z, 52 t-s, 122 d-t, 57 th-d und 62 p-f Wörter.

- NW: Wörter, welche im Vokabelteil des Lehrmittels New World 1 und 2 gelehrt werden
- Quelle: andere Wörter, welche aus verschiedenen Quellen zusammengetragen wurden
- Deutsch und Englisch (Wort)
- WA: Wortart (N = Nomen, V = Verb, A = Adjektiv, W = weitere)
- Regelmässigen Änderung: Art und Anzahl («total Änderungen»)
- Thema (noch nicht alle zugeordnet)

Weitere Änderungen

- Vokale sind häufig willkürlich; z.T. lassen sich Gruppen von gleichen Änderungen finden wie bei o-a: hold – cold – old – fold…
- Endungen sind oft vergleichbar, z.B.
- Verben: -en (can – können, dream – träumen, glide – gleiten) oder -ieren (concentrate – konzentrieren, activate – aktivieren, consume – consumieren, categoise – kategorisieren)
- Nomen: ity-ität (electricity – Elektrizität, musicality – Musikalität), le-el (rattle – Rassel, article – Artikel), y-ie (comedy – Komödie, copy – Kopie), ian-er (technician – Techniker, musician – Musiker)
- Adjektive: al-ell (criminal – kriminell), ic-isch (sarcastic-sarkastisch)
- Oft wird am Ende ein «e» hinzugefügt oder entfernt, z.B culture – Kultur
- Weitere Änderungen bei Konsonanten: c-z (process – Prozess), k-ch (milk – Milch), gh-ch (light – Licht), v-b (seven-sieben), th-t (mother – Mutter), x-chs (fox – Fuchs), f-b (half – halb), y/wg (yarn – Garn, elbow – Ellbogen), dg-ck (edge – Ecke), b-p (rib – Rippe), c-s (rice – Reis), f-v (father -Vater)

Grundsätzlich gab es zwei Verschiebungen:

Lautverschiebung	Lautverschiebung	Beispiele
B → P	P → F / PF	sleep – schlafen, plough – Pflug
D → T	T → S / Z	eat – essen, tide – Zeit
G → C/K	K → CH	make – machen, cook – kochen
	D → T / TH → D	day – Tag, brother – Bruder
	Y → G / V → B, S → SCH	

Einige Veränderungen kann man im Schweizerdeutsch beobachten, z.B. Kind - Chind

Vokabellernstrategien

Nach den Computeraktivitäten können auch Strategien mit den SuS gesammelt und ausgetauscht werden (z.B. Eselsbrücken für falsche Freunde oder Profilwörter, Bezüge zu anderen Sprachen,...).

6.2.2 Teaching material

Material
Grosser Umschlag
- A5 leer:
    - 3x pro SuS für die 3 Computer-Aktivitäten
    - 1x (nach Post-It) pro SuS für Aufgabe 3g) "Gemeinsam Regelwissen sammeln"
- A4 Liste für ID-Codes
- A4 "Sprachliche Ähnlichkeiten und Vokabellernen (Gruppe B)" = Anleitung für LP
- A4 Bingo mit englischen Verben = für Aufgabe 3e) "Verben"
- A4 Double Changes = für Aufgabe 3a) "Double changes: Wörter mit zwei Änderungen"
- A4 Animals = für Aufgabe 3b) "Tiere: Suchsel"
- A4 Body = für Aufgabe 3c) "Körper: Schüttelwörter"
- A4 eat & drink = für Aufgabe 3f) "Menu"
- A4 Lösungen & Hilfe für die Arbeitsblätter

Kleiner Umschlag
- Kärtchen mit Codes für SuS (mit A4 Liste für ID-Codes abgleichen!) – 2 "Päckchen" an Kärtchen: eins für SuS, welche mitmachen dürfen und eins für SuS, welche nicht mitmachen dürfen (mit "nein" markiert)
- "Streifen" für Unterrichtsaktivität 1 (in Gruppen Wörter übersetzen & Regeln erschliessen)
- "Domino bekannt" (Wortschatz aus New World 1&2) und "Domino neu" (Wortschatz nicht aus NW1&2) = für Aufgabe 3d) "Adjektiv-Domino"
- Bunte Kärtchen = für Aufgabe 3e) "Verben" (Bingo; A4 Vorlage mit englischen Begriffen im grossen Umschlag)

4 Poster für Regel-Plakate

Streifen für die erste Lektion

correct	think	wheat	ripe	good	hot	help	perfect	side	three	street	salt
music	brother	ten	open	door	water	stripe	product	word	thing	hate	toe

Double changes

1. Verbinde das englische und deutsche Wort miteinander.
2. Verbinde das Wortpaar mit den zwei passenden Regeln.
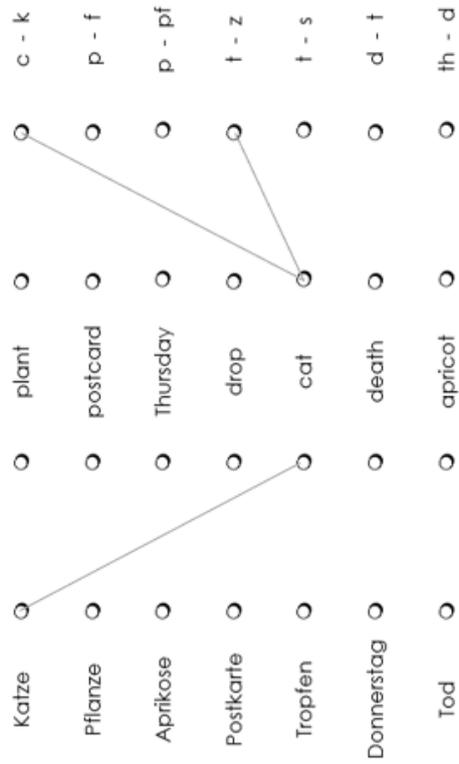
Double changes - LÖSUNG

1. Verbinde das englische und deutsche Wort miteinander.
2. Verbinde das Wortpaar mit den zwei passenden Regeln.
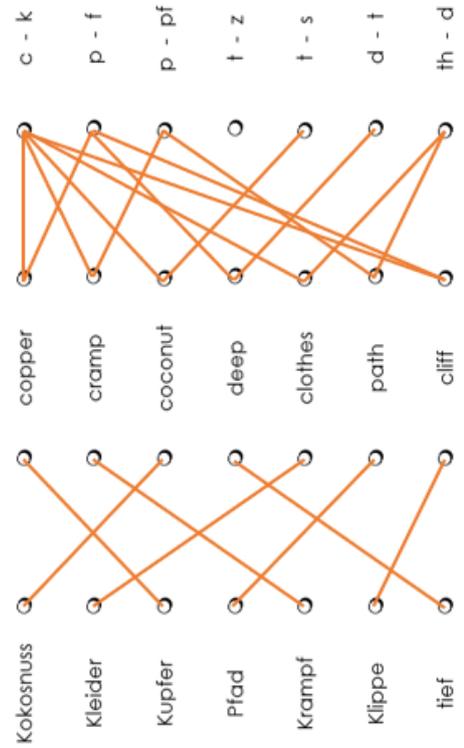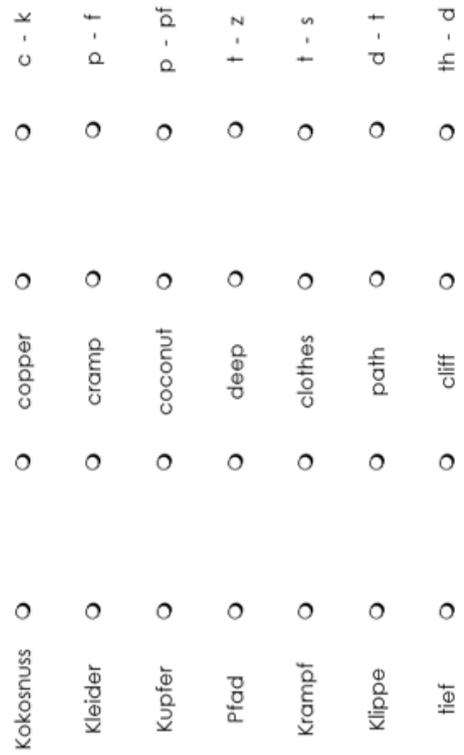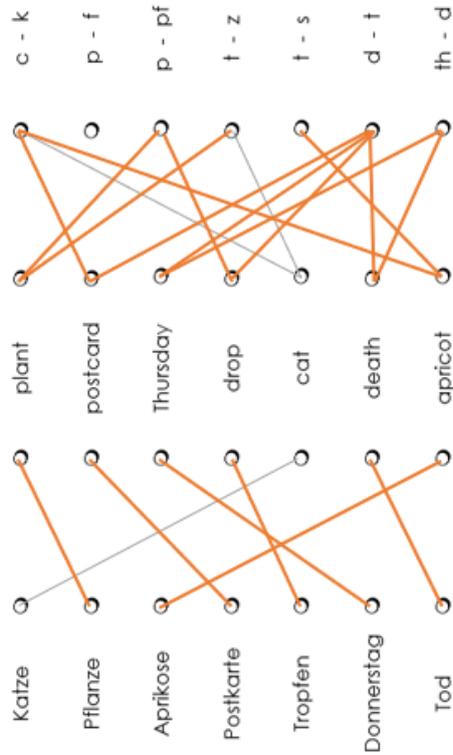
Food & drink

1) Stelle ein Menu mit so vielen ähnlichen Wörtern wie möglich zusammen.

2) Markiere die Änderungen nach Regeln.

Appetizer	Vorspeise
_____	_____
_____	_____
Main course	Hauptgang
_____	_____
_____	_____
_____	_____
Dessert	Dessert
_____	_____
_____	_____
Drinks	Getränke
_____	_____
_____	_____

Food & drink – help

Animal kingdom

1. Finde die 8 Tiere auf Englisch. Suche horizontal und vertikal.

```
U R E I N D E E R S N O U T Z
E A K C A P E U C H I A L Z T
K M A R T E N N C E P U C S I
S U H W T P I V D E A B A E C
S C O R P I O N Z P W Z M N K
Z L F I V F E A T H E R E O N
I A V C R O C O D I L E L K S
H W B C I V G L B H O R N E T
```

2. Setze die 8 Tiere auf Deutsch zusammen.

Af – cke – der – dil – fe – fe – Hor – Ka – ko – Kro – Mar – mel – nis – pion – Ren – Scha – se – Skor – tier – Ze
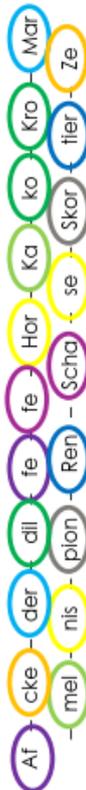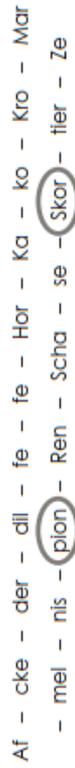
3. Schreibe die Tiere auf Deutsch und Englisch in der richtigen Spalte auf:

c – k	p – f
scorpion – Skorpion	

d – t / th – d	t – z / s

4. *** Für Profis: Findest du die 4 Tier-Körperteile (im Gitter)? ***

c – k:	t – z:
th – d:	p – pf:

SCHNAUZEPFOTEFEDERKLAUE
Hilfe:

---

c – k	p – f
scorpion – Skorpion	sheep – Schaf
camel – Kamel	ape – Affe
crocodile – Krokodil	

d – t / th – d	t – z / s
reindeer – Rentier	tick – Zecke
marten – Marder	hornet – Hornisse

5. *** Für Profis: Findest du 4 Tier-Körperteile (im Gitter)? ***

c – k: claw – Klaue	t – z: snout – Schnauze
th – d: feather – Feder	p – pf: paw – Pfote

SCHNAUZEPFOTEFEDERKLAUE
Hilfe:

Body parts

1. Schreibe die Körperteile auf Englisch und Deutsch.
2. Markiere die Regel-Änderung.
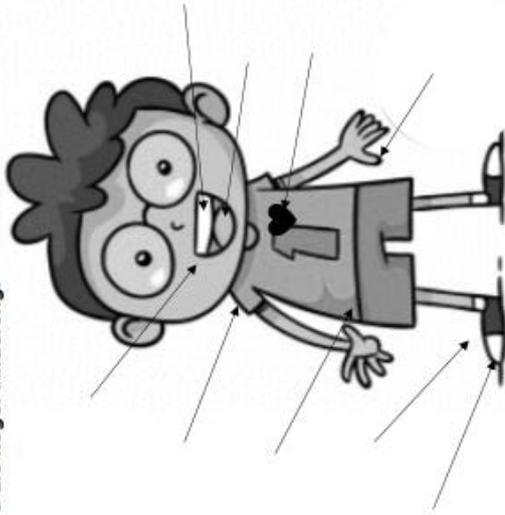
	Englisch	Deutsch
	toe	zeh
1. OET		
2. OGUENT		
3. HMTOU		
4. IHP		
5. MUBTH		
6. REATH		
7. TOOF		
8. DOUSHREL		
9. HOOTT		

Body parts – Lösung

1. Schreibe die Körperteile auf Englisch und Deutsch.
2. Markiere die Regel-Änderung.

	Englisch	Deutsch
	toe	zeh
1. IHP	tongue	Zunge
2. OGUENT	mouth	Mund
3. HMTOU	toe	zeh
4. OET	thumb	Daumen
5. MUBTH	heart	Herz
6. REATH	foot	Fuss
7. TOOF	shoulder	Schulter
8. DOUSHREL	tooth	Zahn
9. HOOTT		

Bingo: *verbs*

pinseln	essen	beissen	hassen	grüssen
dekorieren	kombinieren	kämmen	diskutieren	kochen
zähmen	sitzen	schwitzen	schmelzen	ziehen
helfen	schlürfen	hüpfen	schlafen	tropfen
füttern	trinken	kneten	halten	tanzen
falten	denken	dreschen	danken	gleiten

hate	sleep	glide	melt	dance	eat
think	greet	comb	knead	sweat	cook
paint	thresh	drip	decorate	thank	slurp
help	discuss	tow	hop	bite	hold
tame	drink	hate	fold	combine	sit

Domino: *adjectives*

laut	ripe	reif	salty	salzig	perfect
perfekt	old	alt	open	offen	hard
hart	thin	dünn	sweet	süss	cool
kühl	red	rot	white	weiss	good
gut	correct	korrekt	helpless	hilflos	hot
heiss	practical	praktisch	ten	zehn	loud
platt	direct	direkt	sharp	scharf	tough
zäh	broad	breit	active	aktiv	deep
tief	concrete	konkret	dead	tot	tame
zahm	worldly	weltlich	better	besser	creative
kreativ	thick	dick	great	gross	thirsty
durstig	tight	dicht	outer	äussere	flat

6.3 VOCABULARY LEARNING ACTIVITY

6.3.1 Instruction for Teachers

Allgemeine Hinweise:

Kontrollgruppen:
Die Aktivität findet 3x statt: 1x in Woche 1, 1x in Woche 3 und 1x in Woche 6.
Interventionsgruppen:
Insgesamt gibt es drei Aktivitäten am Computer (1x 45min, 1x 35min, 1x 30min) und zwei Einheiten für den Unterricht (1x 45min, 3x 15min). Diese finden idealerweise zu folgenden Zeitpunkten statt:

- Woche 1: 1x 45min Computeraktivität + 1x 45min Unterrichtseinheit 1 (Grundlagen)
- Woche 1-3: 3x 15min Unterrichtsaktivitäten (vertiefen), dann 1x 35min Computeraktivität
- Woche 6: 1x 30min Computeraktivität

Vorbereitung:

- IDs zuteilen (auf dem vorbereiteten Blatt notieren und Kärtchen entsprechend beschriften)
- Vorgehen an der Wandtafel notieren (siehe unten; 1-5, was fett gedruckt ist & unterstrichen)
- Benötigt werden: Computer mit guter Internetverbindung, leeres A5-Blatt, Stift

Durchführung:

- Anweisung: Sagen Sie den SuS bitte, dass es sich um ein Projekt handelt, an dem viele verschiedene Klassen aus dem Kanton Bern mitmachen. Es ist also kein Test, der benotet wird. Sie erhalten auch zufällig eine ID, so dass nachher niemand ihre Ergebnisse zurückverfolgen kann. Sie als Lehrperson werden zwar eine Übersicht der gesamten Klasse erhalten, aber Sie werden auch nicht wissen, welches Kind welche Angaben gemacht hat. Gleichzeitig ist es aber sehr wichtig, dass sie ihr Bestes geben.
- Wichtig: SuS dürfen nicht den Pfeil «zurück» drücken, sonst beginnt das Experiment von vorne!
- Wenn sie zum letzten Mal «weiter» drücken, bleibt der Bildschirm weiss; das ist das Ende des Tests.
- Am Ende jedes Tests erhalten die SuS eine kleine Belohnung.

Kontrollgruppen:
Unterricht zwischen den Aktivitäten

- Bitte sprechen Sie keine systematischen Ähnlichkeiten während der Projektphase an
- Während den übrigen Englischlektionen zwischen den drei Tests findet «normaler» Englischunter-richt statt. Bitte informieren Sie mich darüber, welche Inhalte sie zwischen den Tests bearbeiten.

1. Aktivität am Computer: **kognaten.com/red** **Woche 1**

Zeit	Inhalt
8'	Laptops aufstarten, ID Kärtchen austeilen, Vorgehen an WT notieren und besprechen («Anweisung» oben)

2'	**1)** <u>**Persönliche Fragen**</u> *- ID zuteilen (sich merken, da 3x dieselbe verwendet werden muss!)* *- Alter (Zahlen eintippen), Geschlecht (wählen), Klasse (wählen)* *- Einstellung gegenüber der Schule, englischen Sprache, dem Englischunterricht und dem Englischlernen* *- Sprachen, die sie zu Hause sprechen: wählen und/oder notieren; Deutsch = Schweizer- und/oder Hochdeutsch; es können mehrere gewählt und/oder notiert werden*
10'	**2)** <u>**Präsentation 2x**</u> *- 2x 5min Präsentation deutsch-englischer Wortpaare ansehen (D-E, dann E-D) mit Hinweis, dass sie diese Wörter im 4. Teil dann übersetzen müssen, sie sich diese also genau merken sollen* *- Die Präsentation erscheint SuS evtl. sehr lange (10min total), sie sehen aber jedes Wort nur 2x 8 Sekunden lang;* *- 30 Wortpaare sind mehr, als sie sich merken können; gebt euer Bestes.*
5'	**3)** <u>**Matheaufgaben**</u> *- 5min Matheaufgaben lösen (so viele sie können); danach werden SuS automatisch weitergeleitet; Lösungen auf A5-Blatt notieren* *- * bedeutet "mal"*
12'	**4)** <u>**Übersetzen 2x**</u> *- zuerst von Deutsch auf Englisch, dann von Englisch auf Deutsch* *- egal ob GROSS- oder kleinbuchstaben - aber Rechtschreibung muss stimmen* *- sie müssen etwas eingeben (das ist auch eine «Schutzfunktion» für sie selber, damit sie nicht ungewollt Wörter überspringen) und dürfen/<u>sollen</u> raten!*
8'	**5)** <u>**Wörter echt oder erfunden**</u> *- SuS sehen ein Wort und müssen entscheiden, ob sie dieses Wort kennen* *- Achtung: einige Wörter gibt es wirklich, einige sind erfunden!*

2. Aktivität am Computer: **kognaten.com/moon (CG) kognaten.com/star (IG)**   **Woche 3**

<u>Vorbereitung:</u>

- Blatt mit zugeteilten IDs bereithalten
- Vorgehen an der Wandtafel notieren (siehe unten; 1-5, was fett gedruckt ist & unterstrichen)
- Benötigt werden: Computer mit guter Internetverbindung, leeres A5-Blatt, Stift

<u>Durchführung:</u>

- Wichtig: SuS dürfen nicht den Pfeil «zurück» drücken, sonst beginnt das Experiment von vorne!
- Wenn sie zum letzten Mal «weiter» drücken, bleibt der Bildschirm weiss; das ist das Ende des Tests.
- Am Ende erhalten die SuS eine kleine Belohnung.

Zeit	Inhalt
8'	Laptops aufstarten, ID Kärtchen austeilen, Vorgehen an WT notieren und besprechen: *Sagen Sie den SuS bitte, dass es sich um ein Projekt handelt, an dem viele verschiedene Klassen aus dem Kanton Bern mitmachen. Es ist also kein Test, der benotet wird. Sie erhalten auch zufällig eine ID, so dass nachher niemand ihre Ergebnisse zurückverfolgen kann. Sie als Lehrperson werden zwar eine Übersicht der gesamten Klasse erhalten, aber Sie werden auch nicht wissen, welches Kind welche Angaben gemacht hat. Gleichzeitig ist es aber sehr wichtig, dass sie ihr Bestes geben.*
2' 10'	**1) ID** *(dieselbe wie beim letzten Mal!)* **2) Präsentation 2x** *- 2x 5min Präsentation D-E Wortpaare ansehen (D-E, dann E-D) mit Hinweis, dass sie diese Wörter im 4. Teil dann übersetzen müssen – also genau merken.* *- 30 Wortpaare sind mehr, als sie sich merken können; sie sollen einfach ihr Bestes geben.*
5'	**3) Matheaufgaben** *- 5min Matheaufgaben bearbeiten (nicht alle müssen gelöst werden!); danach werden SuS automatisch weitergeleitet; Lösungen auf A5-Blatt notieren* *- * bedeutet "mal"*
13'	**4) Übersetzen 2x** *- zuerst von Deutsch auf Englisch, dann von Englisch auf Deutsch* *- egal ob GROSS- oder kleinbuchstaben - aber Rechtschreibung muss stimmen* *- sie müssen etwas eingeben (das ist auch eine «Schutzfunktion» für sie selber, damit sie nicht ungewollt Wörter überspringen) und dürfen/sollen raten* *Interventionsgruppen:*
5'	**5) Feedback zum Material** *- Fragen zum bearbeiteten Unterrichtsmaterial: Welche Aufgaben hast du bearbeitet? Wie haben sie dir gefallen?* *- Evtl. ist es nötig, den SuS zu erklären, welche Aufgaben damit gemeint sind, z.B. indem die Arbeitsblätter etc. and die Wandtafel gehängt werden und entsprechend beschriftet (AB ...); Bei der Frage «Welche Aufgaben hast du gemacht?» darf die Lehrperson auch individuell helfen.*

Interventionsgruppen:

Zwischen Test 2 und 3 am Computer bitte <u>keine</u> Aufgaben zu den Ähnlichkeiten mehr bearbeiten!

3. Aktivität am Computer: **kognaten.com/dog**   **Woche 6**

<u>Vorbereitung und Durchführung siehe 2. Aktivität</u>

Zeit	Inhalt
8'	Laptops aufstarten, ID Kärtchen austeilen, Vorgehen an WT notieren & besprechen:
2' 10' 5' 13'	**1) ID** *(dieselbe wie beim letzten Mal!)* **2) Präsentation 2x** **3) Matheaufgaben** *4)* **Übersetzen 2x**

6.3.2 Test items list

RED

c-k

Konflikt	conflict
Klon	clone
Kohle	coal
Tabak	tobacco
Orakel	oracle

t-z/s

Witz	wit
zähmen	tame
Schlitz	slit
Hornisse	hornet
Zelt	tent
Rassel	rattle

p-f

Affe	ape
Landschaft	landscape
Pfund	pound
pflücken	pluck

d-t/th-d

Garten	garden
sieden	seethe
Durst	thirst
Feder	feather
Leiter	ladder
Traum	dream
Marder	marten

k-ch

Bank	bench
Elch	elk

Profilwörter

waiter	Kellner
mood	Laune
stairs	Treppe
aim	Ziel

Falsche Freunde

Gift	poison
Geschenk	gift

MOON / STAR

c-k

Kontakt	contact
Kandidat	candidate
Klaue	claw
Kanone	cannon
Kabel	cable

t-z/s

Netz	net
grunzen	grunt
Schweiss	sweat
Filz	felt
Minze	mint
Kessel	kettle

p-f

Pflaster	plaster
Saft	sap
hoffen	hope
Pfanne	pan

d-t/th-d

Dorn	thorn
Granate	grenade
Erde	earth
fördern	further
Sattel	saddle
Schatten	shade
Tal	dale

k-ch

Mönch	monk
Drache	drake

Profilwörter

suburb	Vorort
wallet	Geldbörse
corner	Ecke
rail	Gleis

Falsche Freunde

Brief	letter
kurz	brief

DOG

c-k

Kaktus	cactus
Kultur	culture
Kanu	canoe
Krise	crisis
Vehikel	vehicle

t-z/s

Glitzer	glitter
setzen	set
Bolzen	bolt
Zweig	twig
Masse	matter
Nessel	nettle

p-f

Griff	grip
stampfen	stamp
Harfe	harp
Pfennig	penny

d-t/th-d

Gott	god
Leder	leather
Donner	thunder
Dach	thatch
Flut	flood
Leiter	ladder
waten	wade

k-ch

Arche	ark
Storch	stork

Profilwörter

sample	Muster
journey	Reise
bill	Rechnung
topic	Thema

Falsche Freunde

Wand	wall
Zauberstab	wand

6.3.3 Item characteristics[6]

Test 1 "Red"

German	English	POS	CS	L	nLD	FE	FG	TM
Konflikt	conflict	*N*	c-k	8	0.8	3	11	P
Klon	clone	N	c-k	5	0.6	4	16	r
Kohle	coal	N	c-k	5	0.4	2	14	p
Tabak	tobacco	N	c-k	7	0.4	4	14	r
Orakel	oracle	N	c-k	6	0.5	6	13	p
				6.2	0.5	3.8	13.6	
Witz	wit	N	t-z	4	0.8	4	12	p
Zähmen	tame*	V	t-z	6	0.3	5	16	p
Schlitz	slit	N	t-z	7	0.6	6	16	r
Hornisse	hornet*	N	t-s	8	0.5	10	17	p
Zelt	tent	N	t-z	4	0.5	2	12	r
Rassel	rattle	N	t-s	6	0.3	4	17	r
				5.8	0.50	5.2	15.0	
Affe	ape*	N	p-f	4	0.5	6	14	p
Landschaft	landscape	N	p-f	10	0.7	3	11	r
Pfund	pound	N	p-pf	5	0.8	1	12	r
pflücken	pluck	V	p-pf	8	0.5	5	15	p
				6.8	0.63	3.8	13.0	
Garten	garden	N	d-t	6	0.8	1	11	p
sieden	seethe	N	th-d	6	0.3	8	17	r
Durst	thirst	N	th-d	6	0.5	1	15	p
Feder	feather*	N	th-d	7	0.6	2	13	r
Leiter	ladder	N	d-t	6	0.5	4	10	r
Traum	dream	N	d-t	5	0.4	1	11	p
Marder	marten*	N	d-t	6	0.7	10	16	r
				6.0	0.54	3.9	13.3	
Bank	bench	N	k-ch	5	0.4	3	9	r
Elch	elk	N	k-ch	4	0.5	10	15	p
				4.5	0.5	6.5	12.0	
				6	**0.54**	**4.4**	**13.6**	
Kellner	waiter	N	PW	7	0.3	4	14	r
Laune	mood	N	PW	5	0.0	2	13	p
Treppe	stairs	N	PW	6	0.0	2	13	p
Ziel	aim	N	PW	4	0.3	3	9	r
				5.5	0.13		12.3	
Gift	poison	N	FF	6	0.2	2	13	p
Geschenk	gift	N	FF	8	0.1	2	11	r
				7	0.15		12	
				6	0.14	2.5	12.2	
				6.00	0.46	4.00	13.3	

---

[6] Legend: POS = part of speech, CS = consonant shift (PW = profile word, FF = false friend),, L = word length, nLD = normalized Levenshtein distance (shift / insertion / deletion = 1), FE = frequency English, FG = Frequency German, TM = test mode receptive / productive, * = words included in the intervention material

Test 2 "Moon" / "Star"

German	English	POS	CS	L	nLD	FE	FG	TM
Kontakt	contact	*N*	c-k	7	0.7	2	10	p
Kandidat	candidate	*N*	c-k	9	0.8	3	10	r
Klaue	claw	N	c-k	5	0.4	5	16	r
Kanone	cannon	N	c-k	6	0.5	5	14	p
Kabel	cable	N	c-k	5	0.4	2	13	r
				6.4	0.56	3.40	12.6	
Netz	net	N	t-z	4	0.8	3	11	r
grunzen	grunt	V	t-z	7	0.6	5	17	p
Schweiss	sweat	N	t-s	8	0.4	3	14	r
Filz	felt	N	t-z	4	0.5	11	15	p
Minze	mint	N	t-z	5	0.6	5	17	r
Kessel	kettle	N	t-s	6	0.3	6	14	p
				5.7	0.52	5.5	14.7	
Pflaster	plaster	N	p-pf	8	0.9	5	14	r
Saft	sap	N	p-f	4	0.5	7	14	r
hoffen	hope	V	p-f	6	0.5	1	9	p
Pfanne	pan	N	p-pf	6	0.5	2	15	p
				6	0.59	3.75	13.0	
Dorn	thorn	N	th-d	5	0.6	6	14	r
Granate	grenade	N	d-t	7	0.7	7	15	p
Erde	earth	N	th-d	5	0.4	1	11	r
fördern	further	V	th-d	7	0.4	1	10	p
Sattel	saddle	N	d-t	6	0.3	5	14	r
Schatten	shade	N	d-t	8	0.6	2	12	p
Tal	dale	N	d-t	4	0.5	5	12	p
				6	0.51	3.86	12.6	
Mönch	monk	N	k-ch	5	0.4	5	13	p
Drache	drake	N	k-ch	6	0.7	7	15	r
				5.5	**0.53**	**6**	**14**	
				6	**0.54**	**4.33**	**13.3**	
Vorort	suburb	N	PW	6	0.2	3	14	p
Geldbörse	wallet	N	PW	9	0.1	5	14	p
Ecke	corner	N	PW	6	0.2	1	12	f
Gleis	rail	N	PW	5	0.2	3	13	r
				6.5	0.16		13.3	
Brief	letter	N	FF	6	0.2	1	10	p
kurz	brief	A	FF	5	0.0	2	8	r
				5.5	0.08		9	
				6.2	**0.1**	**2.5**	**11.8**	
				6.00	**0.46**	**3.97**	**13.0**	

Test 3 "Dog"

German	English	POS	CS	L	nLD	FE	FG	TM
Kaktus	cactus	N	c-k	6	0.8	8	16	r
Kultur	culture	N	c-k	7	0.7	2	10	p
Kanu	canoe	N	c-k	5	0.4	2	15	p
Krise	crisis	N	c-k	6	0.5	3	11	r
Vehikel	vehicle	N	c-k	7	0.6	2	15	p
				6.2	0.60	3.4	13.4	
Glitzer	glitter	N	t-z	7	0.9	8	18	p
setzen	set	V	t-z	6	0.5	1	8	r
Bolzen	bolt	N	t-z	6	0.5	4	17	p
Zweig	twig	N	t-z	5	0.6	10	13	r
Masse	matter	N	t-s	6	0.5	1	11	p
Nessel	nettle	N	t-s	6	0.3	9	17	r
				6	0.55	5.5	14.0	
Griff	grip	N	p-f	5	0.6	3	12	r
stampfen	stamp	V	p-pf	8	0.6	2	15	p
Harfe	harp	N	p-f	5	0.6	7	15	p
Pfennig	penny	N	p-pf	7	0.6	1	13	r
				6.3	0.6	3.25	13.8	
Gott	god	N	d-t	4	0.5	1	10	r
Leder	leather	N	th-d	7	0.6	3	13	p
Donner	thunder	N	th-d	7	0.4	4	15	r
Dach	thatch	N	th-d	6	0.5	8	11	p
Flut	flood	N	d-t	5	0.4	2	13	r
Leiter	ladder	N	d-t	6	0.5	4	10	p
waten	wade	V	d-t	5	0.6	6	16	r
				5.7	0.5	4	12.6	
Arche	ark	N	k-ch	5	0.4	7	14	r
Storch	stork	N	k-ch	6	0.7	11	15	p
				5.5	0.53	9	14.5	
				6	0.55	4.54	13.5	
Muster	sample	N	PW	6	0.0	3	12	p
Reise	journey	N	PW	7	0.1	2	10	r
Rechnung	bill	N	PW	8	0.0	1	11	p
Thema	topic	N	PW	5	0.2	2	8	r
				6.5	0.09		10.3	
Wand	wall	N	FF	4	0.5	1	11	p
Zauberstab	wand	N	FF	10	0.1	9	17	r
				7	0.3		14	
				6.7	0.16	3	11.5	
				6.10	0.47	4.23	13.1	

6.3.4 Scoring guideline

Test 1 "Red"

Stimulus	Response	Also accepted	Not accepted (examples)
aim	Ziel	ziehl, zie(h)len)	zeit, mag, arm, eisen, zin
clone	Klon	kllon, klohn, klonen	clon, kohle, klaun, kolone
elk	Elch	elche	elken, elcho, elck
feather	Feder	fedder, ferder	vater, fader, ferd, fehler
ladder	Leiter	leeiter, leitter	leder, lauder, leider, laden
gift	Geschenk	geschenck, gescheng, geschenke, gschenk	gift, geschichte, poison,
landscape	Landschaft	lamdschaft, landeschaft, landschaaft, landschaf(d), landschafft, landshaft, lanschaf(f)t, landtschafd, lantschaft	garten, land(es)karte, land
marten	Marder	marderr, mardder	martin, maten, marken
pound	Pfund	pffund, pfunnd, pfond	punkt, rund, pflaume
rattle	rasseln	rasel(n), rassle(n)	sattel, ratte, reiten, raten
seethe	sieden	seiden, side(n)	seit, sehen, setzen, see
slit	Schlitz	schlits, schlitts, schliz	sitzen, schlitten,
tent	Zelt	zehlt	treppe, zehn, zahn, termin
tobacco	Tabak	tabbak, taback, tabback	tobak, tabac, tapack
waiter	Kellner	kelner, kelnner	wasser, weiter, warten
Affe	ape	appe	ate, abe, ade
Bank	bench	dench, benche	bank, benk, banker
Durst	thirst	thrist, thristy	thurst, third, thing, trust
Garten	garden	garde, garder	gart, garen, grau
Gift	poison	poison, poisen, poisson, posion	goison, pousion, poshen
Hornisse	hornet	hornit, hornett	hornut, hornitte, horniss
Kohle	coal	caol, coale, col	cole, cohl, coat,
Konflikt	conflict	-	conflict, conflict,
Laune	mood	mod, moode	lune, moon, mond, loon
Orakel	oracle	oarcle, oracle, orcale	orakl, orkel, coal, orcel
Pflücken	pluck	pluck, pluk, pluken	plock, plump, plucen
Traum	dream	draem, drame, dreams	driem, trauma, dreem, drim
Treppe	stairs	staiers, stair, staires, stairs	slips, sisst, strait, traape
Witz	wit	witt	wiz, wit,
zähmen	tame	tamen, taem	team, same, taim, thame

Test 2 "Moon" / "Star"

Stimulus	Response	Also accepted	Not accepted (examples)
brief	kurz	kurtz, letter	klein, brif, latter
cable	Kabel	kabell, kable, kabl	gabel, kette, gable
candidate	Kandidat	kandidate(n), kandiedat, kanditad, kanditat	kordinaten, kandidaz, kanidat,
claw	Klaue	klauen	clon, klawen, kralle, klaun
corner	Ecke	eccke, ecken, eke	kran, korn, gorner, cornet
drake	Drache	drachen	dunkel, dach, dreck,
earth	Erde	welt	eben, hart, essen
mint	Minze	min(t)z(e)(n), pfefferminze	mintse, mini, mine, meinen
net	Netz	nez(z)	net, nice,
plaster	Pflaster	pfflaster	plastic, basteln,
rail	Gleis	bahn, geleis, gleiss, gleisse, schiene	rennen, strecke, zug, rale
saddle	Sattel	satel, sattle	schatten, sand, sandale
sap	Saft	safft	seife, suppe, schaf
sweat	Schweiss	schweis, schwitzen	süss, schweiz, scharf
thorn	Dorn	dorne(n), dron	horn, turm, korn, ton
Brief	letter	kurz	kurzen, latter, flizt
Filz	felt	filt	pelz, pilz, flitz, pelt
fördern	further	futher, ferther, forther	forden, furden, forth, fuhrt
Geldbörse	wallet	wallet, walett	walle, welter, money, wetel
Granate	grenade	granade	granat, grende, grande
grunzen	grunt	grunt, grant, gront	grunz, gremzen, grunth
hoffen	hope	hop, hopen	hoff, hobe
Kanone	cannon	canonn, canone, cannone	kannon, kanon, conoun
Kessel	kettle	kettle, ketle	kattle, cassle, cettle
Kontakt	contact	contact, contacte	contakt, contact, conact
Mönch	monk	monk, monck	moch, monc, minch
Pfanne	pan	pane, pann	pfain, pam, phane,
Schatten	shade	schade, s(c)hadow	saden, sheat, schadden
Tal	dale	dal, dael	tale, dahle, teal, tail, tall
Vorort	suburb	suburb, subub, suburbe	suburn, subwen, subert

Test 3 "Dog"

Stimulus	Response	Also accepted	Not accepted (examples)
ark	Arche	arch	arg, stark, arke
cactus	Kaktus	kaktuss, kaktu	flosser, pflanze, kactus
crisis	Krise	kriese, krisse	krisis, kreis, kiste, kritisch
flood	Flut	flute, flutt	fluss, flud, flur, flot, flop
god	Gott	got	gut, guet,
grip	Griff	grif, greifen, halten	gips, grippe, graben,
journey	Reise	reisen	journalist, jurnal, ferien
nettle	Nessel	nessle, nesel, nesseln	netz, metal, nadel, nest
penny	Pfennig	pfenning, pfening	pony, pfand, pendant
set	setzen	setz, sitzen	seil, sehen, seten, satz
thunder	Donner	doner, donnere, donnert	blitz, turnen, hunert, tonne
topic	Thema		topf, tropisch, tophik, tropf
twig	Zweig	zweige	zwilling, zwicken, teig, twix
wade	waten	wate, watten	welle, warten, watte
wand	Zauberstab	wall, zauberschtab, zauberstock	mauer, wander, well, wal
Bolzen	bolt	blot, bolten, boolt, bult, balt	bold, botzen, bolce
Dach	thatch	thach	deach, theater, thache
Glitzer	glitter	gliter, glittter	glidder, glither, glider
Harfe	harp	harpp, harpe	harb, harf, harphe
Kanu	canoe	canou, cano	canone, kanut, canoa
Kultur	culture	cultur	kult, coltury, cult, colcter
Leder	leather	lether, lather	leader, leiter, letter, ladder
Leiter	ladder	lader, ledder	lether, latter, lider
Masse	matter	matte, mater	mass, made, mart,
Muster	pattern	pattern, sample	master, mutter, mustard
Rechnung	bill	bil, biil	pill, bull, rate, pit
stampfen	stamp	stamp, stomp, stampen, sstamp	stampf, stampel, stempf
Storch	stork	storck	strake, strong, starch
Vehikel	vehicle	vehicel	veckel, veicel, verhicle
Wand	wall	zauberstab, wal	wand, went, well, wool

6.4 QUESTIONNAIRE

Tippe hier deine ID ein: [　　　　　　　　　]

Bist du ein Junge oder Mädchen?
- ○ Mädchen
- ○ Junge

Wie alt bist du? [　　　]

In welcher Klasse bist du?
- ○ 5. Klasse
- ○ 6. Klasse

Welche Sprache(n) sprichst du zu Hause (mit deinen Eltern, Geschwistern, etc.)? Du kannst mehrere ankreuzen und eintippen.
- ☐ Deutsch
- ☐ Französisch
- ☐ Englisch
- ☐ andere, und zwar: [andere Sprache(n)]

	stimmt gar nicht	stimmt eher nicht	stimmt eher	stimmt ganz genau
Ich gehe gerne zur Schule.	○	○	○	○
Ich finde den Englischunterricht langweilig.	○	○	○	○
Mir gefällt die englische Sprache.	○	○	○	○
Es ist mühsam, Englisch zu lernen.	○	○	○	○

6.5 YES/NO VOCABULARY TEST

Test 1, Level 1 (Meara, 1992): Items (pseudowords marked with *)

accident	aistrope*	balfour*	bath	birth	book
business	cantileen*	channing*	christian	common	contortal*
damage	degate*	different	dogmatile*	door	dowrick*
enough	expect	father	free	glandle*	grey
grow	gummer*	hold	joke	lannery*	lapidoscope*
large	lauder*	lip	love	money	mundy*
new	nonagrate*	obey	oxylate*	path	plate
poor	pull	ralling*	red	retrogradient*	sadly
shine	song	speed	succeed	sew	system
Thirsty	too	tooley*	troake*	wake	warm

6.6 ADDITIONAL DATA AND PLOTS

Means and standard deviations across different grading methods

a) Per test: *M (SD)*

	Total strict	Total sensitive	Cognates strict	Cognates sensitive
Test 1	13.88 (5.44)	15.20 (5.58)	11.72 (4.43)	12.68 (4.47)
Test 2	13.34 (6.12)	16.96 (6.39)	11.38 (5.05)	14.42 (5.19)
Test 3	11.28 (5.49)	14.08 (5.09)	9.28 (4.65)	11.72 (5.04)

b) Improvement IG compared to CG: χ^2, *p*, *M ± SE*

	Total		Cognates	
	strict	sensitive	strict	sensitive
T2 – T1	$\chi^2(5) = 8.25$	$\chi^2(5) = 10.88$	$\chi^2(5) = 9.25$	$\chi^2(5) = 13.76$
	$p = .004$	$p < .001$	$p = .002$	$p < .001$
	$M = 1.76 \pm 0.56$	$M = 2.58 \pm 0.69$	$M = 1.58 \pm 0.47$	$M = 2.35 \pm 0.53$
T3 – T1	$\chi^2(5) = 7.82$	$\chi^2(5) = 9.93$	$\chi^2(5) = 7.64$	$\chi^2(5) = 10.69$
	$p = .005$	$p = .001$	$p = .006$	$p = .001$
	$M = 2.24 \pm 0.76$	$M = 2.90 \pm 0.85$	$M = 1.88 \pm 0.65$	$M = 2.51 \pm 0.69$

Improvement averages by class (sensitive scoring):

Control T2-T1: -0.89 / -0.29 / 0.20 / 0.43 / 0.43 / 0.65 / 1.00 / 1.63 / 1.75 / 2.83

Intervention T2-T1: 1.94 / 2.21 / 2.47 / 2.53 / 3.58 / 4.18 / 4.78

Control T3-T1: -4.20 / -3.33 / -2.58 / -2.38 / -2.29 / -1.86 / -1.41 / -1.38 / -1.17 / 0.17

Intervention T3-T1: -1.68 / -0.47 / -0.16 / 0.05 / 0.17 / 2.36 / 3.17

Additional graphs

Correct items vocabulary learning activity 1
across all participants and by treatment group
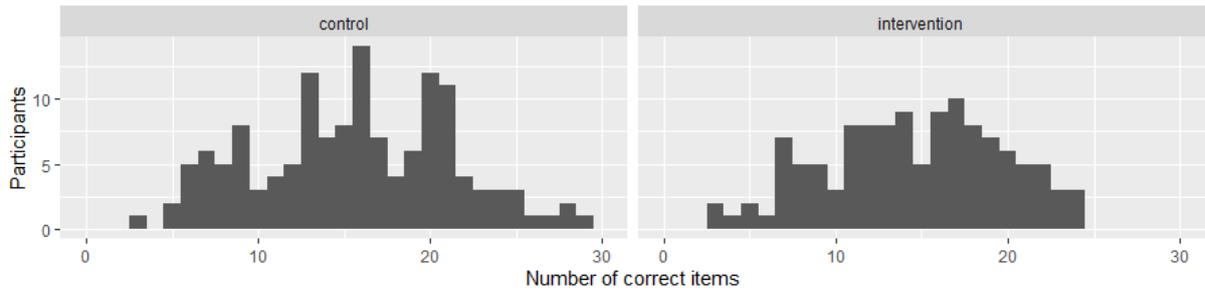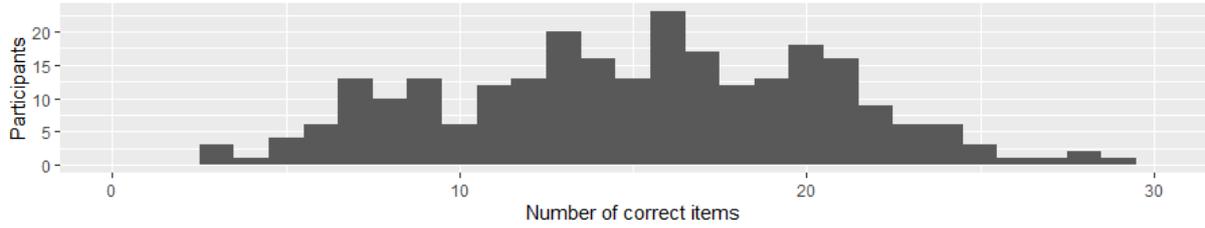
Correct items vocabulary learning activity 2
across all participants and by treatment group
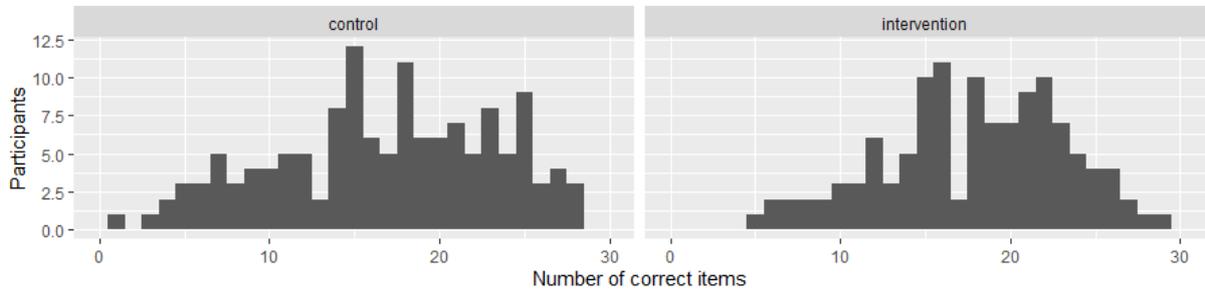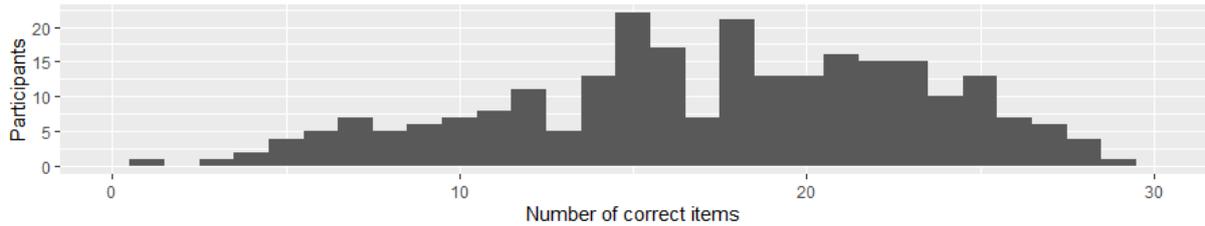
Correct items vocabulary learning activity 3
across all participants and by treatment group
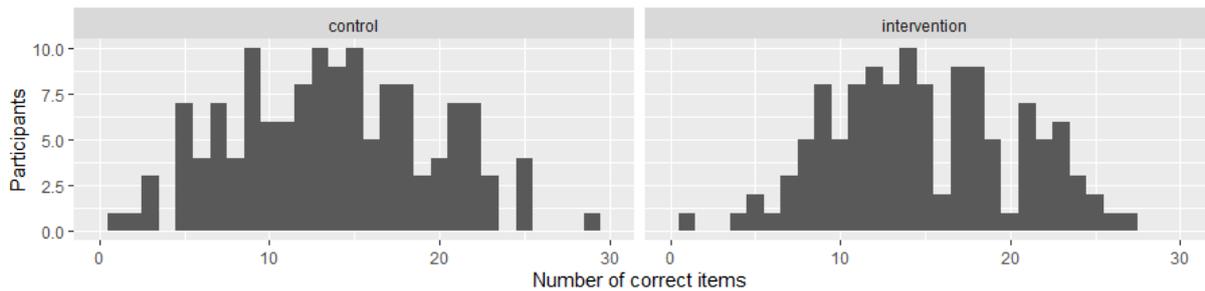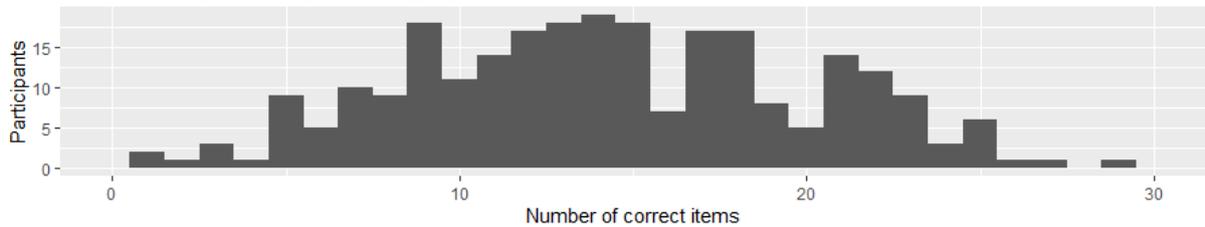
Correct items overall across all three vocabulary learning activities
across all participants
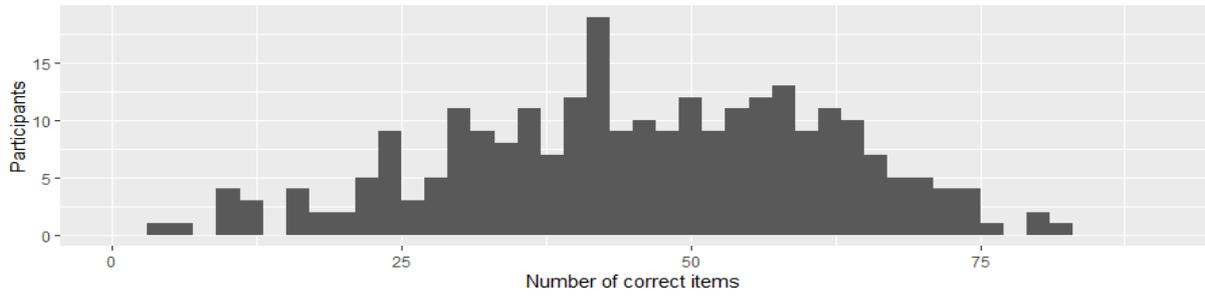
by treatment
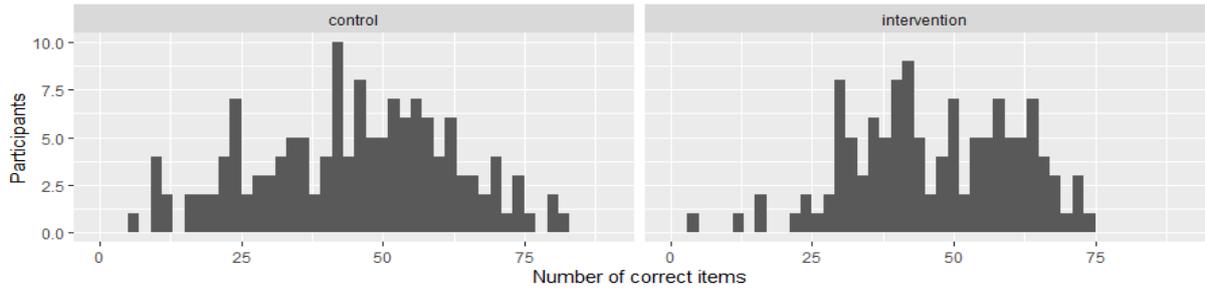

Yes/No vocabulary test score
across all participants
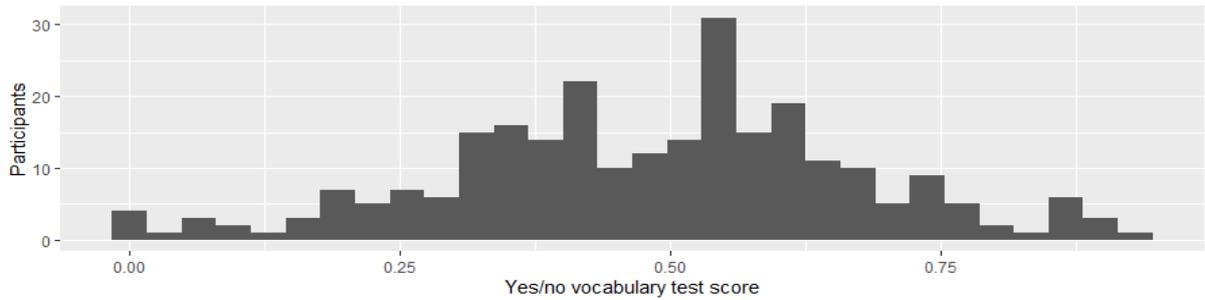
## Average translation accuracy per item
by mode among CG
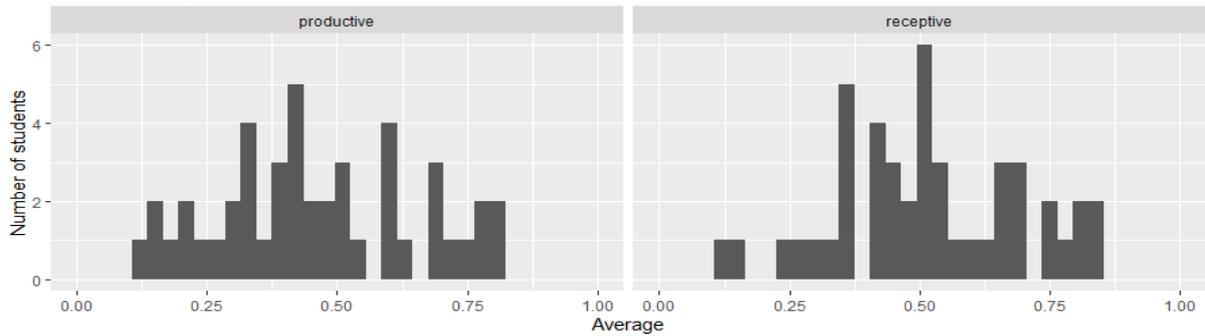
## Correlation performance on cognates in vocabulary learning activities 1 and 2
by treatment group
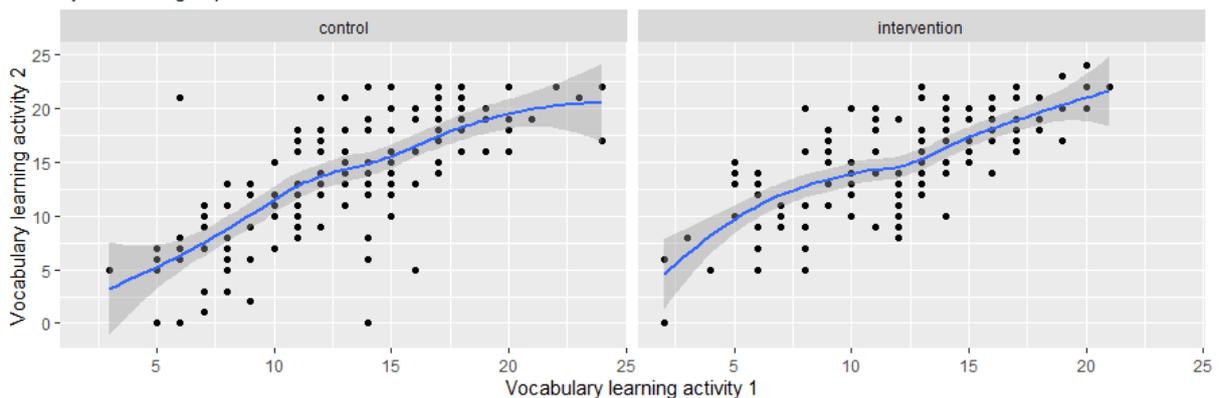
## Correlation performance on cognates in vocabulary learning activities 1 and 3
by treatment group
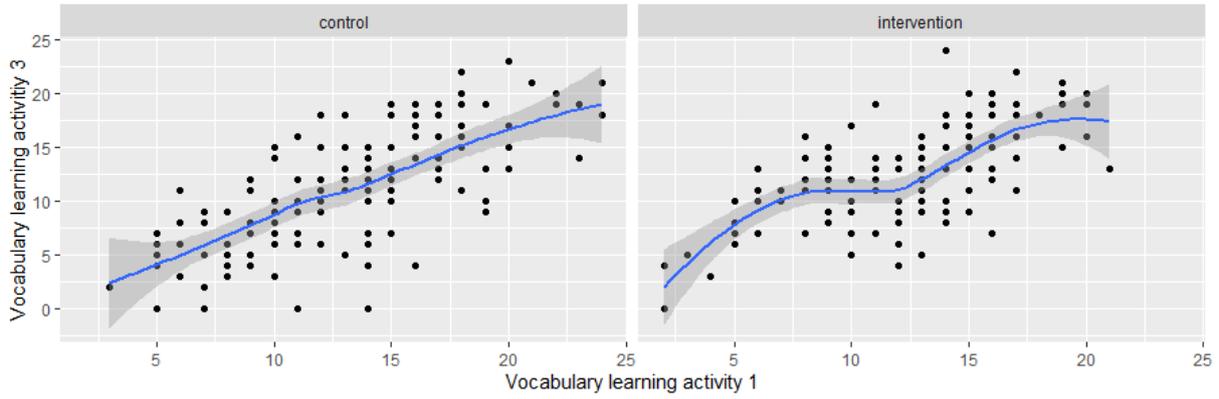
Correlation overall performance on vocabulary learning activities with attitude
by treatment group
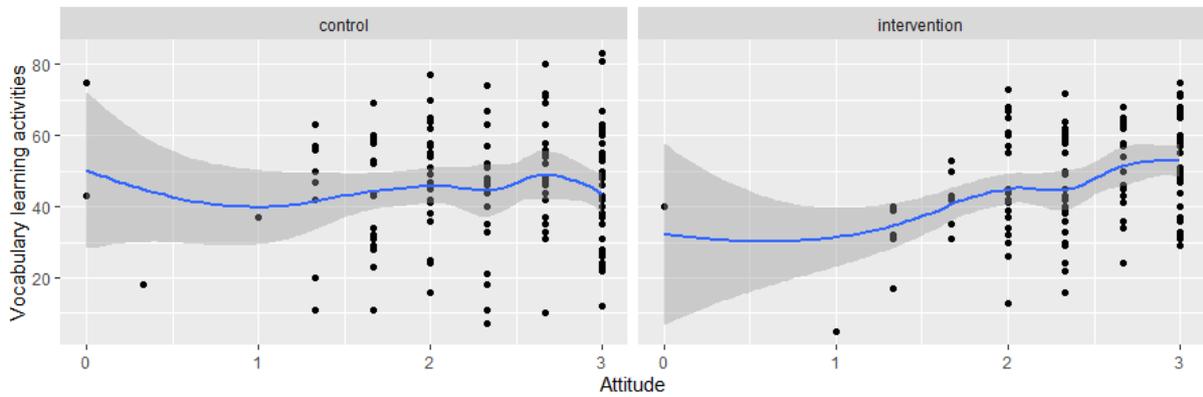
Correlation overall performance on vocabulary learning activities and yes/no vocabulary test
by treatment group
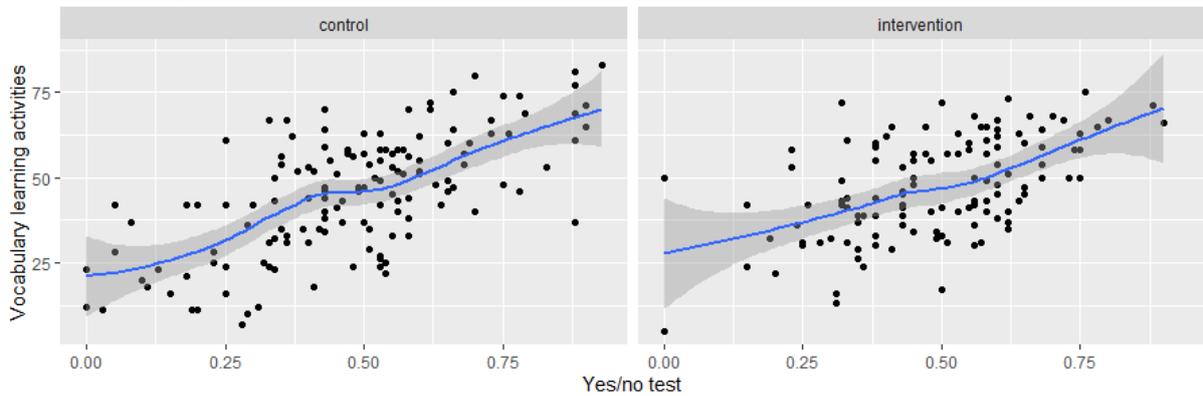
Improvement on cognates in vocabulary learning   activity and intervention evaluation
T2-T1   T3-T1
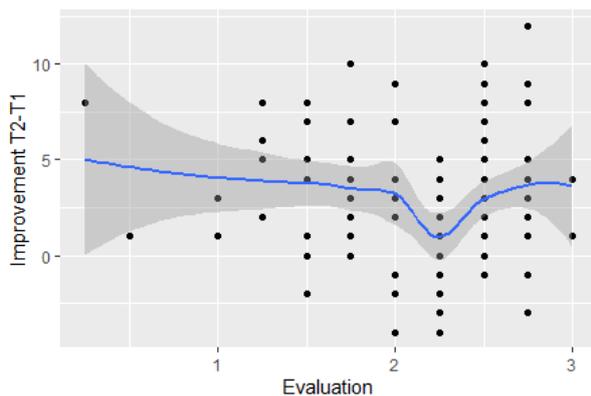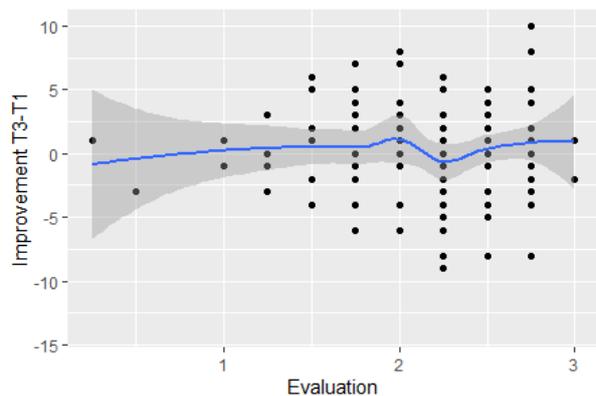
Correlation translation accuracy and nLD
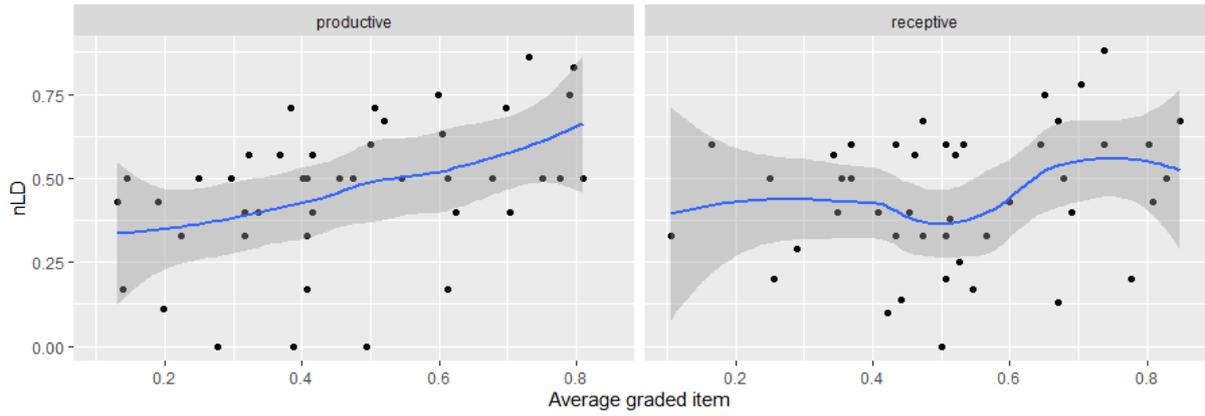
Performance on vocabulary learning activities
by gender

by grade level

Yes/no vocabulary test score
by gender

by grade level
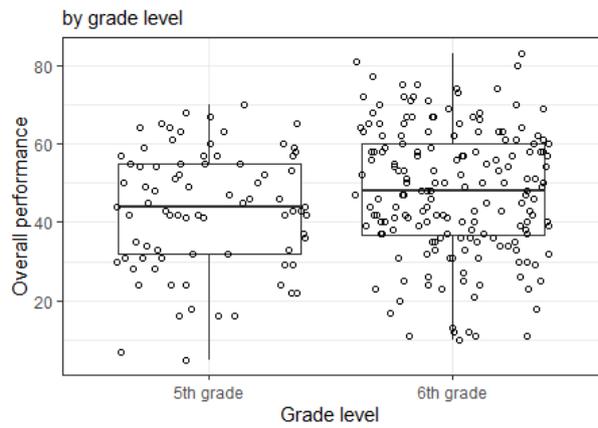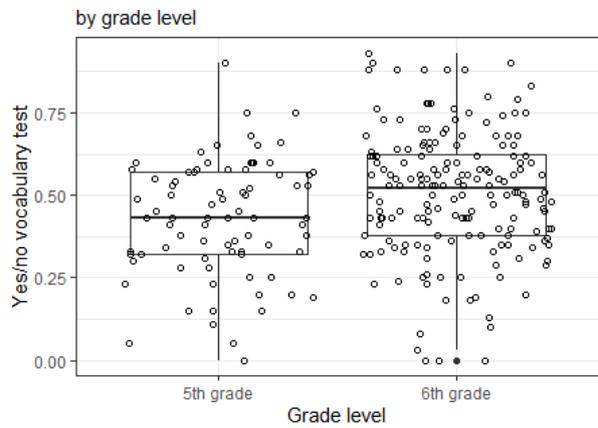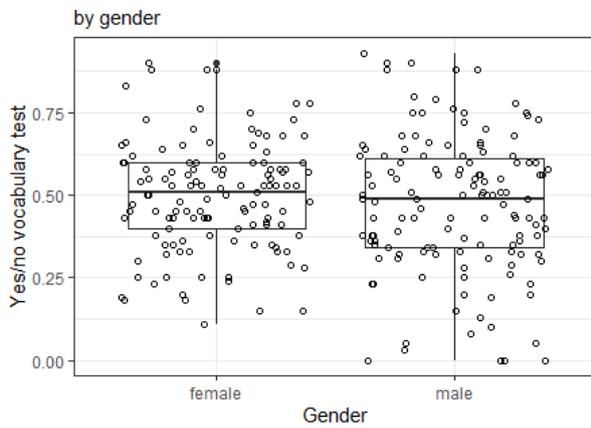
Performance on vocabulary learning activities
by language spoken at home
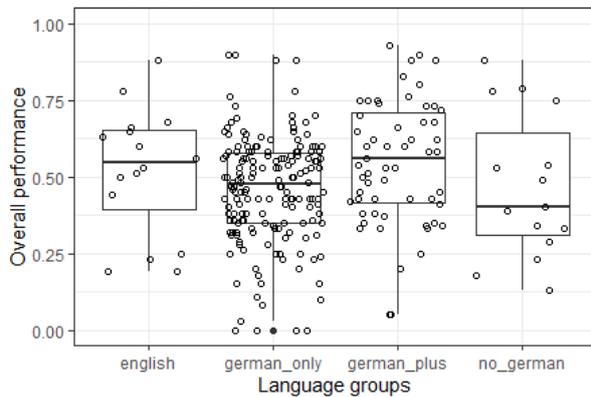
Overall score on the yes/no vocabulary test
by language spoken at home