Between- and within-language priming is the same: Evidence for shared bilingual syntactic representations

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Abstract Two structural-priming experiments investigated how bilinguals represent syntactic structures. According to the shared-syntax account (Hartsuiker, Pickering, & Velkamp, 2004), bilinguals have a single syntactic representation for structures that exist in both languages, whereas separate-syntax accounts claim that the representations for these structures are language specific. Our experiments tested native speakers of Swedish who were highly proficient in English. The results showed that structural priming within language and between languages was equally strong. This indicates that representations of syntactic structures from different languages are shared and, therefore, supports the shared-syntax account.

Keywords Bilingualism · Second language acquisition · Language production · Syntactic priming · Syntactic representation

About half the world's population is bilingual (Gordon, 2005; Grosjean, 1982), using regularly two or more languages with different levels of proficiency. From that perspective, research on language processing should also involve language processing in bilinguals. So far, most studies have focused on lexical processing (e.g., De Groot & Kroll, 1997; Dijkstra & van Heuven, 2002; Fox, 1996; French & Jacquet, 2004; Grainger & Dijkstra, 1992; Marian, Spivey, & Hirsch, 2003), whereas much less work has been done on bilingual syntactic processing (see, e.g., Schwartz & Kroll, 2006).

Research on bilingual word recognition suggests that when bilinguals read or listen to words in one of their languages, the other language is also activated (for reviews, see Dijkstra, 2005; Schwartz & Kroll, 2006). The parallel activation view is supported by experimental evidence that has shown that highly proficient bilinguals, as well as less proficient bilinguals, activate both languages even in cases in which only one language is used or needed (e.g., Dijkstra, Van Jaarsveld, & Ten Brinke, 1998; Duyck, Van Assche, Drieghe, & Hartsuiker, 2007; Spivey & Marian, 1999; Sunderman & Kroll, 2006; van Heuven, Dijkstra, & Grainger, 1998). This parallel language-independent activation during language comprehension is seen as an important characteristic of the bilingual-processing system in most current models of bilingual word recognition (e.g., Dijkstra & van Heuven, 1998, 2002; Green, 1998; Grosjean, 2001).

Similarly, research on bilingual language production has examined whether parallel activation of both languages can be found during the production of words. Evidence from speech production experiments has favored the view that words from both languages are activated at some point during the production of words in the response language (e.g., Colomé, 2001; Hermans, 2004; Hermans, Bongaerts, De Bot, & Schreuder, 1998; Poullisse & Bongaerts, 1994; for a short review, see Kroll, Bobb, & Wodniecka, 2006), although the views on how and when the activation is restricted to the intended language differ between the proponents of language-specific models (see, e.g., Costa, 2005; Costa, La Heij, & Navarrate, 2006) and the proponents of language-nonspecific models (e.g., Hermans, 2004; Kroll, Bobb, & Wodniecka, 2006).

In contrast to the considerable amount of research on bilingual lexical processing, research on bilinguals' sentence processing has only recently started. An important

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question in this research is whether bilinguals store and access syntactic information separately for their languages or whether this information is shared between languages. If some syntactic structures are the same in two languages, are these structures represented separately for the two languages, or do they have a shared representation? The main grammatical principles are assumed to be shared by all languages (e.g., Jackendoff, 2002), but the syntactic structures that convey them often vary from language to language. Some syntactic structures are shared by many languages, whereas others are language specific. Undoubtedly, shared syntactic representations would be beneficial for bilingual language development. Similar structures would need to be learned and stored only once. However, late second-language learners typically fail to achieve native-like competence in syntax (see, e.g., Birdsong, 1999; Long, 1990; Paradis, 2004), and this might indicate that a second language is stored and accessed very differently from the first language (see, e.g., Ullman, 2001).

Structural priming studies investigating syntactic representations in bilinguals

Recently, a number of studies have started to investigate how bilinguals store syntactic representations, using structural priming as a method (Bernolet, Hartsuiker, & Pickering, 2007; Desmet & Declercq, 2006; Hartsuiker, Pickering, & Veltkamp, 2004; Loebell & Bock, 2003; Meijer & Fox Tree, 2003; Salamoura & Williams, 2006; Schoonbaert, Hartsuiker, & Pickering, 2007). Structural priming occurs when language users apply the same or a similar structural organization to sentences that they produce as in sentences that they have recently produced or comprehended. Priming has proved to be a very valuable method for investigating the syntactic structures that people access during sentence processing. For example, Bock (1986) used a picture description task in which participants first repeated either a ditransitive double object (DO) prime structure (e.g., *A rock star sold an undercover agent some cocaine*) or an alternative prime structure (PO) with an object and a prepositional phrase (e.g., *A rock star sold some cocaine to an undercover agent*). Next, they were asked to describe a target picture showing an event (e.g., a man reading a book to a boy) that could be described using either a DO or a PO structure. Participants used a DO structure more often after having repeated a DO than a PO structure, and they produced more PO structures after having repeated a PO than a DO structure. Later studies have shown that these priming effects are not due merely to semantic repetition (Bock & Loebell, 1990) or repetition of function words (Bock, 1989). Structural-priming effects have been observed in many studies, and they occur with a

wide range of grammatical structures (see Pickering & Ferreira, 2008, for a review).

The use of structural priming to investigate syntactic representations in bilinguals follows from the monolingual priming studies and is based on the assumption that the production of a structure in one language should have an effect on the production of a similar structure in the other language if the syntactic representations are shared between the languages or if the representations are connected in the mental network.

Loebell and Bock (2003) investigated structural priming using English and German ditransitive constructions (DO/PO) and active and passive structures in a picture description task. The participants were native German speakers who were highly fluent in English. Loebell and Bock found between-language priming for ditransitive constructions, although the effect was significant only for DO targets. No priming was found between English and German actives and passives. Loebell and Bock argued that the difference between ditransitives and active and passive voice is due to structural differences between English and German. The languages use the same word order in ditransitives, whereas the order is different in passives. This conclusion was later supported by Bernolet et al. (2007), who found priming in relative clauses between Dutch and German, which use the same word order, whereas priming was not found between Dutch and English, which use different word orders in relative clauses.

Meijer and Fox Tree (2003) tested syntactic priming in balanced early bilinguals in Spanish and English, using a sentence recall test. The participants first read a Spanish DO or PO target sentence, which was followed by an English DO or PO prime sentence; next, they were asked to recall the target sentence. Recall was higher when the prime and the target sentence had the same structure than when they differed. In another experiment, Meijer and Fox Tree used Spanish targets where an object pronoun preceded the verb and English prime sentences where the object pronoun either followed the verb or was missing. In Spanish an object pronoun (e.g., *lo*, "it") can precede the verb (e.g., *Lo está comiendo*, "She is eating it") or follow the verb (e.g., *Está comiéndolo*, "She is eating it"). The Spanish target sentences were more frequently recalled as having the direct object pronoun following the verb after the participants had read English primes with object pronouns following the verb than after English primes without an object pronoun.

Hartsuiker, Pickering, and Veltkamp (2004) tested structural priming in active and passive sentences in a dialogue game in which native speakers of Spanish with high to moderate proficiency in English described pictures to a confederate. First, the confederate described a picture to the participant in Spanish, using either the active or the

passive voice in the description, and then the participant described another picture to the confederate in English. Participants produced more English passives following Spanish passives than following Spanish active sentences. Hartsuiker et al. proposed that the results can be explained by extending Pickering and Branigan's (1998) model of syntactic representation to bilingual processing. Pickering and Branigan assumed a distinction between a *lexeme* level that contains phonological information and a *lemma* level that contains syntactic information. The lemma level also specifies the syntactic structure that a word permits or requires. For example, the lemmas of transitive verbs that can occur in an active or a passive structure are connected to a combinatorial node representing the active structure and to another node representing the passive structure. When a lemma occurs in a particular structure, both the combinatorial information and the connection between the combinatorial information and the lemma are activated. If a transitive verb such as *hit* occurs in a passive structure in the prime, both the passive combinatorial node and the connection between *hit* and the passive node become highly activated. This activation will not disappear immediately but decays gradually. Next, if the target sentence contains a verb such as *chase*, the passive structure is primed due to the residual activation of the passive node. If *hit* is repeated in the target sentence, the residual activation of the connection between the passive node and the lemma *hit* will enhance priming.

Hartsuiker et al. (2004) made an important addition to Pickering and Branigan's (1998) model by including a language level (see Fig. 1). Each lemma is connected to a word category node specifying the syntactic category (e.g., *verb*) and to combinatorial nodes specifying the structures with which it can occur (e.g., *active*, *passive*). Lemmas are also connected to a language node (e.g., *English*, *Spanish*). Lemmas are represented in a single, integrated lexicon (see Hartsuiker & Pickering, 2008); this is indicated by a dashed box around L1 and L2 lemmas in Fig. 1. The combinatorial nodes are unspecified for language; lemmas from different languages are connected to the same combinatorial nodes. Hence, combinatorial information is shared by verbs that use the same structure regardless of language. We will refer to this account as the *shared-syntax account*.

The model accounts for the priming effects Hartsuiker et al. (2004) observed between Spanish and English passives. When participants heard a passive Spanish prime (e.g., *El camión es perseguido por el taxi*, "The truck is chased by the taxi"), the representation of the verb lemma (e.g., *perseguir*) becomes activated. The verb is connected to its language node (Spanish), to its category node (verb), and to the (language-unspecific) combinatorial node (passive), all of which become activated (Fig. 1). When subsequently asked to produce an English target sentence containing a

transitive verb (e.g., *hit*), participants were more likely to select the passive structure, because of residual activation of the passive combinatorial node, which was activated by the Spanish prime, whereas the alternative active structure had received no activation from the prime. Similarly, after an active prime is heard in Spanish, the active combinatorial node becomes activated, and its residual activation should prompt participants to produce an English target sentence with an active structure.

An important prediction of the shared-syntax account is that cross-linguistic priming of structures that exist in both L1 and L2 should be equally strong as within-language priming. If different languages share the same combinatorial nodes and the residual activation of the combinatorial nodes results in structural priming, it should not matter whether the language in the prime sentence is the same as or different from that in the target sentence. However, within-language priming when the target sentence has the same verb as the prime sentence should be stronger than between-language priming when the verbs in the prime and target are translation equivalents. This stronger priming is due to residual activation of the connection between the verb lemma and the combinatorial node (see Schoonbaert et al., 2007). We exemplify Hartsuiker and Pickering's (2008) prediction that between- and within-language priming are equally strong with Fig. 2, using the representations of ditransitive DO/PO structures in Swedish and English from the present study. A Swedish DO prime (e.g., *Den ohederlige bilförsäljaren erbjöd den äldre damen en gammal Volvo*) and its English translation equivalent (e.g., *The dishonest car salesman offered the elderly lady an old Volvo*) should activate the same combinatorial node (DO). Therefore, both sentences should prime both an English DO structure and a Swedish DO structure to the same extent.

Hartsuiker et al.'s (2004) results and other findings from structural priming (e.g., Loebell & Bock, 2003; Meijer & Fox Tree, 2003) are also consistent with *separate-syntax accounts*. These accounts assume that syntactic processing in L1 and L2 involves separate representations or procedures, although they assume some interaction between the structural representations or procedures in L1 and L2.

One possible separate-syntax model is shown in Fig. 3 (using DO/PO structures in Swedish and English). We refer to this account as the *connected-syntax account*. In line with Hartsuiker et al.'s (2004) model, it assumes that structural priming is due to residual activation of combinatorial nodes and connections to combinatorial nodes. Lemmas of L1 and L2 are represented in a single integrated lexicon, but unlike Hartsuiker et al.'s model, combinatorial nodes are represented separately in the two languages (indicated by separate boxes around the combinatorial nodes in L1 and L2). DO and PO structures are now represented twice—in Swedish and in English. But because

Fig. 1 Representation of active and passive structures according to the shared-syntax account of bilingual language representation. Adapted from Hartsuiker et al. (2004)

these structures have similar structural configurations in the languages, they are connected (the arcs in Fig. 3), with the strength of the connection determined by the similarity between the structures. The activation of these connections can also be boosted by structural priming. When participants are exposed to a Swedish DO-structure, the Swedish DO node becomes highly activated. Some activation will spread to the English DO combinatorial node, due to the connection between the Swedish and English DO nodes. As a result of the residual activation of the English DO node, when participants are asked to produce an English target sentence with a ditransitive verb, they will be more likely to produce a DO sentence than they would be after a Swedish prime sentence with a PO structure.

The connected syntax model also accounts for the cross-language priming effects observed in previous structural-priming studies. But this account predicts weaker priming between than within languages. Although some activation should spread between combinatorial nodes in the different languages, this indirect activation should be relatively small and should, therefore, result in relatively weak priming. By contrast, within-language priming is direct and, thereby, stronger, because it is due to residual activation of the combinatorial node itself.

Other models that assume separate syntactic representations are De Bot's (1992) model of bilingual language production and Ullman's (2001) declarative/procedural mod-

el (see Hartsuiker & Pickering, 2008, for a review of these models). De Bot assumed three stages of speech production. The first stage is conceptualization, during which the preverbal message is determined. Next, the message is grammatically and lexically encoded during formulation. The final stage is the motor execution of the message. The model has separate formulators for L1 and L2, so that grammatical encoding processes are separate in L1 and L2. Ullman's model assumes that two separate memory systems are involved in language learning and processing. First-language (L1) acquisition uses declarative memory for lexical learning and storage and procedural memory for grammatical processing. Later second language (L2) learning relies more on declarative memory in grammatical processing than on procedural memory, because L2 grammar needs to be memorized or constructed by an explicit rule system that is stored in declarative memory. Thus, grammatical processing in L1 and L2 rely on different representations. These models do not predict any direct structural priming between languages, although De Bot suggested that there is some interaction between the formulators of L1 and L2, which would predict some cross-linguistic priming, but it should be weaker than within-language priming.

Finally, it should be noted that although Hartsuiker and Pickering (2008) argued that their model predicts that within- and between-language priming are equally strong,

Fig. 2 Representation of ditransitive structures according to the shared-syntax account of bilingual language representation

Fig. 3 Representation of ditransitive structures according to the connected-syntax account of bilingual language representation

it may, under certain assumptions, be able to account for stronger within-language priming. For example, if the prime is an English DO (e.g., *offer*), it activates the English language node (see Fig. 2), and the activation will spread from there to all English lemmas (including *send*). Next, activation may spread further to the links between the English lemmas and their combinatorial nodes. This results in strengthening of the links between the English lemmas and the DO node (e.g., *offer*–DO and *send*–DO), as well as the PO node (*offer*–PO and *send*–PO). If it is assumed that the strengthening is particularly strong between the English lemmas and the prime structure node (DO), this would result in additional DO priming when the target is in English (e.g., with *send*). Therefore, DO priming should be stronger when the prime and target are both in English than when prime and target are in different languages.

In order to distinguish between the shared-syntax and separate-syntax accounts, it is important to determine whether cross-language structural priming is as strong as within-language priming. Previous research has not directly contrasted between- and within-language priming. Desmet and Declercq (2006) compared results from an experiment in which they investigated the priming of relative clause attachment (e.g., the attachment of *who stayed at home* to the head noun *the boss* or to the complement *the employees* in the sentence *The boss of the employees who stayed at home*) from Dutch (where gender agreement can disambiguate between the attachments) to English (where the attachment is ambiguous) with those from another experiment in which they investigated priming within Dutch and observed that between-language and within-language priming were equally strong. Their study used a between-experiment manipulation with different participants and slightly different experimental items in the two experiments. Therefore, it is difficult to determine whether the magnitude of between-language priming was similar to that of within-language priming. Furthermore, their priming effects may have been semantic, rather than syntactic

in nature, because the semantic interpretation of relative clause attachment to the head and the complement is different (see Desmet & Declercq, 2006, for a counterargument).

Schoonbaert et al. (2007) used ditransitive DO/PO structures when testing Dutch–English bilinguals whose dominant language was Dutch. The main purpose of the study was to investigate the interaction between lexical and syntactic information, but the experiments also allowed an indirect comparison of between- and within-language priming. In conditions in which the verb in the prime and target was different and not a translation-equivalent, priming between Dutch and English was slightly, but nonsignificantly, smaller than within Dutch or English. However, as in Desmet and Declercq's (2006) study, the comparison was between experiments that tested different participants.

To determine whether between- and within-language priming are equally strong, we conducted two structural priming experiments with bilinguals whose L1 was Swedish and L2 was English. In **Experiment 1**, the language of the target sentences was English, and the language of the primes was either English or Swedish. In **Experiment 2**, the target language was Swedish, and the prime language was either English or Swedish. The study used ditransitive DO/PO structures and a written sentence completion task (Branigan, Pickering, & Cleland, 1999; Desmet & Declercq, 2006; Kaschak, Loney, & Borreggine, 2006; Pickering & Branigan, 1998; Scheepers, 2003).

Experiment 1

Experiment 1 tested sentence fragments as in fragments 1–2 below. Participants first completed one of the DO or PO prime fragments, such as in (1), and then continued to complete a target fragment, such as in (2).

- (1a) The dishonest car salesman offered the elderly lady a . . .

- (1b) The dishonest car salesman offered the old Volvo to a . . .
- (1c) Den ohederlige bilförsäljaren erbjöd den äldre damen en . . .
- (1d) Den ohederlige bilförsäljaren erbjöd den gamla Volvon till en . . .
- (2) The busy doctor sent . . .

The prime was in either English (1a and b) or Swedish (1c and d). In (1a) and (1c), the verb was followed by an indirect object, which prompted participants to complete the fragment as a DO structure. In (1b) and (1d), the verb was followed by a direct object, so that participants would complete it as a PO structure. The target fragment (2) was always in English and could be completed either as a DO or a PO structure. The ditransitive constructions (DO/PO) are structurally identical in Swedish and English; they use the same word order and lack overt case marking (accusative vs. dative) on the objects, so the completions of the prime fragments leads to identical structures in both languages (e.g., *an old Volvo/en gammal Volvo* in DO and *an elderly lady/en äldre dam* in PO).

Method

Participants

Forty students of English at the University of Umeå who were about to complete their second semester of full-time studies in English were recruited as participants. Eight participants were later excluded from the data analyses—4 because they had lived in English-speaking countries for more than 6 months, 2 because they had learned Swedish later in life, and 2 because they took more than 2 hr to complete the task. Thirty-two native speakers of Swedish (18 women and 14 men) were thus included. Their average age was 23 years (range, 19–32). Participants received a coffee-and-cake coupon for participation.

After the experiment, the participants completed a questionnaire about their experience with the English language outside their university studies and were also asked to rate their proficiency in English. The questionnaire showed that the functional use of English did not vary much among the students. All of them had been exposed to English from early childhood on. This exposure consisted largely of American and British films and TV programs (these are never dubbed but subtitled in Sweden), popular music, and computer games. All had studied English as their first foreign language in school prior to their university studies. To keep the proficiency levels of participants as homogeneous as possible, they were chosen

to represent a group of highly proficient language learners (late bilinguals) who had not lived for extended periods as L2 speakers in English-speaking countries. Because higher level students of English often spend one term at an English speaking university as part of their studies, a period of 6 months was chosen as the cutoff point. Six students had attended a summer school abroad for 4–5 weeks to learn English, and 4 had spent one term at an English-speaking university. The L2 exposure at the time of testing was virtually the same for all the participants.

The reported proficiency levels of reading English texts and understanding and producing English in conversations on a 7-point scale (7=*very good*; 1=*very bad*) were very similar between participants $M=29$, $SD=3.6$; range, 21–35, out of the total maximum score of 35). The participants were also asked to compare their English proficiency with that of their student-of-English peers on a 7-point scale. The mean rating was 5.3 ($SD=0.8$; range, 3–7). None of the participants considered themselves native-like speakers of English.

Materials and design

There were 40 materials like (1–2). Each item consisted of two prime fragment sets: a set of two sentence fragments in English (1a, b) and a set of two in Swedish (1c, d). The Swedish set was a translation equivalent of the English set (see the [Appendix](#)).

The prime fragments consisted of two constructions: a DO structure (1a, 1c) and a PO structure (1b, 1d). Both constructions had the same subject NP and ditransitive verb. In the DO structure, the verb was followed by an indirect object (an animate noun with a definite article and modifying adjective), which was followed by an indefinite article. In the PO structure, the verb was followed by a direct object (an inanimate, concrete NP with a definite article and modifying adjective), which was followed by the preposition *to/till* and an indefinite article. Both constructions were thus controlled so that it was hardly possible to use any other completion than a DO in (1a) and (1c) and a PO in (1b) and (1d).

Each condition (1a–1d) was followed by the same target fragment (2). It consisted of a subject NP followed by a ditransitive verb and was in English. The targets could be completed either with a DO or with a PO structure. Seven ditransitive verbs were used in the targets. The verbs in the primes and the targets were always different.

In addition, 122 filler sentence fragments were constructed; 92 English and 30 Swedish fragments. These varied in length corresponding roughly to the length of the experimental prime and target fragments. None of the filler fragments contained a ditransitive verb.

The 40 experimental items (primes and their targets), together with the filler fragments, were placed in four lists, each containing 10 items in each of the four conditions. In a single list, each item appeared in only one prime condition (a–d). The items were placed in a single pseudorandom order. Three filler fragments intervened between the experimental items (following the design of Hartsuiker et al., 2004).

Procedure

The participants were given a booklet to complete. The first page of the booklet contained the instructions. Each page contained a maximum of two experimental items. The booklet included the short questionnaire about the participants' experience with English and their proficiency.

The participants were tested in groups. They were told that we were interested in finding out how they complete the fragments in English and Swedish, given different amounts of words. They were asked to complete the fragments as quickly as possible in the order in which they appeared and to use the first completion that came to mind, but see to it that they produce a grammatically coherent sentence. They were also asked not to change or avoid any completions even if they were unsure how to spell some words. The experiment took about 45–60 min.

Scoring

The prime fragments were always completed with the intended structure (DO or PO). Targets were scored as DO if the verb was followed by an indirect object that was a recipient that, in turn, was followed by a direct object that was a theme. They were scored as PO if the verb was followed by a direct object that, in turn, was followed by a prepositional phrase that was a recipient of the direct object. To be scored as DO or PO, the completion had to be reversible to the other structure; that is, the DO-completions needed to have a PO alternative, and vice versa. Only grammatically correct completions were scored as DO or PO. All other completions were scored as *other*. Completions with misspelled words were not excluded if the words were clearly recognizable and grammatically correct.

Results

Table 1 shows the percentages of DO, PO and *other* completions in the four experimental conditions. The relatively high proportion of *other* completions was due mainly to monotransitive completions where the indirect object was omitted and the direct object was modified (e.g., *The eldest son gave expensive gifts*; *The proud mother*

Table 1 Percentages and standard errors (in brackets) of DO, PO, and *other* target completions following the four prime conditions in Experiment 1

Prime	Target completion (English)		
	DO	PO	OTHER
English DO	36.9 (3.2)	14.1 (2.6)	49.0 (3.2)
English PO	29.4 (3.4)	19.1 (3.1)	51.5 (3.6)
Swedish DO	35.0 (3.2)	15.0 (2.5)	50.0 (3.1)
Swedish PO	29.1 (3.5)	18.8 (3.4)	52.1 (3.7)

showed pictures of her newborn baby). The fact that these completions were produced somewhat more often than in previous experiments using the same method (e.g., Corley & Scheepers, 2002; Pickering & Branigan, 1998; Pickering et al., 2002) suggests that these constructions may be more acceptable for our Swedish-speaking participants than for English-speaking participants. However, in contrast to previous studies using the same method, our participants did not use any other completions in the primes than the intended DO and PO structures, so the prime completions did not result in any exclusions. Therefore, although the proportion of *other* target completions was somewhat higher than in previous studies, the overall proportion of valid responses was quite similar.

We analyzed the data by fitting a mixed effect model using the `lmer` function from the `lme4` package in R (Version 2.10.1; CRAN project; The R Foundation for Statistical Computing, 2009). Mixed-effect models allow the inclusion of participants and items as random variables in a single analysis and, therefore, test whether effects simultaneously generalize across both participants and items. They are well suited for data that include missing responses. Because our data were categorical, we used mixed logit models, which are designed for binomially distributed data (Dixon, 2008; Jaeger, 2008). R's `lmer` binomial function uses Laplace approximation to maximize quasi-log-likelihood. For the analysis of target structure (DO vs. PO), we excluded all *other* completions and included prime language (Swedish vs. English) and prime structure (DO vs. PO) as fixed-effect variables and participants and items as random variables (i.e., including random intercepts for each participant and item). We checked whether adding random slopes for each participant and item improved the model, and because it did not, they were not included. The independent variables were effect (or contrast), coded so that the intercept was the estimate of the logit grand mean and the effects of the variables corresponded to main effects in a standard ANOVA. We also analyzed the proportions of *other* completions (*other* completion vs. DO or PO completion) as a dependent variable, using the same variables.

Analysis of the target structure showed an effect of prime structure, $\beta=.37$, $z=3.36$, $p<.001$, indicating that the proportion of DO completions relative to all DO and PO completions was higher following DO than following PO primes. There was no effect of prime language, $\beta=.02$, $z=0.14$, $p=.89$, indicating that the proportion of DO completions was similar regardless of whether the prime was in English or Swedish. Most important, there was no interaction between prime language and prime structure, $\beta=.11$, $z=-.98$, $p=.33$: The priming effect was unaffected by whether the prime was in Swedish (different language from the target) or English (same language as in the target). Analysis of the *other* completions showed no effect of prime structure, $\beta=-.06$, $z=-.91$, $p=.36$, prime language, $\beta=-.02$, $z=-.35$, $p=.73$, or interaction, $\beta=.01$, $z=.08$, $p=.94$, indicating that participants produced a similar proportion of *other* completions across conditions.

ANOVAs on the arcsine-transformed proportions of DO completions (excluding *other* completions) by participants and by items were also conducted. Participant/item list was included as a variable, and condition means were used when the condition mean for a participant or item was missing. The ANOVAs showed an effect of prime structure, $F_1(1,28)=4.44$, $p=.04$; $F_2(1,36)=10.81$, $p<.01$, but no effect of prime language or interaction, $F_s<1.3$.

Discussion

Participants' completions of target fragments were affected by the structure of the prime sentences. The proportion of DO completions out of all DO and PO completions was higher after DO than after PO primes. This structural-priming effect did not differ when the prime and target were in the same language (English) from when the prime language (Swedish) was different from the target language (English). This provides strong support for the shared-syntax account (Hartsuiker et al., 2004), according to which different languages that use similar syntactic structures share the combinatorial nodes that represent these structures. An English or a Swedish DO prime sentence activates the language-independent DO combinatorial node, and residual activation of this combinatorial node facilitates the production of an English DO target sentence to the same extent. This is exactly what we found in our experiment; syntactic priming between Swedish and English ditransitive constructions did not differ, as compared with priming within English.

Our results seem inconsistent with separate-syntax accounts, which assume that the production of syntactic structures in L1 and L2 involves separate representations or procedures. The connected syntax account (Fig. 3) and the models by De Bot (1992) and Ullman (2001) all predict that

structural priming should be larger within the same language than between languages, contrary to what we found.

Experiment 2

An alternative explanation for the outcome of [Experiment 1](#) may be that syntactic representations are less strongly activated in L2 than in L1. Studies on bilingual word representations have demonstrated asymmetric priming effects between languages. Both semantic and translation priming from L2 to L1 have been shown to be weaker than priming from L1 to L2 (Altarriba, 1992; Basnight-Brown & Altarriba, 2007; Duyck, 2005; Fox, 1996; Gollan, Forster, & Frost, 1997; Grainger & Frenck-Mestre, 1998; Jiang, 1999; Jiang & Forster, 2001; Keatley, Spinks, & De Gelder, 1994). To explain these asymmetric priming effects, several researchers have suggested that semantic representations are generally weaker in L2 than in L1 and, therefore, prime less strongly (e.g., Finkbeiner, Forster, Nicol, & Nakamura, 2004; Schoonbaert, Duyck, Brysbaert, & Hartsuiker, 2009). If structural representations are also weaker in L2 than in L1, this may explain why we found no evidence that within-language priming was stronger than between-language priming. L2–L2 priming may be relatively weak because the structural representation of the L2 prime is weak, whereas the structural representation of an L1 prime in L1–L2 priming is strong. We may not have observed stronger within-language (L2–L2) priming because a weaker representation of L2 primes than of L1 primes counteracted it.

The prime sentences (3a–3d) were the same as those in [Experiment 1](#), whereas the target fragment (4) was now always in L1, Swedish.

- (3a) The dishonest car salesman offered the elderly lady a . . .
- (3b) The dishonest car salesman offered the old Volvo to a . . .
- (3c) Den ohederlige bilförsäljaren erbjöd den äldre damen en . . .
- (3d) Den ohederlige bilförsäljaren erbjöd den gamla Volvon till en . . .
- (4) Den stressade läkaren skickade . . . ("The busy doctor sent . . .")

If the results of [Experiment 1](#) were affected by weaker structural representations of L2 primes than of L1 primes, between-language priming in [Experiment 2](#) (from L2 English to L1 Swedish) should be weaker than within-language priming (L1 Swedish), for two reasons. First, syntactic processing in English and Swedish uses separate representations or procedures, and second, L2 primes should lead to weaker syntactic activation than should L1 primes.

Table 2 Percentages and standard errors (in brackets) of DO, PO, and *other* target completions following the four prime conditions in Experiment 2

Prime	Target completion (Swedish)		
	DO	PO	OTHER
English DO	23.2 (1.9)	23.7 (2.1)	51.7 (2.6)
English PO	18.0 (2.3)	28.0 (2.3)	54.0 (2.9)
Swedish DO	23.0 (2.2)	25.5 (2.0)	51.5 (2.8)
Swedish PO	18.2 (2.0)	27.8 (1.9)	54.0 (2.8)

Method

Participants

Sixty-six students of English at the University of Umeå who were studying in their second semester of full-time studies of English, were about to start their second semester, or had just finished the second semester were recruited as participants. All were native speakers of Swedish and had not lived in English-speaking countries for longer than 6 months. Six students who failed to follow the instructions were excluded from the analyses. Sixty students (36 women and 24 men) whose average age was 24 years (range, 19–42) were included in the analyses. The participants were paid for taking part.

The participants completed the same questionnaire about their experience with the English language as the participants in Experiment 1. Exposure to English before their university studies was similar to that of the participants in Experiment 1. Thirteen students had attended a summer school abroad for 4–5 weeks to study English, and 9 students had spent one term at an English-speaking university. The reported proficiency levels of understanding and producing both written and spoken English were very similar to those in Experiment 1 ($M=28$, $SD=4.6$; range, 14–35 of the total maximum score of 35). The participants also rated their English proficiency as compared with their student peers on a 7-point scale. The mean rating was 5.1 ($SD=1.2$; range, 2–7). None of the participants considered themselves native-like speakers of English.

Materials and design

The same 40 prime materials as those in Experiment 1 were used. The target sentence fragments were Swedish translations of the English target fragments (see the Appendix). One of the target verbs, *loan*, was replaced by the Swedish ditransitive verb, *skänka* ("give away"), because Swedish uses the verb *låna* ("loan") for both *loan* and *borrow* and the use of *låna* would have made the sentence fragments ambiguous. In a few cases, the modifying adjective in the

subject NP in the target fragment was not the exact translation equivalent of the English adjective. These smaller manipulations did not affect the overall structure of the target fragments.

In Experiment 1, there were 92 English and 30 Swedish filler fragments. This was now reversed to 92 Swedish and 30 English filler fragments. The translations were rough equivalents of the fillers used in Experiment 1. None of the filler fragments contained a ditransitive verb.

The same design as that in Experiment 1 was used, except for the number of intervening filler fragments, which was now varied between one and four to decrease the possibility that the participants would see a pattern in the sequence of sentences.

Procedure and scoring

The same procedure and scoring as those in Experiment 1 were used.

Results

Table 2 shows the percentages of DO, PO and *other* completions in the four experimental conditions. We used logit mixed effect models to analyze target structure (DO vs. PO) and proportions of *other* completions (*other* completions vs. DO or PO completions). Prime language and prime structure were fixed-effect variables, and participants and items random variables. Adding random slopes for each participant or item did not improve the model.

In the analysis of target structure, we observed an effect of prime structure, $\beta=.28$, $z=3.32$, $p<.001$. The proportion of DO completions, relative to all DO and PO completions, was higher after DO than after PO primes. The proportion of DO completions was unaffected by the prime language, $\beta=.08$, $z=.91$, $p=.36$. There was also no interaction between prime structure and prime language, $\beta=-.01$, $z=-.16$, $p=.88$, indicating that the priming effect was unaffected by whether the language of the prime was the same as or different from that of the target. In the analysis of the *other* completions, there was no effect of prime structure, $\beta=-.04$, $z=-.93$, $p=.35$ or prime language, $\beta=.02$, $z=.46$, $p=.65$, and no interaction, $\beta=-.02$, $z=.50$, $p=.62$.

ANOVAs conducted in the same way as in Experiment 1 showed an effect of prime structure, $F_1(1,56)=9.26$, $p<.01$; $F_2(1,36)=6.97$, $p=.01$, but no effect of prime language and no interaction, $F_s<1.1$.

Combined analysis Experiments 1 and 2

In order to provide a stronger test of the shared- and separate-syntax accounts, we conducted a combined analysis of the data

from Experiments 1 and 2. A logit mixed effect analysis of target structure (DO vs. PO) was conducted in the same way as before, but in addition to prime structure and prime language, we also included target language (Swedish vs. English) as a fixed-effect variable. The variable target language is identical to the experiment variable (1 vs. 2). Adding random slopes for each participant or item did not improve the model. The combined analysis showed an effect of prime structure, $\beta=.30$, $z=4.52$, $p<.001$, confirming that participants produced more DO targets after DO than after PO primes. There was no effect of prime language, $\beta=.08$, $z=1.28$, $p=.20$, but there was an effect of target language, $\beta=.68$, $z=4.40$, $p<.001$. Participants produced more DO target completions when the target was in English (Experiment 1) than when it was in Swedish (Experiment 2). This suggests that for our participants, the English verbs were more DO biased than were their Swedish translations. There was no interaction between prime language and prime structure, $\beta=-.06$, $z=-.86$, $p=.39$, indicating that the priming effect was similar regardless of the prime language. There was also no interaction between target language and prime structure, $\beta=-.05$, $z=-.69$, $p=.49$, so the priming effect was also unaffected by the language of the target. The interaction between prime language and target language was also nonsignificant, $\beta=.00$, $z=-.05$, $p=.96$, suggesting that the proportion of DO responses was unaffected by whether the prime and target were in the same or a different language. Most important, there was no three-way interaction between prime structure, prime language, and target language, $\beta=.08$, $z=1.14$, $p=.26$. ANOVAs showed an effect of prime structure, $F_1(1,84)=12.30$, $p<.01$; $F_2(1,36)=21.58$, $p<.01$, and target language, $F_1(1,84)=23.78$, $p<.01$; $F_2(1,36)=22.57$, $p<.01$. No other main effects or interactions were significant, $F_s<1.8$.

Separate-syntax accounts predicted that when the target was in English (Experiment 1), we should have observed stronger priming when the prime was in English than when it was in Swedish, whereas when the target was in Swedish (Experiment 2), we should have observed stronger priming when the prime was in Swedish than when it was in English. As a result, we should have observed a three-way interaction. The absence of such an interaction shows that even with a larger set of data, there is no evidence that priming is stronger when the prime and target are in the same language than when they are not. This supports the shared-syntax account.

Discussion

Experiment 2 showed that structural priming was equally strong between languages (from English to Swedish) as within a language (Swedish). These results provide further evidence for the shared-syntax account (Hartsuiker et al.,

2004) but do not support separate-syntax accounts. The results cannot be explained by assuming weaker syntactic representations in L2 than in L1. English structures (L2) were equally effective primes as the Swedish structures (L1). If L1 structures prime more strongly than L2 structures, L1 to L1 priming should have been stronger than L2 to L1 priming, which was not the case.

The combined analyses of Experiments 1 and 2 give corroborative evidence for shared syntactic representations. Even with a larger set of data, structural priming was equally strong between as within languages. Furthermore, no interaction was found between prime language and prime structure in the combined analyses, which does not support the idea that L2 syntactic representations are more weakly activated and, therefore, prime less strongly than do L1 syntactic representations.

General discussion

The question that we addressed in the study was whether bilinguals have a single structural representation for syntactic structures that exist in two languages or whether the syntactic representations are separate in the bilingual system. The shared-syntax account (Hartsuiker et al., 2004) claims that languages have a common mental representation for syntactic structures that have the same structural configuration, whereas separate-syntax accounts, such as the connected syntax account (Fig. 3) and the models by De Bot (1992) and Ullman (2001), claim that structural representations or procedures are language specific. The results from the two experiments here showed that structural priming occurred both within one language and between languages and that priming did not differ in strength. This gives strong support for the shared-syntax model and is inconsistent with separate-syntax accounts. Our results also do not support an alternative interpretation of the shared-syntax model of Hartsuiker et al. (2004; Hartsuiker & Pickering, 2008), according to which spreading activation from the language node to the lemma—combinatorial node links in that language results in stronger within-language than between-language priming.

An important issue for the shared-syntax account is the extent to which syntactic structures in the two languages need to be similar in order to share combinatorial nodes. Bernolet et al. (2007) found priming in relative clauses between Dutch and German, which use the same word order (the subordinate verb-final order), whereas priming was not found between Dutch and English, which use different word orders in relative clauses. Loebell and Bock (2003) found no priming between English and German actives and passives and argued that this was due to different word orders between English and German passives. Both studies suggest that the internal constituent structure needs to be the same in both languages in order to share nodes. If the structures

differ, they do not share nodes but have separate representations in L1 and L2. This suggests that during L2 learning, L2-structures are mapped onto existing L1 structural representations if the L1 and L2 structures are the same. This is not possible when the L2 structure is different, in which case the L2-structure has to be represented separately. L2 structures that do not exist in L1 may therefore rely on different (e.g., declarative vs. procedural) memory systems (Ullman, 2001). Because the configurational structure of the ditransitive construction is identical in English and Swedish, they share the same representations, and therefore, we observed priming between the languages.

The evidence for the shared-syntax account also has important implications for cross-language *syntactic transfer*, a process by which the properties of second language learners' L1 influence L2. The effect of L1 on L2 processing has been questioned by some researchers (see, e.g., Clahsen & Felser, 2006; Ellis, 1994). Cross-language priming indicates that L1 does influence L2 processing, because exposure to a syntactic structure in L1 facilitates the processing of the same structure in L2. But the results from our experiment suggest that it is not entirely appropriate to refer to this as *syntactic transfer*, because the term suggests that transfer occurs between separate representations in L1 and L2. Instead, our study suggests that L1 affects L2 because syntactic representations are shared, rather than that there is transfer from one structure to another.

The results from our study reflect the bilingual organization of a particular but fairly typical group of L2 learners. Our participants were university-level language learners who had no or very little experience of living in the L2 country as second-language speakers. Research on cross-language priming has not compared different groups of language learners in a systematic way; the participants in the priming studies have generally been late bilinguals with various levels of proficiency. Our participants were university students of English with a relatively high proficiency, whereas the participants in some previous studies (Bernolet et al., 2007; Desmet & Declercq, 2006; Schoonbaert et al., 2007) presumably represented a group with somewhat lower proficiency. Despite this, all studies observed between-language priming, and the between-experiment comparisons in the studies of Desmet and Declercq (2006) and Schoonbaert et al. (2007) are consistent with our finding that structural priming between and within language is equally strong. Hartsuiker et al. (2004) and Loebell and Bock (2003) tested L2 speakers who lived in the L2 country and were presumably more proficient than our participants and found cross-language priming with these populations. Meijer and Fox Tree (2003), in turn, investigated cross-linguistic priming in native Spanish–English bilinguals and reported syntactic priming effects that were similar to Fox Tree and Meijer's (1999) within-language priming effects. Together, our study and these

previous studies are most consistent with the idea that structural priming is relatively independent of proficiency. The bilingual system adapts to overlapping structures in L1 and L2 even at lower proficiency levels. That is, if L2 shares a particular syntactic structure with L1, the grammar system extends the L1 combinatorial nodes of that structure to L2 if the configurational structure of the construction is the same in both languages.

In sum, our results support the view that the bilingual system is highly integrated. It converges with the results from studies investigating bilingual lexical processing, which suggest that lexical activation is fundamentally language nonselective in nature; when bilingual speakers comprehend or produce words in one language, there is activation of related words in the other language. The evidence from the present study indicates that when bilinguals activate a syntactic structure in one language, they activate a syntactic representation that is unspecified for language and is shared with the other language if the grammatical configuration of this structure is the same in both languages. This provides support for the shared-syntax account proposed by Hartsuiker et al. (2004). By contrast, the study provides evidence against separate-syntax accounts, which assume separate syntactic representations in L1 and L2 and, therefore, predict that within-language syntactic priming should be stronger than cross-language syntactic priming.

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Appendix

Experimental primes (a–d) and their targets (e)

- 1a, b. The tired racing driver gave /the helpful mechanic
a/ /the dirty overall to a
- 1c, d. Den trötta racerföraren gav /den hjälpsamme
mekanikern en/ /den smutsiga overrallen till en
- 1e. The old patient showed/ Den gamla patienten
visade
- 2a, b. The efficient secretary sent /the unfriendly busi-
nessman a/ /the bad copy to a
- 2c, d. Den effektiva sekreteraren skickade /den ovänliga
affärsmannen en/ / den dåliga
- 2e. The little boy mailed/ Den lille pojken skickade
- 3a, b. The young captain promised /the old sailor a/ /the
new life jacket to a
- 3c, d. Den unga kaptenen lovade /den gamle sjömannen
en/ /den nya livvästen till en

- 3e. The arts collector showed/ Konstsamlaren visade
- 4a, b. The mysterious millionaire loaned /the poor artist a/ /the valuable painting to a
- 4c, d. Den mystiske miljonären lånade /den fattiga konstnären en/ /den värdefulla tavlan till en
- 4e. The elegant gentleman sent/ Den elegante herrn sände
- 5a, b. The overworked scientist mailed /the experienced surgeon a/ /the important file to
- 5c, d. Den överanstängda forskaren skickade /den erfarne kirurgen en/ /den viktiga filen till en
- 5e. The generous brother loaned/ Den generöse brodern skänkte
- 6a, b. The tired mother handed /the hungry baby a/ /the shrunken apple to a
- 6c, d. Den trötta mamman räckte /det hungriga barnet en/ /det skruppna äpplet till en
- 6e. The unhappy air hostess showed/ Den olyckliga flygvärdinnan visade
- 7a, b. The stressed ticket seller promised /the young fan a/ /the last ticket to a
- 7c, d. Den stressade biljettförsäljaren lovade /den unga beundraren en/ /den sista biljetten till en
- 7e. The desperate kidnapper gave/ Den desperata kidnapparen gav
- 8a, b. The strange fashion designer offered /the famous journalist a/ /the pink jacket to a
- 8c, d. Den originelle modeskaparen erbjöd /den berömda journalisten en/ /den rosa jackan till en
- 8e. The considerate girlfriend gave/ Den omtänksamma flickvännen gav
- 9a, b. The enthusiastic child showed /the young baby-sitter a/ /the colourful book to a
- 9c, d. Det ivriga barnet visade /den unga barnvakten en/ /den färgglada boken för en
- 9e. The devoted lawyer sent/ Den hängivna advokaten sände
- 10a, b. The anxious grandmother promised /the little girl a/ /the big present to a
- 10c, d. Den ängsliga mormodern lovade /den lilla flickan en/ /den stora presenten till en
- 10e. The smart salesman showed/ Den smarta försäljaren visade
- 11a, b. The nice lady loaned /the new neighbour a/ /the rusty bike to a
- 11c, d. Den trevliga kvinnan lånade /den nya grannen en/ /den rostiga cykeln till en
- 11e. The wounded soldier sent/ Den sårade soldaten sände
- 12a, b. The young shop assistant showed /the tall customer a/ /the blue dress to a
- 12c, d. Det unga affärsbiträdet visade /den storväxta kunden en/ /den blå klänningen för en
- 12e. The helpful father sent/ Den hjälpsamma fadern sände
- 13a, b. The dissatisfied client sent /the famous therapist a/ /the expensive gift to a
- 13c, d. Den missnöjda klienten skickade /den berömda terapeuten en/ /den dyra gåvan till en
- 13e. The little grandchild gave/ Det lilla barnbarnet gav
- 14a, b. The angry architect handed /the cheerful engineer a/ /the latest plans to a
- 14c, d. Den arga arkitekten räckte /den glade ingenjören en/ /den senaste planritningen till en
- 14e. The proud mother showed/ Den stolta modern visade
- 15a, b. The reckless blackmailer promised /the sleazy journalist a/ /the secret photo to a
- 15c, d. Den hänsynslöse utpressaren lovade /den skrupelfria journalisten en/ /den hemliga bilden till en
- 15e. The friendly farmer offered/ Den vänliga bonden erbjöd
- 16a, b. The tiny youngster gave /the kind teacher a/ /the expensive orchid to a
- 16c, d. Den spenslige ynglingen gav /den vänlige läraren en/ /den dyra orkidén till en
- 16e. The intelligent policeman showed/ Den kloke polismannen visade
- 17a, b. The unconventional hostess served /the hungry guest a/ /the strange dessert to a
- 17c, d. Den okonventionella värdinnan serverade /den hungriga gästen en/ /den märklige efterrätten till en
- 17e. The honest hotel owner mailed/ Den ärliga hotelägaren skickade
- 18a, b. The dishonest car salesman offered /the elderly lady a/ /the old Volvo to a
- 18c, d. Den ohederlige bilförsäljaren erbjöd /den äldre kvinnan en/ /den gamla Volvon till en
- 18e. The busy doctor sent/ Den stressade läkaren sände
- 19a, b. The worried receptionist showed /the surprised manager a/ /the expensive bill to a
- 19c, d. Den oroliga receptionisten visade /den förvånade chefen en/ /den dyra räkningen för en
- 19e. The unfaithful boyfriend offered/ Den otrogne pojkvännen erbjöd
- 20a, b. The handsome lifeguard threw /the female surfer a/ /the yellow swimsuit to a
- 20c, d. Den stilige badvakten slängde /den kvinnliga surfaren en/ /den gula baddräkten till en
- 20e. The moody ticket inspector gave/ Den sura biljettkontrollanten gav
- 21a, b. The athletic swimmer loaned /the tired diver a/ /the old boat to a
- 21c, d. Den atletiske simmaren lånade /den trötta dykaren en/ /den gamla båten till en

- 21e. The clumsy waitress showed/ Den klumpiga servitrisen visade
- 22a, b. The nervous driving instructor handed /the young learner a/ /the thick manual to a
- 22c, d. Den nervöse bilskolläraren räckte /den unga eleven en/ /den tjocka manualen till en
- 22e. The eldest son gave/ Den äldsta sonen gav
- 23a, b. The kind neighbour loaned /the attractive woman a/ /the new lawnmower to a
- 23c, d. Den vänlige grannen lånade /den attraktiva kvinnan en/ /den nya gräsklipparen till en
- 23e. The successful manager offered/ Den framgångsrika förbundskaptenen erbjöd
- 24a, b. The poor woman sent /the multinational insurance company a/ /the modest insurance claim to a
- 24c, d. Den fattiga kvinnan skickade /det multinationella försäkringsbolaget en/ /det blygsamma skadeståndskravet till en
- 24e. The embarrassed guide handed/ Den generade guiden räckte
- 25a, b. The popular lecturer gave /the old professor a/ /the old book to a
- 25c, d. Den populära föreläsaren gav /den gamla professorn en/ /den gamla boken till en
- 25e. The unpleasant shop keeper sent/ Den otrevliga butikägaren sände
- 26a, b. The rude bartender handed /the shy customer a/ /the empty bottle to a
- 26c, d. Den oförsämde bartendern räckte /den blyge kunden en/ /den tomma flaskan till en
- 26e. The polite postman offered/ Den artiga brevbäraren erbjöd
- 27a, b. The young photographer gave /the suspicious editor a/ /the beautiful picture to a
- 27c, d. Den unga fotografen gav /den misstänksamme redaktören en/ /den vackra bilden till en
- 27e. The regretful taxi driver offered/ Den ångerfulla taxichauffören erbjöd
- 28a, b. The aggressive hijacker showed /the furious pilot a/ /the large jackknife to a
- 28c, d. Den aggressiva kaparen visade /den ursinnige piloten en/ /den stora fällkniven för en
- 28e. The strict schoolmaster handed/ Den stränga rektorn räckte
- 29a, b. The helpful student loaned /the new friend a/ /the expensive stereo to a
- 29c, d. Den hjälpsamme studenten lånade /den nya vännen en/ /den dyra stereon till en
- 29e. The quiet cleaning lady handed/ Den tystlåtna städerskan räckte
- 30a, b. The generous bank manager offered /the rich customer a/ /the big cheque to a
- 30c, d. Den generöse bankdirektören erbjöd /den rika kunden en/ /den stora checken till en
- 30e. The tactful servant gave/ Den diskreta betjänten gav
- 31a, b. The annoyed builder showed /the careless plumber a/ /the broken cable to a
- 31c, d. Den förargade byggmästaren visade /den slarvige rörmokaren en/ /den trasiga kabeln för en
- 31e. The bald hairdresser handed/ Den flintskalliga frisören räckte
- 32a, b. The confused spy sent /the Russian double agent a/ /the secret map to a
- 32c, d. Den förvirrade spionen skickade /den ryske dubbelagenten en/ /den hemliga kartan till en
- 32e. The impatient customer showed/ Den otåliga kunden visade
- 33a, b. The energetic boss sent /the inexperienced intern a/ /the handwritten list to a
- 33c, d. Den energiske chefen skickade /den oerfarna praktikanten en/ /den handskrivna listan till en
- 33e. The shocked nurse gave/ Den chockade sköterskan gav
- 34a, b. The exhausted messenger handed /the beautiful princess a/ /the valuable ring to a
- 34c, d. Den utmattade kuriren räckte /den vackra prinsessan en/ /den värdefulla ringen till en
- 34e. The sad clown showed/ Den sorgsna clownen visade
- 35a, b. The new ambassador sent /the old president a/ /the white rose to a
- 35c, d. Den nya ambassadören skickade /den gamle presidenten en/ /den vita rosen till en
- 35e. The arrogant police officer gave/ Den arroganta poliskonstapeln gav
- 36a, b. The rich man gave /the faithful chauffeur a/ /the antique revolver to a
- 36c, d. Den rike mannen gav /den trogne chauffören en/ /den antika revolvern till en
- 36e. The bankrupt pub owner loaned/ Den bankrutta pubägaren skänkte
- 37a, b. The young bride sent /the unfaithful fiancé a/ /the worthless ring to a
- 37c, d. Den unga bruden skickade /den otrogne fästmannen en/ /den värdelösa ringen till en
- 37e. The corrupt judge handed/ Den korrumperade domaren räckte
- 38a, b. The famous actress gave /the old schoolfriend a/ /the old costume to a
- 38c, d. Den berömda skådespelerskan gav /den gamla skolkamraten en/ /den gamla scenkostumen till en
- 38e. The reluctant landlord loaned/ Den motvilliga hyresvärden skänkte

- 39a, b. The remorseful burglar sent /the poor woman a/ /
the stolen ring to a
- 39c, d. Den ångerfulla inbrottstjuven skickade /den stackars
kvinnan en/ /den stulna ringen till en
- 39e. The disappointed archaeologist showed/ Den
besvikna arkeologen visade
- 40a, b. The stupid bodyguard threw /the drowning man
a/ /the long rope to a
- 40c, d. Den dumma livvakten slängde /den drunknande
mannen en/ /den långa linan till en
- 40e. The new colleague offered/ Den nya kollegan
erbjöd

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