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Cross-linguistic syntactic representations between L2 and L3 in late trilinguals

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ABSTRACT

Two cross-linguistic syntactic priming experiments investigated whether late trilingual speakers share syntactic representations between their second and third language, whether said sharing is influenced by proficiency in the two non-native languages, and whether there is evidence of lexical boost effect. Participants were late trilinguals, namely native speakers of Italian (L1) with English as L2 and German as L3. In a written picture description task, they were primed with sentences that had a double-object (DO) or prepositional-object (PO) dative in one non-native language (e.g., English) and were asked to describe pictures depicting ditransitive events in the other non-native language (e.g., German) and viceversa. Results showed that participants produced a high number of PO constructions in English and of DO constructions in German, regardless of the primed condition. There was a weak lexical boost effect (greater priming with repeated verbs). Priming of DO constructions was found in L3>L2 and this effect was modulated by proficiency. Participants produced a non-primed construction, namely shifted-DO (SDO) in German. We interpret this as a possible effect of cross-language interference (CLI) from Italian (L1).

Keywords: cross-linguistic syntactic priming, trilingualism, sentence production, dative alternation

ITALIAN SUMMARY

Il priming sintattico (in inglese: *syntactic priming*, *syntactic persistence* o *structural priming*) è un fenomeno impiegato per comprendere come le parole vengano immagazzinate nella mente dei parlanti e come questi possano recuperale per utilizzarle durante i processi di comprensione e di produzione. Secondo questo fenomeno, processare una frase contenente una specifica struttura sintattica facilita la ripetizione della stessa struttura quando si processa una frase successiva (Pickering & Branigan, 1999). Sono state fatte due importanti scoperte sulle rappresentazioni sintattiche coinvolte nella produzione: la nozione che il priming sintattico sia relativamente longevo e l'effetto denominato *lexical boost*. Il primo si riferisce al fatto che il priming ha effetto anche nell'eventualità in cui vengano inserite delle frasi non correlate tra prime e target: Bock e Griffin (2000) hanno testato il priming inserendo fino a 10 frasi tra le due prese in esame, trovando prove del fenomeno cercato. Il lexical boost si riferisce invece all'incremento della forza del priming nel caso della ripetizione del verbo tra prime e target (Pickering & Branigan, 1998). Quando le lingue prese in esame sono più di una, il priming viene definito cross-linguistico; il priming sintattico cross-linguistico viene utilizzato per indagare se – e, in caso positivo, con quale estensione – le informazioni sintattiche di due o più lingue coincidano o se invece siano distinte. Hartsuiker et al. (2004) hanno proposto due possibili modelli: il *separate-syntax account* prevede che i parlanti abbiano un 'magazzino sintattico' per ogni lingua; lo *shared-syntax account* prevede che, almeno parzialmente, le informazioni sintattiche siano condivise tra le diverse lingue, riducendo la ridondanza e favorendo il code-switching quando necessario.

Dagli studi cross-linguistici è nato l'interesse sulla diversa forza dell'effetto priming nel caso in cui la ricerca coinvolga solo una lingua e nel caso in cui invece ne coinvolga diverse. Hartsuiker e Bernolet (2017) hanno proposto che un parlante, nelle fasi iniziali dell'acquisizione di una seconda lingua (L2), non abbia delle specifiche rappresentazioni sintattiche per questa lingua e che tenda probabilmente ad emulare ciò che viene prodotto dai parlanti nativi e/o ad utilizzare le informazioni della sua lingua madre (L1). Aumentando la sua conoscenza della seconda lingua, si formano prima delle rappresentazioni sintattiche specifiche per quella lingua che successivamente andranno ad unirsi con quelle della L1 una volta raggiunto un buon livello nella L2. Sebbene numerosi studi si siano focalizzati sul fenomeno del bilinguismo, le questioni riguardanti le rappresentazioni sintattiche dei parlanti plurilingui necessitano di ulteriori approfondimenti. Per molto tempo, gli studiosi hanno discusso se il processo di acquisizione e/o apprendimento di una terza lingua (L3) fosse diverso da quello di

una L2; successivamente, molti di loro hanno cominciato a condividere la convinzione che il fenomeno del plurilinguismo necessitasse di studi specifici, diversi da quelli sul bilinguismo (Leung, 2007).

Il presente studio ha l'obiettivo di contribuire alla ricerca sul plurilinguismo fornendo nuovi dati sui trilingui, in particolare madrelingua italiani che parlano inglese (L2) e tedesco (L3). È stata scelta una categoria specifica di partecipanti: i *late trilinguals*, cioè coloro che hanno appreso la L2 e la L3 solo in un secondo momento e non in contemporanea alla L1. Lo studio utilizza il priming sintattico cross-linguistico focalizzandosi sull'alternanza dei dativi, ossia la rappresentazione di un evento dativo attraverso due alternative denominate DO (double-object) e PO (prepositional-object). Nella prima, il verbo ditransitivo è seguito da due NP ($NP_{BENEFICIARIO}$ NP_{TEMA}); nella seconda, il verbo ditransitivo è seguito da un NP_{TEMA} e un $PP_{BENEFICIARIO}$. Diversamente da altre lingue (per esempio, lo spagnolo e l'italiano), l'inglese e il tedesco ammettono entrambe le strutture: un parlante, quando pronuncia una frase dativa, compie l'azione inconscia di scegliere quale alternativa usare. Sebbene siano le due alternative più comuni, non sono le uniche costruzioni possibili per la rappresentazione di eventi dativi.

Lo studio prende in esame le rappresentazioni sintattiche cross-linguistiche in entrambe le direzioni: inglese-tedesco (L2>L3) e tedesco-inglese (L3>L2). Ogni partecipante ha svolto solo uno dei due esperimenti. Il design degli esperimenti presenta due variabili indipendenti: la struttura dativa (DO o PO) e la presenza o assenza di ripetizione del verbo tra prime e target. Gli esperimenti sono composti da 96 prove, di cui 32 sperimentali e 64 filler. In ogni prova, ai partecipanti è stato richiesto di leggere ad alta voce una frase (*prime*), di guardare attentamente una immagine, e infine di descrivere quella immagine utilizzando le parole fornite loro. 26 partecipanti hanno svolto l'esperimento nella direzione L2>L3 e altri 26 nella direzione contraria, per un totale di 52 partecipanti. Sono state create due liste controbilanciate per esperimento, ossia ai partecipanti appartenenti alla lista 1 sono stati presentati gli eventi con una struttura e agli appartenenti alla lista 2 è stata presentata la struttura opposta. Ogni lista è composta da 16 eventi dativi per struttura.

Lo studio si prefigge l'obiettivo di rispondere a tre domande di ricerca: se nei trilingui tardivi le rappresentazioni sintattiche della L2 e della L3 siano conservate unitamente o separatamente; se il livello di competenza nelle due lingue sia un fattore determinante nell'integrazione delle rappresentazioni delle due lingue; se ci siano delle prove dell'effetto del *lexical boost*. I risultati hanno mostrato priming solamente nel caso della struttura DO nella direzione L3>L3; tale priming appare essere influenzato dal livello di competenza della lingua utilizzata nella produzione della descrizione. Il lexical boost non è stato rinvenuto in quantità

sufficienti per poterlo considerare come rilevante. Nell'insieme, i dati rinvenuti non sono stati considerati sufficienti per poter affermare l'integrazione delle rappresentazioni sintattiche tra una L2 e una L3. Interessante è la produzione di una struttura che non è stata proposta come prime, cioè la shifted-DO (SDO) in tedesco: questa forma è stata interpretata ipotizzando un transfer dall'italiano (L1).

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INTRODUCTION

Psycholinguistics aims to achieve the understanding of mental representations and processes that underlie language use. Bilingualism and multilingualism have given rise to an interest in the representations of different languages in people's minds. Cross-linguistic representations of bilingual speakers have been thoroughly investigated, but questions regarding multilingual speakers remain partly unanswered. The current study is intended to provide a contribution to the inquiry providing a new set of findings on late trilingual speakers, namely native speakers of Italian who speak English (L2) and German (L3), by employing cross-linguistic syntactic priming. Dative alternation is the syntactic construction chosen, i.e., the expression of a dative event as double-object (DO) or a prepositional-object (PO). There is a correspondence between the dative alternation in English and in German, hence the choice of the two languages and of the construction. E.g.,

1a. The assistant passed the boss the key.

1b. Der Assistent reichte der Chefin den Schlüssel.

2a. The assistant passed the key to the boss.

2b. Der Assistent reichte den Schlüssel an die Chefin.

where 1a and 1b are the DO alternatives, and 2a and 2b the PO alternatives.

The study investigates cross-linguistic syntactic representations in both directions: L2>L3 and L3>L2. The experiments are written picture description tasks composed of 96 trials, among which 32 are experimental trials and 64 filler trials. In each trial participants were asked to read out loud a prime sentence, to carefully look at a picture presented on their screen, and finally to write a description of the picture using the words provided. 26 participants underwent the L2>L3 direction and 26 the L3>L2 direction, for a total of 52 participants. The study aims to answer three research questions:

i. In late trilingual speakers, are syntactic representations between their L2 and L3 shared or separated (Hartsuiker et al., 2004)?

ii. Is proficiency a determining factor in the sharing of said syntactic representations (Bernolet et al., 2013; Hartsuiker & Bernolet, 2017)?

iii. Is there evidence of lexical boost effect (Pickering & Branigan, 1998)?

Chapter 1 offers a brief overview of priming, cross-linguistic syntactic priming, multilingualism, and dative alternation in English and German. Chapter 2 presents the pilot phase of the experiments: firstly, pictures and sentences were administered to native speakers or English and German; secondly, seven native speakers of Italian piloted the experiments and provided useful suggestions. Chapter 3 delineates the study itself, illustrating the most important details of the experiments. Finally, chapter 4 discusses the findings and attempts to interpret them in the lights of the theories hitherto proposed by researchers; moreover, follow-up studies are proposed.

1. LITERATURE REVIEW

The present chapter provides an overview of the notions of psycholinguistics fundamental to understanding the aim and methodology of the study itself. First, an outline is given of syntactic priming and its functioning, with attention to how stronger priming can be elicited. Next, theoretical accounts of cross-linguistic syntactic priming are illustrated with references to experiments employing different language combinations. The third paragraph presents the modern view on multilingualism, focusing on the juxtaposition with bilingualism. Finally, the fourth paragraph elucidates dative alternation, with specific attention reserved for dative constructions in English and German.

1.1 Syntactic Priming Paradigm

Broadly speaking, psycholinguistics is an interdisciplinary field interested in the different areas involved in language use: processes, production, and comprehension. Language production is the process starting from pre-linguistic thoughts and ending in written or oral articulation, that is constituted by the middle stages of planning and lexicalisation: in order to convey a message, language is used to encode the chosen meaning. Priming is one of the techniques adopted to understand how words are stored in the speakers' minds and how they can be retrieved during language comprehension and language production. It consists in the presentation of a stimulus (*prime*) that is related phonologically, semantically, or it is unrelated, to what the participant is going to produce (*target*): the prime is dispensed in the first part of each trial, prior to the task meant to be measured. *Syntactic priming*, also referred to as *syntactic persistence* or *structural priming*, occurs when said relation is syntactic: the processing of an utterance with a particular structure facilitates the repetition of the same structure while processing and producing a subsequent utterance (Pickering & Branigan, 1999). This means that passive sentences are produced more often after passive primes rather than after active primes. Essential for this phenomenon is the presence of two alternative syntactic structures to express the same concept, e.g., one event can be expressed by an active sentence or by the corresponding passive sentence. Significantly, syntactic structures of primes are also repeated in targets that are minimally related in lexical, conceptual, or discourse content (Bock, 1986), meaning that what is primed is indeed the syntax. Connected to the syntactic priming paradigm is the mechanism underlying sentence production. Levelt et al. (1999) proposed a model of language production composed of three stages (conceptualization, formulation, and

articulation) where words undergo three levels of representation: a conceptual stratum, a lemma stratum, and a form stratum. Syntactic information is encoded in the lemma stratum, a concept more thoroughly explained in the model developed by Roelofs (1992; 1993), where the lemma stratum contains lemma nodes (the base form of words, e.g., the uninflected form of *give*), connected to nodes at the conceptual stratum (message) and to nodes at the word-form stratum (morphology and phonology). Moreover, the lemma nodes are linked to the syntactic property nodes via SYNTACTIC_CATEGORY links (*give* is connected to nodes that depict different categories of syntactic information, e.g., "verb") (Pickering & Branigan, 1998; 1999). Employing a set of five experiments where prime and target verbs shared different kinds of relations (they were the same verb or different verbs; they had identical or different forms, namely tense, aspect, and number), Pickering and Branigan (1998) found syntactic priming in all instances, although with different strength, and therefore proposed an extended version of Roelofs' model where lemma nodes are linked to nodes encoding combinatorial information. The lexicalist residual activation account of Pickering and Branigan (1998) suggested that a lexical-syntactic node corresponding to a syntactic choice is activated by the processing of a prime utterance and the state of activation facilitate the probability of selection of said node (Hartsuiker et al., 2008). The rationale behind the model is that combinatorial information is intrinsically phrasal, is linked to the verb's lemma and not to a singular form of the verb and is shared between lemmas; rather than being interpreted as mediated by the meaning or connected the subcategorization frames, combinatorial nodes should be considered as purely syntactic.

An explanation of syntactic priming was presented in the matter of activation at the lemma stratum (Pickering & Branigan, 1998). This model was able to elucidate the results concerning syntactic priming found by Bock (1989), unexplainable in terms of lexical, thematic, or metrical relations between prime and target. On the whole, the new model shed light on the conditions under which syntactic priming occurs. Hartsuiker et al. (1999) found priming in dialogue by designing a speech production experiment where the syntactic alternatives of the utterances differed in word order; this was presented as evidence for the notion that production and comprehension share combinational nodes, supporting Levelt et al.'s (1999) idea that the lemma stratum is shared between comprehension and production. It is the level of representation where the knowledge activated by syntactic priming is stored.

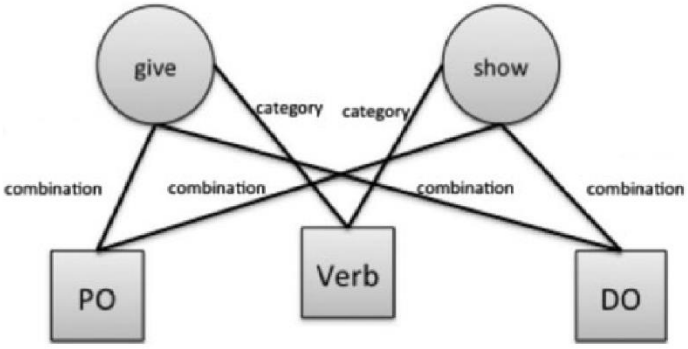


Figure 1.
Partial and simplified representation of the Lexicalist residual activation model proposed by Pickering and Branigan (Hartsuiker & Bernolet, 2017, p. 220)

To further the understanding of the relationship between language comprehension and production, Bock et al. (2007) conducted an experiment examining syntactic persistence, finding evidence consistent to Bock and Griffin's (2000) results, namely that there are few significant differences in priming strength when primes are immediately followed by production, and when production is preceded by one to ten filler sentences. Moreover, they found evidence of cross-modality persistence, showing that the magnitude of structural persistence from comprehension to production was comparable to persistence from production to production. Syntactic priming has been found in experiments employing different methodologies as sentence completion (e.g., Pickering & Branigan, 1998), sentence recall (e.g., Potter & Lombardi, 1998), spoken production (e.g., Bock, 1986), and written production (e.g., Pickering & Branigan, 1998); different constructions (e.g., Ferreira, 2003; Hartsuiker & Westenberg, 2000), different tasks (e.g., Branigan, Pickering, & Cleland, 2000; Potter & Lombardi, 1998), in English (e.g., Bock, 1986), German (e.g., Scheepers, 2003), Dutch (e.g., Hartsuiker & Kolk, 1998), between different languages (e.g., Hartsuiker et al., 2004), and with different kind of participants, as people with aphasia (e.g., Cho-Reyes et al., 2016), people with amnesia (Ferreira et al., 2008) children acquiring language (Bencini & Valian, 2008), and children who stutter (e.g., Anderson & Conture, 2004) (Hartsuiker et al., 2008).

Analysing data from syntactic priming, two important findings concerning syntactic representations in production have been attested: the notion that syntactic priming is long-lived (e.g., Bock & Griffin, 2000), and the lexical boost effect. Even though it may not be necessary to obtain structural priming, lexical overlap (in particular, of the head verb or head noun of the construction taking part in the syntactic alternation) between a prime and target sentence has been shown to greatly enhance structural priming, a phenomenon known as the *lexical boost* to

structural priming (Pickering & Branigan, 1998). Thus, if a target utterance requires the verb *give*, speakers are more likely to reuse the previous sentence's structure if the prime contained *give* rather than *show*. This is explicable in terms of residual activation of the combinatorial nodes and additional activation of the links between the verb and combinatorial node (Hartsuiker et al., 2008). Regarding nouns, priming is stronger if both prime and target have the same head noun (e.g., *sheep*) than if they have different head nouns. In addition to a boost from lexical identity, there is also a *semantic boost* (e.g., if prime and target have semantically related nouns such as *sheep* and *goat* vs. *sheep* and *knife* (Cleland & Pickering, 2003). In priming across languages, there is also a boost when verbs in prime and target are translation equivalents rather than unrelated verbs (Schoonbaert et al., 2007), although this boost only occurred when priming from L1 to L2 and not in the reverse direction.

1.2 Cross-linguistic Syntactic Priming

Cross-linguistic syntactic priming investigates syntactic priming between languages, and it is employed to determine whether and to what extent syntactic information is shared. Every language is unique, yet some constructions are common between languages: under investigation is whether bilinguals store these common structures separately or collectively. Two main accounts illustrate how bilinguals represent syntax: the *separate-syntax account* states that they have one syntactic store for each language and the two are kept separate; the *shared-syntax account* states that syntactic information is, at least to a certain extent, shared between languages (Hartsuiker et al., 2004). Notable example of similar syntax across languages is the expression of transitive events in English and Spanish, e.g., the active sentence *the boxer hits the opponent* corresponds to the Spanish *el boxeador golpea al oponente*, and the passive sentence *the opponent is hit by the boxer* to *el oponente es golpeado por el boxeador*. The separate-syntax account predicts that the two active constructions, as well as the two passive constructions, are kept separate, leading to a double representation of some information: this is explicable with reference to the fact that the two languages are indeed different, and that language-specific stores might increase the efficiency of the processing due to the focusing on one single language. Differently, the shared-syntax account predicts that shared aspects of similar constructions are stored jointly, reducing redundancy, and favouring code-switching when needed; additionally, language-specific information is stored. The shared-syntax account predicts cross-linguistic syntactic priming, whereas the separate-syntax account predicts no priming effect (Hartsuiker et al., 2004). Hartsuiker et al. (2004) found positive evidence of

cross-linguistic syntactic priming between production and comprehension in the English-Spanish combination, suggesting that the shared-syntax account is able to elucidate the propensity that even proficient bilinguals have to use constructions belonging to their first language (L1) while producing utterances in their second (L2). Revisiting Pickering and Branigan's (1998) model, Hartsuiker et al. proposed an extended bilingual version: the shared-syntax model is a lexical-syntactic model for sentence production in bilinguals where syntactic information and lexicon are shared between L1 and L2 as much as possible. Lemma nodes from both languages are connected to language nodes but also to shared categorical nodes, and to shared combinatorial nodes. Taking the aforementioned English-Spanish transitive events as example, the corresponding lemma nodes *hit* and *golpear* are connected to a conceptual node (HIT/GOLPEAR (X, Y)), to different language nodes (the British flag representing L1; the Spanish flag representing L2), to a shared category node containing information about their grammatical category (VERB), and to shared combinatorial nodes containing information about their ability to form sentences both in the active and passive tense (Active, Passive). In other words, not only combinatorial nodes are connected to lexical nodes, but they are also shared between languages; language nodes are connected to lexical nodes and tag them for the chosen language (Hartsuiker & Bernolet, 2017).

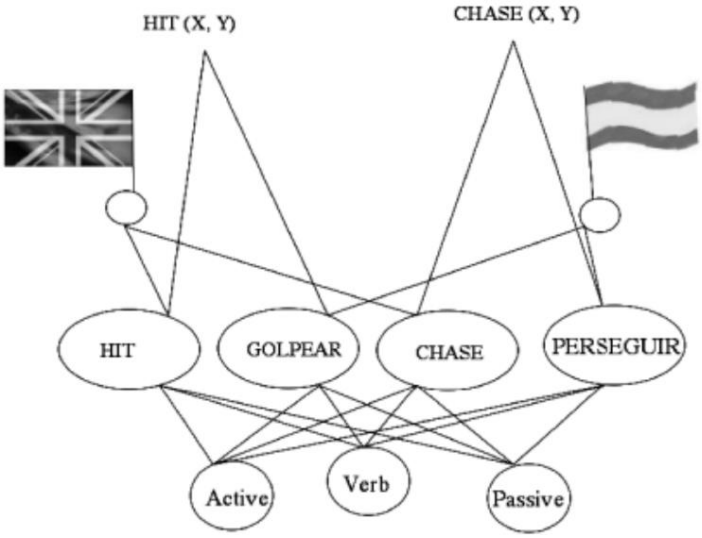


Figure 2.
Hartsuiker et al.'s (2004, p. 412) shared-syntax model

Starting from Hartsuiker et al.'s (2004) results and from Loebell and Bock's (2003) – where they found evidence of syntactic priming in the German-English combination using the dative alternation (see paragraph 1.4) –, Bernolet et al. (2007) argued that bilinguals have shared

syntactic representations for all those constructions that are fairly similar between the two languages, and language-specific representations for the constructions that are different. Flett et al. (2013) designed a syntactic priming experiment to determine whether bilinguals' processing of their non-native language is somehow affected by their experience of their native language, rather than depending entirely on their experience of non-native language. They illustrated two possible approaches to processing: *language-specific* mechanisms, where the experience of the native language does not affect the bilinguals' preferences for the non-native language while they produce sentences; structural preferences are specific to a single language and experiences in that language affect preferences for said language exclusively. Differently, in *language-non specific* mechanisms not only the experience of the non-native language but also the experience of the native language affects the bilinguals' preferences for the non-native language during production. Flett et al. (2013) found syntactic priming in the Spanish-English and German-English combinations with proficient participants in both languages. Significantly, they found evidence of the fact that L2 learners succeeded in gathering language-specific representations of syntactic constructions that do not exist in their native-language, due to extended exposure to the non-native language; this contradicted Berlonet et al.'s (2007) findings that predicted shared syntactic representations limitedly for similar constructions. Pickering and Ferreira (2008) argued that the degree of sharing of the syntactic representations in bilinguals may be related to their knowledge of the non-native language, being the degree greater for proficient bilinguals, bilinguals who speak typologically closer languages, and bilinguals who learned the non-native language early.

Flett et al. (2013) argued that if bilinguals are proficient in both languages, their experience of the native language does not affect their preferences of processing a non-native language. They proposed that bilinguals' syntactic representations are shared between languages, whereas their experiences of using said representations are language specific. These results are therefore consistent with the language-specific account: highly proficient bilinguals' processing of their non-native language is not affected by the existence or absence of a specific syntactic construction in their native language. They proposed an extended version of the model designed by Hartsuiker et al. (2004) that includes the presence of a combinatorial node representing a syntactic construction grammatical in only one out of the two languages (i.e., the DO construction is available is English but not in Spanish). Said combinatorial node is not connected limitedly to a specific language, so that the DO construction in Spanish is not inhibited by the model itself, even though there are no direct links between the DO node and

Spanish lemmas. The model allows the production of Spanish sentences using the DO construction, regardless of the grammaticality of the sentence itself.

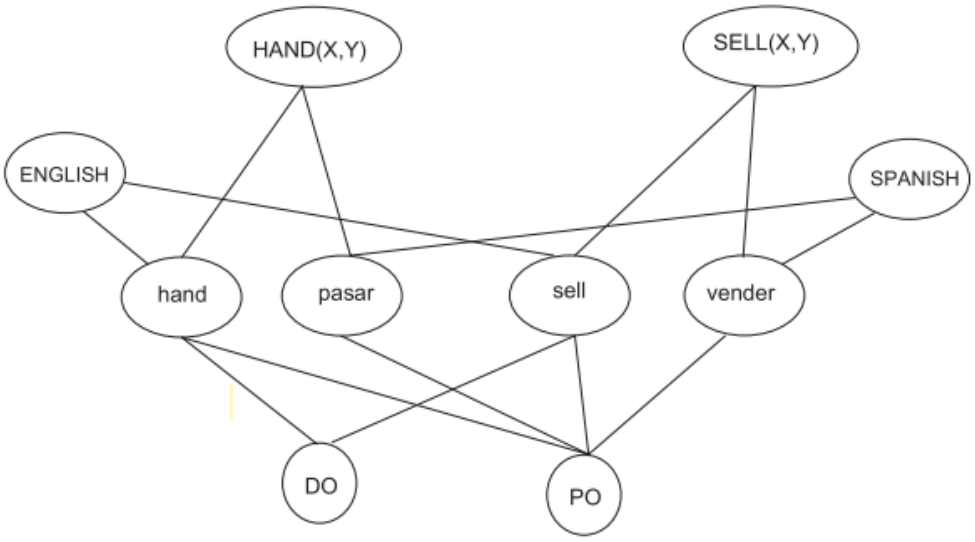


Figure 3.
Flett et al.'s (2013, p. 758) adaptation of Hartuisker et al.'s (2004) bilingual model

From cross-linguistic research the question arose whether priming is stronger, weaker, or of equal strength if it is between-language (i.e., two or more languages are involved in the study) rather than within-language (i.e., only one language is under scrutiny). Whereas Hartsuiker and Pickering (2008) proposed that the magnitude of the priming effect within- and between-language should be analogous if the shared syntax model is adopted, Cai et al. (2011) and Bernolet et al. (2013) observed stronger within-language priming. The former presented their results through the lens of the shared-syntax account, arguing that language nodes send activation to all the words of the chosen language, including the already employed lemma in the case of within-language experiments. Differently, Bernolet et al. (2013) interpreted their results in terms of proficiency: they tested late bilinguals with different levels of proficiency in their L2 and found evidence that this difference influenced syntactic sharing with L1. Interestingly, they observed that L2 learners at the early stages (i.e., during the learning process) have item- and language-specific representations of L2 syntactic structures, kept separated from L1 representations. Only subsequently, when their level of proficiency has increased, the syntactic representations become shared between L1 and L2. Bernolet et al. (2013) argued that the shared-syntax account proposed by Hartsuiker et al. (2004) is the final state of bilingual memory, when late bilinguals have acquired a high level of proficiency in the L2: there is a shift from language-specific to shared syntactic representations, where late bilinguals initially

have separate representations for their L1 and L2 and exclusively in a second stage the representations of equivalent structures in L1 and L2 collapse. Similarly, Hartsuiker and Bernolet (2017) illustrated a theory where during the early stages of learning the L2, learners have no syntactic representations of that language. They might be able to emulate the sentences produced by proficient speakers or might employ L1 syntactic information while processing L2. Gaining knowledge, L2 syntactic representations start to develop, being initially item- and language-specific, and in a second stage becoming shared between languages, leading to shared syntactic representations when high proficiency is achieved. Related to bilinguals' proficiency is the study conducted by Hwang et al. (2018), where cross-linguistic syntactic priming was adopted to determine whether late bilinguals have language-specific or shared representations for constructions that are cross-linguistically similar or different. They tested English and Korean, languages that similarly convey transitive meaning with transitive constructions, but have different constructions for conveying causative meaning, since English use causative constructions but Korean use transitive ones (i.e., the two constructions for causatives are cross-linguistically different). As stated before, according to the shared-syntax account, bilinguals' syntactic processing in one language is influenced by the grammatical rules of the other one (Hartsuiker et al., 2004): this model predicts that while speaking English, Korean-English late bilinguals' processing of a causative event would activate not only the causative construction though the link in English, but also the active transitive construction through the link in Korean, leading to the possibility of mistakenly employing a transitive construction to express a causative event in English. Their results were consistent with the conclusions drawn by Bernolet et. all (2013) and Hartsuiker and Bernolet (2017) concerning proficiency: proficiency influenced the strength of syntactic priming. Hwang et al. (2018) provided evidence that late bilinguals are able to develop shared syntactic representations across languages that are typologically different, as long as the constructions in the two languages are similar enough in terms of information structure, thematic role orders, or functional relations. Moreover, they discovered that the number of syntactic transfer errors increased as the speakers' level of proficiency increased, meaning that proficient bilinguals have a higher tendency to accept as appropriate an active transitive construction to produce a causative event. This fits the prediction of the shared-syntax account.

1.3 Multilingualism

The former paragraph presented an overview of bilingual models of language representations. The knowledge that many people speak more than two languages raised the query whether bilingual models might be used to account for their lexico-semantic representation, or whether new models are required (Tytus, 2017). A native language (L1) is acquired by a person during early childhood by the exposure to a natural environment. The term *bilingual* usually refers to a speaker who acquired not one but two languages during childhood. The same term is also used when the second language (L2) is a non-native language leaned subsequently to the acquisition of L1: these speakers are called *unbalanced bilinguals* because the syntax of their L1 was already established when they started learning the L2 (Bernolet et al., 2013). For quite a long time, researchers disagreed about the nature of third languages (L3), particularly whether they should be treated as a L2 or differently. Many researchers showed an interest in what is now called *multilingualism* and started sharing the belief that it deserves an independent domain of inquiry (Leung**,** 2007), acknowledging that the process of acquiring a L2 is quite different from acquiring a L3.

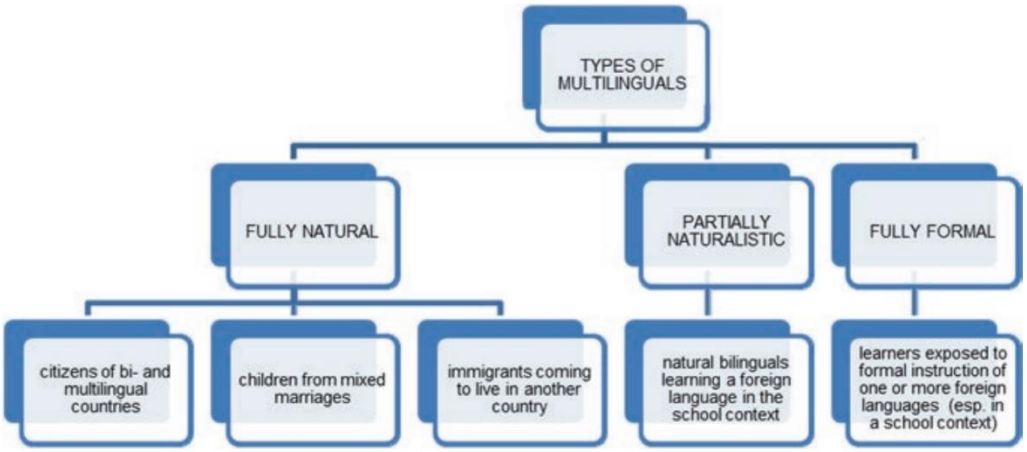


Figure 4.
Multilingual contexts of language acquisition based on Hoffman (2001) and Gabrys´-Barker (2005) in Szubko-Sitarek (2015, p. 13)

The influence that one language has on the other(s) in bilingual or multilingual speakers is referred to as *cross-linguistic influence* (CLI) and it can be seen through the phenomenon of *cross-linguistic transfers* (Murphy, 2003). One of the most debated topics is whether L1, L2, or both, represent the dominant source for CLI during L3 learning. Different approaches have been proposed. Lemhöfer et al.'s (2004) experiment provided evidence for *language non-selectiveness*: in a cross-linguistic experiment between Dutch (L1) and German (L3), data

showed how not only L1 and L3 but also L2 had been activated simultaneously during lexical processing. L2 played an essential role during the processing of L3, suggesting an interaction between all languages within the trilinguals' minds. Starting from this notion, the question arose regarding the degree of activation of each language and of the strength of influence on the other(s) (Leung, 2007). Many variables affect cross-linguistic influence between two or more languages, for instance language proficiency (e.g., Odlin, 1989), typological similarity between languages (Kellerman, 1995), recency of activation, frequency of use (Hammarberg, 2001), and L1 dominance as the predominant language. Hammarberg (2001) illustrated the *second language (L2) factor* in L3 acquisition, that is the tendency to transfer from a L2 rather than L1. Leung (2007) argued that said tendency proves that all the non-native languages are grouped together in the speakers' minds, facilitating the transfer from L2 and accelerating it in comparison to the transfer from L1. An additional significant factor is typological similarity between languages, i.e., the degree of typological closeness between the target language and L1 or L2 determines the source of transfer. Moreover, Bardel and Falk (2007) argued that during the initial state of L3 acquisition the transfer of syntactic structures is easier from L2 rather than L1, regardless of the typological proximity between L1 and L3: said factor benefits transfer only from L2 to L3, not from L1 to L3. The *second language factor* is therefore stronger than the *typology factor*: L2 assumes the role of filter, hindering the access to L1. This has been called the *L2 Status Factor* (L2SF) model. Aparicio and Lavaur (2016) employed a masked translation priming paradigm to investigate the processing of two non-native languages, their influence on one another, and the role of the dominant language during processing. French(L1)-English(L2)-Spanish(L3) late unbalanced trilinguals performed a primed lexical decision task. Primes were presented in L1, L2 or L3, and targets were produced in L2 or L3. Evidence showed a translation priming effect only when prime words were presented in the L1 (indicating shared conceptual representations between languages), and a lack of translation priming effect with L2 and L3 primes. Data was explained through an organisation of the multilingual lexicon by the L1 and an absence of cross-language interactions between the non-dominant languages. The latter could be interpreted as evidence of the fact that L2 and L3 representations are not strong enough to access conceptual representation in a masked translation priming experiment, or that L1 mediates their access to conceptual representation (Aparicio & Lavaur, 2013; 2016). Tytus (2017) designed an experiment composed by primed animacy decision tasks between German, English and French, in all six directions in order to better understand the lexico-semantic representation of trilinguals in long-term memory. Results showed analogous priming effects from L1 to L2 and from L2 to L1, but asymmetrical

priming effects between L2 and L3 in the two directions. Starting from Finkbeiner et al.'s (2004) bilingual memory *Sense Model*, where conceptual level is partially shared (i.e., lexical stores for L1 and L2 are separated), and said sharing is conditioned by the quantity of shared meaning between two languages, Tytus (2017) proposed a trilingual hybrid version of it. In the *Modified Trilingual Lexical Memory model*, the lexical stores for the three languages are still separated but highly interactive. L2 and L3 lexicons are smaller in size than L1 lexicon, mirroring the level of language proficiency. The representations of the conceptual store overlap to a large degree but are not completely merged. L1 and L2 lexical stores are connected symmetrically in the two directions (i.e., from L1 to L2 and from L2 to L1); L2 and L3 lexical stores are connected asymmetrically, being the direction from L3 to L2 weaker than the opposite; L1 and L3 lexical stores are connected symmetrically but with less strength than the other combinations. Significantly, the model is dynamic: the interaction between the three lexicons and the patterns of representations are influenced by several factors, namely language proficiency, frequency of language use, authentic language exposure, and active language use (Tytus in Booth & Clenton, 2020).

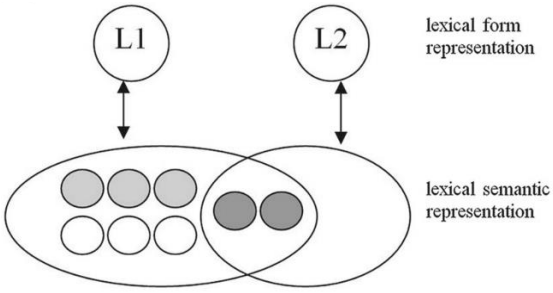


Figure 5.
Finkbeiner et al.'s Sense Model (2004) in Tytus (2017, p. 1627)

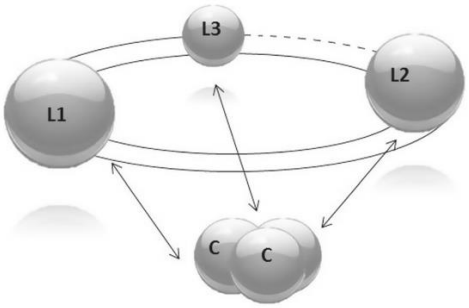


Figure 6.
Modified Trilingual Lexical Memory model (Tytus, 2017, p. 1639)

According to the *Typological Primacy Model* (TPM) (Rothman, 2015), L3 transfer is influenced by structural proximity (i.e., linguistic properties shared between languages at the level of mental representation) between the L3 and L1 and/or the L2. In the earliest stage, speakers exploit the access to both the systems of L1 and L2 until they acquire the knowledge to determine which language is more typologically closer to the L3. Hall and Ecke (2003) proposed the *Parasitic Model* (PM) to explain cross-linguistic influence during the learning process of L3 lexicon. They argued that such process is composed of three stages, establishing a parasitic connection between new and already acquired words through similarities in terms of: (a) lexical FORM (i.e., phonology and orthography), (b) syntactic

FRAME, and (c) the item's meaning (CONCEPT). Chen (2020) investigated the parasitic connection to the CONCEPT representation of L3 words illustrated in the parasitic model under the special conditions where L3 is typologically distant from L1 and L2. Data revealed differences related to proficiency: with low levels of L2 proficiency, both L2 and L1 were selected as parasitic hosts; with high levels of L2 proficiency, L2 was the exclusive parasitic host.

Regarding cross-linguistic syntactic priming, Hartsuiker et al. (2016) designed a set of four experiments with multilingual participants in order to further deepen the understanding of the shared syntactic representation. The goal was to compare the strength of syntactic priming in three conditions: within-language, between the native language and a non-native language, and between two non-native languages. Data revealed that within- and between-languages syntactic priming were equal in strength; moreover, syntactic priming between the native language and a non-native language was equal in strength to priming between two non-native languages. These results provided additional support for the shared-syntax account across languages.

1.4 Dative alternation

In paragraphs 1.1 and 1.2 it was stated that syntactic priming revealed how the processing of a construction in one language triggers the processing of said construction in the same or in a different language. Multiple constructions have been used in experiments, among which two of the most frequent are voice alternation (i.e., active and passive tenses), and dative alternation. Dative alternation is the representation of dative events through two different constructions, the *double-object* (DO) and the *prepositional-object* (PO) (also referred to as *prepositional dative* or PD). In order to produce said dative sentences, the VP (i.e., verbal phrase) needs to involve a verb belonging to a specific category called *ditransitive verbs*. Ditransitive verbs are transitive verbs that can take three arguments: an agent, a theme, and a recipient. In a DO construction, the dative verb is followed by two NPs (i.e., noun phrases) with the $NP_{RECIPIENT}$ - NP_{THEME} strict constituent order, whereas in the PO construction the dative verb is followed firstly by a NP_{THEME} and secondly by a $PP_{RECIPIENT}$ (i.e., prepositional phrase). In other words, in both constructions an agent, a theme, and a recipient are present but what changes is the order of the constituents, being AGENT-RECIPIENT-THEME in DO sentences and AGENT-THEME-preposition-RECIPIENT in PO sentences. For example,

1. a. The woman offered the young boy a tissue.
   b. The woman offered a tissue to the young boy.

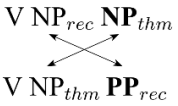


Figure 7.
(Bresnan & Ford, 2010, p. 188)

where sentence 1a is the double-object alternative, and sentence 1b is the prepositional-object alternative. The ditransitive verb *offer* took three arguments: *the woman* as agent, *the young boy* as recipient, and *a tissue* as theme.

Bock (1986) presented participants in her study with transitive and dative primes, and with target pictures that could have been described through either an active or passive for transitive events, or through a DO or PO for dative events. The picture on the right shown in figure 8 could have been easily described by participants as both *the man is reading the boy a story* (DO) and *the man is reading a story to the boy* (PO).

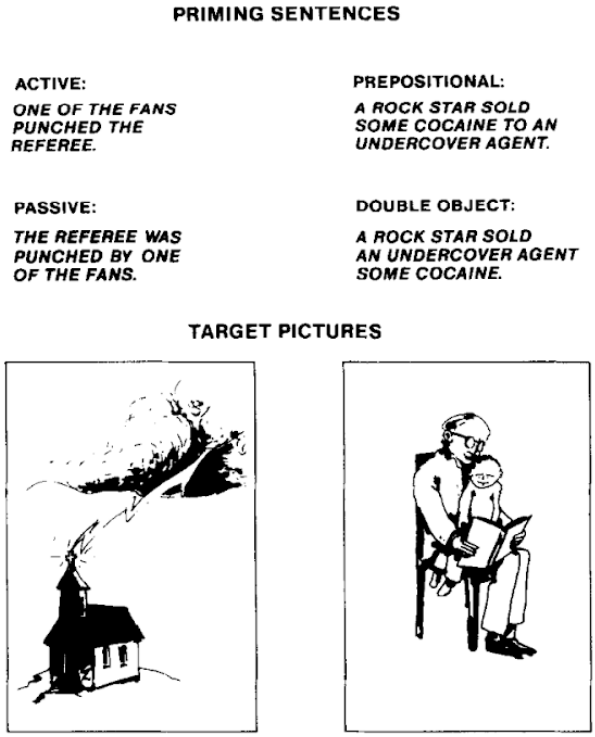


Figure 8.
Example of experimental trial in Bock (1986, p. 361)

Dative alternation has been used extensively in priming experiments, e.g., Pickering and Branigan (1998), Loebell and Bock (2003), Schoonbaert et al. (2007), Flett et al. (2013). Regarding the prepositional-object construction, Bock (1989) significantly found priming

effect between primes and targets that contained different prepositions, meaning that prime sentences as *the secretary baked a cake to her boss* and *the secretary baked a cake for her boss* were equally successful in triggering the production of *the girl handed the paintbrush to the man*. Moreover, Bock and Loebell (1990) argued that also a prepositional sentence involving a locative as *the wealthy widow drove her Mercedes to the church* could elicit a PO sentence.

The degree of acceptability of the two constructions is different in every language. Generally speaking, English and German allow both DO and PO constructions, while Spanish and Italian allow only the PO construction. This means that while producing a dative sentence, English and German speakers make the unconscious decision of using one of the dative constructions. Differently, for Spanish and Italian speakers producing a dative sentence should not involve taking said decision.

2. a. the woman sends the mayor the letter.
   b. the woman sends the letter to the mayor.
3. a. die Frau schickt dem Bürgermeister den Brief.
   b. die Frau schickt den Brief an den Bürgermeister.
4. a. *la donna invia il sindaco la lettera.
   b. la donna invia la lettera al sindaco.
5. a. *la mujer envía el alcalde la carta.
   b. la mujer envía la carta al alcalde.

Even if a language allows the dative alternation, it does not mean that all verbs accept it (e.g., *deny* does not accept the PO construction). Evidence showed that some native speakers use those constructions that are allegedly ungrammatical, as sentences 4a in Italian and 5a in Spanish. Furthermore, it is not always easy to determine whether a DO, a PO, or both constructions are acceptable with a specific verb: for example, the verb *geben* in German has been the focus of many studies, since it allegedly occurs only in the DO construction, but research showed that it does occur in the PO (Willems et al., 2019). In addition, a verb may not accept the alternatives evenly: some verbs are DO-biased, meaning that native speakers are more prone to using a DO construction rather than a PO (e.g., *award*, *make*, *serve*, *show*, *teach*); in reverse, some verbs are PO-biased (*bring*, *hand*, *read*, *sell*, *write*) (Bresnan & Ford, 2010). Crucially, the usage of the PO construction in German is more restricted than in English (Loebell and Bock, 2003) and learners are usually taught to use the DO alternative whenever possible.

Interestingly, when producing a dative sentence, speakers do not only make a choice between the two (or more) alternatives, but also about word order. Languages that show flexibility in constituent order may allow what is termed *marked orders* (Valentini, 2018), which are different constituent orders compared to the primary (i.e., not marked) order. For example, Italian unmarked word order is SVO (i.e., subject – verb – object) but due to its flexibility, marked dative sentences in Italian in a PO construction might emerge, e.g., *la donna mostra al ragazzo un abito* (Sfriso, 2020). This construction is also referred to as *shifted-PO* (SPO): whereas in a PO the NP precedes the PP, in the shifted-PO the order is mirrored, resulting in the NP following the PP (Cai et al., 2012). Moreover, Köhne et. al (2014) illustrated what they called shifted-DO (SDO), i.e., a ditransitive event represented by two NPs where the NP_{THEME} precedes the $NP_{RECIPIENT}$. Although German shows a strict set of grammatical rules, the sequencing of NPs and PPs is fairly variable, resulting in the following choices to express a dative event (Jäschke, 2016):

Das Mädchen hat ihrer Freundin den Brief geschickt *NOM DAT ACC*	$NP_{RECIPIENT} – NP_{THEME}$ (DO)
Das Mädchen hat den Brief ihrer Freundin geschickt *NOM ACC DAT*	$NP_{THEME} – NP_{RECIPIENT}$ (SDO)
Das Mädchen hat den Brief an ihre Freundin geschickt *NOM ACC ACC*	$NP_{THEME} – PP_{RECIPIENT}$ (PO)
Das Mädchen hat an ihre Freundin den Brief geschickt *NOM ACC ACC*	$PP_{RECIPIENT} – NP_{THEME}$ (SPO)

German is one of the languages that preserved the case system: it has inflected pronouns, nouns, articles, and adjectives in four grammatical cases (nominative, genitive, dative, and accusative). The dative alternation involves a change of case coding for the recipient: in the DO *die Frau schickt dem Bürgermeister den Brief*, the recipient *der Bürgermeister* is coded in the dative case (hence, the declined masculine article *dem*), while in the PO *die Frau schickt den Brief an den Bürgermeister*, the recipient is coded in the accusative (hence, the declined masculine article *den*). In both constructions, the theme is coded in the accusative case. The

preposition *an* corresponds to the English *to*, while *für* corresponds to *for*; both prepositions require the accusative case in these contexts. Differently, the preposition *zu* corresponds to the English *to* but requires the dative case, e.g., *die Oma brachte einen Kuchen zu ihrem Enkel*.

Loebell and Bock (2003) stated that it is possible to find priming effect employing clause-level alternatives, e.g., voice alternation and dative alternation, in the absence of the repetition of elements of the noun phrase or of the internal structure of the verb phrase (i.e., lower-level phrase structures). They designed a cross-linguistic priming experiment between English and German using the aforementioned alternations: they predicted priming in the dative alternation, there being a correspondence between the double-object configurations and the prepositional-object configurations respectively. Regarding voice alternation, they predicted priming only with active sentences because of the lack of correspondence between the passive configurations.

6. a. The ball hits the boy.
   b. The boy is hit by the ball.
7. a. Der Ball trifft den Jungen.
   b. Der Junge wird vom Ball getroffen.

While the German active 7a corresponds to the English 6a, the passive 7b does not correspond to the English 6b. In an English passive sentence, the auxiliary is immediately followed by the past participle; in German the auxiliary occupies the second position, but the past participle is expressed at the end of the sentence. Constituent order is considered essential to priming and therefore the absence of overlap of phrase structure hinders its effect (Bock & Loebell, 1990; Loebell & Bock, 2003; Bernolet et al., 2007): this has been referred to as *constituent order account* (Jacob et al., 2017) and offers an alternative approach compared to the *combinatorial node account* illustrated by Hartsuiker and colleagues (Hartsuiker et al., 2004; Hartsuiker & Pickering, 2008). Although the two accounts share the acknowledgment of the relevance of constituent order in cross-linguistic syntactic priming, the latter does not explain priming purely in terms of constituent order but rather in terms of how the magnitude of the similarity of constituent orders between languages translates in a shared combinatorial node or in a language-specific combinatorial node (Jacob et al., 2017). In order to investigate these accounts, Jacob et al. (2017) designed a cross-linguistic syntactic experiment between English and German employing dative alternation in sentences belonging to different levels of embedding, i.e., main clauses and embedded clauses. Whereas the constituent order of DO and PO main clauses corresponds in the two languages (2a corresponds to 3a and 2b corresponds to 3b), this is not

true when embedded clauses are involved: German requires the sentence to be built as verb-final, as in sentence 9.

8. The man thought that the woman sent the letter to the mayor.
9. Der Mann dachte, dass die Frau den Brief an den Bürgermeister schickte.

The results showed that both the similarity of constituent order and of the level of embedding are determining factors in eliciting syntactic priming cross-linguistically. Therefore, neither the *constituent order account* nor the *combinatorial node account* were able to satisfactorily elucidate the data. Based on such findings, Jacob et al. (2017) proposed a hierarchical syntactic tree representation for a German PO main clause and its English fragment. While processing a prime sentence, the speaker codifies its syntactic structure through the representation of a hierarchical tree where constituent order information and levels of embedding information are portrayed. This syntactic tree is therefore activated and can be exploited to produce the target. In the event that the elements of said tree are inconsistent with the target sentence information that needs to be portrayed, the speaker could suppress the already-computed syntactic tree to preserve the grammaticality of the target. However, this account predicts that syntactic priming occurs even if there are differences on lower levels of the tree, e.g., it occurs between languages whose noun-phrases contain an article and languages whose noun-phrases do not (Chen et al., 2013).

2. PILOT PHASE

The goal of the present study is to design an effective cross-linguistic syntactic priming experiment between English (L2) and German (L3), namely a written picture description task. In order for the experiment to be as effective as possible, and to have useful data to explain the strength of syntactic priming in the final experiment, all items (i.e., sentences and pictures) were administered to either English or German native speakers. Afterwards, the experiment was piloted in a small group of native speakers of Italian who knew the purpose of the experiment and provided constructive suggestions on how to improve the procedure of the experiment itself.

2.1 Norming Phase

The norming phase was composed of two tasks: the picture description task and the judgment task. Participants were recruited through Twitter, Facebook, and personal connections. Some native speakers participated to both activities, others to just one. The activities were anonymous and no personal information was collected. The only requirements requested were to be at least 18 years of age and to have either German or English as mother tongue.

2.1.1 Picture Description Task on Pavlovia – English

2.1.1.1 Method

16 native speakers of English were asked to perform a picture description task run on the Pavlovia platform in their native language. The task was completely carried out in English, and it was anonymous. After expressing their consent, participants were presented with a brief instructional video and a short mock trial. They were asked to describe 32 pictures depicting ditransitive events using the verb hints given; the pictures were not preceded by a prime sentence, nor any further indication was given. Participants were free to create the target description in the way they thought to be most appropriate and natural. The task lasted circa 10-15 minutes. At the end, some optional feedback questions regarding the pictures were proposed:

- What do you think about the images?

- Did you notice some anomalies in the pictures you have just described? Did something stand out?
- Do you think the images were clear and easy to describe? Do you have comments, critiques, or suggestions about the experiment?

2.1.1.2 Scoring and Results

Descriptions were scored as double-object datives when the recipient was the direct object immediately following the verb, and the theme followed the recipient. Descriptions were scored as prepositional datives when the theme was the direct object immediately following the verb, and the recipient followed the theme being the object of a PP. Specifically, both the prepositions *to* and *for* were accepted in the PO construction. If not scored as DO or PO, a sentence was scored as "Other".

22 items (i.e., 68.75%) were scored as both DO or PO at least once; 10 items (i.e., 31.25%) were scored as only PO or Other.

Table 1. *Numbers and percentages of structures produced to describe the pictures in English*

	DO	***PO***	***Other***
number	52	241	208
percentage	10.4%	48.1%	41.5%

2.1.2 Picture Description Task on Pavlovia – German

2.1.2.1 Method

14 native speakers of German were asked to perform a picture description task on Pavlovia in their native language. The whole experiment was carried out in German, consent form and instructional video included. After the video and the mock trial, participants were asked to describe 67 pictures (32 dative events and 35 transitive events) using the verb hints given. The task lasted circa 25-30 minutes. At the end, participants were asked some optional feedback questions:

- Was halten Sie von den Bildern?
- Sind Ihnen bei den gerade beschriebenen Bildern Auffälligkeiten aufgefallen? Ist etwas aufgefallen?
- Waren die Bilder klar und leicht zu beschreiben? Haben Sie Kommentare, Kritiken oder Anregungen zum Experiment?

2.1.2.2 Scoring and Results

The abovementioned scoring criteria were used. Moreover, the theme always had to be coded in the accusative case, whereas the recipient needed to be coded in the dative case in DOs. To be classified as PO, the PP had to contain either the preposition *an* or *für*, followed by the recipient coded in the accusative case.

2 items (i.e., 9.34%) were scored solely as DO; 11 items (i.e., 34.38%) were scored either as DO or Other. All items were scored at least once as DO.

Table 2. *Numbers and percentages of structures produced to describe the pictures in German*

	DO	***PO***	***Other***
number	249	48	146
percentage	56.2%	10.8%	33.0%

2.1.3 Acceptability rating of sentences (Judgment Task) – English

2.1.3.1 Method

24 native speakers of English, divided in two lists (namely, 12 in list 1 and 12 in list 2), were asked to fill out a Google Form rating the acceptability of 83 sentences (40 dative events and 43 transitive events) from 1 (totally unacceptable) to 6 (totally acceptable). Participants were told to consider acceptability in terms of ease of understanding and probability of use of said sentence while speaking. Each sentence was paired with a box where participants were able to add comments, critiques, or suggestion if they wanted to. List 1 and list 2 were

counterbalanced, meaning that participants in list 1 were presented with a specific event in one of the two alternatives (DO or PO for dative events, active or passive voice for transitive events) and participants in list 2 were presented with the opposite alternative, for a total of 166 events divided into the lists.

2.1.3.2 Scoring and results

Grades 1 and 2 represented ungrammaticality; grades 3 and 4 represented low grammaticality; grades 5 and 6 represented high grammaticality. 5 events (i.e., 6.25%) had an average judgment <4; 2 out of them involved the verb *describe* in the DO construction. 30 events (i.e., 37.5%) had an average judgment between 4 and 4.9; 47 events (i.e., 58.75%) had an average judgment ≥5.

Table 3. *Results of the Judgment Task in English by verb and by mean grammaticality per dative type*

VERB	***DO EVENTS MEAN GRAMMATICALITY***	***PO EVENTS MEAN GRAMMATICALITY***
award	4.83	5.13
bake	4.54	5.60
bring	5.20	4.96
build	5.08	5.33
buy	5.25	5.63
deliver	4.29	5.29
describe	2.80	5.70
gift	4.50	5.29
give	3.90	4.33
hand	4.83	5.48
lend	4.80	5.40
make	5.08	4.70
offer	4.46	5.25
rent	4.28	5.33

sell	4.42	5.42
serve	5.20	5.33
sew	4.50	5.13
write	4.88	5.29

2.1.4 Acceptability rating of sentences (Judgment Task) – German

2.1.4.1 Method

23 native speakers of German, divided in two counterbalanced lists (namely, 12 in list 1 and 11 in list 2), were asked to fill out a Google Form rating the acceptability of 83 sentences (40 dative events and 43 transitive events) from 1 (totally unacceptable) to 6 (totally acceptable). They had the optional possibility of write comments, critiques, or suggestions in the comment box.

2.1.4.2 Scoring and results

Grades 1 and 2 represented ungrammaticality; grades 3 and 4 represented low grammaticality; grades 5 and 6 represented high grammaticality. 10 events (i.e., 12.5%) had an average judgment <4, among which 2 involved the verb *verschenken* in the DO construction. 13 events (i.e., 16.25%) had an average judgment between 4 and 4.9; 57 events (i.e., 71.25%) had an average judgment ≥5, including 9 events (i.e., 11.25) with an average of 6.

Table 4*. Results of the Judgment Task in German by verb and by mean grammaticality per dative type*

VERB	***DO EVENTS MEAN GRAMMATICALITY***	***PO EVENTS MEAN GRAMMATICALITY***
backen	4.50	4.73
bauen	5.36	5.91
beschreiben	5.38	2.83
bringen	4.82	4.02

geben	6.00	4.19
kaufen	5.88	5.87
leihen	5.96	4.09
liefern	5.21	5.61
machen	5.59	4.68
nähen	5.83	5.61
reichen	5.70	5.01
schreiben	5.75	5.77
servieren	5.83	4.18
überbringen	4.86	4.30
übergeben	5.96	5.26
verkaufen	5.55	5.91
verleihen	5.95	5.72
vermieten	5.74	5.83
verpachten	5.46	5.60
verschenken	2.94	4.56

2.1.5 Additional Norming Phase

Since some sentences were judged poorly and some pictures proved themselves as not clear enough, new sentences and new pictures were created. A new version of the Google Form in each language was made, containing both the new sentences and pictures. 24 native speakers of English, divided in two counterbalanced lists (13 in list 1 and 11 in list 2), were asked to judge 16 sentences (12 dative events and 4 transitive events) and to describe 12 ditransitive pictures. 46 native speakers of German, divided in two counterbalanced lists, were asked to judge 17 (7 dative events, 10 transitive events) sentences and to describe 12 ditransitive pictures.

Table 5. *Results of the additional Judgment Task in English by verb and by mean grammaticality per dative type.*

VERB	***DO EVENTS MEAN GRAMMATICALITY***	***PO EVENTS MEAN GRAMMATICALITY***
bake	4.85	5.73
bring	5.01	5.09
build	5.39	5.27
hand	4.96	5.87

Table 6. *Results of the additional Judgment Task in German by verb and by mean grammaticality per dative type.*

VERB	***DO EVENTS MEAN GRAMMATICALITY***	***PO EVENTS MEAN GRAMMATICALITY***
schicken	4.95	4.90
überbringen	5.32	4.52
übergeben	5.51	5.27
vermieten	5.73	5.67

Table 7*. Numbers and percentages of structures produced to describe the additional pictures in English.*

	DO	***PO***	***Other***
number	58	117	113
percentage	20.14%	40.63%	39.24%

Table 8*. Numbers and percentages of structures produced to describe the additional pictures in German.*

	DO	***PO***	***Other***
number	197	71	183
percentage	43.68%	15.74%	40.58%

2.1.6 Discussion

Data from the norming phase was deemed essential for the final choice of the items. The present study is parallel to a study conducted on English and Spanish (a comparison between the two studies aims to investigate language distance and its effects), therefore a prerequisite for all the sentences was to have an acceptability rate of at least 3 out of 6 in all three languages and not only in English and German. This led to difficulties of translation, especially regarding the contexts native speakers judged as appropriate for specific verbs. Verbs that in one of the three languages accept exclusively one dative alternative had been considered as not appropriate given the purpose of the study. This led to the choice of using every verb twice, for a total of eight verbs per experimental condition. To not weaken the priming effect, no verb was repeated more than two times, causing for example the impossibility of using both the German verbs *vermieten* and *verpachten*, since their English equivalent is *rent*. The German verb *geben* was discarded because of the conflicting literature, despite the fact that its mean of grammaticality in the PO construction was 4.19, higher than expected. Moreover, significant differences regarding the acceptance of DO and PO constructions by native speakers of German were foreseen. For this reason, all sentences had been previously checked by a native speaker of German for grammaticality and naturalness. Following their advice, *reichen* was not translated as *hand* but as *pass*, leading to the opportunity of using *übergeben* paired with *hand*. With respect to pictures, data revealed that in some cases the assignment of roles (i.e., who was the agent and who was the recipient) was not clear enough, and some changes were made; the amendments made in the sentences led to the creation of some new pictures due to the verb overlap condition or to different picture-verb pairings. A different issue involved the creation of the pictures: most of them were created through Pixton, a comic creation website. Although

Pixton has a pretty wide range of choice regarding the characters' actions, they were limited and made impossible to depict some events. Whenever possible and if necessary, the pictures created through Pixton were furtherly modified using other platforms.

Collectively, results showed conflicting judgments of native speakers both on the acceptability rate of sentences, on contexts of use of specific verbs, and on the way some pictures were described.

2.2 Pilot Experiment

The goal of the pilot was to assess feasibility of the experiment, enhancing the likelihood of success by detecting malfunctions to fix and/or possible improvements to introduce.

2.2.1 Method

2.2.1.1 Participants

Participants were seven native speakers of Italian with different levels of proficiency in English and German, and different knowledge of psycholinguistics. They were all aware of the purpose of the study and were asked to report any issue and to propose changes if needed.

2.2.1.2 Materials and Design

The experiments were written picture description tasks with a 2x2 factorial design with two independent variables, namely dative alternation (DO-PO), and verb overlap (same verb-different verb). One experiment was built from English to German and the other from German to English: in both experiments, two counterbalanced lists of items were created, for a total of four different lists. Each participant was randomly assigned to a list and underwent only one language direction. The experiments were composed of 96 trials:

- ◊ 32 experimental trials (dative events)
- ◊ 64 filler trials (32 transitive events, 32 intransitive events)

Each trial was composed by three elements: a prime sentence in language A, a picture, and disconnected target words in language B.

2.2.2 Procedure

At the beginning of the experiment, participants were shown an instructional video and were then asked to undergo three mock trials. In the experiment, participants were asked to read out loud a prime sentence shown on their screen for 3.0 seconds, to carefully look at the target picture shown for 1.7 seconds, and finally to write down the description using the words provided, with a time limit of 15 seconds. A progress bar at the bottom of the screen enabled participants to keep track of the time available to produce the target sentence.

2.2.3 Results

Participants expressed their concern about timing, specifically regarding the time limit to produce the target in the English>German direction, and regarding the time available to read the prime sentence in the German>English direction. They proposed longer timing for both the prime sentence and the target picture, and to delete the time limit to produce the description. Moreover, they proposed to eliminate the possibility of deleting typed letters, since the tendency of correcting mistakes was very strong. Everything else was judged as clear and efficient.

3. THE PRESENT STUDY

The present study is a cross-linguistic experiment that aims at investigating whether in late trilingual speakers' syntactic representations between their second and third language are shared or separated. As stated before, this study is part of a bigger project that has the goal of investigating whether shared syntactic representations are somehow influenced by the distance between languages: data from the two parallel studies will be compared in the future to answer to this question. The study is also interested in testing whether proficiency is a determining factor in the sharing of syntactic representation**s** between L2 and L3 (Bernolet et al., 2013; Hartsuiker & Bernolet, 2017). The chosen languages for the study belong to the Germanic family: English (L2) and German (L3); the parallel study focuses on English (L2) and Spanish (L3). Moreover, the possible presence of lexical boost effect is investigated, therefore one of the two independent variables involved in the design is lexical overlap. All participants in both studies have Italian as their L1.

The current study investigates syntactic priming in both directions, L2>L3 and L3>L2. The study predicts a positive effect of cross-linguistic syntactic priming between English (L2) and German (L3) and therefore the confirmation of the shared-syntax account (Hartsuiker et al., 2004). The integration of syntactic representations of trilinguals is predicted to be influenced by proficiency, particularly of the target language. The lexical boost effect is expected to be attested (Pickering & Branigan, 1998).

3.1 Method

3.1.1 Participants

Participants were 52 native speakers of Italian (40 female, 11 male, 1 prefer not to say). They were recruited online through social media (Facebook, Instagram) and through correspondence with linguistic high schools all over Italy. In order to qualify for the experiment, participants had to be at least 18 years of age and to be late trilinguals of English and German, meaning that they learned their L2 and L3 after the acquisition of their L1 (Italian). The mean age of participants was 24 (range 18-41). Their language background was assessed though the Bilingual Profile Questionnaire (Appendix C) administered through Google Forms in English. Their self-rated proficiency in English and German was between A2 and C2. As illustrated in paragraph 3.2, they were classified based on the language they produced the descriptions in: regarding those (26) who underwent the L3>L2 direction, 3.85% rated their proficiency in

German as B1, 46.15% as B2, 46.15% as C1, and 3.85% as C2; regarding those (26) who underwent the L2>L3 direction, 7.69% rated their proficiency in English as A2, 30.77% as B1, 30.77% as B2, 26.92% as C1, and 3.85% as C2.

3.1.2 Design

The experiments were picture description production tasks with a 2x2 factorial design. There were two independent variables: dative construction (DO - PO) and verb overlap between the prime and the target.

***Table 9**. Experimental conditions*

	DO	**PO**
Different verb	DO-Different verb	PO-Different verb
Same verb	DO-Same verb	PO-Same verb

3.1.3 Materials

The experiments were composed of a total of 96 trials, of whom 32 were experimental. Each experimental trial consisted in a prime dative event and a target picture depicting a dative event, therefore 96 sentences and 96 pictures were created, and all involved an agent, a theme, and a recipient. 16 different verbs were employed: *liefern – deliver, reichen – pass, machen – make, backen – bake, bauen – build, schreiben – write, leihen – lend, vermieten – rent, kaufen – buy, verkaufen – sell, schicken – send, servieren – send, nähen – sew, verleihen – award, überbringen – bring, übergeben – hand*. Two counterbalanced lists were created for each experiment, meaning that participants in list 1 were presented with primes in one dative alternative and participants in list 2 were presented with the opposite alternative, for a total of 16 prime events in each alternative in every list. For example, participants in list 1 were presented with the DO prime sentence 10A or 10B depending on the direction of the experiment, and participants in list 2 with the PO alternative 11A or 11B:

10. a. The girl bought her cousin a scarf.
    b. Das Mädchen kaufte seiner Cousine einen Schal.
11. a. The girl bought a scarf for her cousin.
    b. Das Mädchen kaufte einen Schal für seine Cousine.

Each experiment involved 8 ditransitive verbs per experimental condition. To reduce the possibility of participants understanding which syntactic structure was under scrutiny or noticing the relationship between the prime sentence and the target picture, 64 fillers were employed. Therefore, the 96 trials were divided as the following:

- ◊ 32 experimental trials (ditransitive events)
- ◊ 64 filler trials (32 transitive events, 32 intransitive events)[1]

Between two experimental trial, two filler trials (one involving a transitive event, the other an intransitive one) were always present. The pictures were in black and white and for the most part had been created on Pixton.com; they depicted events that could be described in the primed construction or in the alternative. To elicit the production of ditransitive events, not only the target verb, but also the agent, the recipient, and the theme were provided to the participants.

3.1.4 Procedure

Through different communication channels (social media, university staff, word of mouth, etc.), participants received the recruitment text containing basic information about the experiment and a URL link to the Consent Form (Appendix D), administered through Google Forms. In the confirmation message of the Consent Form there was the URL link redirecting to the Bilingual Profile Questionnaire, once again administered through Google Form. After filling out both forms, participants received an email with their participant ID, a URL link of the experiment and useful information to ensure the proper functioning of the experiment.

Instructions were given through a video containing examples of each type of event (dative, transitive, intransitive). In order to make the participant familiar with the timing of prime sentences and of target pictures, they completed a brief mock trial before starting the actual experiment. In the experiment, participants were presented with a prime sentence for 4.5

[1] The transitive items (i.e., pictures and sentences) were created by Chiara Facipieri, the data collector of the parallel study. She also contributed to the creation of intransitive items.

seconds and then with a target picture for 2.5 seconds. Finally, participants were presented with a visual array containing mandatory words to produce target descriptions. Whereas the verb was always displayed on the left in its infinite form, the position on the nouns depended on the number of words: with intransitive events, the only noun provided was the agent and it was positioned in the middle of the screen, at the same height of the verb; with transitive events, the agent and the patient were displayed one on the top and the other to the bottom. With experimental dative events, the theme was always displayed at the top, while the positions of the agent and of the recipient were counterbalanced, displayed on the bottom, one on the left and the other on the right, as in Cho-Reyes (2016). In the L2>L3 direction, each noun was paired with its article in the nominative case. All participants were asked to create a one-sentence description of the pictures combining all the words provided, adding not-included function words. Each trial consisted in a prime sentence, a target picture, and target words, as shown in figure 9.

3.1.5 Scoring

In English, descriptions of dative pictures were scored as double-object (DO) when the recipient was the direct object immediately following the verb, and the theme followed the recipient. Descriptions were scored as prepositional datives (PO) when the theme was the direct object immediately following the verb, and the recipient followed the theme being the object of a PP. The prepositions *to* and *for* were accepted in the PO construction, but with consideration of the meaning of the sentence. Descriptions were scored as shifted-PO (SPO) when the PP containing the recipient preceded the NP containing the theme, e.g., *the boy lends to the girl a torch*. All other descriptions were scored as "Other".

In German, the same criteria for DO and PO were applied, with the additional essential regard for case assignment: the recipient in DO constructions had to be coded in the dative case, whereas it had to be coded in the accusative case in PO constructions and preceded only by *an* or *für*. The theme had to be always coded in the accusative case. Descriptions were coded as shifted-DO (SDO) when the NP containing the theme preceded the NP containing the recipient, the former coded in the accusative case and the latter in the dative case, e.g., *Die Autorin schrieb das Autogramm dem Mädchen*. All other descriptions were scored as "Other", included those where one or more constituents were coded in other cases than the aforementioned.

Significantly, the two marked constructions (i.e., SDO and SPO) were scored as independent and of equal importance to PO and DO constructions.

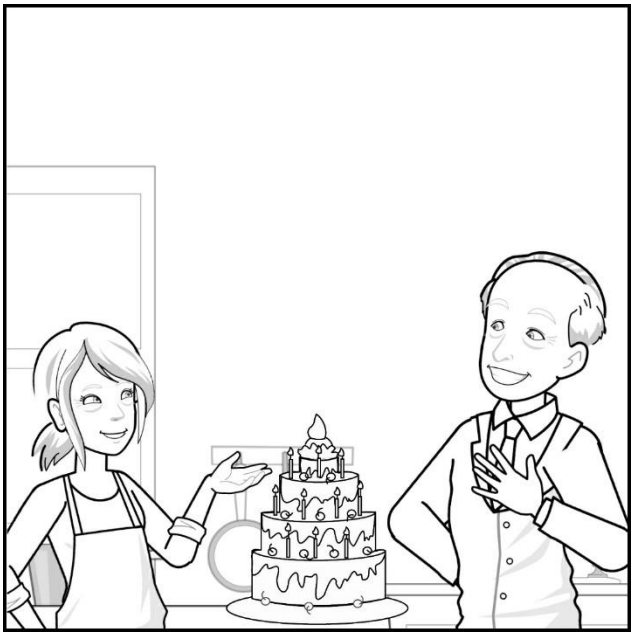
Figure 9. Example of experimental trial in the same verb condition in the two directions: the L2>L3 direction on the left, the L3>L2 direction on the right.

$L2_{ENG}$>$L3_{GER}$	**$L3_{GER}$>$L2_{ENG}$**

PRIMING SENTENCE

ENGLISH	GERMAN
The pastry chef baked his sister a muffin	Der Konditor backte seiner Schwester einen Muffin
The pastry chef baked a muffin for his sister	Der Konditor backte einen Muffin für seine Schwester

TARGET PICTURE



TARGET WORDS

GERMAN		ENGLISH	
backen	der Kuchen	bake	cake
	der Mann die Frau		husband wife

The few cases where responses were either blank or incomplete were scored as "Blank". Since participants could not delete typed letters and were told to produce responses in the shortest possible time, spelling mistakes were not taken into consideration, neither were grammatical mistakes regarding the declension of the verbs (namely, the past participle form of verbs and the position of the *über* not-separable prefix in the sentences involving the verbs *übergeben* and *überbringen*). Rarely, participants used different verbs rather than the provided ones: this was not considered as incorrect, therefore the constructions were scored solely with the abovementioned criteria as if participants used the given verbs.

3.2 Results

3.2.1 Priming from German to English

In order to display the data as clearly as possible, and to consider useful information regarding participants to draw the final conclusions, different tables have been created. Table 10 displays the total number, proportions, and standard deviation of responses by prime condition of all 26 participants that underwent the L3>L2 direction. Similarly, table 11 and 12 display the same kind of data but divided based on participants' self-rated proficiency in English: this distinction allows to make statements regarding the proficiency factor.

Table 10. *Total number, proportions and (standard deviation) of double-object, prepositional-object, shifted-PO and Other by prime condition of participants (N=26) in the German-English experiment.*

	DO		***PO***		***SPO***		***Other***	
	n	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*
Condition								
DO-Different	19	.09 (0.29)	167	.81 (0.40)	1	.00 (0.07)	20	.10 (0.30)
DO-Same	25	.12 (0.33)	148	.71 (0.45)	5	.02 (0.15)	29	.14 (0.35)
PO-Different	12	.06 (0.23)	172	.83 (0.38)	2	.01 (0.10)	21	.10 (0.30)
PO-Same	17	.08 (0.27)	168	.81 (0.40)	3	.01 (0.12)	20	.10 (0.30)

Data show a high number of PO productions in all four prime conditions, being it equal or higher after a PO prime (.81 and .71 after a DO prime; .83 and .81 after a PO prime). The

number of DO responses after a DO prime (.09 and .12) is higher than after a PO prime (.06 and .08). The highest number of SPO responses is in the DO-Same condition (.02).

Table 11. *Total number, proportions and (standard deviation) of double-object, prepositional object, shifted-PO and Other by prime condition of participants (N=13) with a self-rated proficiency of* ***B1-B2*** *in the German-English experiment.*

	DO		***PO***		***SPO***		***Other***	
	n	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*
Condition								
DO-Different	4	.04 (0.19)	85	.83 (0.38)	1	.01 (0.10)	12	.12 (0.32)
DO-Same	8	.08 (0.27)	73	.70 (0.46)	5	.05 (0.21)	18	.17 (0.38)
PO-Different	1	.01 (0.10)	86	.83 (0.39)	2	.02 (0.14)	15	.14 (0.35)
PO-Same	7	.07 (0.25)	83	.81 (0.40)	3	.03 (0.17)	10	.10 (0.30)

Table 12. *Total number, proportions and (standard deviation) of double-object, prepositional object, shifted-PO and Other by prime condition of participants (N=13) with a self-rated proficiency of* ***C1-C2*** *in the German-English experiment.*

	DO		***PO***		***SPO***		***Other***	
	n	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*
Condition								
DO-Different	15	.14 (0.35)	82	.78 (0.42)	0	.00 (0.00)	8	.08 (0.27)
DO-Same	17	.17 (0.37)	75	.73 (0.45)	0	.00 (0.00)	11	.11 (0.31)
PO-Different	11	.11 (0.31)	86	.83 (0.37)	0	.00 (0.00)	6	.06 (0.24)
PO-Same	10	.10 (0.29)	85	.81 (0.39)	0	.00 (0.00)	10	.10 (0.29)

The intermediate group (i.e., B1-B2) produced SPO constructions, however they were few; the advanced group (i.e., C1-C2) did not produce any SPO responses. The intermediate group produced some DOs (.04 and .08 after DO primes, .01 and .07 after PO primes). The proportions

of DOs are much higher in the advanced group: .14 and .17 after DO primes, .11 and .10 after PO primes. There seems to be a priming effect regarding the production of DO by the advanced group, being the proportions higher after DO primes. Moreover, the proportions of DOs increased in presence of verb overlap in both groups.

3.2.2. Priming from English to German

As for the German-English direction, the results of all 26 participants are presented collectively in table 13, and then classified by the participants' self-rated proficiency in the language they produced descriptions in (i.e., German). Participants were divided in three groups: beginner (i.e., A2-B1), intermediate (i.e., B2), and advanced (i.e., C1-C2).

Table 13*. Total number, proportions and (standard deviation) of double-object, prepositional object, shifted-DO and Other by prime condition of participants (N=26) in the English-German experiment.*

	DO		***PO***		***SDO***		***Other***	
Condition	*n*	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*
DO-Different	132	.63 (0.48)	8	.04 (0.19)	26	.13 (0.33)	42	.20 (0.40)
DO-Same	134	.65 (0.48)	8	.04 (0.19)	25	.12 (0.33)	39	.19 (0.39)
PO-Different	128	.62 (0.49)	9	.04 (0.20)	37	.18 (0.38)	34	.16 (037)
PO-Same	137	.67 (0.48)	12	.06 (0.23)	26	.13 (0.33)	30	.15 (0.35)

Data show a high number of DO descriptions in all conditions, with no apparent influence of the prime constructions: .63 and .65 after DO primes, .62 and .67 after PO primes. The not-primed construction SDO was produced in the following proportions: .13 and .12 after a DO prime, .18, and .13 after a PO prime. The number of PO constructions produced is low in all conditions, with minimal increase after PO primes. The PO-Same condition displays higher proportions in both DO and PO descriptions than the PO-Different: .67 DO descriptions and .06 PO descriptions in the former condition, .62 and .04 PO description in the latter condition.

Table 14*. Total number, proportions and (standard deviation) of double-object, prepositional object, shifted-DO and Other by prime condition of participants (N=10) with a self-rated proficiency of* ***A2-B1*** *in the English-German experiment.*

	DO		***PO***		***SDO***		***Other***	
	n	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*
Condition								
DO-Different	43	.54 (0.50)	4	.05 (0.22)	14	.18 (0.38)	19	.24 (0.43)
DO-Same	37	.47 (0.50)	5	.06 (0.24)	15	.19 (0.39)	21	.27 (0.44)
PO-Different	42	.53 (0.50)	2	.03 (0.16)	22	.28 (0.45)	14	.18 (0.38)
PO-Same	45	.58 (0.50)	2	.03 (0.16)	16	.21 (0.40)	15	.19 (0.39)

Table 15*. Total number, proportions and (standard deviation) of double-object, prepositional object, shifted-DO and Other by prime condition of participants (N=8) with a self-rated proficiency of* ***B2*** *in the English-German experiment.*

	DO		***PO***		***SDO***		***Other***	
	n	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*
Condition								
DO-Different	42	.68 (0.47)	1	.02 (0.13)	11	.18 (0.39)	8	.13 (0.34)
DO-Same	51	.77 (0.42)	0	.00 (0.00)	6	.09 (0.29)	9	.14 (0.35)
PO-Different	46	.70 (0.46)	0	.00 (0.00)	11	.17 (0.38)	9	.14 (0.35)
PO-Same	46	.75 (0.44)	0	.00 (0.00)	7	.11 (0.32)	8	.13 (0.34)

***Table 16**. Total number, proportions and (standard deviation) of double-object, prepositional object, shifted-DO and Other by prime condition of participants (N=8) with a self-rated proficiency of **C1-C2** in the English-German experiment.*

	DO		***PO***		***SDO***		***Other***	
	n	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*
Condition								
DO-Different	47	.71 (0.46)	3	.05 (0.21)	1	.02 (0.12)	15	.23 (0.42)
DO-Same	46	.74 (0.44)	3	.05 (0.22)	4	.06 (0.25)	9	.15 (0.36)
PO-Different	40	.65 (0.48)	7	.11 (0.32)	4	.06 (0.25)	11	.18 (0.39)
PO-Same	46	.70 (0.46)	10	.15 (0.36)	3	.05 (0.21)	7	.11 (0.31)

With regards to DO descriptions, proportions are higher in the intermediate group (.68 and .77 after DO primes, .70 and .75 after PO primes) and advanced group (.71 and .74 after DO primes, .65 and .70 after PO primes), and lower in the beginner group (.54 and .47 after DO primes, .53 and .58 after PO primes). SDO constructions were mainly produced by the beginner group, setting a significant difference compared to the advanced group: the former produced .18 and .19 SDO descriptions after DO primes, .28 and .21 SDO descriptions after PO primes; the latter produced .02 and .06 SDO descriptions after DO primes, .06 and .05 SDO descriptions after PO primes. Regarding proportions of PO descriptions, the beginner group produced .05 and .06 after DO primes, .03 and .03 after PO primes; the intermediate group produced .02 and .00 after DO primes, .00 and .00 after PO primes; the advanced group produced .05 and .05 after DO primes, .11 and .15 after PO primes.

3.2.3 Target pictures and verbs

Results of the pilot phase (see Chapter 2) highlighted the importance of the choice of verbs involved in ditransitive events and of the clarity of the pictures presented to participants. For this reasons, tables 17, 18, 19 and 20 have been created.

As shown in table 17, the verbs *award*, *rent*, and *sew* elicited respectively 32, 15, and 10 descriptions scored as "Other". In particular, *award* was frequently used with the preposition "with", e.g., *a man awards the actress with an Oscar*; events with *sew* sometimes involved the owner of the dress (theme), e.g., *the seamstress is sewing the dress of the bride*. *Rent* elicited

different kind of constructions, e.g., *the man rents a house thanks to the realtor* and *the woman is renting a car from the man*.

Interestingly, table 18 shows that three verbs did not elicit any PO: *überbringen*, *übergeben*, and *vermieten*. All verbs elicited at least 4 SDO constructions.

Table 17*. Number of occurrences of double-object, prepositional object, shifted-PO and Other by target verb in the German-English experiment.*

Verb	***DO***	***PO***	***SPO***	***Other***
award	6	13	1	32
bake	3	47	0	2
bring	4	44	0	4
build	3	48	0	1
buy	6	44	1	1
deliver	5	42	0	5
hand	7	39	0	6
lend	7	42	2	0
make	7	45	0	0
pass	3	46	0	2
rent	5	31	0	15
sell	3	45	2	2
send	5	43	2	2
serve	3	42	1	6
sew	1	39	2	10
write	5	45	0	2

Table 18*. Number of occurrences of double-object, prepositional object, shifted-DO and Other by target verb in the English-German experiment.*

Verb	***DO***	***PO***	***SDO***	***Other***
backen	28	9	4	11
bauen	32	5	7	8
kaufen	37	2	6	7
leihen	33	1	8	9
liefern	34	2	8	7
machen	31	5	7	8
nähen	35	3	6	7
reichen	38	1	8	5
schicken	34	4	7	7
schreiben	33	1	8	9
servieren	35	1	8	8
überbringen	35	0	6	11
übergeben	33	0	7	12
verkaufen	30	1	10	11
verleihen	32	2	8	10
vermieten	31	0	6	15

The following tables show the number of occurrences per construction by target picture. By comparing the results of the two, it is possible to say that pictures proved themselves to be clear and effective in eliciting ditransitive events.

Table 19*. Number of occurrences of double-object, prepositional object, shifted-PO and Other by target picture (shown through the gloss of the event depicted) in the German-English experiment.*

Verb	***DO***	***PO***	***SPO***	***Other***
agent rent man house	2	15	0	8
author write girl autograph	2	24	0	0
baker sell girl bread	0	24	1	1
boy hand man hammer	1	23	0	1
boy lend girl torch	6	18	1	0
boy make girl hamburger	4	22	0	0
daughter bake mother cookies	2	23	0	1
delivery boy bring girl package	3	22	0	1
delivery boy deliver woman pizza	1	22	0	3
father send daughter gift	3	20	1	2
girl deliver old man groceries	4	20	0	2
girl make boy hotdog	3	23	0	0
girl send grandfather letter	2	23	1	0
grandfather build grandson treehouse	3	23	0	0
grandmother buy niece bear	3	23	0	0
lady serve nurse plate	2	18	1	5
lady sew man jacket	0	21	0	5
mailcarrier deliver woman letter	1	22	0	3
man award actress Oscar	3	7	0	16
man buy boy saxophone	3	21	1	1
man sell boy ice-cream	3	21	1	1
man write woman check	3	21	0	2

manager rent girl car	3	16	0	7
priest hand couple certificate	2	21	0	3
professor hand student diploma	5	18	0	3
seamstress sew bride dress	1	18	2	5
student lend athlete book	1	24	1	0
vet hand boy dog	2	23	0	1
waiter serve clown coffee	1	24	0	1
wife bake husband cake	1	24	0	1
woman award athlete medal	3	6	1	16
woman build girl rocking horse	0	25	0	1

Table 20*. Number of occurrences of double-object, prepositional object, shifted-DO and Other by target picture (shown through the gloss of the event depicted) in the English-German experiment.*

Verb	***DO***	***PO***	***SDO***	***Other***
agent rent man house	16	0	3	7
author write girl autograph	18	1	4	3
baker sell girl bread	15	0	5	6
boy hand man hammer	17	0	5	4
boy lend girl torch	18	1	3	4
boy make girl hamburger	16	6	1	3
daughter bake mother cookies	15	5	3	2
delivery boy bring girl package	19	0	2	5
delivery boy deliver woman pizza	18	0	4	4
father send daughter gift	19	0	2	4

girl deliver old man groceries	18	1	2	5
girl make boy hotdog	16	4	1	5
girl send grandfather letter	13	1	7	5
grandfather build grandson treehouse	17	4	0	5
grandmother buy niece bear	19	1	3	3
lady serve nurse plate	19	0	6	1
lady sew man jacket	17	2	4	3
mailcarrier deliver woman letter	15	0	4	6
man award actress oscar	18	0	4	4
man buy boy saxophone	19	1	2	4
man sell boy ice-cream	16	1	5	4
man write woman check	18	0	4	4
manager rent girl car	17	1	2	6
priest hand couple certificate	13	0	5	7
professor hand student diploma	17	0	4	5
seamstress sew bride dress	19	0	6	1
student lend athlete book	17	0	6	3
vet hand boy dog	18	0	2	6
waiter serve clown coffee	13	0	6	7
wife bake husband cake	13	3	3	7
woman award athlete medal	15	1	4	5
woman build girl rocking horse	13	4	2	7

4. DISCUSSION AND CONCLUSIONS

4.1 General discussion

The aim of the present study was to investigate cross-linguistic syntactic representations in late trilingual speakers. Specifically, 52 native speakers of Italian whose L2 and L3 are respectively English and German participated to the study. Two experiments were designed: in the experiment which primed from English to German, participants read prime sentences in English and produced target sentences in German; in the experiment from German to English, participants read prime sentences in German and produced target sentences in English. The experiments tested whether syntactic priming occurred between two non-native languages, whether proficiency was a determining factor of said sharing (Bernolet et al., 2013; Hartsuiker & Bernolet, 2017), and whether the lexical boost effect was attested (Pickering & Branigan, 1998). The study predicted a positive effect of cross-linguistic syntactic priming between the chosen languages, confirming the shared-syntax account (Hartsuiker et al., 2004). Proficiency in the target language was predicted to be significant, and the lexical boost effect was predicted to be attested.

The results illustrated in the previous chapter and in the next sections highlight the importance of proficiency in the target language. Although the study focuses on the relation between two non-native languages, it is important to note that speaking for trilingual speakers requires having control over three languages, not just two. Trilingual processing is more effortful than bilingual processing (Festman, 2008): producing in one language involves the inhibition of the other two languages in order to avoid cross-language interference, that is the intrusion of the non-target language while producing the target language (see paragraph 1.3).

Paragraph 4.1.1 presents the most important results of the priming experiment from German to English, whereas paragraph 4.1.2 presents the results of the priming experiment from English to German. In paragraph 4.2 two possible follow-up studies are proposed. Paragraph 4.3 illustrates the conclusions of the present study.

4.1.1 Experiment 1: German to English

Overall, the experiment revealed a tendency of non-native speakers to produce PO constructions in English regardless of the primed condition. The proportions of POs produced don’t diversify from one group to the other, whereas the number of DOs produced increases in the advanced group. Moreover, a priming effect with a magnitude of 7% was found in DO

responses, as shown in figure 10. If only the advanced group is considered, data show a priming effect with a magnitude of 10%.

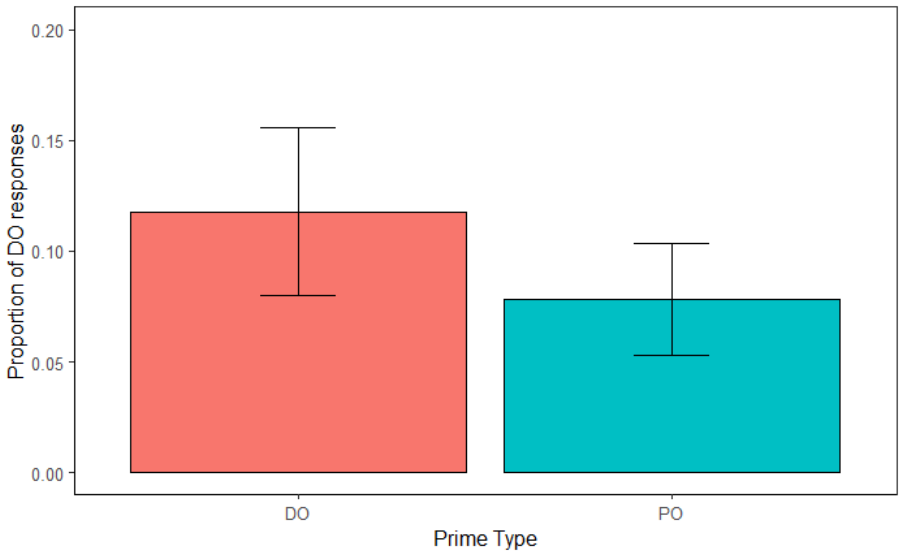


Figure 10.
Main effect of prime type on the proportions of DO responses in the German-English experiment

Although very small, an increase of DO proportions was observed in the DO-Same condition than in the DO-Different condition, suggesting a possible lexical boost effect. If results of all 26 participants are investigated, the lexical boost effect has a magnitude of 3% in the DO descriptions produced after DO primes; it has a magnitude of 4% if only the intermediate group is considered.

A non-primed construction, namely shifted-PO (SPO), was produced. By taking into consideration participants' proficiency in English, data showed that only those who rated their proficiency as B1 or B2 produced SPOs; participants with a higher level of proficiency (i.e., C1 and C2) did not produce any SPO. Therefore, the production of SPOs is influenced by the participants' level of proficiency, being it apparently not high enough for them to prevent using said construction.

Data regarding less proficient participants – who are predicted to be more influenced by their mother tongue – can be interpreted in terms of L1 influence: the absence of the DO construction in their L1 (i.e., Italian) may have caused their substantial production of POs over DOs and the production of SPOs (however low), which is a marked rare construction. The difference in the role played by the L1 between the intermediate and the advanced groups is

consistent with Flett et al.'s (2013) findings, according to which proficient bilinguals are not influenced by their L1 while processing the L2. It is also consistent with was observed by Bernolet et al. (2013), that is stronger between-language priming for more proficient bilinguals than for less proficient bilinguals. This is in line with the priming effect found in the present experiment: data showed less priming at a lower level of proficiency than in the higher, namely a magnitude of priming effect for the DO condition of 10% in the advanced group and 4% in the intermediate group. Therefore, the sharing of the syntactic representations seems to be modulated by proficiency: if priming is an indicator of the integration of the syntactic account, then the advanced group seems to have a more integrated system between German in English in the L3>L2 direction, at least regarding the DO construction.

Table 21. *Total number, proportions and (standard deviation) of double-object by prime condition; priming effect, and lexical boost of double-object of all participants (N=26), of the B1-B2 group (N=13), and of the advanced group (N=13) in the German-English experiment.*

	All participants		***Intermediate group***		***Advanced group***	
	DO		***DO***		***DO***	
Condition	*n*	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*
DO-Different	19	.09 (0.29)	4	.04 (0.19)	15	.14 (0.35)
DO-Same	25	.12 (0.33)	8	.08 (0.27)	17	.17 (0.37)
PO-Different	12	.06 (0.23)	1	.01 (0.10)	11	.11 (0.31)
PO-Same	17	.08 (0.27)	7	.07 (0.25)	10	.10 (0.29)
DO priming effect		7%		4%		10 %
DO lexical boost		3%		4%		3%

4.1.2 Experiment 2: English to German

Overall, participants produced a high number of DO descriptions, with no apparent difference based on prime condition nor participants' level of proficiency in German. This was partially expected since the DO construction is very common in German and learners of German are usually taught that it is the most grammatical and natural dative alternative. The number of descriptions scored as "Other" is quite high and it has been caused mainly by erroneous declensions of articles. It is important to state that none of the 26 participants whose data are here illustrated failed to decline all sentences, meaning that they indeed knew the correct form of articles; when they made mistakes, they were possibly not paying attention or they simply forgot to do it, albeit the latter seems to be a slim possibility. As stated before, spelling mistakes were not taken into consideration, and participants were aware of that; it was not always clear if the declension mistake was a real grammatical mistake or a spelling one, but if the article was written in one of its four possible forms, it was considered declined in said case. Many times, participants immediately realized their case assignment mistake, and typed the right form after a wrong one: the latter version was considered as final and therefore scored as correct.

Interestingly, participants produced a non-primed construction, namely shifted-DO (SDO). The proportions of SDOs are higher than the proportions of POs. This construction could be a language transfer from Italian: participants have a tendency of not using a DO since it is not available in Italian, but at the same time they know that the DO is the most common construction in German. Therefore, participants used a construction that it is grammatical in German but that they had probably produced while being unconsciously influenced by their L1. As for the previous experiment, proficiency seems to be a determining factor: tables 14, 15 and 16 show that proficiency and SDO descriptions are inversely related, meaning that SDO proportions decrease as proficiency in German increases, as shown in figure 11.

Differently, PO descriptions don't seem to be influenced by the participants' level of proficiency in German. Even though high proficient participants produced less POs than the less proficient, participants that rated their proficiency as B2 produced just one PO construction. There seems to be a lexical boost effect of 9% in the production of DOs by the intermediate group. In the advanced group, a lexical boost effect of 3% was observed in the production of DOs, and of 4% in the production of POs.

Table 22. *Total number, proportions, (standard deviation) and lexical boost of double-object by prime condition of participants (N=8) with a self-rated proficiency of B2 group; total number, proportions, (standard deviation) and lexical boost of double-object and of prepositional-object of participants (N=8) with a self-rated proficiency of C1-C2 group, in the English-German experiment*

	Intermediate group		***Advanced group***		***Advanced group***	
	DO		***DO***		***PO***	
Condition	*n*	*% (sd)*	*n*	*% (sd)*	*n*	*% (sd)*
DO-Different	42	.68 (0.47)	47	.71 (0.46)	3	.05 (0.21)
DO-Same	51	.77 (0.42)	46	.74 (0.44)	3	.05 (0.22)
PO-Different	46	.70 (0.46)	40	.65 (0.48)	7	.11 (0.32)
PO-Same	46	.75 (0.44)	46	.70 (0.46)	10	.15 (0.36)
lexical boost	9%		3%		4%	

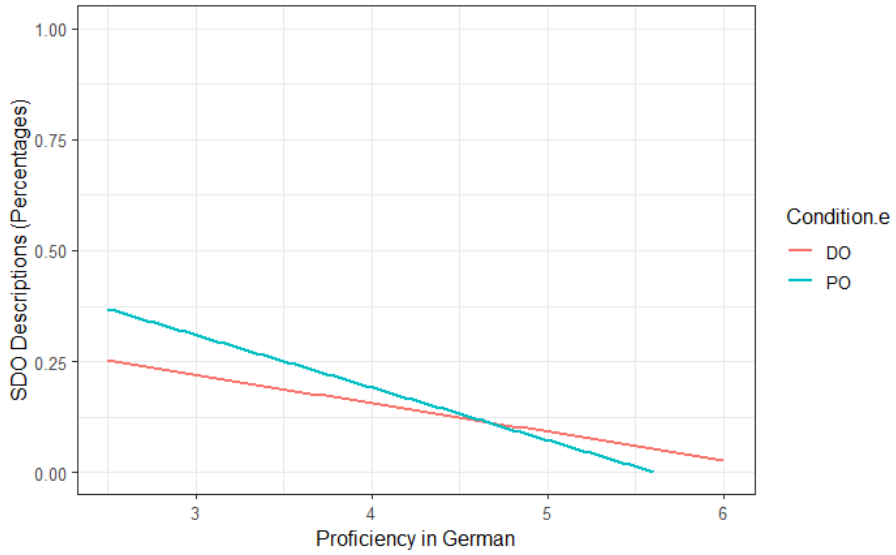


Figure 11.
SDO descriptions as a function of proficiency in German in the English-German experiment

4.2 Follow-up

4.2.1 CLI and L1 transfers

In the experiment from German to English, participants produced a non-primed construction (i.e., shifted-DO); in paragraphs and 4.1.2, the possibility of it being a language transfer from L1 has been proposed. To hinder said transfer as much as possible, the whole experiment was conducted in English (e-mail containing the URL link and the basic information, and instructional video included), so that participants allegedly didn't use Italian for the whole duration of the experiment.

Festman (2008) suggested that switching between three languages negatively influence the ability of participants of controlling the production in the target language. Cross-language interference (CLI) is reported to be more frequent in lower proficiency languages, since inhibiting the non-target languages is more difficult, whereas CLI is reported to be less frequent in high proficiency languages. Furthermore, while processing their weaker language even trilingual speakers of intermediate to high proficiency are not able to restrict lexical retrieval to the target language (Festman, 2008). It is also true that in case of trilingual speakers, any of the non-target languages can cause CLI while processing the target language (Mosca, 2019). Festman (2008) designed a picture naming experiment with speakers of German (L1), English (L2), and French (L3), and found that English was the language that showed higher CLI and that German was the major source of it; this results have been interpreted in terms of typological closeness of German and English. Mosca (2019) designed a picture naming experiment with unbalanced trilinguals of German (L1), English (L2) and Italian (L3): her data showed that German was the stronger source of interference, and that English was the language that showed higher CLI. Additionally, she designed a similar experiment with participants with trilingual speakers of Italian (L1), German (L2), and English (L3): her findings presented L2 as the language that showed higher CLI and L3 as the major source of influence. Taken together, the three aforementioned experiments show CLI between English and German regardless of their status as L1, L2 or L3 – notably, the English (L2)-German (L3) pairing was not tested – in terms of typological similarity between the two languages.

It seems necessary to point out that syntactic constructions are the focus of this study, whereas Festman (2008) and Mosca (2019)'s studies were focused on lexicon. It is not possible to say if the current study is inconsistent with the mentioned findings, because it does not involve the participants' L1. Therefore, to determine whether the present results are truly inconsistent with other findings and to determine whether the present results are, as hypothesised, explainable through L1 transfer, a more complete study should be designed: this

study should not only design experiments in the L2>L3 and L3>L2 directions, but also in the L1>L3, L3>L1, L1>L2 and L2>L1 directions.

4.2.2 Language distance

The typological similarity between English and German does not seem to have positively influenced the experiments as predicted, but this topic requests for a further investigation. In order to determine whether the distance between a L2 and a L3 is significant, the present findings need to be compared to those from the parallel study involving English (L2) and Spanish (L3). By doing so, it will be hopefully possible to argue whether the priming between two Germanic languages is stronger, weaker, or equal to priming between a Germanic language and a Romance language. Moreover, more participants need to be recruited and more data need to be collected to make a significant contribution to the research on multilingualism. Specifically, a more thorough investigation on participants' proficiency in both the prime and the target language would shed light on the absence or presence of evidence supporting the shared-syntax account.

Many unanswered questions regarding syntactic priming with speakers of three or more languages need to be addressed, also in terms of language transfer.

4.3 Conclusions

The current study is intended to contribute to the inquiry on multilingualism providing a new set of findings on late trilingual speakers, namely native speakers of Italian who speak English (L2) and German (L3), by employing cross-linguistic syntactic priming. The study is intended to answer to three questions:

i. In late trilingual speakers, are syntactic representations between their L2 and L3 shared or separated (Hartsuiker et al., 2004)?
ii. Is proficiency a determining factor in the sharing of said syntactic representations (Bernolet et al., 2013; Hartsuiker & Bernolet, 2017)?
iii. Is there evidence of lexical boost effect (Pickering & Branigan, 1998)?

Syntactic priming was investigated both from German to English and from English to German.

Overall, participants produced a high number of PO constructions in English and of DO constructions in German, regardless of the primed condition. The production of POs does not seem to be modulated by proficiency in any of the experiments.

In experiment 1 (German to English), participants produced a non-primed construction, a shifted-PO, that is acceptable but relatively rare in English (Pickering et al., 2002). It was produced only by less proficient participants (i.e., those who rated their proficiency as B1-B2) and not by higher proficient participants (i.e., those who rated their proficiency as C1-C2). Therefore, SPO descriptions seem to be modulated by proficiency in the target language. Priming was attested only in experiment 1, from German to English, and only regarding the DO construction, with a magnitude of 7% if all participants are considered, and of 10% if only the advanced group is considered, meaning that more proficient participants were more primed than less proficient participants. This is consistent with Flett et al.'s (2013) and Bernolet et al.'s (2013) findings regarding more between-language priming for more proficient bilinguals than for less proficient bilinguals.

In experiment 2 (English to German), no priming effect was attested. As expected, participants produced a high number of DO descriptions overall. Many descriptions were scored as "Other" since participants often failed to correctly decline the articles. Interestingly, a grammatical non-primed construction in German was produced, namely shifted-DO (e.g., *Die Autorin schrieb das Autogramm dem Mädchen*): this has been interpreted in terms of transfer from Italian (L1), a language where the DO construction is not available. Participants attempted to use the DO constriction as taught, but a transfer from Italian caused a shifted word order similar to the constituent order in the PO construction.

The fact that priming effect was found restrictively to the DO construction in only one of the two experiments has been deemed as not sufficient to claim that syntactic representations are shared between English (L2) and German (L3) in late trilinguals, although influence of proficiency requires further investigation. When present, priming effect was indeed modulated by the participants' proficiency in the target language: this is evidence that proficiency is a determining factor in the sharing of syntactic representations between languages.

Lexical boost effect was found in very low magnitude if the participants of each experiment are considered jointly (i.e., with no classification based on their proficiency in the target language); therefore, is it not possible to claim the present study has collected evidence of it. However, it was attested with a magnitude of 9% in the case of DO description produced by the intermediate group in the experiment from English to German.

The study predicted a positive effect of priming in both experiments, and therefore the confirmation of the shared-syntax account: this was found partially true for the experiment from German to English, limitedly to the DO construction. The integration of syntactic representations of L2 and L3 in late trilinguals was predicted to be influenced by proficiency: this was confirmed in terms of influence of the target language. The lexical boost effect was expected to be attested: it was attested only with low magnitude; specifically, in the experiment from German to English a magnitude of 7% was attested if all participants are considered, and of 10% if only those belonging to the advanced group are considered. In the experiment from English to German, the lexical boost effect was attested limitedly to the intermediate group with a magnitude of 9%.

To conclude, data confirmed only the prediction regarding proficiency in the target language. Predictions regarding shared syntactic representations between L2 and L3 in late trilinguals were not confirmed, nor were the presence of lexical boost effect. Two follow-up studies have been proposed in paragraph 4.2. Firstly, it is proposed a study involving not only L2 and L3 but also L1: it could clarify the present results, allowing to judge the consistency with Festman (2008) and Mosca (2019)'s findings. The second follow-up proposed is a comparison with a parallel study that investigates English (L2) and Spanish (L3) that could shed light on the importance of typological similarity between languages in the present study and provide new findings regarding the language distance factor in priming.

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Appendix A. Prime sentences in English and German

Experimental ditransitive events (*a = double-object; b= prepositional object)*

(1) a. The babysitter made the baby a cup of milk.
Die Babysitterin machte dem Baby eine Tasse Milch.
b. The babysitter made a cup of milk for the baby.
Die Babysitterin machte eine Tasse Milch für das Baby.

(2) a. The judge handed the jury the document.
Der Richter übergab der Jury das Dokument.
b. The judge handed the document to the jury.
Richter übergab das Dokument an die Jury.

(3) a. The policeman brought the parents some good news.
Der Polizist überbrachte den Eltern eine gute Neuigkeit.
b. The policeman brought some good news to the parents.
Der Polizist überbrachte eine gute Neuigkeit an die Eltern.

(4) a. The board awarded the student the prize.
Der Vorstand verlieh der Studentin den Preis.
b. The board awarded the prize to the student.
Der Vorstand verlieh den Preis an die Studentin.

(5) a. The assistant passed the boss the key.
Der Assistent reichte der Chefin den Schlüssel.
b. The assistant passed the key to the boss.
Der Assistent reichte den Schlüssel an die Chefin.

(6) a. The carpenter built her father a wardrobe.
Die Tischlerin baute ihrem Vater einen Kleiderschrank.
b. The carpenter built a wardrobe for her father.
Die Tischlerin baute einen Kleiderschrank für ihren Vater.

(7) a. The poet wrote his lover a poem.
Der Dichter schrieb seiner Geliebten ein Gedicht.
b. The poet wrote a poem to his lover.
Der Dichter schrieb ein Gedicht an seine Geliebte.

(8) a. The composer sold the band the song.
Der Komponist verkaufte der Band das Lied.

b. The composer sold the song to the band.
Der Komponist verkaufte das Lied an die Band.

(9) a. The plumber lent the woman the tool.
Der Klempner lieh der Frau das Werkzeug.

b. The plumber lent the tool to the woman.
Der Klempner lieh das Werkzeug an die Frau.

(10) a. The soldier brought his captain the message.
Der Soldat überbrachte seinem Kapitän die Nachricht.

b. The soldier brought the message to his captain.
Der Soldat überbrachte die Nachricht an seinen Kapitän.

(11) a. The father passed his son the toy.
Der Vater reichte seinem Sohn das Spielzeug.

b. The father passed the toy to his son.
Der Vater reichte das Spielzeug an seinen Sohn.

(12) a. The girl bought her cousin a scarf.
Das Mädchen kaufte seiner Cousine einen Schal.

b. The girl bought a scarf for her cousin.
Das Mädchen kaufte einen Schal für seine Cousine.

(13) a. The boy made his girlfriend a photo album.
Der Junge machte seiner Freundin ein Fotoalbum.

b. The boy made a photo album for his girlfriend.
Der Junge machte ein Fotoalbum für seine Freundin.

(14) a. The young couple sent their families the photo.
Das junge Paar schickte seinen Familien das Foto.

b. The young couple sent the photo to their families.
Das junge Paar schickte das Foto an seine Familien.

(15) a. The construction company built the citizens a fountain.
Das Bauunternehmen baute den Bürgern einen Brunnen.

b. The construction company built a fountain for the citizens.
Das Bauunternehmen baute einen Brunnen für die Bürger.

(16) a. The grandmother sewed her niece a hat.
Die Großmutter nähte ihrer Enkelin einen Hut.

b. The grandmother sewed a hat for her niece.

Die Großmutter nähte einen Hut für ihre Enkelin.

(17) a. The experts awarded the mathematician the Fields Medal.
Die Experten verliehen dem Mathematiker die Fields-Medaille.

b. The experts awarded the Fields Medal to the mathematician.
Die Experten verliehen die Fields-Medaille an den Mathematiker.

(18) a. The grandmother wrote her friend a letter.
Die Großmutter schrieb ihrer Freundin einen Brief.

b. The grandmother wrote a letter to her friend.
Die Großmutter schrieb einen Brief an ihre Freundin.

(19) a. The hostess served the guests some tea.
Die Gastgeberin servierte den Gästen einen Tee.

b. The hostess served some tea to the guests.
Die Gastgeberin servierte einen Tee an die Gäste.

(20) a. The florist sewed her roomate a blanket.
Die Floristin nähte ihrer Mitbewohnerin eine Decke.

b. The florist sewed a blanket for her roomate.
Die Floristin nähte eine Decke für ihre Mitbewohnerin.

(21) a. The man bought his wife a necklace.
Der Mann kaufte seiner Frau die Halskette.

b. The man bought a necklace for his wife.
Der Mann kaufte die Halskette für seine Frau.

(22) a. The owner served the professor the wine.
Der Geschäftsinhaber servierte dem Professor den Wein.

b. The owner served the wine to the professor.
Der Geschäftsinhaber servierte den Wein an den Professor.

(23) a. The son baked his father delicious bread.
Der Sohn backte seinem Vater ein leckeres Brot.

b. The son baked some delicious bread for his father.
Der Sohn backte ein leckeres Brot für seinen Vater.

(24) a. The man rented the family the camper.
Der Mann vermietete der Familie den Wohnwagen.

b. The man rented the camper to the family.
Der Mann vermietete den Wohnwagen an die Familie.

(25) a. The mother lent her son the car.
Die Mutter lieh ihrem Sohn das Auto.
b. The mother lent the car to her son.
Die Mutter lieh das Auto an ihren Sohn.

(26) a. The collector sold the museum the sculpture.
Der Sammler verkaufte dem Museum die Skulptur.
b. The collector sold the sculpture to the museum.
Der Sammler verkaufte die Skulptur an das Museum.

(27) a. The young boy delivered the neighbours the newspaper.
Der Junge lieferte den Nachbarn die Zeitung.
b. The young boy delivered the newspaper to the neighbours.
Der Junge lieferte die Zeitung an die Nachbarn.

(28) a. The pastry chef baked his sister a muffin.
Der Konditor backte seiner Schwester einen Muffin.
b. The pastry chef baked a muffin for his sister.
Der Konditor backte einen Muffin für seine Schwester.

(29) a. The postman delivered the shopkeeper the postcard.
Der Postbote lieferte dem Ladenbesitzer die Postkarte.
b. The postman delivered the postcard to the shopkeeper.
Der Postbote lieferte die Postkarte an den Ladenbesitzer.

(30) a. The man rented his brother-in-law the motorbike.
Der Mann vermietete seinem Schwager das Motorrad.
b. The man rented the motorbike to his brother-in-law.
Der Mann vermietete das Motorrad an seinen Schwager.

(31) a. The secretary handed the employee the forms.
Die Sekretärin übergab dem Arbeitnehmer das Formular.
b. The secretary handed the forms to the employee.
Die Sekretärin übergab das Formular an den Arbeitnehmer.

(32) a. The doctor sent the patient the prescription.
Der Arzt schickte dem Patienten das Rezept.
b. The doctor sent the prescription to the patient.
Der Arzt schickte das Rezept an den Patienten.

Filler transitive events *(a= active; b= passive*)

(33) a. The sun blinded the man.
Das Sonnenlicht blendete den Mann.
b. The man was blinded by the sun.
Der Mann wurde vom Sonnenlicht geblendet.

(34) a. A computer controlled the traffic lights.
Ein Computer steuerte die Ampeln.
b. The traffic lights were controlled by a computer.
Die Ampeln wurden von einem Computer gesteuert.

(35) a. A computer controlled the traffic lights.
Ein Computer steuerte die Ampeln.
b. The traffic lights were controlled by a computer.
Die Ampeln wurden von einem Computer gesteuert.

(36) a. The story saddened the young boy.
Die Geschichte betrübte den Jungen.
b. The young boy was saddened by the story.
Der Junge wurde von der Geschichte betrübt.

(37) a. The boat pulled the water-skier.
Das Boot zog den Wasserskifahrer.
b. The water-skier was pulled by the boat.
Der Wasserskifahrer wurde vom Boot gezogen.

(38) a. The blender chopped the apple.
Der Mixer zerkleinerte den Apfel.
b. The apple was chopped by the blender.
Der Apfel wurde vom Mixer zerkleinert.

(39) a. A picture hid the safe.
Das Bild verdeckte den Tresor.
b. The safe was hidden by a picture.
Der Tresor wurde vom Bild verdeckt.

(40) a. The fire burnt the forest.
Das Feuer verbrannte den Wald.
b. The forest was burned by the fire.
Der Wald wurde vom Feuer verbrannt.

(41) a. The mystery intrigued the detective.
Das Geheimnis faszinierte den Detektiv.
b. The detective was intrigued by the mystery.
Der Detektiv wurde vom Geheimnis fasziniert.

(42) a. The tank ran over the soldier.
Der Panzer überfuhr den Soldaten.
b. The soldier was run over by the tank.
Der Soldat wurde vom Panzer überfahren.

(43) a. The printer printed the papers.
Der Drucker druckte die Dokumente.
b. The papers were printed by the printer.
Die Dokumente wurden vom Drucker gedruckt.

(44) a. An asteroid hit the dinosaurs.
Der Asteroid traf die Dinosaurier.
b. The dinosaurs were hit by an asteroid.
Die Dinosaurier wurden vom Asteroiden getroffen.

(45) a. The gun fired a bullet.
Die Waffe schoss eine Kugel.
b. The bullet was fired by the gun.
Die Kugel wurde von der Waffe geschossen.

(46) a. The program scheduled the exam time.
Das Programm plante den Prüfungstermin.
b. The exam time was scheduled by the program.
Der Prüfungstermin wurde vom Programm geplant.

(47) a. The performance delighted the audience.
Die Aufführung verzauberte das Publikum.
b. The audience was delighted by the performance.
Das Publikum wurde von der Aufführung verzaubert.

(48) a. The hurricane ruined the crop.
Der Hurrikan zerstörte die Ernte.
b. The crop was ruined by the hurricane.
Die Ernte wurde von den Hurrikan zerstört.

(49) a. The autopilot landed the plane.

Der Autopilot landete das Flugzeug.

b. The plane was landed by the autopilot.
Das Flugzeug wurde vom Autopiloten gelandet.

(50) a. The sprinkler watered the plants.
Der Sprinkler bewässerte die Pflanzen.

b. The plants were watered by the sprinkler.
Die Pflanzen wurden vom Sprinkler bewässert.

(51) a. A lifeboat saved the woman.
Das Rettungsboot rettete die Frau.

b. The woman was saved by a lifeboat.
Die Frau wurde vom Rettungsboot gerettet.

(52) a. The alarm awoke the old man.
Der Wecker weckte den alten Mann.

b. The old man was awakened by the alarm.
Der alte Mann wurde von dem Wecker geweckt.

(53) a. The truck emptied the garbage bin.
Der Müllwagen leerte die Mülltonne.

b. The garbage bin was emptied by the truck.
Die Mülltonne wurde vom Müllwagen geleert.

(54) a. The tornado injured the girl.
Der Tornado verletzte das Mädchen.

b. The girl was injured by the tornado.
Das Mädchen wurde vom Tornado verletzt.

(55) a. The fireworks startled the dog.
Das Feuerwerk erschreckte den Hund.

b. The dog was startled by the fireworks.
Der Hund wurde vom Feuerwerk erschreckt.

(56) a. A helicopter is pursuing the thieves.
Der Hubschrauber verfolgte die Diebe.

b. The thieves are pursued by the helicopter.
Die Diebe wurden vom Hubschrauber verfolgt.

(57) a. The machine graded the tests.
Die Maschine bewertete die Tests.

b. The tests were graded by the machine.
Die Tests wurden von der Maschine bewertet.

(58) a. A ball broke the window.
Der Ball zertrümmerte das Fenster.

b. The window was broken by a ball.
Das Fenster wurde vom Ball zertrümmert.

(59) a. The company hired the young lawyer.
Die Firma beschäftigte den jungen Anwalt.

b. The young lawyer was hired by the company.
Der junge Anwalt wurde von der Firma beschäftigt.

(60) a. The wind shook the branches.
Der Wind schüttelte die Zweige.

b. The branches were shaken by the wind.
Die Zweige wurden vom Wind geschüttelt.

(61) a. The speech inspired the students.
Die Rede inspirierte die Studierenden.

b. The students were inspired by the speech.
Die Studierenden wurden von der Rede inspiriert.

(62) a. The announcement surprised the passengers.
Die Ankündigung überraschte die Passagiere.

b. The passengers were surprised by the announcement.
Die Passagiere wurden von der Ankündigung überrascht.

(63) a. The dishwasher washed all the dishes.
Die Spülmaschine spülte das ganze Geschirr.

b. All the dishes were washed by the dishwasher.
Das ganze Geschirr wurde von der Spülmaschine gespült.

(64) a. The water flooded the streets.
Das Wasser überschwemmte die Straßen.

b. The streets were flooded by the water.
Die Straßen wurden vom Wasser überschwemmt.

Filler intransitive events

(65) The little girl knocked on a door.
Das kleine Mädchen klopfte an die Tür.

(66) The athlete stretched.
Der Athlet streckte sich.

(67) The wound bled.
Die Wunde blutete.

(68) It snowed.
Es schneite.

(69) The balloon floated in the air.
Der Luftballon schwebte in der Luft.

(70) The audience clapped.
Das Publikum klatschte.

(71) The bird sat on a branch.
Der Vogel saß auf einem Ast.

(72) The boy apologized to his mother.
Der Junge entschuldigte sich bei seiner Mutter.

(73) The brush belonged to the woman.
Der Pinsel gehörte der Frau.

(74) The cat slept under the table.
Die Katze schlief unter dem Tisch.

(75) The doctor pondered on the diagnosis.
Der Arzt grübelte über die Diagnose.

(76) The concert took place in Venice.
Das Konzert war in Venedig.

(77) The flowers blossomed.
Die Blumen blühten.

(78) The boys studied.
Die Jungs studierten.

(79) The girls chatted online.
Die Mädchen chatteten online.

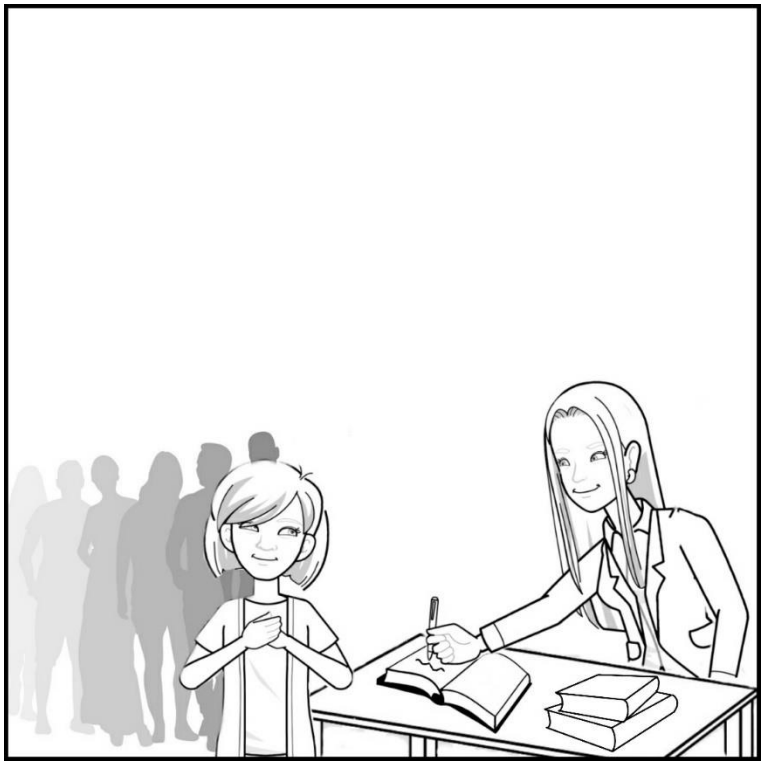
(80) The horses galloped in the fields.
Die Pferde galoppierten über die Felder.

(81) The ladies partied on the beach.
Die Mädchen feierten am Strand.
(82) The library opened at 9.
Die Bibliothek öffnete um 9 Uhr.
(83) The workers relaxed.
Die Mitarbeiter entspannten sich.
(84) The woman woke up at 7.
Die Frau wachte um 7 auf.
(85) The water boiled.
Das Wasser kochte.
(86) The sun disappeared behind the clouds.
Die Sonne verschwand hinter den Wolken.
(87) The student panicked before the exam.
Der Junge geriet in Panik.
(88) The soldiers marched in the parade.
Die Soldaten marschierten in der Parade.
(89) The shop closed.
Der Laden schloß.
(90) The private jet landed.
Der Privatjet landete.
(91) The prince hiked.
Der Prinz wanderte.
(92) The players trained.
Die Spieler trainierten.
(93) The phone rang.
Das Telefon klang.
(94) The old man coughed.
Der alte Mann hustete.
(95) The newlyweds travelled across Europe.
Das Brautpaar reiste quer durch Europa.
(96) The neighbours argued.
Die Nachbarn diskutierten.

Appendix B. Experimental target pictures and gloss of pictured events[2]

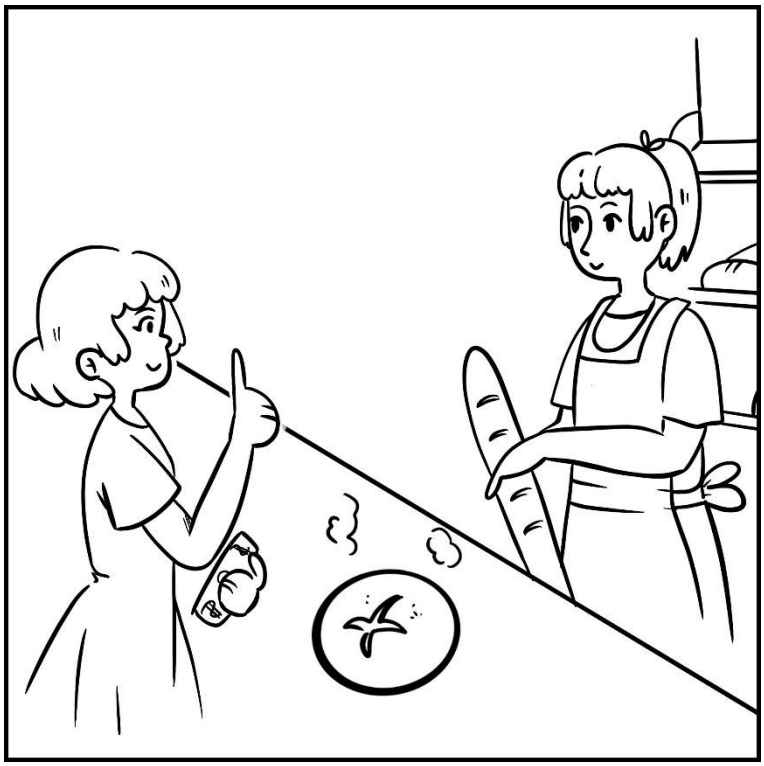
1. (real estate) agent rent man house

2. author write girl autograph

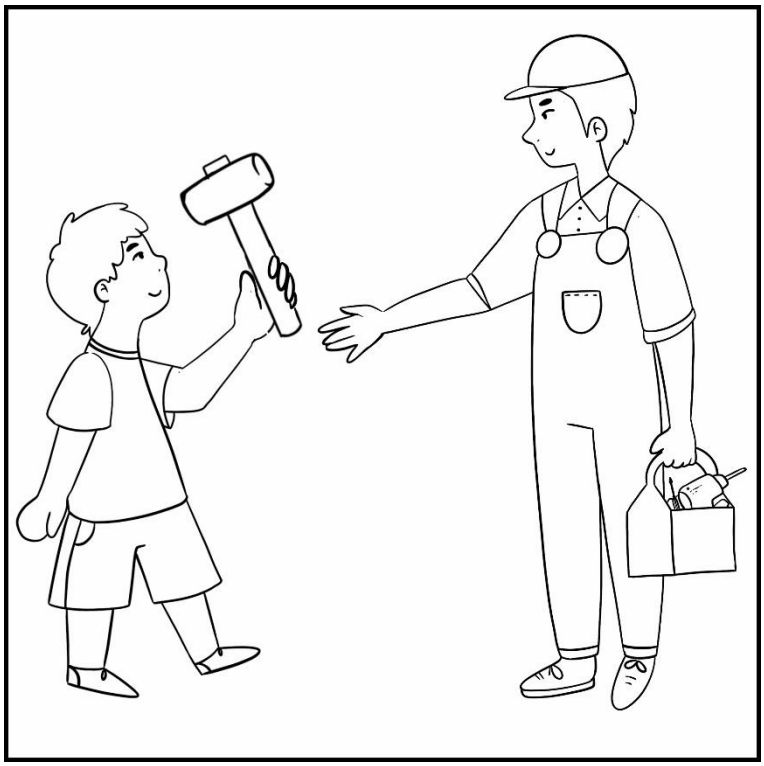


[2] Only ditransitive experimental pictures are included in the present Appendix. For those interested in the 32 transitive and the 32 intransitive pictures, can send an e-mail to a.giovannini96@gmail.com

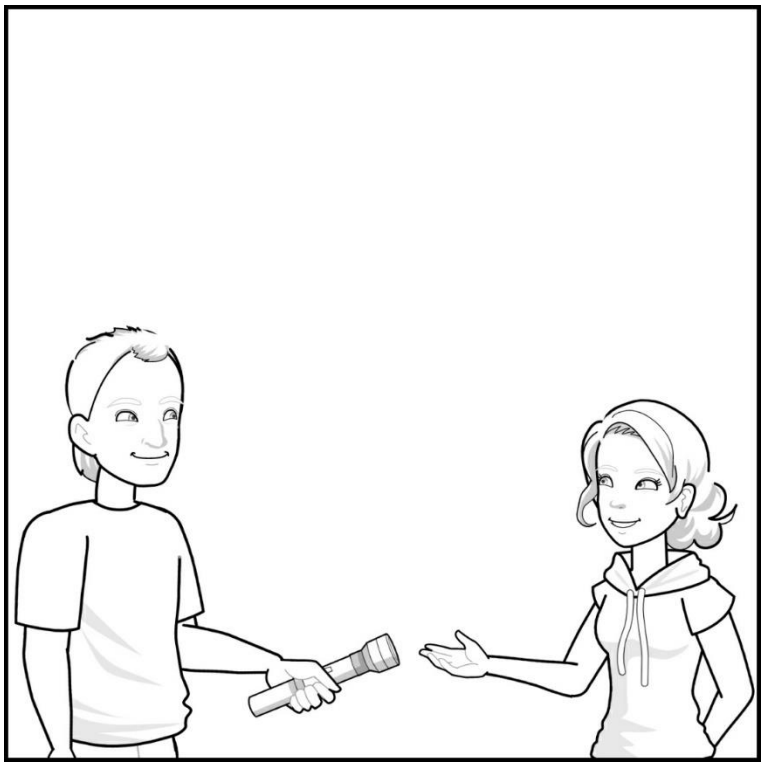
3. baker sell bread girl



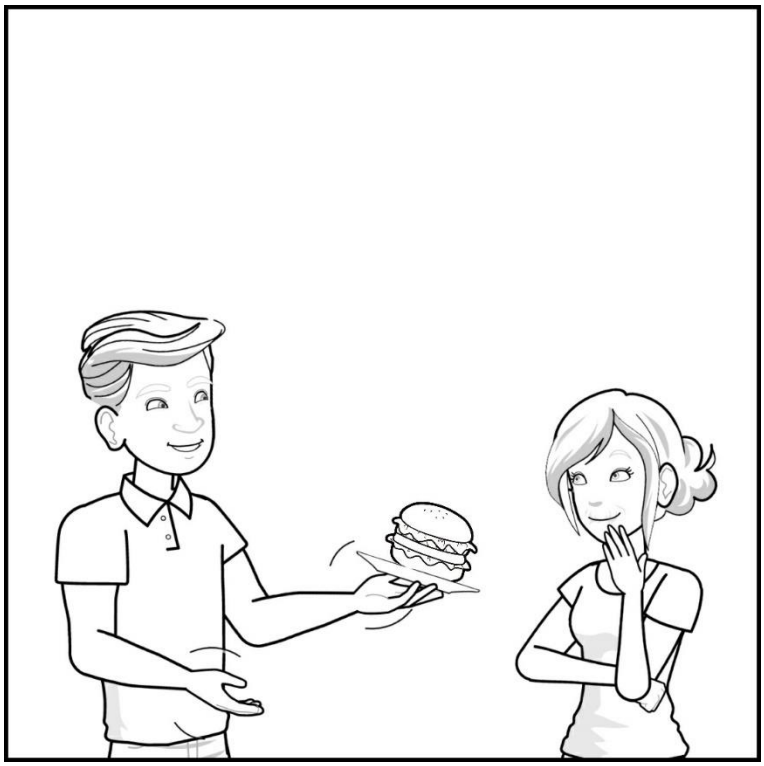
4. boy hand man hammer



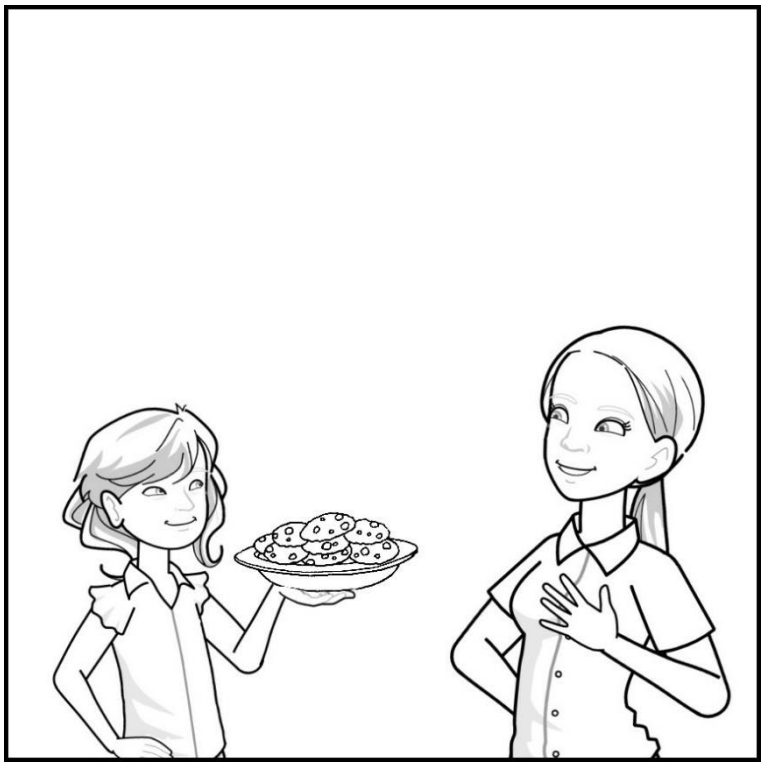
5. boy lend girl torch



6. boy make girl hamburger

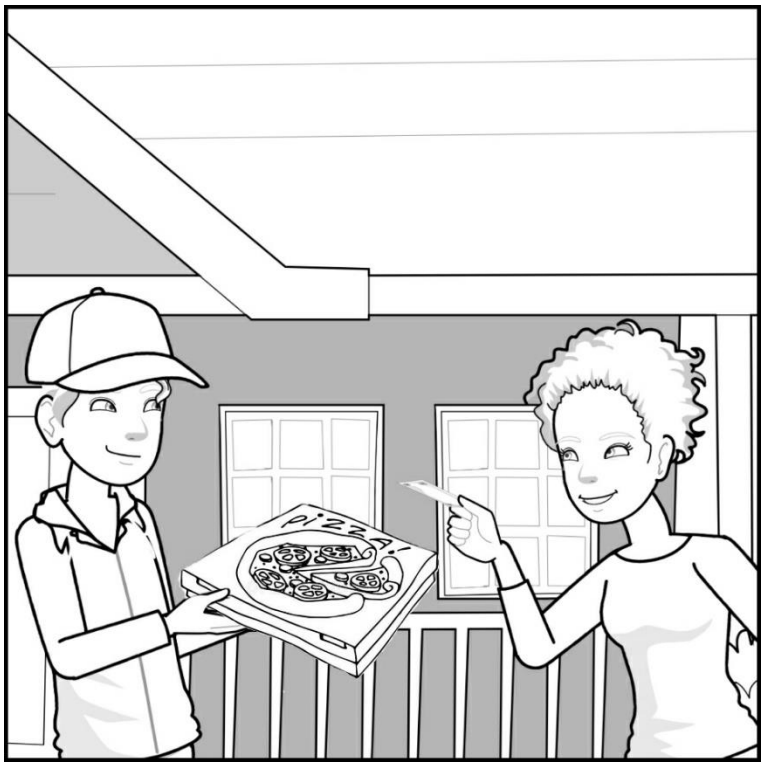


7. daughter bake mother cookies



8. delivery boy bring girl package

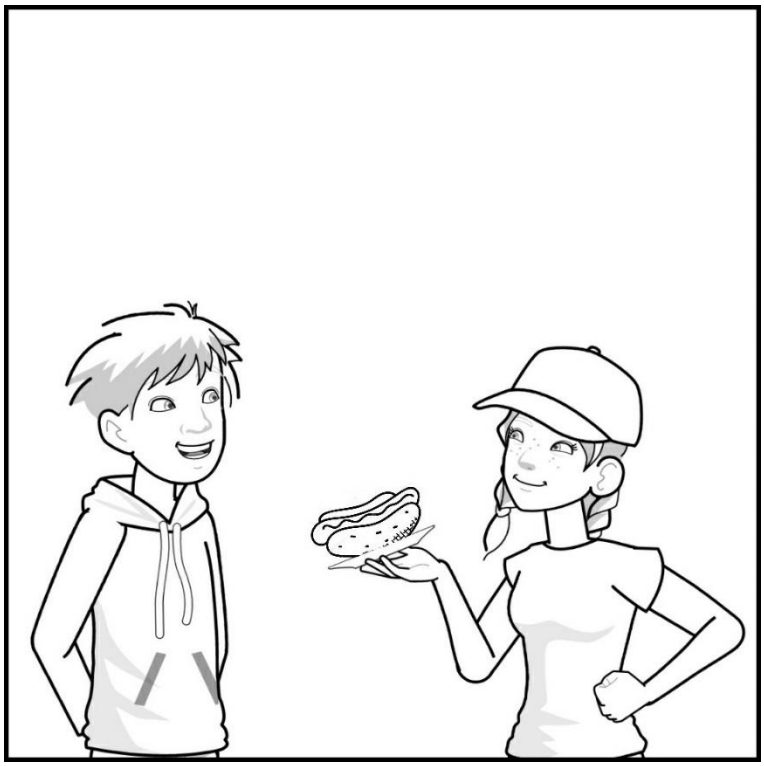
9. delivery boy deliver woman pizza



10. father send daughter gift

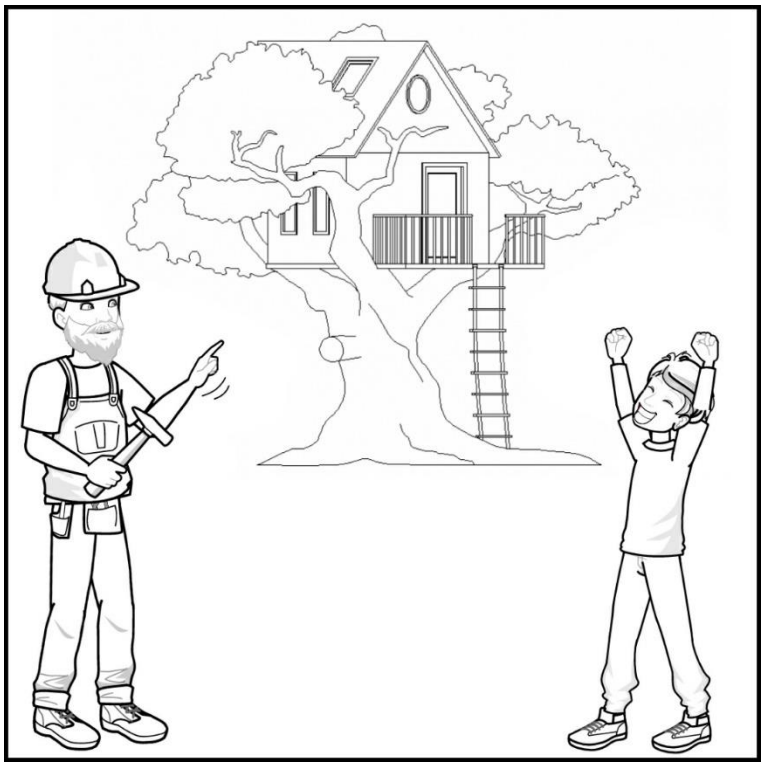
11. girl deliver old man groceries

12. girl make boy hotdog

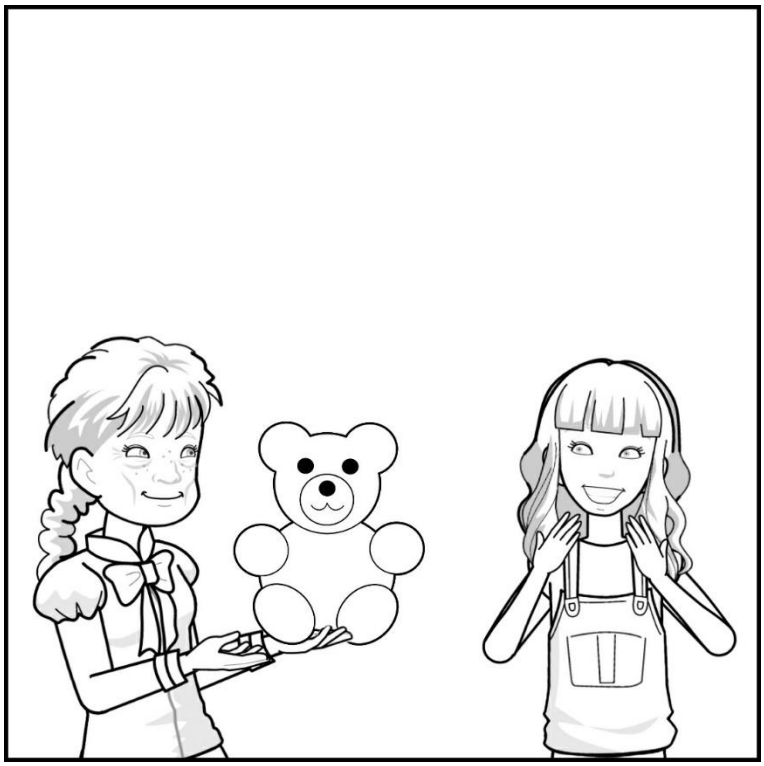


13. girl send grandfather letter

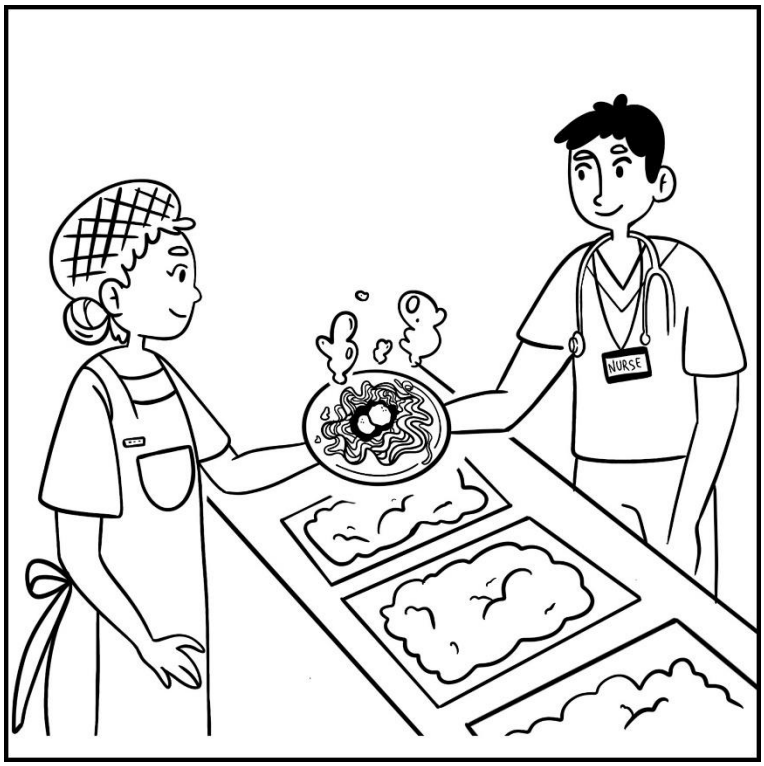
14. grandfather build grandson treehouse



15. grandmother buy niece bear

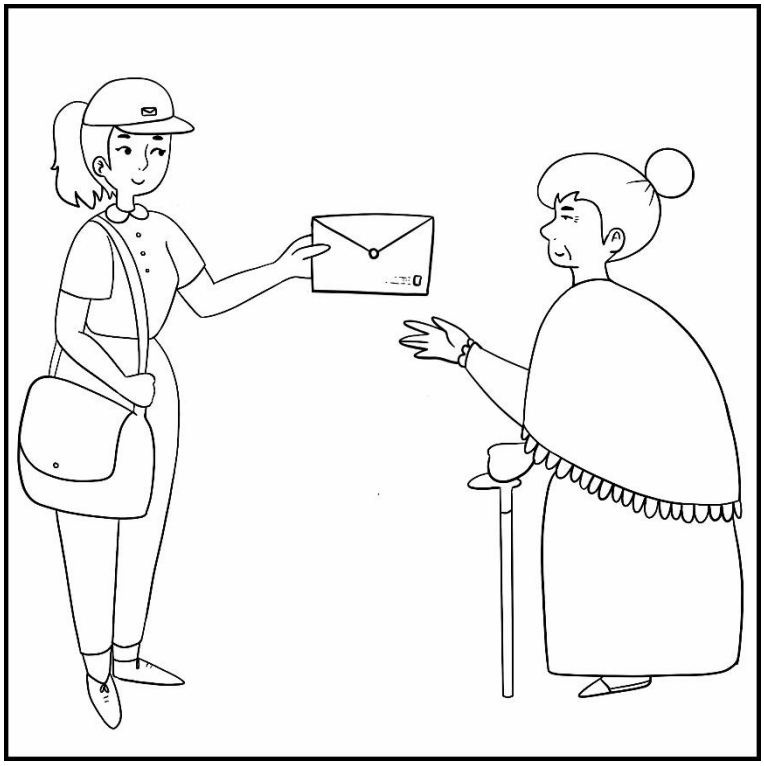


16. lady serve nurse plate



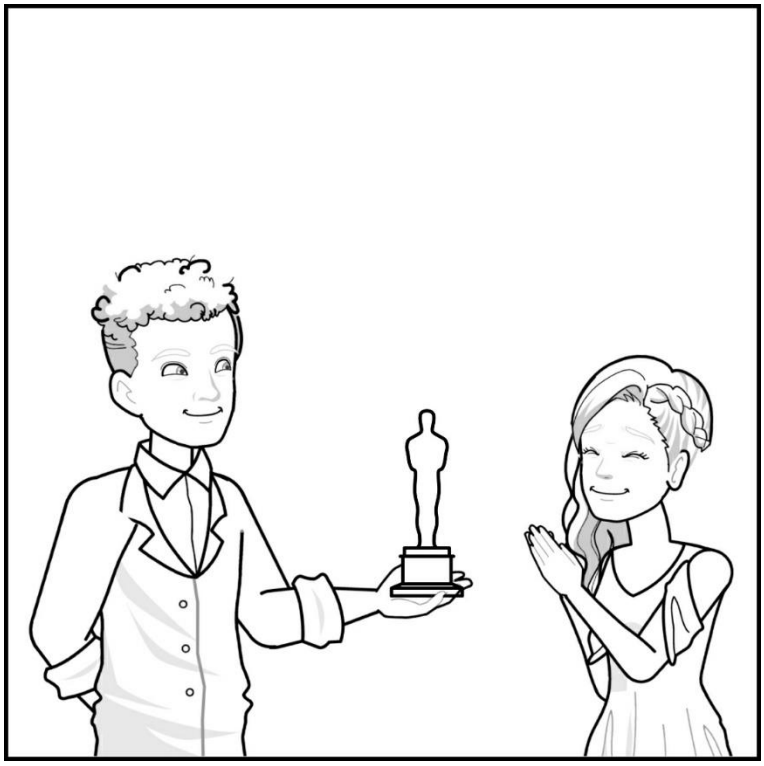
17. lady sew man jacket[3]

18. mailcarrier deliver woman letter



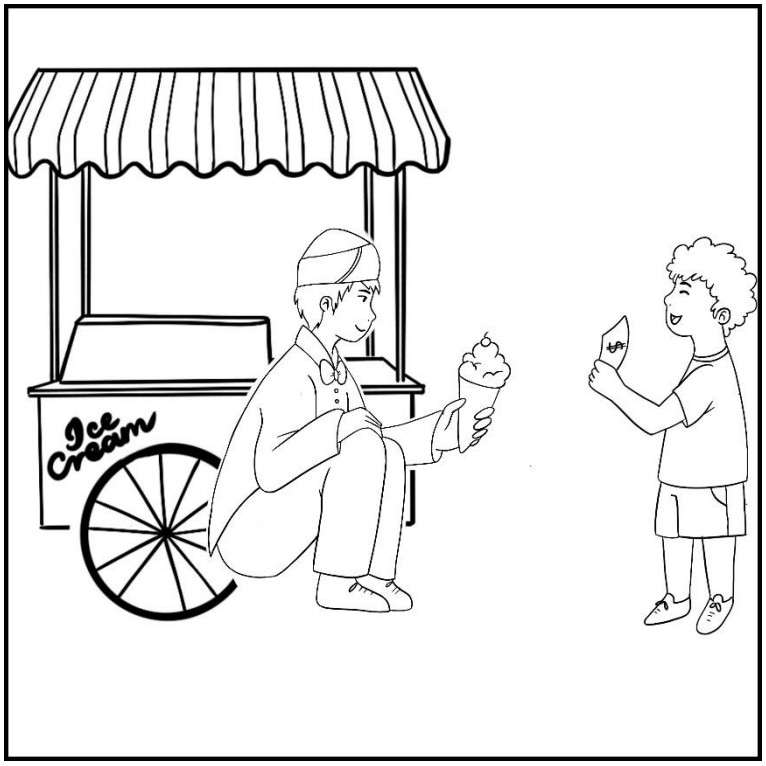
[3] This picture was created by merging two pictures drawn by Marisa Battiglini.

19. man award actress Oscar

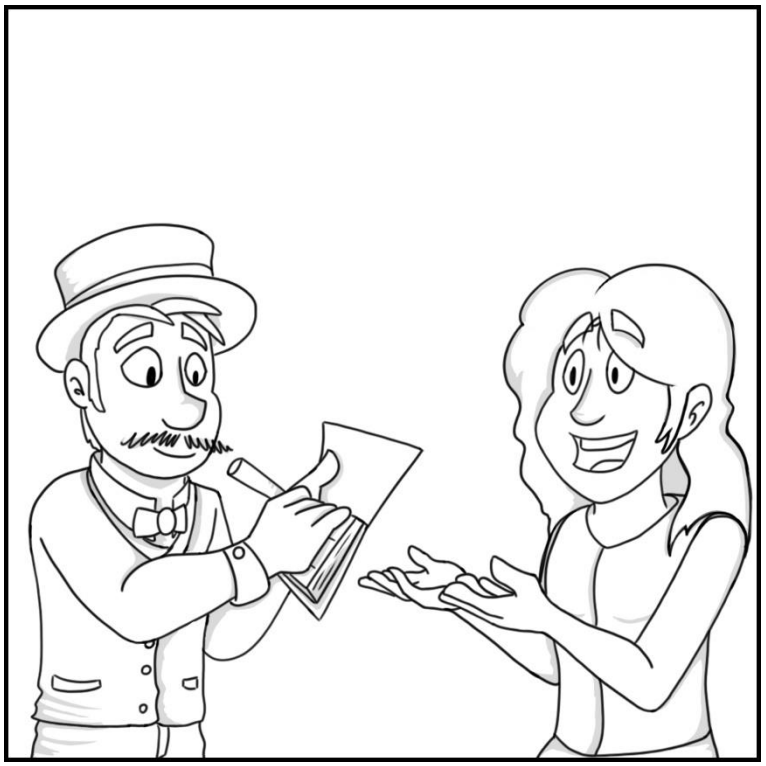


20. man buy boy saxophone

21. man sell boy ice-cream



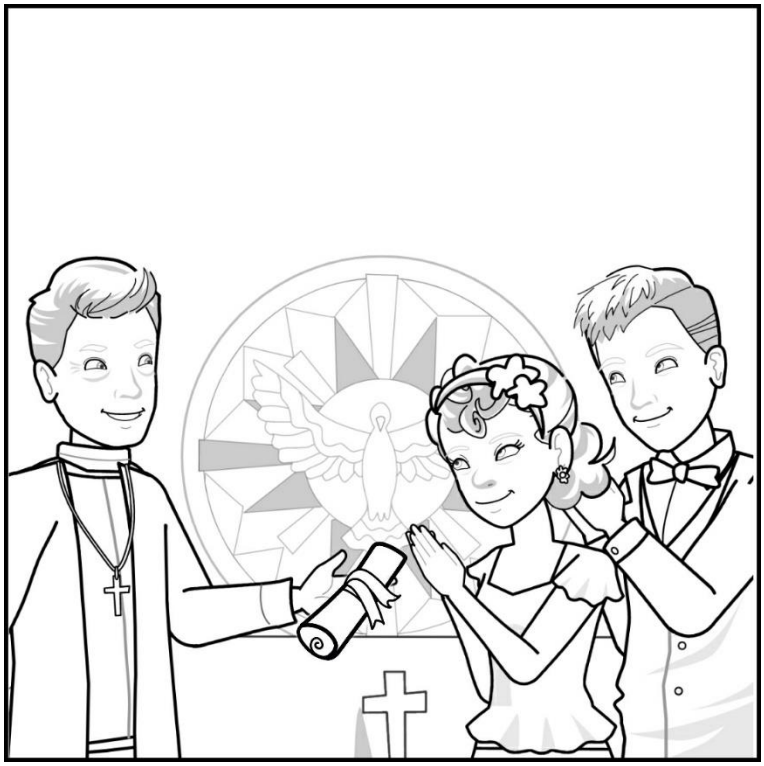
22. man write woman check[4]



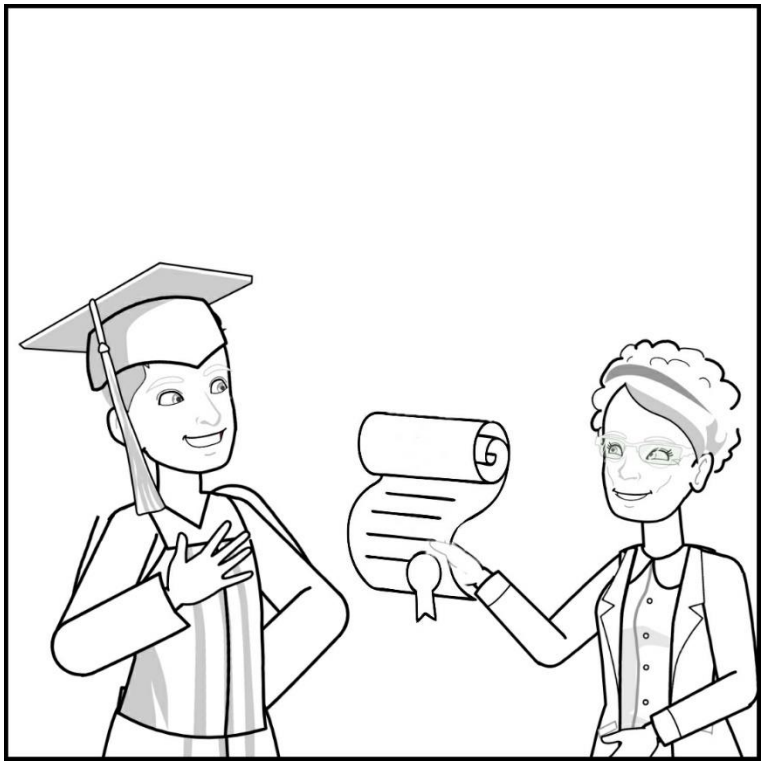
[4] This picture was drawn by 2d animator Emanuele Mauri.

23. manager rent girl car

24. priest hand couple certificate



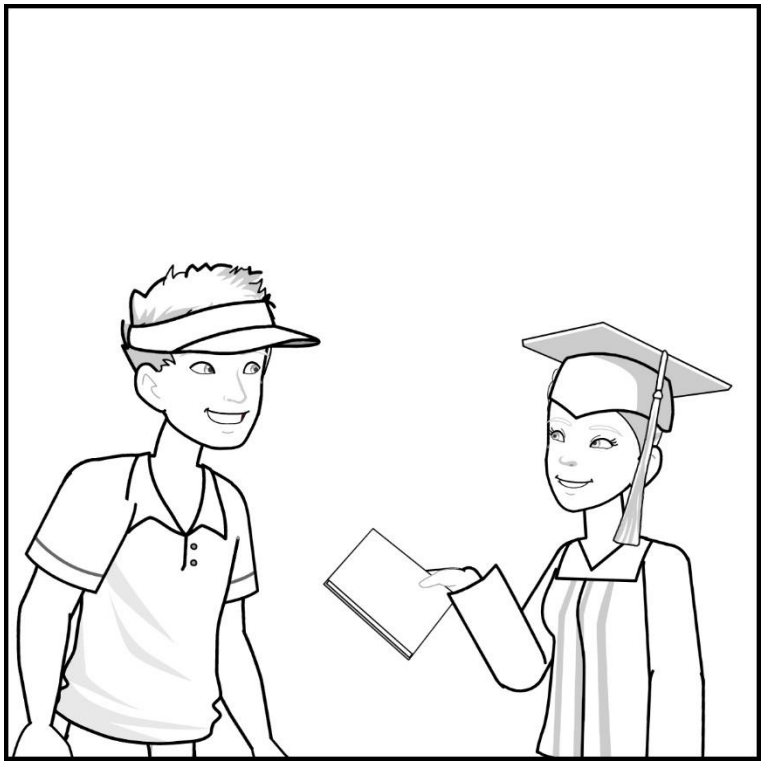
25. professor hand student diploma



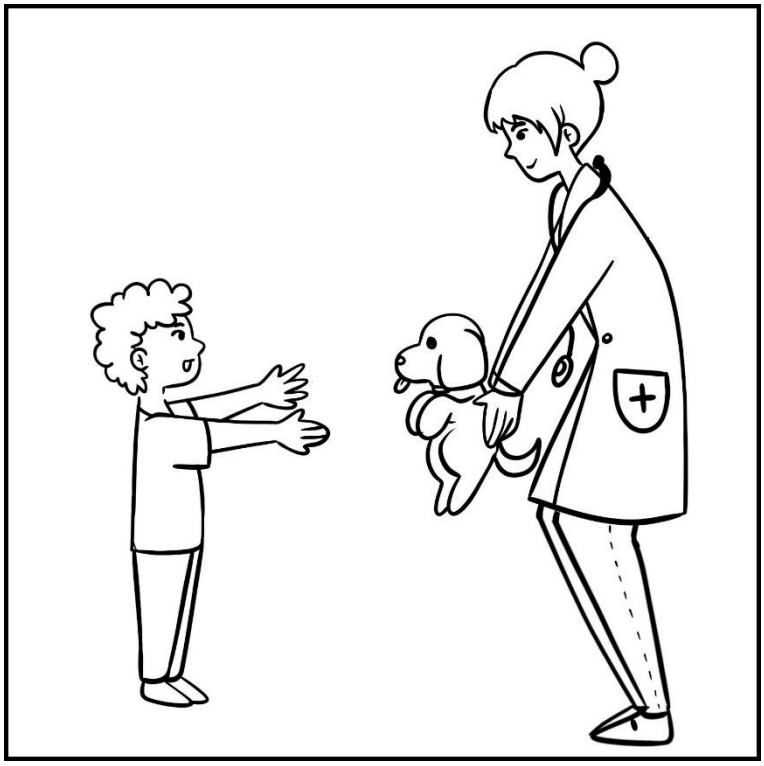
26. seamstress sew bride dress[5]

[5] This picture was drawn by 2d animator Emanuele Mauri.

27. student lend athlete book



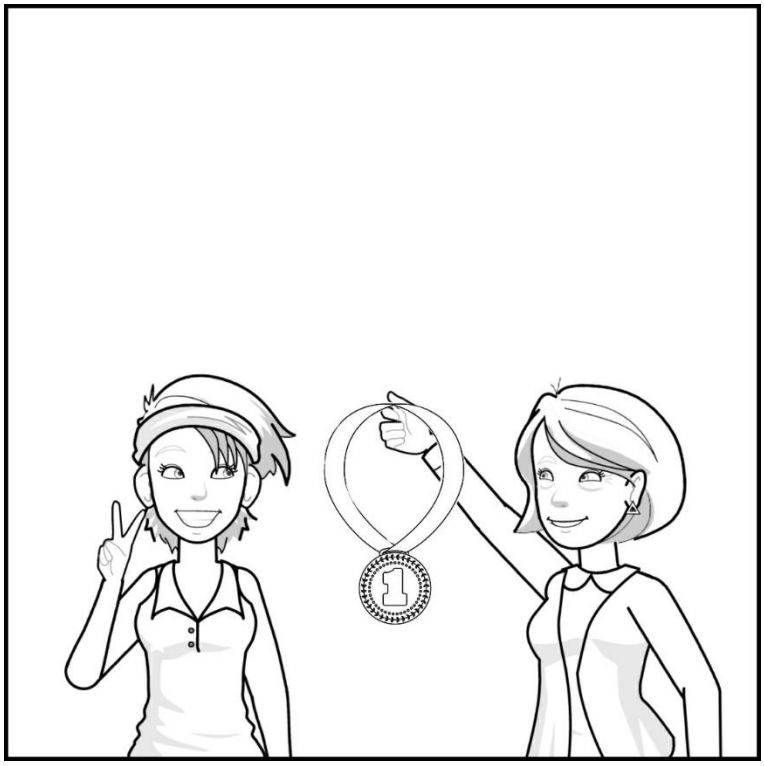
28. vet hand boy dog



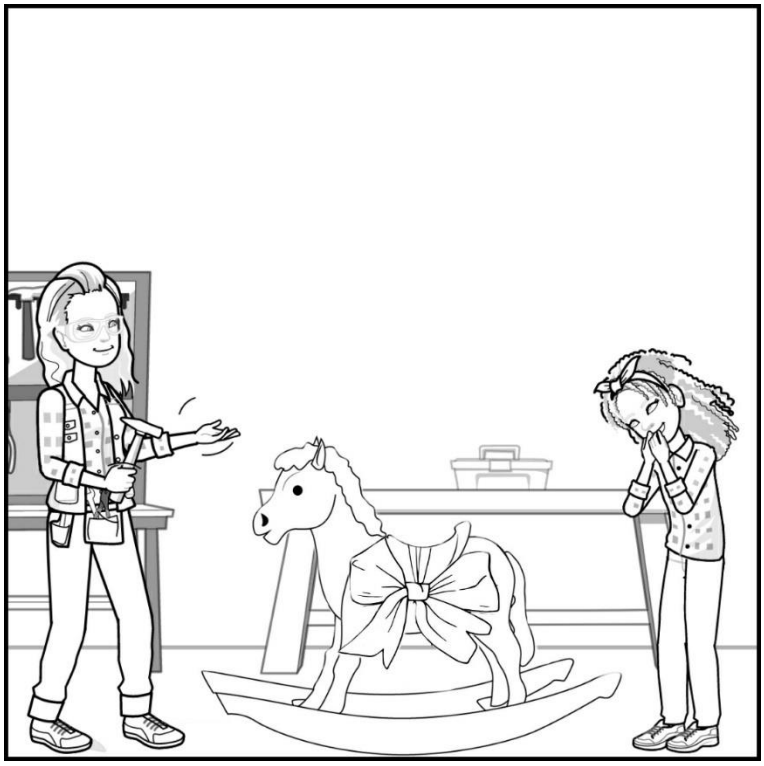
29. waiter serve clown coffee

30. wife bake husband cake

31. woman award athlete medal



32. woman build girl rocking horse



Appendix C. Bilingual Language Profile: English-German

We would like to ask you to help us by answering the following questions concerning your language history, use, attitudes, and proficiency. This survey was created to better understand the profiles of L2 learners of English and German. The survey consists of 18 questions and will take less than 10 minutes to complete. This is not a test, so there are no right or wrong answers. Please answer every question to the best of your ability.

Thank you very much for your help.

1. Email _____

I. Biographical Information

2. First Name _____
3. Last Name _____
4. Age _____
5. Gender
   - ◊ F
   - ◊ M
   - ◊ Non-binary
   - ◊ Transgender
   - ◊ Prefer not to say
6. Country of residence _____
7. Highest level of education completed
   - ◊ Middle school
   - ◊ High school
   - ◊ Bachelor degree (Laurea Triennale)
   - ◊ Masters degree (Laurea Magistrale)

II. Language History

In this section, we would like you to answer some questions about your language history.

8. At what age did you start learning ENGLISH?
   - ◊ 0 - 5 years old
   - ◊ 6 - 10 years old
   - ◊ 11 - 14 years old
   - ◊ 15 - 19 years old
   - ◊ 20 +

9. At what age did you start learning GERMAN?
    - ◊ 0 - 5 years old
    - ◊ 6 - 10 years old
    - ◊ 11 - 14 years old
    - ◊ 15 - 19 years old
    - ◊ 20 +
10. At what age did you start to feel comfortable using ENGLISH?
    - ◊ For as long as I can remember.
    - ◊ 6 - 10 years old
    - ◊ 11 - 14 years old
    - ◊ 15 - 19 years old
    - ◊ 20 +
    - ◊ Not yet comfortable.
11. At what age did you start to feel comfortable using GERMAN?
    - ◊ For as long as I can remember.
    - ◊ 6 - 10 years old
    - ◊ 11 - 14 years old
    - ◊ 15 - 19 years old
    - ◊ 20 +
    - ◊ Not yet comfortable.
12. Have you ever lived in an ENGLISH speaking country?
    - ◊ Yes
    - ◊ No
13. If yes, how many years have you lived in that country?
    - ◊ Less than 1 year
    - ◊ 1 – 3
    - ◊ More than 3 years
14. Have you ever lived in a GERMAN speaking country?
    - ◊ Yes
    - ◊ No
15. If yes, how many years have you lived in that country?
    - ◊ Less than 1 year
    - ◊ 1 – 3
    - ◊ More than 3 years

III. Language use

In this section, we would like you to answer some questions about your language use. Please, refer only to the last six months. If the contexts don't apply to your life, please select 'never'.

16. In an average week, for how many hours do you use ENGLISH in the following contexts?

	Never	Less than 1 hour	1-3 hours	More than 3 hours
With friends				
With family				
At university				
At work				
On social media				

17. In an average week, for how many hours do you use GERMAN in the following contexts?

	Never	Less than 1 hour	1-3 hours	More than 3 hours
With friends				
With family				
At university				
At work				
On social media				

18. In an average week, for how many hours do you use ENGLISH in the following contexts?

	Never	Less than 1 hour	1-3 hours	More than 3 hours
Watching television (movies, tv series, ...)				
Listening to radio or podcasts				
Reading for fun				
Writing emails/texts to friends				
Listening to music				

19. In an average week, for how many hours do you use GERMAN in the following contexts?

	Never	Less than 1 hour	1-3 hours	More than 3 hours
Watching television (movies, tv series, ...)				
Listening to radio or podcasts				
Reading for fun				
Writing emails/texts to friends				
Listening to music				

IV. Language proficiency

In this section, we would like you to rate your language proficiency. Please answer each question by clicking on the appropriate button.

20. What level of ENGLISH do you think you have?

- ◊ A1
- ◊ A2
- ◊ B1
- ◊ B2
- ◊ C1
- ◊ C2

21. If you have taken any standardized language proficiency tests (e.g., IELTS, TOEFL, CAE ect.), please write the name of each test and the score you received. If you do not remember the exact score, then indicate an "Approximate score" instead.

_____

_____

22. What level of GERMAN do you think you have?

- ◊ A1
- ◊ A2
- ◊ B1
- ◊ B2
- ◊ C1
- ◊ C2

23. If you have taken any standardized language proficiency tests (e.g., Goethe-Zertifikat), please write the name of each test and the score you received. If you do not remember the exact score, then indicate an "Approximate score" instead.

_____

_____

24. From 1 (not very well) to 6 (very well),

a. How well do you SPEAK English? 1 2 3 4 5 6
b. How well do you READ English? 1 2 3 4 5 6
c. How well do you WRITE English? 1 2 3 4 5 6
d. How well do you UNDERSTAND English? 1 2 3 4 5 6

25. From 1 (not very well) to 6 (very well),

a. How well do you SPEAK German? 1 2 3 4 5 6
b. How well do you READ German? 1 2 3 4 5 6
c. How well do you WRITE German? 1 2 3 4 5 6
d. How well do you UNDERSTAND German? 1 2 3 4 5 6

Appendix D. Consent Form

Dear participant, thank you for participating in our study. Carefully read and fill out the consent form. After submitting the form, please fill out the Bilingual Language Profile. You will find the link in the confirmation message of this form.

1. Email _____

Modulo per l'espressione del consenso informato

Gentile partecipante, Il presente studio è condotto dalla studentessa Arianna Giovannini sotto la supervisione della Professoressa Giulia Bencini del Dipartimento di Studi Linguistici e Culturali Comparati dell'Università Ca' Foscari di Venezia sulla piattaforma online Google Forms e Pavlovia. Accettando questo modulo, esprime il suo consenso alla partecipazione allo studio e alle attività in esso incluse. La partecipazione a questo studio è volontaria e potrà decidere di abbandonarlo in qualsiasi momento senza alcun tipo di conseguenza negativa. Esprimendo il suo consenso, autorizzerà i/le ricercatori/trici ad archiviare in formato digitale ed elaborare in maniera confidenziale i suoi dati personali per l'intera durata del progetto di ricerca. A tutela della sua privacy, tutti i dati raccolti non saranno mai riconducibili alla sua persona, in accordo con il codice etico e di condotta dell'Università Ca' Foscari di Venezia e con le normative vigenti. I dati verranno trattati in forma anonima in accordo con il Regolamento UE 2016/679 e il Decreto Legislativo n. 196/2003; inoltre, i risultati delle analisi dei dati verranno presentati e pubblicati in tesi, libri o articoli per riviste scientifiche in forma aggregata e anonima. Può richiedere in ogni momento di modificare, rettificare o eliminare il suo consenso alla partecipazione allo studio e tutti i dati raccolti contattando il/la responsabile della raccolta dati. Lo studio e i moduli che le viene chiesto di compilare hanno ricevuto l'approvazione della Commissione Etica di Ateneo in data 05.02.2020, verbale n. 1/2020 (per ulteriori informazioni: commissione.etica@unive.it).

Metodologia di ricerca

Il presente studio è rivolto a soggetti di età superiore a 18 anni madrelingua italiani con conoscenza della lingua inglese e tedesca con diversi livelli di competenza. L'interesse principale è quello di indagare la rappresentazione crosslinguistica nelle lingue di competenza del parlante per strutture sintattiche. L'esperimento avrà una durata di circa 30 minuti. Le attività proposte potranno coinvolgere la presentazione di frasi in inglese o in tedesco da leggere ad alta voce e la successiva presentazione di immagini da descrivere in inglese o in tedesco.

Infine, le chiediamo inoltre di compilare un breve questionario sul suo background linguistico, il background familiare e il percorso educativo.

Contatti

Per qualsiasi domanda relativa alle procedure dello studio e per modificare/revocare il consenso alla partecipazione allo studio, ora o in futuro, può contattare:

- Supervisore della ricerca: Professoressa Giulia Bencini, tel. studio +39 041 234 7839, indirizzo email: giulia.bencini@unive.it

- Ricercatore/responsabile della raccolta dati: ARIANNA GIOVANNINI; indirizzo email: 881739@stud.unive.it

- Eventuali altri recapiti: Staff BemboLab. Email: bembolab@unive.it, Telefono: 041/2345738 - 041/2345748

Informativa sul trattamento dei dati nell'ambito del progetto

Cross-linguistic syntactic representation between L2 and L3

ai sensi dell'art.13 del Regolamento UE 2016/679 ("Regolamento")

Con il presente documento, l'Università Ca' Foscari Venezia ("Università") le fornisce informazioni in merito al trattamento dei dati personali raccolti all'interno del progetto di tesi denominato Cross-linguistic syntactic representation between L2 and L3 che si prefigge di indagare la rappresentazione cross-linguistica nelle lingue di competenza del parlante ed è condotto dalla studentessa Arianna Giovannini e supervisionato dalla Professoressa Giulia Bencini. Ove necessitasse di ulteriori informazioni relative al progetto, la preghiamo di contattare il Principal Investigator scrivendo all'indirizzo di posta elettronica giulia.bencini@unive.it.

Il progetto è stato redatto conformemente agli standard metodologici del settore disciplinare interessato ed è depositato presso il Laboratorio BemboLab – Dipartimento di Studi Linguistici e Culturali Comparati. dell'Università Ca' Foscari Venezia ove verrà conservato per cinque anni dalla conclusione programmata della ricerca stessa.

Titolare del Trattamento

Il Titolare del Trattamento è l'Università Ca' Foscari Venezia con sede legale in Dorsoduro 3246, 30123 Venezia, rappresentata dal Magnifico Rettore pro tempore.

Responsabile della Protezione dei Dati

L'Università Ca' Foscari ha nominato il "Responsabile della Protezione dei Dati", che può essere contattato scrivendo all'indirizzo di posta elettronica dpo@unive.it o al seguente indirizzo: Università Ca' Foscari Venezia, Responsabile della Protezione dei Dati, Dorsoduro 3246, 30123 Venezia (VE).

Categorie di Dati Personali, Finalità e Base Giuridica

Il trattamento ha ad oggetto i seguenti dati personali dati anagrafici, dati di contatto, background linguistico e livello educativo del partecipante.

I predetti dati saranno raccolti attraverso l'utilizzo della piattaforma Google Form.

Il trattamento dei dati personali verrà effettuato con strumenti cartacei ed informatici, adottando misure tecniche e organizzative adeguate a proteggerli da accessi non autorizzati o illeciti, dalla distruzione, dalla perdita di integrità e riservatezza, anche accidentali.

Per la tutela della riservatezza dei partecipanti, i dati verranno successivamente privati dei riferimenti direttamente identificativi (ad es. nome e cognome, codice fiscale, etc.), in modo che non siano più immediatamente riconducibili al soggetto a cui si riferiscono, e analizzati ai soli fini della realizzazione del suddetto progetto.

Le attività di ricerca sono svolte nell'ambito dell'esecuzione delle finalità istituzionali di ricerca scientifica dell'Ateneo, pertanto la base giuridica è rappresentata dall'art. 6.1.e) del Regolamento ("esecuzione di un compito di interesse pubblico").

È possibile opporsi al predetto trattamento in qualsiasi momento, scrivendo al Responsabile della Protezione dei Dati personali ai recapiti sopra indicati. L'Ateneo si asterrà dal trattare ulteriormente i predetti dati personali salvo sussistano motivi cogenti che legittimino la prosecuzione dello stesso.

Tempi di Conservazione

I dati saranno conservati per la durata del progetto e successivamente per 5 anni al termine dei quali saranno cancellati. I dati potranno essere utilizzati per ulteriori progetti di ricerca.

Destinatari e Categorie di Destinatari dei Dati Personali

I dati raccolti saranno trattati dai ricercatori dell'Università e dai ricercatori impegnati nel progetto, che agiscono sulla base di specifiche istruzioni fornite in ordine alle finalità e modalità del trattamento medesimo, nonché da soggetti che forniscono servizi ausiliari all'Università

nominati ‘responsabili del trattamento’. La lista aggiornata dei responsabili del trattamento è disponibile alla pagina: https://www.unive.it/pag/34666/.
I dati, in forma aggregata ed anonima (in modo da non renderla identificabile), potranno inoltre essere comunicati ad altre Università o enti per lo svolgimento delle attività di ricerca e diffusi per attività di disseminazione dei risultati (ad es. in pubblicazioni, rapporti di ricerca, banche dati nonché citazioni durante lezioni, seminari e convegni). Potranno altresì esaminare tutta la documentazione (comprensiva dei dati identificativi dei partecipanti) raccolta nell’ambito del progetto sia organismi nazionali e internazionali sia comitati delle riviste scientifiche italiane e straniere al fine di controllare che la ricerca sia condotta correttamente e in conformità alle disposizioni vigenti, nonché eventuali auditor.

Diritti dell’Interessato e Modalità di Esercizio
Lei potrà esercitare nei confronti dell’Università tutti i diritti previsti dagli artt. 15 e ss. del Regolamento; in particolare, potrà ottenere: l’accesso ai dati personali, la loro rettifica o integrazione, la cancellazione (c.d. diritto all’oblio”), la limitazione e l’opposizione del trattamento. La richiesta potrà essere presentata, senza alcuna formalità, contattando direttamente il Principal Investigator giulia.bencini@unive.it e/o il Responsabile della Protezione dei Dati all’indirizzo dpo@unive.it ovvero inviando una comunicazione al seguente recapito: Università Ca’ Foscari Venezia – Responsabile della Protezione dei dati, Dorsoduro 3246, 30123 Venezia. In alternativa, è possibile contattare l’Università, scrivendo a PEC protocollo@pec.unive.it. Inoltre, se ritiene che i dati personali siano stati trattati in violazione a quanto disposto dal Regolamento, potrà fare reclamo al Garante per la Protezione dei Dati Personali o adire le opportune sedi giudiziarie.

2. Il/La sottoscritto/a (digitare nome e cognome) _____
3. Data e luogo di nascita _____

dichiara
di aver letto con attenzione e compreso le informazioni contenute nel presente documento. Dichiara di esprimere il proprio consenso a partecipare allo studio qui descritto e dichiara di aver letto l’informativa sul trattamento dei dati personali. Il consenso potrà essere modificato/revocato in qualsiasi momento. Il/La ricercatore/trice invierà quanto prima una copia del modulo di consenso informato compilato.

4. Acconsenti di partecipare allo studio?
    - ◊ Acconsento a partecipare allo studio e dichiaro di aver letto l'informativa sul trattamento dei dati
    - ◊ Non acconsento a partecipare allo studio e dichiaro di aver letto l'informativa sul trattamento dei dati