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Title Page

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Title

The production of passives by English-Norwegian and Turkish-Norwegian bilinguals: A preliminary investigation using a cross-linguistic structural priming manipulation

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Abstract

This preliminary study tested cross-linguistic structural priming of passives in two groups of adult bilinguals speaking Norwegian-English and Norwegian-Turkish to understand the nature of syntactic mental representations in bilingual minds. Passives in spoken Norwegian are structurally similar to those in English, whereas passives in Turkish are distinct in being morphologically constructed. A shared syntax account based on the similarity of the structures would predict structural priming effects for the Norwegian-English group but not the Norwegian-Turkish group. Results of a computerized picture description task showed that participants provided more active descriptions than passives, but did not indicate any priming in terms of an increased likelihood of repeating the type of the prime they heard in Norwegian in their target picture description in English or Turkish. This can be related to the small sample size or the observation that there were too few passive productions overall. We thus ran an additional analysis which indicated that participants were more likely to produce passives when the target pictures contained inanimate agents. We also ran a separate analysis on Turkish target responses, which did not reveal an effect of prime type on the emphasis of thematic role (agent vs. patient). However, this analysis also showed that pictures with inanimate agents were more likely to be described with target structures emphasizing the patient rather than the agent. We suggest that further research is required to get a clearer picture of the role of the similarity of passives in cross-linguistic structural priming.

Keywords

cross-linguistic structural priming, bilingualism, Norwegian, Turkish, English, passives, syntactic representation

Introduction

Structural priming (Bock 1986), which refers to the facilitating influence of having previously processed a grammatical structure on its subsequent production or comprehension, has been a central phenomenon in the psycholinguistics literature of the last three decades (see Dell and Ferreira 2016 for a special issue on the recent developments in the field and Pickering and Ferreira 2008 for a critical review). The aspects of linguistic knowledge that are prone to such facilitation effects through priming must be mentally represented at some level (Pickering and Ferreira 2008). Therefore, structural priming provides a direct source of empirical evidence for linguistic representations (Branigan and Pickering 2017). One type of structure investigated through structural priming is the active-passive alternation. In her influential study, Bock (1986) had native speakers of English repeat a passive sentence such as “The referee was punched by one of the fans” or its active counterpart: “One of the fans punched the referee” in the priming phase. Then, in the experimental phase, participants described an unrelated picture showing a transitive event such as a picture of lightning striking a church, which can normally be described with both an active or a passive sentence. When the prime sentence was passive, participants

were more likely to use another passive sentence such as “The church is being struck by lightning” instead of an active like “Lightning is striking the church” while describing the target picture. Bock (1986) also found similar results for the dative verb (prepositional object vs. double object) alternation.

Structural priming in bilinguals

More recently, studies have adopted the structural priming paradigm to investigate the representation of syntax in bilingual minds (see Koostra and Muysken 2017 for a special issue on the subject and Hartsuiker and Bernolet 2017 for a review on this issue). Some of these studies focused on cross-linguistic priming in the active-passive alternation. In one such study with German-English bilinguals, Loebell and Bock (2003) used the same picture description task as in the original Bock (1986) study and found no priming for the active-passive alternation (despite finding significant priming for the dative verb alternation)¹. On the other hand, another cross-linguistic priming study on passives in Spanish-English bilinguals by Hartsuiker, Pickering and Veltkamp (2004) did reveal priming effects in a dialogue game-like methodology known as the “confederate-scripting task” (Branigan, Pickering and Cleland 2000). This result provided support for the shared syntax account of bilingual mental representation². According to Hartsuiker et al. (2004), one possible reason why passives could be primed in Spanish-English bilinguals but not in German-English bilinguals in Loebell and Bock (2003) might be related to word order similarity of the target construction in the two languages. In Spanish, the word order in active (*El taxi persigue el camión* meaning “the taxi chases the truck”) and passive (*El camión es perseguido por el taxi* meaning “the truck is being chased by the taxi”) sentences are similar to that in English (Hartsuiker et al. 2004, p. 933). However, in German passives, the past participle comes at the sentence-final position (as can be seen in an example from Loebell and Bock 2003, p. 797: *Die Böden werden täglich von dem Hausmeister gereinigt* meaning “the floors are cleaned daily by the janitor”). On the other hand, in a study with Dutch-English bilinguals, using a computerized version of the dialogue-game, Bernolet, Hartsuiker and Pickering (2009) found that not only the PP-final passives, which share the same word order as English passives, but also PP-medial passives with a different word order, primed English PP (*by*-phrase)-final passives. Another study by Chen, Jia, Wang, Dunlap and Shin (2013) investigated priming of passives in Chinese-English bilinguals with a picture description task and a confederate scripting task. The authors found cross-linguistic priming for Chinese and English passives. Notably, whereas the *by*-phrase is located in the sentence final position in English, the agent is pre-verbal in Chinese. Therefore, priming was observed in the absence of word order similarity. Finally, in a picture matching/picture description study, Kutasi, Suffill, Gibb, Sorace,

¹ In another study, Weber and Indefrey (2009) found cross-linguistic structural priming of passives in German-English bilinguals. However, this study investigated priming in comprehension through a self-paced reading task and through neuroimaging. For the purpose of the present study, our focus is on the studies in production.

² Also see Vasilyeva, Waterfall, Gámez, Gómez, Bowers and Shimpi (2010) who found cross-linguistic structural priming of passives from Spanish to English but not from English to Spanish in bilingual children.

Pickering and Branigan (2018) found cross-linguistic priming of passives in bilinguals speaking Scottish Gaelic and English which are also two languages with different word orders in both actives and passives. To sum up, although no priming was observed in Loebell and Bock (2003) for German and English passives, several other studies did find priming between languages with passive constructions of different word orders.

Other cross-linguistic structural priming studies investigating structures besides passives also yielded somewhat mixed results regarding the role of word order similarity in priming. Directly addressing this issue, Bernolet, Hartsuiker and Pickering (2007) found priming for relative clauses between Dutch and German, which have the same verb-final order; but not between Dutch and English, in which relative clauses are expressed with different word orders. The authors argue that word order repetition is required for shared representations. On the other hand, other studies found priming across languages even though the word order of the target structure was different. For example, Desmet and Declercq (2006) showed priming of high vs. low attachment in relative clauses in Dutch-English bilinguals. Although the focus of the study was not the relation between priming and word order repetition in this study, as explained above, the relative clauses in these two languages position verbs at different locations. Shin and Christianson (2009) addressed this question more directly. This study revealed priming between Korean postpositional and English prepositional datives. The authors argue that cross-linguistic priming can occur independently of argument order when syntactic structure is identical. Given the conflicting results with respect to the role of word order similarity in cross-linguistic priming in general and in the priming of passives in particular, the exact nature of syntactic representations which can be shared between languages deserves further scrutiny.

Priming of thematic emphasis

In addition to the question on the dependence of priming on word order similarity, another line of research focused on the issue of thematic emphasis as a possible locus of priming. In one study mentioned above, Bernolet et al. (2009) interpreted their findings in terms of the priming of the binding between emphasis and thematic roles (also see Vernice, Pickering and Hartsuiker 2012 for the persistence of thematic emphasis in Dutch cleft sentences). In another study, Heydel and Murray (2000) observed that German-English bilinguals produce more English passives after both German passives (*Der Manager wird von einem PR-Mann beraten*, the manager is by a PR-man advised) and German OVS sentences (*Den Manager berät ein PR-Mann*, the manager [ACC] advises a PR-man [NOM], meaning a “PR-man advises the manager”) than after German SVO actives (*Ein PR-Mann berät den Manager*, “a PR-man advises the manager”). Similarly, in a confederate scripting study with Polish-English bilinguals, Fleischer, Pickering and McLean (2012) found that participants produced more English passives after Polish passives and OVS sentences. Importantly, passives and OVS sentences differ in their syntax but involve the same

information structure. The authors thus argue for a language-independent level of information structure.³ We are going to revisit the thematic emphasis issue in the Discussion.

Aims of the present study

The main motivation of the present preliminary study was to contribute to the understanding of the nature of mental representations of bilinguals by investigating whether structural and word order similarity is a necessary and sufficient precondition for priming passives across languages. In the present study, we examine cross-linguistic structural priming of the active/passive alternation in Norwegian-English bilinguals and Norwegian-Turkish bilinguals. As we will explain below, passives in English and spoken Norwegian are similar in general structure and word order, whereas Turkish passives are different in being morphological. We used a computerized version of the original picture description task introduced in Bock (1986) and applied to bilinguals by Loebell and Bock (2003). In the priming phase, participants heard and repeated active or passive prime sentences in Norwegian. Then, in the experimental phase they described target pictures depicting transitive events in either English or Turkish depending on their language pair. The study thus tested priming from Norwegian into English and Turkish. The fact that the exact same task and materials were used for both bilingual groups (the only difference being the language of target description) enables us to directly compare cross-linguistic priming in two language pairs, one consisting of rather similar passive structures (i.e. Norwegian-English) and one consisting of rather different passive structures (i.e. Norwegian-Turkish). Few studies with respect to priming and cross-linguistic priming exist for either of these language pairs (for exceptions, see Wolleb 2015 for a study on word order in possessive constructions and dative alternation with bilingual children speaking Norwegian and English, and see Wolleb, Sorace and Westergaard 2018 for a study on the dative alternation with the same population; for cross-linguistic structural priming studies involving Turkish and another language, see Sodacı 2018 for a study with Dutch-Turkish bilinguals, and Kutlu 2015 for one with English-Turkish bilinguals). To the best of our knowledge, this is the first study to investigate cross-linguistic priming involving Turkish-Norwegian bilinguals and the first one to investigate priming of passives in English-Norwegian ones. It is also first in comparing priming directly in these two language pairs.

Passive structures in Norwegian and Turkish

In Norwegian, syntactic/periphrastic passives are constructed with an auxiliary (*bli* “become” for dynamic passives and *være* “be” for stative passives) and a participle (Lødrup 2013). This is similar to the surface forms of English passive structures as seen in examples (1a) and (1b) (Åfarli 1989, p. 74-75).

(1) a. Vi ser katta.

³ Also note that in a recent study on structural priming during comprehension, Ziegler and Snedeker (2019) found priming of information structure in the English dative verb alternation.

we see cat-the
'We see the cat.'

- b. Katta **blir** *sett* (av oss).
Cat-the becomes seen (by us)
'The cat is seen (by us).'

In addition to these syntactic/periphrastic constructions, in Norwegian, it is also possible to make passives morphologically through the *-s* suffix as seen in (2) (Åfarli 1989, p. 92).

- (2) Jon advares for ofte.
Jon warn-s (pres) too often
'Jon is warned too often.'

The distinction between the periphrastic *bli*-passives and the morphological *s*-passives in Norwegian is a challenging one and has traditionally been attributed to aspectual differences (Lødrup 2000) (see Engdahl 1999 for a discussion on the possible factors affecting the choice of *bli*- vs. *s*-passives in Norwegian, Danish and Swedish). The linguistic factors behind the choice of the form are not of crucial relevance for present purposes. What is more important here is the frequency of these forms in spoken and written language. As we will explain in more detail in the 'Discussion' section, periphrastic *bli*-passives are more common than morphological *s*-passives in both spoken and written Norwegian, but in spoken Norwegian this difference is even larger, making *s*-passives very low frequent overall in Norwegian speech (Laanemets 2009). Since the focus of the present study is on priming in spoken language, the structure under scrutiny is the periphrastic passive.

On the other hand, Turkish is an agglutinative (Lewis 1967), head-final (Kural 1997) language with a rich morpho-syntax (Csató and Johnson 1998) and with SOV as the unmarked order in verbal sentences (Göksel and Kerslake 2005) although its word order is flexible (Kural 1992). Passives⁴ are mainly constructed morphologically through the affixation of the *-Il/(I)n* suffix to either transitive (3a and 3b, adapted from Göksel and Kerslake 2005, p. 149) or intransitive verbs (e.g. Kornfilt 1997; Göksel and Kerslake 2005).

- (3) a. Teknisyen televizyon -u tamir ed -iyor.
Technician TV -ACC repair AUX -IMPF
'The technician is repairing the TV set.'

⁴ As for the experimental psycholinguistic investigation of Turkish passives, see e.g. Bayram et al. (2017) for a study on the production of passives in Turkish by heritage speakers in Germany and monolinguals in Turkey. Another study is an unpublished small-scale project which looks at structural priming of passives in Turkish children [Kavukcu Atak, N. (2014). *Perception and production of Turkish passive forms in 5-year-old preschoolers*. Unpublished study. Middle East Technical University, Ankara].

- b. Televizyon (teknisyen tarafından) tamir ed **-il** -iyor
 TV technician by repair AUX-PASS -IMPF
 ‘The TV set is being repaired (by the technician).’

Passivization in Turkish, as in other languages, is used in order to suppress the agent or the performer of the action denoted by the verb and to topicalize the direct object. Even though the purpose of passivization is to de-emphasize the agent, it is nevertheless possible to express it with *tarafından*⁵ (‘by’) (if the agent is an animate entity); an adverbial, usually a locative or ablative NP (if the agent is an inanimate entity) or the adverbial suffix -CA (if the agent is an official body). For instance, in (3b) the agent can be expressed as the complement of the postposition *tarafından* the optional agentive postpositional phrase. However, these *tarafından*-phrases are not used very frequently and agentless passives are much more common in Turkish. (Göksel and Kerslake 2005).

In Turkish, it is possible to passivize both transitive and intransitive verbs (e.g. Göksel and Kerslake 2005). When an intransitive verb is passivized, the person performing the action is unimportant, as in English sentences with “people”, “one” or the impersonal “you” as subject. Such impersonal passives (see sentence (4), adapted from Göksel and Kerslake 2005, p. 151, which emphasize the action, are very frequent in Turkish (Göksel and Kerslake 2011). Impersonal passives do not take agent phrases and most frequently occur with aorist marking (Göksel and Kerslake 2005).

- (4) Burada yürü-**n**-mez.
 Here walk-PASS-NEG.AOR
 ‘(You/we/one/people) can’t walk here.’

Nevertheless, passivization is not the only means of topicalizing objects in Turkish. Given that sentence-initial position is considered as the topic-position in Turkish (Erguvanlı 1984), and that Turkish allows scrambling due to its morphological case marking, it is possible to topicalize the object of the active sentence given in (3a) as in an OSV sentence as in (5), for example⁶:

- (5) Televizyon -u teknisyen tamir ed -iyor.
 Television -ACC technician repair AUX -IMPF
 ‘The technician is repairing the TV set.’

⁵ Kornfilt (1997) glosses *taraf-in-dan* as side-3SG-ABL. Özsoy (2009) argues that when the complement of the *tarafından*-phrase is a pronoun, it is overtly marked with the genitive (GEN) case marker -(n)In, whereas when it is a noun, it is marked with the phonologically null abstract GEN marking.

⁶ Erguvanlı (1984) also suggests that the preverbal position is associated with the focus and the postverbal is associated with backgrounded information. However, the relationship between word order and information structure is rather complex. Crucially, prosody is also considered to play a role in information structure (for more on the interaction of syntax and intonation regarding information structure, see e.g. İşsever 2003; Kılıçaslan 2004; Özge and Bozşahin 2010).

Accordingly, a secondary aim of the present study was to investigate the possibility of priming the assignment of emphasis to thematic roles in Turkish. English and Norwegian periphrastic passives are identical not only in their manner of passivization and word order, but also in terms of their information structure. Although structurally different, Turkish passives also play the function of demoting the agent and promoting the patient. Crucially, Turkish also has a relatively free word order which it can use for purposes such as topicalization. A secondary analysis of the Turkish data will particularly address this issue.

Predictions

To sum up, the present study tested structural priming between Norwegian and (1) English which constructs passives syntactically/periphrastically as Norwegian mostly does in spoken language and with a similar (SVO) word order and (2) Turkish which constructs passives morphologically in both written and spoken modalities. If structural similarity, in terms of both the general means of passivization (i.e. the distinction between syntactic/periphrastic vs. morphological processes of passivization) and word order, is required for cross-linguistic priming, then we would only expect to see priming effects present in the Norwegian-English group and not the Norwegian-Turkish group. If such similarity is not a prerequisite for priming, then we would expect to get priming for both groups. If priming is also present in the Norwegian-Turkish group, it could be due to the persistence of the order of thematic roles or the persistence of the assignment of the emphasis on thematic roles.

Experiment

Participants

11 Turkish-Norwegian bilinguals (7 women and 4 men, age range = 22-64, $M = 41.64$, $SD = 15.21$) and 12 English-Norwegian bilinguals (8 women and 4 men, age range = 22-64, $M = 33.33$, $SD = 14.47$) participated in the study. To be eligible for participation, volunteers needed to be at least 18 years old, to have been living in Norway for at least 5 years and to use Norwegian and one of either Turkish or English fluently in their daily lives. There were 27 volunteers fulfilling these criteria who participated in the study. However, data from two participants, who had made errors in half or more of their prime sentence repetitions, were not included in the analysis. Data from two other participants were also excluded from the analyzed data set as they were childhood Turkish-German and English-Tagalog bilinguals. Data from early bilinguals were only included in the analysis if their language pair included Norwegian and one of the other two target languages. As a result, data from 23 participants were analyzed. The participants filled in a language history questionnaire in Turkish and English, which we had adapted from Li, Zhang, Tsai and Puls (2014) by adding some relevant questions such as the Norwegian dialect of the participants. We should note that the composition of the two bilingual groups with respect to the age and social context of acquisition of the two languages were not

identical and homogenous. The Norwegian-English group consisted of 7 individuals who were “balanced”, early simultaneous bilinguals who started learning to speak both languages before the age of 3. The age at which one acquires language is henceforth referred to as ‘age of acquisition’ or AoA. There were 2 native speakers of English (AoA < 3 years) and late learners of Norwegian (AoA > 20 years) who had immigrated to Norway later in life. The remaining 3 Norwegian-English bilinguals were native speakers of Norwegian (AoA < 3 years) who had started learning English at school at a rather young age (AoA < 12 years). On the other hand, all the participants of the Norwegian-Turkish group were native speakers of Turkish (AoA < 3): 8 of them started learning Norwegian rather late (AoA > 12 years), whereas the other 3 learned Norwegian earlier in life (AoA < 12 years). Several participants in the latter group also reported high proficiency in English. Table 1 presents a summary of the participants’ self-ratings of proficiency in Norwegian and either English or Turkish.

Table 1 Self-ratings of proficiency in Norwegian and English or Turkish ^a

	Norwegian-English Bilinguals		Norwegian-Turkish Bilinguals	
	Norwegian	English	Norwegian	Turkish
Reading	6.83 (0.39)	6.75 (0.45)	6.45 (0.69)	6.91 (0.30)
Writing	6.67 (0.65)	6.75 (0.45)	6.18 (0.75)	6.82 (0.40)
Speaking	6.83 (0.39)	6.58 (0.67)	5.91 (0.70)	6.82 (0.40)
Listening	6.92 (0.29)	6.92 (0.29)	6.18 (0.75)	7.00 (0.00)

^a Scale from 1 to 7 with higher numbers indicating higher proficiency

Materials

The study involved auditory (linguistic) and visual stimuli. The auditory stimuli were prime and filler sentences that the participants heard and repeated. These sentences were always in Norwegian. The visual stimuli consisted of target and filler pictures that the participants described in either English or Turkish, depending on their language group. The experimental item set contained active and passive prime sentences in Norwegian, and pictures which can normally be described with either a passive or an active sentence. We first created a set of 32 prime sentences (16 active sentences and their passive counterparts). All agents in the prime sentences were animate nouns as Turkish does not allow by-phrases with inanimate agents in passives (except personified machines, see Göksel and Kerslake 2005). Half of the patients in these prime sentences were animate and the other half were inanimate. There were also 20 grammatically unrelated filler sentences. Half of the agents of the filler sentences were animate, and the other half were inanimate. All the Norwegian experimental and filler sentences were checked for grammaticality and naturalness by a native speaker. As for the visual stimuli, 16 target pictures depicting a transitive event (4 with both an animate agent and animate patient, 4 with an animate agent and an inanimate patient, 4 with an inanimate agent and an animate patient

and 4 with both an inanimate agent and inanimate patient⁷) and 20 intransitive filler pictures were included in the experiment. The position of the agents and patients (i.e. whether they appeared on the left- or right-hand side of the picture) was also controlled for. Overall, there were 16 prime sentences and 16 corresponding target pictures each of which was only presented once. There were also 20 filler sentences and 20 filler pictures. Each filler sentence and picture was presented twice throughout the session (so there were 80 instances that were fillers in total). Therefore, every participant encountered a total of 112 stimulus items in the session.

Following Loebell and Bock (2003), we created two major counterbalanced lists of 112 items each. The items in the two lists were identical except that they contained alternative (passive or active) versions of the prime sentences. There were 32 priming trials consisting of a priming sentence in Norwegian (active or passive) and an immediately following paired target picture, on each list. The verbs in the prime sentences were not translation equivalents of verbs that were likely to be used in the description of target pictures. There were no items between the prime sentences and the target pictures. The filler sentences and pictures did not have the same sentence-picture contingency that the priming trials did. Between each priming trial (prime-target pair), there were always 5 fillers. Active and passive primes alternated throughout the session. We ensured that there were never more than 3 sentences or 3 pictures in a row. We also ensured that successive items were semantically unrelated and did not make a coherent discourse together. In addition, throughout the study, all the filler sentences and pictures were repeated twice. It was necessary to pay special attention to the distribution of the 40 filler items (20 sentences and 20 pictures) which were repeated twice to obtain 80 filler instances. Following Loebell and Bock (2003), about 1/6 of the fillers were repeated in the first third of the experiment, another 1/3 in the next third of the experiment and the remaining 1/2 of the fillers were repeated in the last third of the experiment. Except these restrictions, the fillers and their repetitions were randomly arranged, resulting in the pseudorandom ordering template of the 112 stimulus items. There were a total of eight different versions of the list (i.e. four versions of the two major lists) and participants were randomly assigned to one of these versions. The full stimulus set can be obtained from the first author via e-mail correspondence.

Procedure

Data collection sessions took place in a quiet office at the Center for Multilingualism (MultiLing) at the University of Oslo. Participants were tested individually. They first read and signed the consent form and were given information about the study both orally and in writing. They sat in front of a computer screen and the experiment was presented through the E-Prime 2.0 Professional software (Psychology Software Tools, Pittsburgh, PA). Before the actual study, there was a short practice trial. During the main experiment, participants listened to the Norwegian sentences which had been previously read by the second author who is a native

⁷ To be able to compare the English and Turkish productions in a full factorial design, we opted for having equal numbers of animate and inanimate agents and patients in the target pictures.

speaker, recorded and transferred to the software. Then, they repeated the sentence in Norwegian out loud and made a recognition decision as to whether they had heard this sentence before during the session by pressing a key. Following this priming phase, they saw a target picture on the screen which they described in either English or Turkish depending on their group. After describing the picture, they were again asked to indicate whether they had seen this picture before. They made such a recognition decision after each item including the fillers, which ensured that the participant kept paying attention to the sentences they heard, and constituted a distractor memory task. Throughout the session, the system recorded the oral production and recognition decisions of the participants. At the end of the session, the participants also filled out the language background questionnaire. The whole session took about 45-60 minutes.

Analysis of active and passive targets in English and Turkish

Coding

Descriptions provided in English by the Norwegian-English bilinguals and in Turkish by Norwegian-Turkish bilinguals were transcribed and coded as “active”, “passive” or “other” descriptions. Utterances which included a subject NP denoting the agent (including personal pronouns), a transitive verb, and an object NP (denoting the patient) were coded as “active”⁸. Utterances were coded as “passive” if they included a subject NP (denoting the patient); a form of the verb “to be” (or “to get”) and a participle for English, and the passivization morpheme for Turkish, and optionally a *by*-phrase denoting the agent⁹. Ungrammatical sentences (with the exception of minor morphosyntactic deviations such as subject-verb agreement errors or the omission of an article) and intransitive clauses (e.g. “The elephant is riding in the car”) were coded as “other”. If both of the two opposing types of sentences were provided within a single response, that response was also coded as “other”. Productions coded as “other” were excluded from the analysis¹⁰.

Data analysis and results

The correct response rate to the recognition question in all participants was at least 90%. Overall, the participants produced a total of 285 sentences (excluding “other” completions). 40 (14.04%) of these 285 sentences were passives. Table 2 shows the number of active and passive

⁸ Turkish sentences such as *dalgıç doktor-a ateş ed-iyor* (diver doctor-DAT shoot AUX-IMPF, meaning “The diver is shooting the doctor.”) which have DAT-marked objects were also coded as actives as they can be passivized as in *doktor-a ateş ed-il-iyor* (doctor-DAT shoot AUX-PASS-IMPF, meaning “The doctor is being shot.”).

⁹ We have also run the analysis with only the passives overtly expressing the agent, but the results were the same.

¹⁰ We have had two other coders (one for English responses and one for Turkish responses) perform a post-hoc blind coding. The inter-rater reliability was equal to or greater than 95% for both English and Turkish data. The items of disagreement were mainly ones classified as “others”.

descriptions and the proportion of passives produced by prime type for the two language groups¹¹.

Table 2 Counts of active and passive descriptions and proportion of passives per condition

	Norwegian-Turkish Bilinguals		Norwegian-English Bilinguals	
	Active Prime	Passive Prime	Active Prime	Passive Prime
Passive	8	11	9	12
Active	57	55	66	67
Proportion of Passives	0.12	0.17	0.12	0.15

In the present study, structural priming is measured in terms of valid completion types (following e.g. Hartsuiker, Beerts, Loncke, Desmet and Bernolet 2016). In order to test our hypothesis that passive primes would lead to more passive target descriptions in the Norwegian-English group and not the Norwegian-Turkish group, we ran a generalized linear mixed modeling analysis with a logit function (logit mixed effects modeling) with target type (active vs. passive) as the outcome variable (see Jaeger 2008; and Baayen, Davidson and Bates 2008 for advantages of using mixed effects modeling), using the “lme4” package (Bates, Maechler, Bolker and Walker 2015) version 1.1-18-1, in R (R Core Team 2018) version 3.5.1. The coded data analyzed during the current study and the R script with the analyses are available from the first author upon request.

We entered prime type (with the levels coded as “Active” vs. “Passive”) and language of description (with the levels “English” or “Turkish” depending on the bilingual group) and their two-way interaction as fixed effects in the model¹². Following Barr, Levy, Scheepers and Tilly (2013), we started with the maximal model and included random slopes for both effects and their interaction within items and the random slope for prime type within subjects in the model, in addition to the random intercepts for both subjects and items. As suggested in Winter (2013), we used the likelihood ratio test through the *anova* function in R to compare models. In this and the following analyses, random slopes were removed from the formula when the model failed to converge, when there was a correlation of .8 or higher between the random intercept and the

¹¹ Of the 19 Turkish passives, six were agentless, four included a *tarafından*-phrase, six included an ABL (-DAn) NP, two included a DAT (-DA) NP and one included an instrumental NP with -(y)la/ile. Of the 21 English passives, 17 included a *by*-phrase, one expressed the agent through the preposition under (for the verb crush) and three were truncated.

¹² We also tested a model with the addition of mean proficiency for Norwegian and mean proficiency in English/Turkish as covariates and their interaction as L2 proficiency has been found to influence cross-linguistic structural priming in bilinguals (Bernolet, Hartsuiker and Pickering 2013). These variables were also centered as in Bernolet et al. 2013. However, removing the covariates did not significantly influence model fit. For simplicity of presentation, we limit our scope to the main fixed effects of interest and thus only report the model with prime type and language here.

random slope and when the exclusion of the random slope did not significantly affect the model fit.

The model with the two fixed effects, their interaction and the two random intercepts (Table 3) was compared to its subset models. This full model was not significantly different than the null model with only the random intercepts ($p > .5$). In addition, reduced models with only prime type or only language were not significantly different than the full model, indicating that neither effect was significant. Likewise, removing the interaction from the full model did not have a significant effect, which shows that the interaction was also non-significant (see also Table 4).

Table 3 Summary of the fixed effects in the mixed logit model on target type

Predictor	Coefficient	SE	Wald Z	P
Intercept	-3.64	(1.11)	-3.30	< .001
Prime Type = Passive	0.47	(0.61)	0.77	= .44
Language = Turkish	-0.39	(0.89)	-0.44	= .66
Interaction = Passive & Turkish	-0.06	(0.94)	-0.06	= .95

Table 4 Comparisons of reduced models against the full model: “description ~ prime type*language + 1|subject + 1|item”

Model	χ^2	DF	p
description ~ prime type + 1 subject + 1 item	0.34	2	= .84
description ~ language + 1 subject + 1 item	0.91	2	= .64
description ~ prime type + language + 1 subject + 1 item	0.00	1	= .95

To sum up, the significant negative intercept in Table 3 indicates that overall participants are less likely to produce a passive target description than an active description. However, this analysis did not lead to any significant fixed effects or interaction and thus failed to provide enough evidence to reject the null hypothesis.

The observation that there were few passive descriptions overall led us to run an additional analysis to investigate whether the production of passives was related to the animacy of agents and patients in the target pictures that the participants described. A logit mixed effects model with the fixed effect animacy of the agent and with random intercepts for subjects and items (Table 5)¹³ was a significantly better fit of the data than the null model ($\chi^2(1) = 230.52, p < 0.001$). The model indicates that when the target picture has an inanimate agent, the log-likelihood of getting a passive description is increased by 4.545 units (which is equal to an odds

¹³ We also tested but did not get any significant effect for the animacy of the patient. Moreover, the addition of the fixed effect of language of description did not significantly alter the model. For simplicity of presentation, here we interpret the model with only the animacy of the agent as a fixed effect.

ratio of about 94:1). Participants are more likely to produce a passive if the target picture contains an inanimate agent.

Table 5 Summary of the fixed effects in the mixed logit model for agent animacy on target type

Predictor	Coefficient	<i>SE</i>	Wald <i>Z</i>	<i>P</i>
Intercept	-5.77	(1.24)	-4.66	< .001
Agent = Inanimate	4.55	(1.26)	3.62	< .001

Analysis of agent-emphasizing and patient-emphasizing responses in Turkish

Due to the typological properties of Turkish presented in the ‘Introduction’, it could be possible that Norwegian passives might prime a form favoring a patient and demoting an agent, in general, rather than priming specifically passive morphosyntax in Turkish. Such a priming would be thematic and not syntactic in nature. In order to test this, we recoded the Turkish data and conducted a new analysis on the picture descriptions of the Norwegian-Turkish bilinguals.

Coding

We recoded the Turkish data into three groups: “agent-emphasizing”, “patient-emphasizing” and “other” target descriptions. We have coded the sentences in which the agent was topicalized (i.e. appeared at the sentence initial position) regardless of its sentential function (subject, object, etc.) and case (NOM, ACC, etc.) as “agent-emphasizing”. In addition, as there were several independent relative clauses in the data, the relative clauses in which the extracted head NP denoted the agent were also coded as “agent-emphasizing”. The same procedure applied to “patient-emphasizing” productions. Here, we are not using the term “emphasis” or “to emphasize” in a technical sense, but rather follow Bernolet et al. 2009 and Fleischer et al. 2012 in adopting it as a cover term to indicate favoring one thematic role and demoting the other. In our data set, this broadly covers topicalizations and relativization¹⁴. Finally, responses which did not include a verb, or which included existentials, and responses with conflicting types of thematic roles given simultaneously were coded as “other”. These responses were excluded from the analysis.

¹⁴ It is beyond the scope of the present study to also address “focus” or “new information” which is argued to be indicated by both word order (generally assumed to be the pre-verbal position-Erguvanlı 1984) and prosody (e.g. İşsever 2003). However, focus is an intrinsically inseparable part of information structure and definitely deserves further scrutiny.

Data analysis and results

Table 6 below illustrates the numbers of Turkish target sentences emphasizing (i.e. topicalizing or relativizing) agents and patients for both active and passive prime conditions, as well as the proportion of emphasized patients per condition¹⁵.

Table 6 Counts of Turkish descriptions with topicalized/relativized agents and patients and proportion of such patients per active and passive prime for Norwegian-Turkish Bilinguals

	Norwegian-Turkish Bilinguals	
	Active Prime	Passive Prime
Patient	12	14
Agent	56	56
Proportion of Patients	0.18	0.20

For the Turkish data, we ran a new logit mixed effects modeling analysis with emphasized thematic role (Agent vs. Patient) as the outcome variable. As fixed effects, in addition to prime type (with the levels coded as “Active” vs. “Passive”), we also entered animacy of the agent of the target picture (with the levels coded as “Animate” vs. “Inanimate”) and the interaction of the two. The reason for including the animacy of the agent was that the previous analysis had indicated an effect of this factor for passives, which could also be present for emphasized thematic roles¹⁶. We also included random slopes and intercepts. Following the same elimination procedure described for the analysis of active and passive targets, we ended up with a model that included the two fixed effects and their interaction as well as the two random intercepts per subject and item. This full model (Table 7) was a better fit of the data than the null model containing only the two random intercepts ($X^2(3) = 12.16, p < .01$). Removing prime type or the interaction from the full model did not significantly affect model fit; however, removing agent animacy did decrease data likelihood of the model, suggesting a significant effect of agent animacy (Table 8).

Table 7 Summary of the fixed effects in the mixed logit model on emphasized thematic role

Predictor	Coefficient	SE	Wald Z	P
Intercept	-6.86	2.41	-2.85	< .01
Prime Type = Passive	2.00	1.84	1.09	= .28
Agent = Inanimate	5.82	2.40	2.43	< .05
Interaction = Passive & Inanimate	-2.46	2.08	-1.19	= .24

¹⁵ Among all the responses including full sentences emphasizing the agent and the patient, there was only one instance of OSV and one instance of OVS word order, the rest were all SOV sentences.

¹⁶ As in the previous analysis, we also tested but did not get any significant effect for the animacy of the patient. For simplicity of presentation, again, we interpret the model with only the animacy of the agent as a fixed effect.

Table 8 Comparisons of reduced models against the full model: “emphasized thematic role ~ prime type*agent animacy + 1|subject + 1|item”

Model	X^2	DF	P
emphasized thematic role ~ prime type + 1 subject + 1 item	12.14	2	< .01
emphasized thematic role ~ agent animacy + 1 subject + 1 item	1.67	2	= .43
description ~ prime type + agent animacy + 1 subject + 1 item	1.66	1	= .20

To sum up, the significant negative intercept on Table 7 indicates that overall Norwegian-Turkish bilinguals are less likely to produce a passive target description than an active description. This analysis did not reveal a significant fixed effect for prime type, failing to provide enough evidence to reject the null hypothesis. The interaction between prime type and agent animacy was not significant, either. However, there was a significant fixed effect of agent animacy. If a target picture contains an inanimate agent (rather than an animate agent), participants are more likely to topicalize or relativize the patient (instead of the agent) (see also Table 9).

Table 9 Counts of Turkish descriptions with topicalized/relativized agents and patients and proportion of such patients per animate and inanimate agents in target pictures for Norwegian-Turkish Bilinguals

	Norwegian-Turkish Bilinguals	
	Animate Agent	Inanimate Agent
Patient	3	23
Agent	72	40
Proportion of Patients	0.04	0.58

Discussion

The present study showed that both the Norwegian-Turkish and the Norwegian-English bilinguals produced a lower proportion of passives than actives while describing the target pictures, which is compatible with the general frequency of the two alternate structures (see below). The first analysis did not reveal any significant priming effect in terms of an increased likelihood of getting passive descriptions (as opposed to active descriptions) after passive primes than after active primes for either language group and thus failed to provide enough evidence to rule out the null hypothesis. Our hypothesis was that if structural similarity was required for priming, then we should have observed priming between Norwegian and English passives and not between Norwegian and Turkish passives. If, on the other hand, the locus of priming was thematic or information-structural, we would expect to see priming for both groups of bilinguals. For the Norwegian-Turkish bilinguals, the absence of syntactic priming was not too surprising, as the two languages have different linguistic means of passivization in spoken language. It should also be noted that although Turkish allows scrambling, almost all the passive productions

in our data set had the SOV word order. Therefore, this finding seems to be in line with the studies that suggest word order similarity to be necessary for cross-linguistic structural priming such as Loebell and Bock (2003) and Bernolet et al. (2007). However, this observation is in contradiction with several other studies on cross-linguistic priming of passives which found priming in the absence of such similarity (e.g. Hartsuiker et al. 2004; Bernolet et al. 2009; Chen et al. 2013; Kutasi et al. 2018). On the other hand, the absence of such priming in Norwegian-English bilinguals and the lack of a difference between the two bilingual groups was rather unexpected, as the syntactic/periphrastic passives in these two languages are similar not only in terms of constituent structure and word order, but also in terms of information structure. Loebell and Bock (2003) did not find any priming for passives in German-English bilinguals, either. However, the word order is slightly different in German passives than in English. Although Norwegian is also a Germanic language, its syntactic/periphrastic passives with SVO word order are more similar to English passives than German passives. Nonetheless, in the present study, priming was not observed for this group either.

While interpreting the results of the present study, it is crucial to keep in mind that this is a preliminary study with only 23 participants. It is possible that the lack of power (see Mahowald et al. 2016) might be camouflaging some priming effects. Further data from more participants is thus warranted. The absence of significance in our statistical tests does not prove the absence of an effect, therefore we need to be cautious while drawing conclusions based on the present data.

With respect to the frequency of passives in Turkish, an early study by Tarzi (1983) cited in Ketrez (1999, p. 21) states that in Turkish, passives are rare especially in informal “unplanned speech”. Göksel and Kerslake (2011), on the other hand, suggest that passives are very frequent in Turkish, as it is possible to passivize both transitive and intransitive verbs. According to an early, small-scale corpus study (Bada and Bedir 1999), there are more actives than passives overall in both written and spoken Turkish. The authors also suggest that passives are more frequent in written language (9.9%, 40/406 sentences) than in spoken language (5.3%, 30/568 sentences). This is compatible with existing data for Norwegian and English, as according to Laanemets (2009), passive voice is much more frequently used in written Norwegian (10.8% per finite verb) than in spoken Norwegian (0.8% per finite verb), which is also in line with Biber, Johansson, Leech, Conrad and Finegan (1999)’s findings for English. Furthermore, Bada and Bedir (1999) also compared the frequency of regular and impersonal passives in Turkish. In spoken Turkish, 52.3% (22/44) of all passives were regular passives and 47.7% (21/44) were impersonal passives (the difference between the two was not significant). In written Turkish, on the other hand, there were significantly more regular passives (76.1%, 70/92) than impersonal passives (23.9%, 22/92). Overall, given that passives are less frequent than actives, especially in spoken language, the low number of passives produced by our participants, coupled with the small sample size, may have contributed to the lack of statistical power of our analyses.

One possible factor that may have affected our results is the existence of a morphological passive structure, namely the *s*-passive, in Norwegian. Interestingly, this property of Norwegian passives

makes them align with Turkish passives rather with English passives. As mentioned in the ‘Introduction’, this type of passive is more frequent in written Norwegian than in spoken Norwegian: According to corpus data, 79.6% of the passives in spoken Norwegian are *bli*-passives and 20.4% are *s*-passives; whereas in written Norwegian, 62.5% of passives are *bli*-passives and 37.5% are *s*-passives (Laanemets 2009). Overall, in both written and spoken language, morphological *s*-passives are less frequent than syntactic/periphrastic *bli*-passives. Since the present study investigated priming in spoken language, the general discussion was based on *bli*-passives. Although the existence of morphological *s*-passives in Norwegian as an alternative structure may potentially have had an influence on the results, at this point, this possibility does not go beyond mere speculation. In future studies, it is worth testing *s*-passives along with *bli*-passives in comparison with Turkish and English passives, both in written and spoken structural priming tasks.

As noted above, the absence of a significance in our results does not necessarily prove the absence of an effect and could indicate a lack of power. In addition to the small sample size, another possible limitation of the study related to the heterogeneity of the groups in terms of the age and setting of language acquisition. Despite their comparable proficiency self-ratings, the two groups differed in that the Norwegian-Turkish group mainly consisted of early and late learners of Norwegian, while the Norwegian-English group included simultaneous bilinguals, learners of Norwegian, and learners of English. To get a clear picture, it is necessary to carry out future studies with a larger number of participants and items, as well as with more homogeneous and more directly comparable bilingual groups.

Furthermore, the observed results could also be related to some aspect of the design or the nature of the task. The task employed in the present study was a computerized version of the picture description task used by Loebell and Bock (2003). That both studies used the same task may imply that the pattern may be task-relevant; however, this is unlikely, as Kutasi et al. (2018) also used a somewhat similar task, but did find priming. Their participants also heard stimulus sentences in a computerized task and described pictures, but instead of indicating whether they had encountered each item, they made a decision as to whether the sentences they heard matched pictures that were subsequently presented. Similarly, in one of their experiments, Chen et al. (2013) had their participants read sentences aloud and then describe pictures and they found priming. In their second experiment, they used a confederate scripting task, as did Hartsuiker et al. (2004), and Bernolet et al. (2009), and all showed priming (note that Bernolet et al. 2007, which suggested that word order similarity was necessary for cross-linguistic priming of relative clauses, also used a computerized confederate scripting task). Possible influences of the nature of the experimental task on the results also deserve further scrutiny.

The main analysis on the English and Turkish responses showed that the overall number of passive descriptions was quite low. This led us to further investigate the conditions in which participants actually do provide passive descriptions. An additional analysis on the English and Norwegian target sentences revealed that participants were more likely to produce a passive

sentence when the target picture contained an inanimate agent. We will return to the discussion of this finding below, but for now we conclude that in future studies, it could make sense to involve more of or only those pictures that depict inanimate agents to elicit a larger proportion of passives. Furthermore, like Loebell and Bock (2003), we did not provide the verb or the nouns as written cues on the pictures. Although this ensured that the task tested spoken language without the influence of written language, it also led to a number of non-target completions.

Another limitation of the present preliminary study is the absence of control experiments testing within-language structural priming of passives vs. actives in Turkish and Norwegian monolinguals. Non-syntactic pragmatic factors may always play a role in the use of passives in different languages. If no priming effects are observed with monolinguals either (as in Loebell and Bock 2003's results for L1 German), then it may be the case that Norwegian and Turkish speakers do not persevere on the use of passives or simply do not tend to use passives in such contexts. The absence of within-language priming might be due to pragmatic constraints or the nature of the experimental items, independent of the nature of bilingual syntactic representations. Therefore, it would definitely be informative to conduct such follow-ups.

In addition to the main analysis, we also ran another one which focused only on the Turkish target sentences produced by the Norwegian-Turkish bilinguals. This analysis addressed the question of whether Norwegian passives could prime Turkish structures which favored the patient and demoted the agent, as Turkish has some other means of doing that in addition to specifically passive morphosyntax. Again, we did not find a significant effect of prime type (active vs. passive) on the type of the emphasized (i.e. topicalized or relativized) thematic role (emphasized agent vs. emphasized patient), which means that our data do not provide enough evidence to reject the null hypothesis. As the number of participants is quite low, this analysis does not have much statistical power. Therefore, it is hard to draw conclusions from these data. On the other hand, we found a significant effect of the animacy of the agent of the target picture, similar to the effect of the animacy of the agent on passive responses in the English and Turkish combined data. The result here was that if the target picture contained an inanimate agent (rather than an animate agent), Turkish speakers were more likely to topicalize or relativize the patient (instead of the agent) in their description. It looks like overall, inanimate agents in the pictures tend to be de-emphasized in the sentences describing these pictures. This finding is compatible with the well-documented observation that conceptual factors such as animacy can influence sentence structure (see among others Clark 1965; Bock, Loebell and Morey 1992; McDonald et al. 1993; Prat-Sala and Branigan 2000; Branigan, Pickering and Tanaka 2008; Vasilyeva and Gámez 2015; and Ziegler and Snedeker 2018). The role of animacy on linguistic structure has also been investigated in relation to Turkish grammar (e.g. Sezer 1979 cited by Özsoy 2009; Nakipoğlu-Demiralp 2001; and Özsoy 2009). Gülşeker Solak (2007) had native speakers of Turkish describe pictures with transitive actions in writing. She found that participants produced more OSV sentences in the “inanimate agent-animate patient” condition than in the “inanimate agent- inanimate patient” condition. A thorough review of the relationship between animacy,

thematic roles and grammatical structure is beyond the scope of the present study; however, we should note that interestingly, both our analyses revealed an effect of the animacy of the agent and not the animacy of the patient. This could possibly be related to a higher general status of agents over patients in a thematic hierarchy (e.g. Givón 1984), but given the limitations of the study, we cannot draw any conclusions with this regard.

To conclude, the present preliminary study did not provide any evidence for the shared syntax account from adult Norwegian-English and Norwegian-Turkish bilinguals. However, as discussed above, caution is necessary in the interpretation of such results from small sample sizes, as the absence of statistical significance does not necessarily imply the lack of an effect. Given that Loebell and Bock (2003) and the present study did not reveal significant cross-linguistic structural priming effects for the active-passive alternation whereas several other studies on language pairs with more or less similar passive structures did (e.g. Hartsuiker et al. 2004; Bernolet et al. 2009; Chen et al. 2013; Kutasi et al. 2018), further research is warranted to shed light on the nature of the representation of passives in bilingual minds. But despite its limitations, this preliminary study, which directly compared Norwegian-English and Norwegian-Turkish bilinguals within the same experimental structural priming task, paves the way for such future research.

Conflict of Interest

On behalf of both authors, the corresponding author states that there is no conflict of interest.

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