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Transfer of topic-prominent structure in Chinese learners of Norwegian as a second and third language

RESEARCH

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ABSTRACT

This study examines cross-linguistic influence in the acquisition of Norwegian by first-language (L1) Chinese learners. With a semi-subtractive design, the study compares learners of Norwegian as a second language (L2) with learners who acquire Norwegian as a third language (L3) after having acquired L2 English. Chinese is a topic-prominent language with topic–comment as the basic syntactic structure, and the topic can be syntactically independent of the comment clause. Norwegian and English are subject-prominent languages organised around a subject–predicate structure, in which a syntactically visible subject is often required and a topicalised element other than subject or object must be marked. On a pseudo-longitudinal basis, the study employs two experimental methods: an oral translation task and an acceptability judgement test. The results show non-facilitative transfer of Chinese-like topic-prominent structure in both learner groups, as well as facilitative transfer of subject-prominent structure from L2 English in the L3 group, which appears to occur at very early stages of L3 Norwegian development. A discrepancy is observed between acceptance and production, as topic-prominent structure is accepted more readily than it is produced and follows a different developmental pattern. While production develops towards the target subject-prominent structure, acceptance does not show the same trend. Overall, the findings indicate co-activation of both the L1 and the L2 in L3 acquisition and suggest that learners struggle to reject non-target structures compatible with a previously acquired language.

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1. INTRODUCTION

Over the past decade, research has focused extensively on multilingual acquisition and how grammatical properties of previously acquired languages influence the acquisition of a third language (L3). Important questions in the field concern whether the order of acquisition or language status – specifically, whether a first language (L1) or a second language (L2) – affects transfer patterns. Additionally, there is interest in determining whether transfer[1] occurs wholesale (e.g., Rothman, 2011, 2015; Rothman et al., 2019) or property-by-property (e.g., Westergaard et al., 2017; Slabakova, 2017).

Despite numerous syntactic phenomena having been investigated within the field of L3 acquisition, to our knowledge, few studies have examined the transfer of properties related to topic- or subject-prominent structure. According to Li and Thompson (1976, p. 460), many structural differences between languages are related to whether the basic structure of sentences in a language is analysed as subject–predicate or topic–comment. Chinese is a so-called topic-prominent (TP) language, in which the topic plays an essential role in syntactic structure. Norwegian and English, on the other hand, are subject-prominent (SP) languages in which the syntactic subject is a crucial element in the subject-predicate syntactic structure.

This study investigates the transfer of TP structure from L1 Chinese to L2/L3 Norwegian, an SP language. We also examine whether prior acquisition of another SP language, English, facilitates the acquisition of SP structure in Norwegian. We compare the acquisition of Norwegian between two groups of learners who share the same L1, Chinese: one group acquiring Norwegian as their L2 (the L2 group), and another group with prior knowledge of L2 English, acquiring Norwegian as their L3 (the L3 group). This semi-subtractive design helps distinguish the potential influence of the two previously acquired languages and is therefore advantageous for examining property-by-property transfer (cf. Westergaard et al., 2023).

2. BACKGROUND

2.1. SUBJECT-PROMINENT AND TOPIC-PROMINENT LANGUAGES

This study is based on the distinction between TP and SP languages as examined by Li and Thompson (1976, 1981), who criticised the traditional approach to linguistic analysis, which treats the subject as the default. Instead, they proposed that certain languages, such as Chinese, with respect to the "basic sentence type" (Li & Thompson, 1976, p. 461), present information in a topic–comment rather than a subject–predicate structure and are thus named topic-prominent. In Chinese, this structure is frequent, exhibits greater variety, and does not necessarily have a counterpart in English (Xu, 2015). A topic is a nominal in definite form that serves as "the center of attention of the sentence" (Li & Thompson, 1976, p. 466). It can be semantically relevant but grammatically independent of the rest of the sentence, the comment (Li & Thompson, 1976; for a similar definition, see Xu, 2015). In other words, the topic is not necessarily generated in the comment sentence and subsequently moved into the topicalised position (Xu & Langendoen, 1985). In contrast, in SP languages such as English and Norwegian, the subject–predicate grammatical relationship is dominant; the subject is often required in a sentence, is in a selectional relationship with the verb, and often controls verb agreement (Li & Thompson, 1976).

We illustrate these differences with the Chinese sentence in (1a).[2] The first constituent, *this book*, is the topic. The rest of the sentence, *I have many questions*, serves as a comment on the topic. The topic is grammatically independent of the comment, which is itself a complete sentence with both a subject and a predicate. This contrasts with SP languages such as English and Norwegian, where the corresponding Sentences (1b) and (1c) are ungrammatical. In SP languages, clauses[3] are structured in a subject–predicate format, with the syntactic subject as an integrated, typically mandatory component of a sentence, functioning as an argument of

1 In this article, the terms *transfer* and *cross-linguistic influence* (CLI) are used interchangeably as the influence of previously acquired language(s) on the acquisition or use of a new language (e.g., Westergaard et al., 2023).

2 For clarity, in all example sentences in Chinese the topic is in bold and the subject (if it exists) is underlined.

3 In this study, we focus on main clauses only because many participants have a low proficiency level in Norwegian.

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the predicate constituent[4] (Li & Thompson, 1976). Topics that do not have an argument relation to the verb must be marked with a topic marker, as shown in (1d) and (1e).

(1) a. **这本书** 我 有 很多 问题。
this book I have many question
'When it comes to this book, I have many questions.'

b. *This book I have many questions.

c. *Denne boka har jeg mange spørsmål.
this book have I many questions

d. Regarding this book, I have many questions.

e. Når det gjelder denne boka, har jeg mange spørsmål.
when it comes to this book have I many questions

SP languages also allow unmarked topics. Both Norwegian and English are SVO languages, with the subject usually occupying the sentence-initial position, making it the natural topic. Other nominals (as well as other constituents) may also serve as the topicalised element, but such a fronted topic is syntactically linked to a position within the predicate, meaning it is derived by *move*, rather than being a syntactically independent but semantically related constituent that *merges* with the sentence (Xu, 2015). Thus, Sentences (2a) and (2b) are grammatical in certain contexts, in contrast to (1b) and (1c), where the topicalised element is not generated within the predicate.

(2) a. Many questions I had _____.

b. Mange spørsmål hadde jeg _____.
many questions had I

Topicalisation resulting from movement, as in (2), is referred to as "the English-style topic structure" (Chafe, 1976, as cited in Xu, 2015, p. 394) and is allowed in both SP and TP languages (Xu, 2015). However, the "Chinese-style topic structure" with an externally merged topic, as in (1a), is allowed only in TP languages (Xu, 2015).

Because SP and TP affect the basic construction of sentences, this study includes four TP structure types that reflect this difference. The first TP structure type contains a *double subject* (also named "double nominative construction" in, among others, Xu, 2015, p. 398): Two nominal constituents precede the finite verb (Li & Thompson, 1976), such as in Sentence (1a). The first is usually the topic, while the second is typically the subject. In the second structure type, *false subject*, the subject can be omitted if it does not carry semantic information or can be inferred from context (e.g., Sentence 3a). Therefore, the topic, as the only nominal before the verb, may resemble a subject, but semantically and syntactically, it is not. Thus, sentences (1a) and (3a) are grammatical in Chinese. Their counterparts in English, (1b) and (3b) and, in Norwegian, (1c) and (3c), require changing the topic to an adverbial or adding a visible subject, as in (1d) and (3d), and (1e) and (3e), respectively.

(3) a. **这家餐厅** 能 吃到 正宗的 中国菜。
This restaurant can eat authentic Chinese dishes

b. *This restaurant can eat authentic Chinese dishes.

c. *Denne restauranten kan spise autentiske kinesiske retter.
This restaurant can eat authentic Chinese dishes

d. At this restaurant, one/customers can eat authentic Chinese dishes.

e. På denne restauranten kan man spise autentiske kinesiske retter.
At this restaurant can one eat authentic Chinese dishes

The third TP structure type comprises non-declaratives, namely interrogatives and imperatives. In English and Norwegian, sentence-initial elements are usually the finite verb in *yes/no-*

4 One exception is imperative sentences, where the subject is typically omitted in both Norwegian and English.

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questions, as in Sentences (4d) and (4e), the finite verb or adverb in imperatives, as in (5d) and (5e), and the question word in *wh*-questions, unlike in declaratives. However, in Chinese, those sentences can also be expressed with TP structure, as shown in (4a) and (5a), whose word-by-word counterparts in English (4b) and (5b) and in Norwegian (4c) and (5c) are ungrammatical.

(4) a. **这家餐厅** 你 来 过 吗？
This restaurant you come PFV Q

b. *This restaurant, have you visited before?

c. *Denne restauranten, har du besøkt før?
This restaurant have you visited before

d. Have you visited this restaurant before?

e. Har du besøkt denne restauranten før?
Have you visited this restaurant before

(5) a. **这家餐厅** 千万 别 去！
This restaurant be sure not visit

b. *This restaurant, never visit!

c. *Denne restauranten, aldri besøk!
This restaurant never visit

d. Never visit this restaurant!

e. Aldri besøk denne restauranten!
Never visit this restaurant

The fourth TP structure type involves the deletion of co-referential elements. In TP languages, topics control co-referential constituent deletion (Li & Thompson, 1976), and constituents co-referential with the topic can be omitted. This omission is not allowed in SP languages. Thus, Sentence (6a) is grammatical in Chinese, whereas its counterparts in English (compare 6b and 6d) and Norwegian (compare 6c and 6e) require an overt co-referential pronoun (*it* or *den*).

(6) a. **这只狗** 很安静， 从来不 吵， 我 很喜欢。
This dog very quiet never noise I very like

b. *This dog is very quiet, never makes any noise, and I like very much.

c. *Denne hunden er veldig stille, bråker aldri, og jeg liker veldig godt.
This dog is very quiet noises never and I like very much

d. This dog is very quiet, **it** never makes any noise, and I like **it** very much.

e. Denne hunden er veldig stille, **den** bråker aldri, og jeg liker **den** veldig godt.
This dog is very quiet **it** noises never and I like **it** very much

This pattern is also relevant to broader null-argument phenomena in Chinese: Discourse topics can license zero anaphora in topic chains, yielding systematic deletion of co-referential material (e.g., Huang, 1989). Importantly, such topic-linked omissions are not identical to TP/SP structure, but they may interact with it by increasing tolerance for missing arguments in judgement and by facilitating omission-type responses.

2.2. PRIOR RESEARCH

The acquisition of a new language with a different type of TP/SP structure has been examined in several studies. Generally, they can be categorised into two subgroups: (a) from SP to TP (e.g., English speakers learning Chinese) and (b) from TP to SP (e.g., Chinese speakers learning English). As for the first group, a number of studies (e.g., Jin, 1994; Jung, 2004; Liu, 2015; Yuan, 1995, 2017) have used a variety of methods to examine learners with an SP language as L1 acquiring a TP language, such as Chinese, Japanese or Korean, as L2. Some have also employed more complex study designs comparing different learner groups across SP and TP languages; one

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such example is Cao et al. (2006), who included L1 speakers of English, Japanese, and Korean. These studies found negative transfer of SP structure into L2 Chinese, but also development from non-target-like SP structure to target-like TP structure. As Liu (2015) concluded, "it is not the case that topic structures are all beyond the reach for non-advanced learners" (p. 19).

A number of studies (e.g., Chang & Xu, 2022; Chang et al., 2017; Li, 2014; Li & Yang, 2014; Xiao, 2002; Yang & Li, 2012) have focused on the opposite acquisition order: learners with TP languages as L1 acquiring SP languages as L2. All these studies reported evidence of transfer of TP features from L1 Chinese into L2 English. For example, Li and Yang (2014) observed Chinese learners' use of TP structure in English, and noted a shift from TP to SP. In another study, Yang and Li (2012) found that certain TP constructions are more challenging to unlearn, suggesting a hierarchy for these structures in L2 acquisition. When comparing learners at different levels, they concluded that the L1 "gradually gives way to the L2," leading them to hypothesise a "Topic-to-subject progression" (p. 140). This result aligns with Xiao (2002), as both studies suggest that transfer of Chinese-type TP structure may be long-lasting, with some TP features persisting over development. Although TP influence generally decreases with increasing proficiency, residual TP features have been observed even among advanced learners (e.g., Li, 2014; Li & Yang, 2014; Yang & Li, 2012). In this respect, their findings differ from Chang et al. (2017) and Chang and Xu (2022), who argued that learners can successfully unlearn Chinese TP structure as their proficiency in L2 English develops.

Although the transfer of TP and SP structure has been studied extensively in second language acquisition, relatively few studies have examined it in L3 acquisition. Jin (2009) investigated L1 Chinese and L2 English speakers learning L3 Norwegian, focusing on object omission. Using a grammaticality judgement test with corrections, she found that the learners had some difficulty rejecting sentences without objects in both L2 English and L3 Norwegian, but the accuracy was much lower in L3 Norwegian. She thus concluded that there was "a strong L1 effect and little trace of L2 English interlanguage transfer" (p. 157). These results align with Fung (2001), who studied Chinese L1 speakers with L2 English learning L3 German. Fung's results show that although Chinese learners could, to some extent, produce fronting constructions in German, their production was "to a large extent, restricted to the 'framing' function found in Chinese-style topics of topic-comment sentences" (p. 13). Fung thus concluded that in this context the acquisition of German "has already been blocked by Chinese-style topic functions" (p. 13).

2.3. CROSS-LINGUISTIC INFLUENCE IN L3 ACQUISITION

Over the past two decades, the field of L3 research has focused intensively on explaining the process of cross-linguistic influence (CLI) in L3 acquisition. One question that attracted considerable attention in early research on L3 acquisition was whether the order of acquisition affects CLI and whether a language's status as L2 or L1 influences CLI. Some studies found that transfer primarily occurs from the L1 (Hermas, 2010; Jin, 2009), while proponents of the *L2 Status Factor Hypothesis* (Bardel & Falk, 2012; Falk & Bardel, 2011) argue that the L2 holds a privileged status as a source of transfer in L3 acquisition due to similarities between the L2 and L3 in cognitive status. According to the *Cumulative Input Threshold Hypothesis* (Cabrelli & Iverson, 2024), non-facilitative transfer from the L1 is more challenging to overcome than from the L2 due to differences in the cumulative amount of input in the two languages.

Some other models argue that similarity is a key factor in choosing a transfer source. According to the *Typological Primacy Model* (Rothman, 2011, 2015; Rothman et al., 2019), the previously acquired language which the linguistic parser perceives as more similar to the L3 will be transferred in its entirety at the initial stages. The strength of similarity is placed on a four-level hierarchy: (a) lexicon, (b) phonology, (c) morphology, and (d) syntax (Rothman et al., 2019). If sufficient lexical similarities are identified, a wholesale transfer will occur. Otherwise, the parser continues scanning at the next level until sufficient similarities trigger a wholesale transfer.

Whether transfer is wholesale or property-by-property remains a widely debated question. Advocates of the *Linguistic Proximity Model* (Westergaard et al., 2017) and *the Scalpel Model* (Slabakova, 2017) contend that transfer can occur from any structure in any language, a concept known as *Full Transfer Potential* (Westergaard et al., 2023). According to both

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the Linguistic Proximity Model and the Scalpel Model, CLI results from the co-activation of previously acquired languages during L3 processing. It operates property-by-property and can arise simultaneously from both the L1 and the L2. In contrast to the Typological Primacy Model, the Linguistic Proximity Model predicts that similarities on the abstract structural level are the primary driver of CLI. However, the Linguistic Proximity Model allows more influence from superficial similarities at the initial stages before structural similarities take over (Westergaard et al., 2017).

2.4. RESEARCH QUESTIONS AND PREDICTIONS

Considering the differences between SP and TP languages and models of L2 and L3 acquisition, we address four research questions (RQs), followed by their respective predictions.

> RQ1. Does non-facilitative transfer of TP structure occur in Chinese learners' acquisition of Norwegian?

Based on previous findings on L1 transfer of TP structure (e.g., Li & Yang, 2014; Yang & Li, 2012), we expect both groups to produce and accept *TP[5] structure in Norwegian.

> RQ2. Are there differences between learners with prior knowledge of L2 English and those without?

If SP structure transfers from L2 English, the L3 group should produce and accept fewer *TP sentences than the L2 group. The L2 Status Factor Hypothesis predicts a privileged role for L2 English in L3 transfer (Bardel & Falk, 2012; Falk & Bardel, 2011), while the Typological Primacy Model predicts wholesale transfer of one of the languages at the initial stages (Rothman, 2011, 2015; Rothman et al., 2019). If L2 is selected as the transfer source, *TP will occur significantly less often in early learners in the L3 group than in the L2 group. Wholesale transfer from the L1, by contrast, predicts no group difference at early stages. The Linguistic Proximity Model and the Scalpel Model allow property-by-property influence from both the L1 and the L2 in the L3 group (Slabakova, 2017; Westergaard et al., 2017, 2023).

> RQ3. What do learning trajectories look like? Does L1 transfer decrease with increasing proficiency in L2/L3 Norwegian?

We expect *TP structure to be gradually replaced by SP structure as Norwegian proficiency increases.

> RQ4. Are there differences between learners' production and acceptance?

This question is most informative at low proficiency, where the models make divergent predictions. Under the Linguistic Proximity Model, co-activation of L1 Chinese and L2 English makes acceptance and production of both SP and *TP structure possible (Westergaard et al., 2017, 2023). In contrast, wholesale L2 transfer under the Typological Primacy Model (Rothman, 2011, 2015; Rothman et al., 2019) predicts more parallel patterns across tasks, with *TP infrequent in production and mainly rejected in the acceptability judgement test (AJT). With increasing proficiency, development of Norwegian is expected to reduce non-target influence, making task differences less diagnostic of initial transfer.

3. METHOD

3.1. PARTICIPANTS

This study utilised a semi-subtractive design with two groups of L1 Chinese speakers. The L2 group (n = 12) reported no functional proficiency in any additional language other than Chinese and Norwegian. Since English education has been compulsory in China since the turn of the millennium, most of these participants were aged 40–59 and had resided in Norway for longer periods (5–14 years). They were mainly recruited from the Chinese Women and Children's Association in Norway. Additionally, most of them had not received systematic Norwegian

5 The asterisk marks Chinese-type TP sentences when they occur as ungrammatical or non-target-like in Norwegian test items or learners' production. It is not used when TP denotes grammatical structure in Chinese, a typological category, or a transfer source.

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language training. Participants in the L3 group (n = 15) had learned L2 English before acquiring Norwegian as an L3. According to self-reports, all had high proficiency in L2 English (at least B2) and used English frequently for work or study. The L3 learners were generally younger (20–39 years) and had mainly resided in Norway for a relatively short period (0–9 years). They were recruited from the researchers' own network. They all had higher education, and the vast majority were enrolled in Norwegian language courses and had received systematic language training. None of them had a background in linguistics. Note that none of the participants had learned Norwegian before moving to Norway.

To assess the participants' proficiency in Norwegian and enable a pseudo-longitudinal study design, we administered a 46-item cloze test.[6] Proficiency levels were ranked according to the number of correct answers recorded, as shown in Figures 1a and 1b. Consequently, a higher ID number indicates a higher proficiency level.

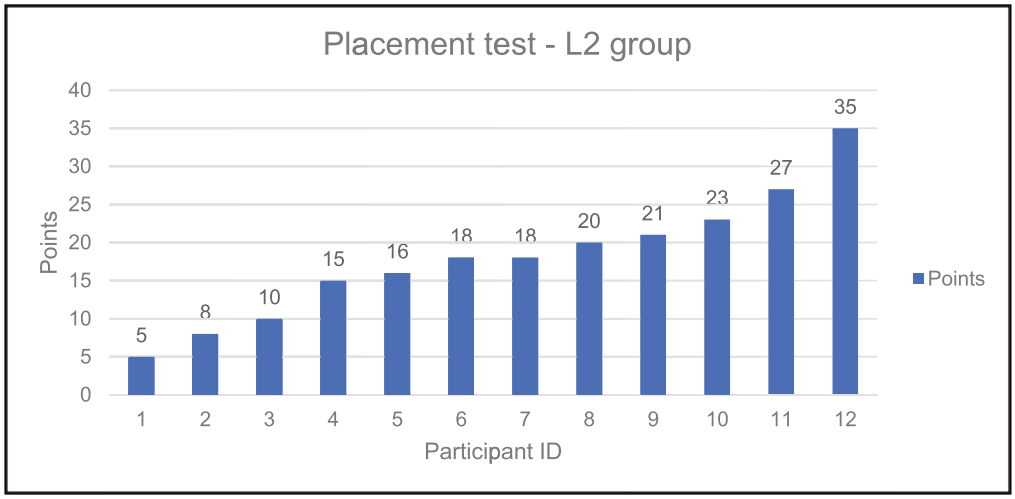


Figure 1a The level placement tests (L2 group).

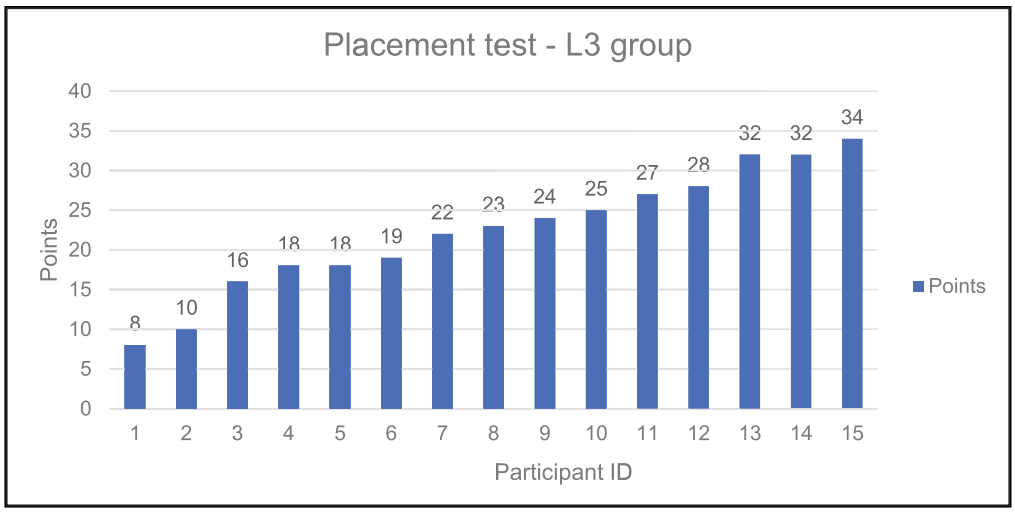


Figure 1b The level placement tests (L3 group).

3.2. TEST DESIGN

This study includes both an oral translation task (OTT) and an acceptability judgement test (AJT) to evaluate participants' production and acceptance of SP and TP structure in L2/L3 Norwegian. Since the study was conducted during the coronavirus pandemic, data were collected online using the data collection service Nettskjema and the meeting platform Zoom, with a researcher present during the sessions.

The OTT included 30 sentences. Approximately one quarter (seven) were fillers, and the other 23 were test sentences, grouped into two topics, "Restaurant Wang" and "This book", since TP structure is more readily elicited when a concrete topic is established. Participants were

6 The cloze test comprised a text of four paragraphs, each corresponding to textbook levels A1 (N = 12), A2 (N = 11), B1 (N = 12), and B2 (N = 11), with one grammatical or lexical word missing in each blank. All sensible answers were accepted and awarded one point.

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shown Chinese sentences on a shared screen and were asked to translate them orally into Norwegian. The 23 TP test sentences exhibited typical Chinese-style TP structure, which has no counterpart in English or Norwegian (see Section 2.1), and the 7 fillers were SVO sentences that could not elicit such TP structure. Accordingly, the test was intended to elicit participants' use of TP structure in L2/L3 Norwegian. As outlined in Section 2.1, Chinese permits both Chinese-type and English-type TP sentences, whereas Chinese-type TP sentences are ungrammatical in both English and Norwegian. Some participants, especially those in the L2 group, exhibited pronunciation difficulties, which posed challenges for transcription. To address this issue, the researcher transcribed participants' responses in real time during the task. When an utterance contained unidentifiable pronunciation, the researcher requested brief clarification from the participant before proceeding to the next sentence. These clarification requests were limited to pronunciation-related issues and did not involve grammatical or structural feedback.

The AJT comprised 50 sentences in Norwegian, including 45 test items and five fillers. Of the 45 test sentences, 21 were grammatical with SP structure, and 24 were ungrammatical with Chinese-like *TP structure. The *TP items were evenly distributed across the four TP structure types discussed above. As shown in one pilot test, participants, as expected, accepted almost all SP stimuli and rarely rejected them. In contrast, the *TP stimuli yielded richer evidence for subsequent analysis. Thus, the SP items functioned as grammatical control items and also helped reduce the salience of the ungrammatical *TP items. Participants viewed the sentences on screen and were asked to judge each sentence as grammatical or ungrammatical; they could also select "I don't know". Participants were also asked to suggest corrections to the sentences they rejected.

4. STATISTICAL METHODS

For both tasks, we fitted generalised linear mixed-effects models with a binomial response in R (R Core Team, 2024) using the glmer function from the lme4 package (Bates et al., 2015). Model diagnostics, including checks for singularity and residual patterns, were conducted using the DHARMa package (Hartig, 2024). To assess the contribution of individual predictors, we conducted Type II Wald χ^2 tests using the Anova() function from the car package (Fox & Weisberg, 2019).

4.1. THE OTT

In the OTT, each participant produced 30 sentences, of which seven were fillers. We coded non-TP answers as target-like (1) and *TP answers as non-target-like (0) (see below for details). The fixed effects were: group (reference level = L2), Norwegian proficiency (z-transformed), and their interaction; we included random intercepts for participant (ID) and item. Recall that the items involved two different topics (Restaurant Wang and This book). We did not expect this difference to systematically affect the responses and therefore did not include topic type as a categorical variable. Since every item (i.e., each sentence to be translated) was unique, we decided that including a random intercept for each item would be enough to capture intrinsic differences among items. Based on this specification, the model formula was as follows:

$$\text{response} \sim \text{group} * \text{proficiency_z} + (1 \mid \text{ID}) + (1 \mid \text{Item})$$

The categorisation of the production data requires clarification, as not all sentences can be easily categorised as either SP or TP. As explained in Section 2.1, TP and SP are not mutually exclusive; some SP structure types are acceptable in Chinese, but none of the TP structure types examined here is acceptable in Norwegian. Since we are looking at non-facilitative transfer of TP structure that leads to ungrammaticality in Norwegian, we divided the production data into two categories based on the presence or absence of the Chinese-like non-target *TP structure: (a) *TP: sentences that correspond to the TP structure found in Chinese and are ungrammatical in Norwegian, and (b) non-TP: sentences that cannot be analysed as having (ungrammatical) *TP structure. This can include sentences with grammatical SP structure, as well as sentences that exhibit TP-like features yet still meet the grammatical requirements of a subject-predicate structure. Note that we focus only on the presence or absence of non-target *TP structure; thus, sentences in both categories may contain other non-target features that are not relevant for *TP/non-TP categorisation. We illustrate our categorisation with responses from two of the sentences in the OTT in (7) and (8). Participant IDs are given in parentheses. The stimulus

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sentence in (7a) is a typical subjectless sentence similar to the TP false subject structure type in Chinese (see Section 2.1). The topic is *Restaurant Wang*, while the agentive subject, *people* or *customers*, is omitted, probably because it lacks a specific referent and can be inferred from the context. This sentence is unacceptable in Norwegian because it lacks a syntactic subject. For the same reason, (7b) is categorised as a typical *TP answer.

(7) a. Stimulus 1:
王记饭店 要 打电话 预约 座位
Restaurant Wang need/should call reserve seat
'Restaurant Wang requires a telephone reservation.'
'People have to call Restaurant Wang to reserve a table.'

b. (*TP) Restaurant Wang må ringe reservere. (A1)
Restaurant Wang must call reserve.

c. (non-TP) Vi trenger ringe til Restaurant Wang på reservere. (B6)
We need call to Restaurant Wang at/on reserve.

d. (non-TP) Det må bestille bord på Restaurant Wang. (A12)
It must reserve table at Restaurant Wang

The produced sentence in (7c), on the other hand, is analysed as non-TP as it has an additional subject *we* (note that this sentence is also acceptable in Chinese). Sentences like (7d) are more challenging to analyse, as they lack a semantic subject and are therefore non-target-like in Norwegian. However, we have categorised (7d) as non-TP since it contains the formal subject *it* and thus lacks Chinese-like TP features. Furthermore, the structure is not similar to any of the TP structure types presented in Section 2.1. We further illustrate this with another example of responses to Sentence (8a), which targets the double subject structure type, as there are two nominals to the left of the predicate (*good*): the first, *Restaurant Wang*, functions as the topic while *wok* is the subject.

(8) a. Stimulus 2:
王记饭店 炒菜 不错
Restaurant Wang wok good
'Restaurant Wang serves good wok.'

b. (*TP) Restaurant Wang wok mat veldig bra (A8)
Restaurant Wang wok food very good

c. (non-TP) Wok på Restaurant Wang er bra (B6)
Wok at Restaurant Wang is good

d. (non-TP) Det har bra wok på Restaurant Wang (B11)
It have good wok at Restaurant Wang

Sentence (8b) is a typical *TP production that corresponds to this structure type. It stands in contrast to (8c), where the two nominal phrases are merged into a single nominal construction serving as the subject (*wok at Restaurant Wang* as the subject is also allowed in Chinese, literally *Restaurant Wang's wok*). Sentence (8d) shows some influence from Chinese, for example, the verb *have*, but it has the formal subject *it*, which exists in English and Norwegian, but not in Chinese.

4.2. THE AJT

In the AJT, 24 test sentences contained *TP structure and 21 contained grammatical SP structure. Responses were coded as target-like (1) or non-target-like (0). "I don't know" answers were rare (45 in total). For each participant, we calculated the proportion of their responses that were coded as "I don't know." Across participants, these proportions had a mean of 4% (*SD* = 3%, range = 0–13%). The fixed predictors were: grammaticality, that is, whether the item to be evaluated was grammatical (i.e. SP, vs. ungrammatical, i.e. *TP; reference level = grammatical); group: L2 vs. L3; reference level = L2; and proficiency in Norwegian (*z*-transformed to mean = 0 and *SD* = 1). We included all two-way interactions and a three-way interaction between group, grammaticality, and Norwegian proficiency. The random structure included a random intercept

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for participants (ID) and for items (Barr et al., 2013). Based on this specification, the model formula was as follows:

$$\text{response} \sim \text{group} * \text{grammaticality} * \text{proficiency_z} + (1|\text{ID}) + (1|\text{item})$$

The standard maximum-likelihood model produced a convergence warning. Given the highly uneven response distribution across grammaticality conditions, particularly the near-ceiling performance in the grammatical condition (see Section 5.2), we fitted a penalised logistic mixed-effects model following Clark et al. (2023), using a normal prior on the fixed effects to regularise the estimates.

5. RESULTS

This section presents the descriptive and statistical results from the OTT and the AJT.

5.1. RESULTS FROM THE OTT

5.1.1. Descriptive results

In the OTT, each participant produced 30 sentences, of which seven were fillers. Figures 2a and 2b below show the production of non-target *TP structure. The *x*-axis shows the informant ID, and, as outlined in Section 3.1, higher ID numbers indicate higher proficiency levels. The *y*-axis shows the number of *TP sentences produced out of the 23 test sentences.

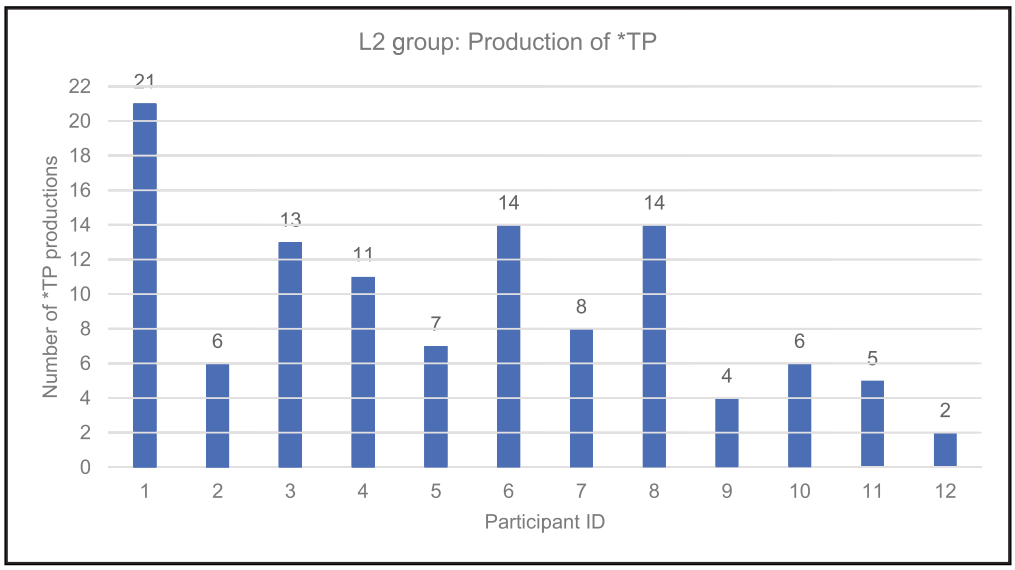


Figure 2a L2 group's results from the OTT. Count of *TP productions by participant. Participants are ordered by Norwegian proficiency levels (x-axis).

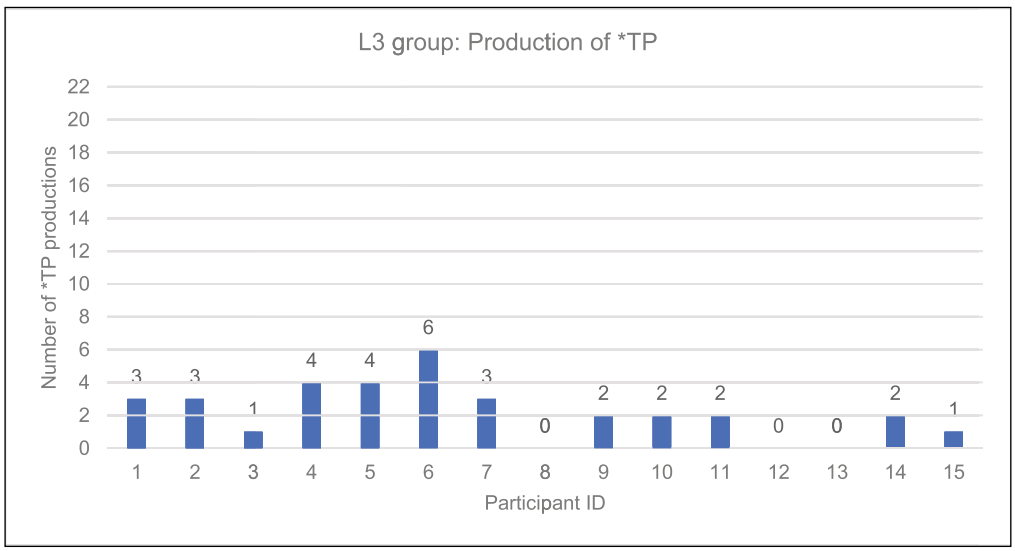


Figure 2b L3 group's results from the OTT. Count of *TP productions by participant. Participants are ordered by Norwegian proficiency levels (x-axis).

As shown in Figures 2a and 2b, Chinese-like *TP structure is present in the production data for both the L2 and L3 groups. On average, the L2 group produced 9.25 sentences with *TP structure (*SD* = 5.45). In contrast, the L3 group produced considerably fewer, with a mean of 2.20 (*SD* = 1.70) (see Table 1).

GROUP	NON-TP		*TP	
	M (SD)	*% (SD)*	*M (SD)*	*% (SD)*
L2	13.75 (5.45)	59.78% (23.68)	9.25 (5.45)	40.22% (23.68)
L3	20.8 (1.7)	90.43% (7.39)	2.20 (1.7)	9.57% (7.39)

Table 1 Descriptive statistics for the OTT by group. Non-TP = responses without non-target *TP structure; *TP = non-target-like responses with ungrammatical *TP structure. M = mean number of responses per participant; % = mean percentage. SD in parentheses.

5.1.2. Statistical results

The mixed-effects model revealed a significant main effect of group (see Table 2). The positive coefficient for group (β = 1.929, *SE* = 0.404, *z* = 4.773, χ^2 = 24.277, *p* < .001) indicates that the L3 group was significantly more likely to produce non-TP sentences than the L2 group. This finding is consistent with the descriptive statistics, which showed that the L3 group produced substantially fewer *TP sentences than the L2 group.

	MODEL ESTIMATES			TYPE II WALD TESTS		
	β	*SE*	*z*	*χ^2*	*df*	*p*
group	1.929	0.404	4.773	24.277	1	<.001 ***
N_prof	0.997	0.282	3.540	14.922	1	<.001 ***
Group: N_prof	−0.414	0.412	−1.004	1.009	1	.315

Table 2 Results of a generalised linear mixed-effects model (binomial) predicting production without non-target *TP structure. β = estimated coefficient; *SE* = standard error; *z* = Wald *z*-statistic. χ^2 = Type II Wald chi-square statistic; *p* = *p* value; χ^2 and *p* values are based on Type II Wald χ^2 tests.

Group: reference level = L2.

N_prof: proficiency *z*-transformed to a mean of 0 and an *SD* of 1.

Significance codes: * *p* < .05; ** *p* < .01; *** *p* < .001.

There was also a significant main effect of proficiency (N_prof; β = 0.997, *SE* = 0.282, *z* = 3.540, χ^2 = 14.922, *p* < .001). This indicates that higher Norwegian proficiency was associated with a greater likelihood of producing non-TP sentences. In other words, as Norwegian proficiency increased, participants were more likely to produce fewer *TP sentences (see Figure 3), although this does not necessarily mean they produced fully target-like Norwegian structures (see discussion above). The interaction between group and proficiency was not significant (β = −0.414, *SE* = 0.412, *z* = −1.004, χ^2 = 1.009, *p* = .315), suggesting that the effect of proficiency was comparable across the two groups.

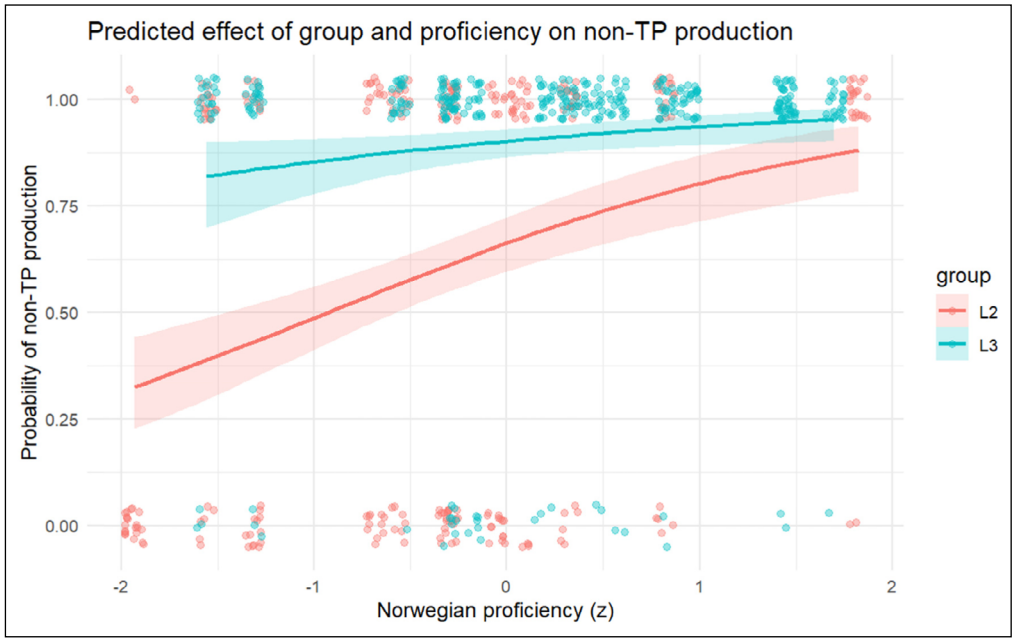


Figure 3 Probability of non-TP production by group (L2 vs. L3) and Norwegian proficiency (z-transformed). Data points are jittered for clarity.

5.2. RESULTS FROM THE AJT

5.2.1. Descriptive results

We continue by presenting the descriptive results of the AJT, that is, the percentages of target-like, non-target-like, and unsure responses for each group across each category. Target-like responses correspond to acceptance for the SP condition and rejection for the *TP condition; non-target-like responses correspond to acceptance for the *TP condition and rejection for the SP condition; unsure responses correspond to "I don't know". Note that the results for rejection are

adjusted based on participants' corrections, which means that rejection of a sentence not only indicates that a participant rejects the relevant structure but also corrects it into the opposite structure. This can involve changing from a grammatical SP sentence to an ungrammatical *TP sentence, or vice versa. If a participant considers an SP sentence ungrammatical but suggests corrections unrelated to the SP structure *per se* (e.g., spelling or letter case), this is treated as acceptance of SP.

GROUP	CONDITION	TOTAL TRIALS	TARGET-LIKE	NON-TARGET-LIKE	UNSURE
L2	SP	252	19.67 (1.15) [93.65%]	0.42 (0.79) [1.98%]	0.92 (0.9) [4.37%]
	*TP	288	5.75 (3.84) [23.96%]	17.17 (3.74) [71.53%]	1.08 (1.08) [4.51%]
L3	SP	315	20.53 (0.64) [97.78%]	0.13 (0.35) [0.63%]	0.33 (0.62) [1.59%]
	*TP	360	9.13 (3.42) [38.06%]	13.8 (3.08) [57.5%]	1.07 (0.96) [4.44%]

Table 3 Descriptive statistics for the AJT by group and condition. Total trials = raw trial count across all participants. Target-like, Non-target-like, and Unsure values represent mean responses per participant (SD) with mean percentage in square brackets.

As shown in Table 3, participants in both groups accepted the vast majority of the SP sentences in Norwegian, with a mean of 93.65% for the L2 group and 97.78% for the L3 group, with a very low rate of unsure responses (L2 group: 4.37%; L3 group: 1.59%). Only in extremely rare cases was a grammatical SP sentence rejected and corrected to a *TP sentence: There were five instances for the L2 group and two for the L3 group.

Although both groups showed very high acceptance of target-like SP structure, neither group consistently rejected stimuli with non-target *TP structure; acceptance rates for *TP items were well above 50% on average in both groups (see Figures 4a and 4b). However, a considerable difference between the two groups was observed: The L2 group accepted 71.53% of the *TP sentences (M = 17.17, SD = 3.74), whereas the L3 group's acceptance was lower at 57.50% (M = 13.80, SD = 3.08) (see Table 3).

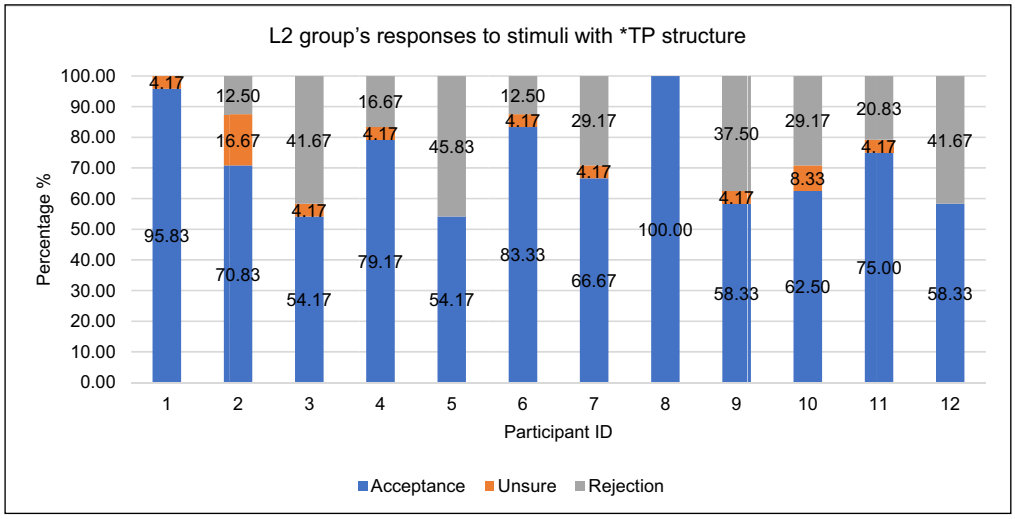


Figure 4a L2 group's responses to stimuli with *TP structure by participant in the AJT.

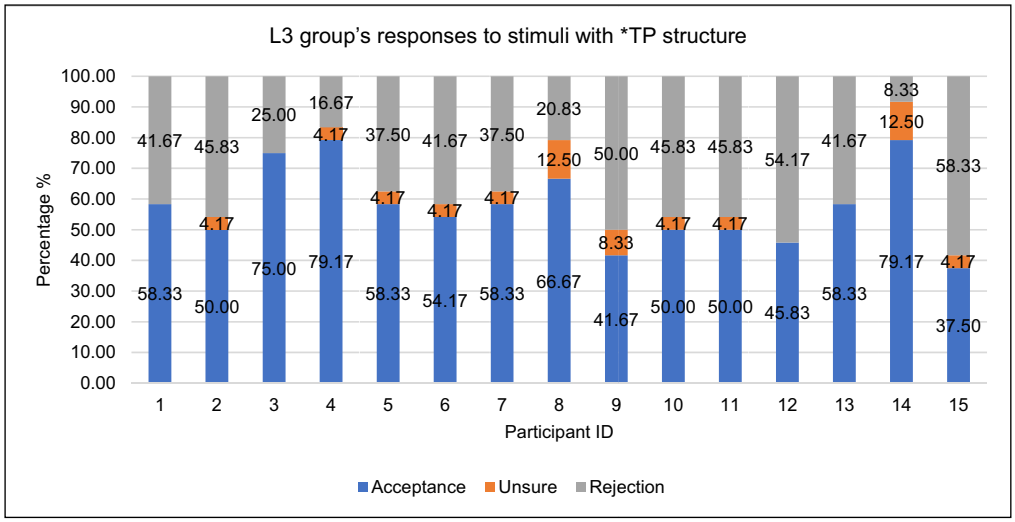


Figure 4b L3 group's responses to stimuli with *TP structure by participant in the AJT.

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5.2.2. Statistical results

The model included all main effects and their interactions. As mentioned in Section 4.2, given the highly uneven response distribution and near-ceiling performance in the grammatical condition, we fitted a penalised model following Clark et al. (2023) to obtain more stable estimates in the presence of potential separation. As expected, the model showed a large negative estimate for grammaticality (β = −6.28, *SE* = 0.76, *z* = −8.32, *p* < .001), reflecting the strong contrast between highly accurate responses to grammatical items and lower accuracy on ungrammatical items. No other fixed effect or interaction reached statistical significance (see Table 4).

PREDICTOR	β	*SE*	*z*	*p*
group	1.384	0.851	1.627	.104
grammaticality	−6.282	0.755	−8.319	<.001***
proficiency	0.214	0.486	0.439	.660
group × grammaticality	−0.507	0.837	−0.605	.545
group × proficiency	0.631	0.864	0.730	.465
grammaticality × proficiency	0.225	0.482	0.466	.641
group × grammaticality × proficiency	−0.967	0.854	−1.132	.257

Table 4 Results of a penalised generalised linear mixed-effects model (binomial) predicting accuracy in the AJT. β = estimated coefficient; SE = standard error; z = Wald z-statistic. The model included group, grammaticality, proficiency, and their interactions, with random intercepts for participants and items. Fixed effects were regularised using a normal prior with SD = 3 following Clark et al. (2023).

Group: reference level = L2; Grammaticality: reference level = grammatical; Proficiency: *z*-transformed to a mean of 0 and SD of 1.

Significance codes: * *p* < .05; ** *p* < .01; *** *p* < .001.

Because grammaticality was coded with grammatical items as the reference level and group with L2 as the reference level, the coefficient for group in the model represents the difference between the groups specifically for grammatical sentences, at mean proficiency. Given the near-ceiling performance in this condition, there is very little variation on which to estimate a group difference. Thus, the non-significant group coefficient should not be interpreted as evidence that the groups do not differ in their responses to ungrammatical sentences. Post-hoc comparisons based on estimated marginal means indicated no significant difference between the L2 and L3 groups for grammatical sentences (*OR* = 0.251, *p* = .104) but a significant difference for ungrammatical sentences (*OR* = 0.416, *p* = .015), with L2 participants showing lower odds of an accurate response than L3 participants (see Figure 5).

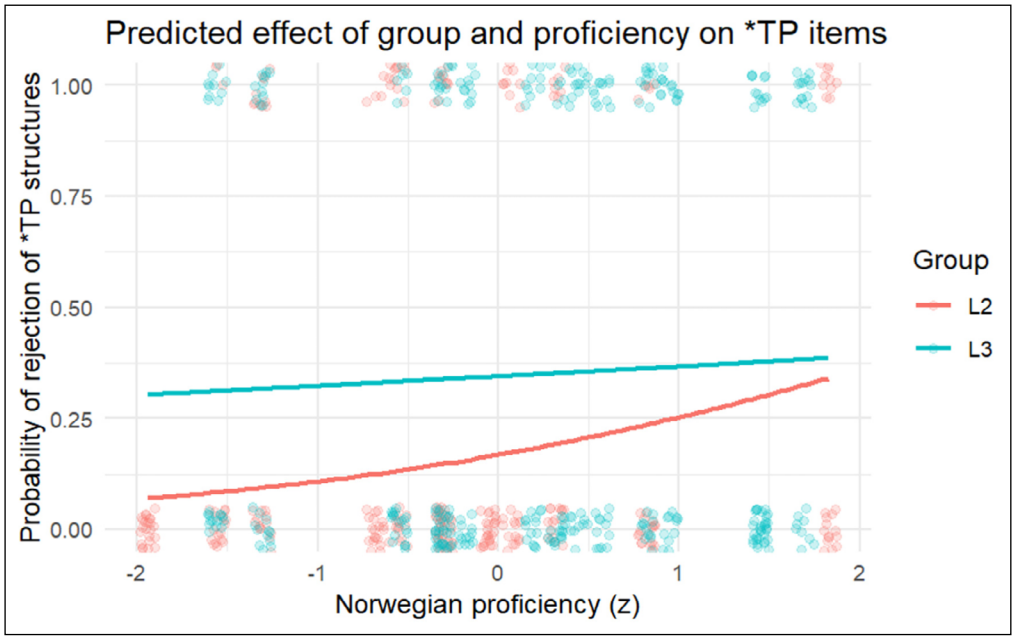


Figure 5 Probability of target-like rejections of *TP items by group (L2 vs. L3). Norwegian proficiency (z-transformed, x-axis) was not a significant predictor of accuracy. Data points are jittered for clarity.

6. DISCUSSION

Our first research question asks whether non-facilitative transfer of TP structure occurs in L1 Chinese learners' acquisition of Norwegian. Our data reveal the production and acceptance of non-target *TP structure in both groups of learners. Since the corresponding structures are grammatical in Chinese, we analyse the production and acceptance of *TP structure as non-facilitative transfer from L1 Chinese.

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Our second research question asks whether there are differences between the two groups. The AJT results showed no difference between the groups for grammatical SP sentences, with both groups performing at ceiling. In contrast, for ungrammatical *TP sentences, the L3 group performed significantly better than the L2 group. Results from the OTT also reveal a clear difference between the two groups, with the L2 group being significantly more likely to produce *TP structure than the L3 group (40.22% vs. 9.57% of all test-sentence translations, respectively). Thus, results from both tests indicate a greater non-facilitative influence of the L1 in the L2 group than in the L3 group.

Our third research question examined learning trajectories and whether L1 transfer becomes less pronounced as L2/L3 proficiency increases. Results from the AJT reveal no significant effect of proficiency in either group, that is, they do not show improved rejection of *TP. However, the OTT revealed a main effect of proficiency in both groups, with the production of *TP structure decreasing as proficiency increased. Closer inspection of the data reveals interesting differences between the two groups. In the L2 group, participants with 20 points or less on the Norwegian proficiency test produced 6–21 instances of *TP structure (from a total of 23), while participants with higher proficiency (>20) produced only 2–6 instances of *TP structure. The L3 group differs dramatically from the L2 group in that the production of *TP structure is lower even among lower-proficiency participants (≤20), with only 1–6 (from a total of 23) occurrences of *TP structure. Given that L2 learners also produce significantly more sentences with *TP structure than L3 learners overall, these findings suggest that non-facilitative Chinese influence is attenuated in the L3 group from an earlier stage, indicating that SP structure is in place earlier than in the L2 group. This pattern is consistent with facilitative transfer of SP structure from L2 English, as learners without L2 English but at approximately the same proficiency level in Norwegian showed much stronger influence from L1 Chinese (cf. RQ2). Recall that our participants were not tested in their L2 English, and we therefore cannot demonstrate knowledge of the relevant structures in English.[7] However, the fact that the difference between the two groups is so distinct, especially among participants at lower proficiency levels, indicates that the SP structure has been acquired in L2 English and is already available for (facilitative) transfer at the early stages of L3 acquisition. We recommend that future L3 studies on this topic include tests of learners' L2 English.

It is interesting to note that the facilitative effect on L3 learners persists even at higher proficiency levels. The L2 learners, on the other hand, appear to gradually acquire the SP structure, a process that takes longer.[8] Nonetheless, the fact that L3 learners at lower proficiency levels also produce some instances of *TP structure suggests that L2 transfer is not wholesale and does not preclude non-facilitative influence from the L1, which is inconsistent with the Typological Primacy Model (Rothman, 2011, 2015; Rothman et al., 2019) and the L2 Status Factor Hypothesis (Falk & Bardel, 2011).

In our fourth research question, we asked whether data from the two tests differed. The AJT results show that participants in both groups accept both the target-like SP structure and the non-target Chinese-like *TP structure. For the L3 group, this pattern differs markedly from their performance in the translation task: While there are very few instances of the non-target *TP structure in their translations, they still judge a considerable number of these sentences as acceptable in the AJT. In other words, their judgements are still influenced by their L1 Chinese grammar even though their production in the OTT overwhelmingly avoids non-target-like *TP structure. This indicates a co-activation of both L2 English and L1 Chinese in the parsing of these structures. In addition, in the AJT, there is no effect of proficiency in either group (cf. RQ3). This suggests that although the participants' production in the OTT becomes more aligned with higher proficiency, their acceptance does not develop in the same way. In other words, the data indicate that production and acceptance do not evolve in parallel.

7 However, we know from previous research that L1 Chinese learners of English transfer TP structure from the L1, especially in early phases of acquisition, and that TP structure is gradually replaced by SP structure (Li & Yang, 2014; Yang & Li, 2012). We can probably assume that our participants have also gone through this developmental pattern in L2 English.

8 We can reasonably assume that this effect will eventually level off and that if we had tested learners with even higher proficiency, the difference between the groups would have been smaller. This is an important question for future research.

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The difference between the two groups in the number of *TP sentences in production indicates that having acquired the SP structure in a prior language facilitates its acquisition in a new SP language (cf. the Cumulative Enhancement Model; Flynn et al., 2004). However, transfer from the L2 is not wholesale, as the L3 participants still accept *TP sentences in the AJT, a finding that aligns with, among others, Fung (2001), Jin (2009), as well as Zhang (2026) regarding low-proficiency learners. Our data indicate that both facilitative transfer from the L2 and non-facilitative transfer from the L1 co-occur and are therefore in line with the Linguistic Proximity Model (Westergaard et al., 2017, 2023) and the Scalpel Model (Slabakova, 2017, 2023). It appears that acquiring new languages results in an accumulation of structures from both the new and previously learned languages, rather than new languages replacing old ones. Furthermore, structures from prior languages remain available for parsing structures in the L3 even though the target structure is probably acquired and can be used for production. Thus, our data indicate that languages are not acquired and/or stored independently of each other. From the perspective of the Cumulative Enhancement Model, learning an additional language is a cumulative process and does not necessarily mean that a new structure replaces an old one. Instead, the new L*n* structures are added to the grammatical repertoire in the multilingual brain and co-exist with structures from the L1 and other L2s. In accordance with Westergaard et al.'s (2023) idea of co-activation, when processing the L3 in the test condition, the co-existing L1 and L2, along with the acquired L3 structure, are all activated. If a test sentence (here *TP) aligns with one of the structures in this joint language repository and/or can be parsed by one of the previously acquired grammars, the participant may tend to accept it despite the fact that they have acquired the target structure (here SP). Thus, it seems that acquiring a new structure (e.g., SP) might be less challenging than learning to reject structures (*TP) that are acceptable in one of the previously acquired languages. This finding aligns with Iacorossi et al. (2025), who found that acquiring verb placement in the L2/L3 that is not acceptable in any of the previously acquired languages is less challenging than learning to reject verb placement that is ungrammatical in the target language but grammatical in one of the previously acquired languages.

Because *TP production did not disappear at the group level despite a decreasing trend, we assume that CLI from the L1 can persist and influence the L3 for a long time, which may be explained by the Cumulative Input Threshold Hypothesis (Cabrelli & Iverson, 2024). As our study did not include a group of participants with L1 English and L2 Chinese and did not test structures where L2 transfer would be non-facilitative (and L1 transfer would be facilitative), we cannot address the Cumulative Input Threshold Hypothesis directly. However, our data indicate that non-facilitative transfer from an L1 is difficult to overcome, as *TP structure is still not rejected in L3 learners' judgements, despite being rarely produced. In our experiment, the L2/L3 learners had to translate Chinese sentences into Norwegian. This might have activated their L1 Chinese grammar and could, in principle, explain the L1 influence. However, if the influence from Chinese stemmed solely from the activation of the L1 grammar, we would expect the L1 influence to be either similar across the two tests or stronger in the production task, since participants did not encounter Chinese sentences in the AJT. Since our results indicate a more substantial influence of Chinese in the AJT, the observed Chinese influence does not appear to result from exposure to or activation of Chinese alone.

Our data indicate that both the L1 and the L2 influence the L3 simultaneously. Prior knowledge of the SP structure in a previously acquired language (i.e., L2 English) appears to give rise to facilitative transfer from the L2. However, L2 transfer is not wholesale, as the AJT data reveal that the learners still use their L1 for judgement and that, apparently, a considerable number of *TP sentences are judged as grammatical in the L3. Facilitative influence from English thus seems to be more pronounced in production than in acceptance. The discrepancy between the L3 learners' acceptance and production of non-target-like *TP structure in the AJT and the OTT demonstrates that there is not necessarily a one-to-one relationship between production and acceptance. Furthermore, it shows that production data do not necessarily fully reflect learners' underlying competence: The fact that L3 learners mainly produce target-like SP structure does not imply a rejection of *TP structure. Our findings, therefore, underline the importance of triangulating methods when studying L*n* learners.

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7. CONCLUSION

This study employed a semi-subtractive design to investigate the cross-linguistic influence of Chinese-like TP structure in two groups of L1 Chinese learners of Norwegian: learners with Norwegian as their L2 and a group with prior knowledge of L2 English acquiring Norwegian as their L3. The study was pseudo-longitudinal and employed two experimental methods: an OTT and an AJT.

Our findings suggest a distinctive and complex non-facilitative transfer of the L1 Chinese-like TP structure in both groups (cf. RQ1). Furthermore, we found relevant differences between the two learner groups in both tests (cf. RQ2): In the OTT, the L3 learners were significantly less likely to produce non-target-like *TP structure and in the AJT, the L3 learners were significantly better at rejecting *TP structure. While results from the AJT revealed no effect of proficiency, the OTT revealed a main effect of proficiency in both groups (cf. RQ3): The decrease in the production of Chinese-like *TP structure indicates that L1 transfer decreases as proficiency increases. We also found interesting differences between production data from the OTT and judgement data from the AJT (cf. RQ4). Results from the OTT indicate that L2 English facilitates the acquisition of SP structure in L3 Norwegian, as even low-proficiency learners in the L3 group produce very few occurrences of non-target-like *TP structure. Learners without L2 English, on the other hand, need to acquire the SP structure in Norwegian over a longer period. L2 learners frequently produce the non-target-like *TP structure, and this production decreases with increasing proficiency in Norwegian. Although OTT data from the L3 group show that the SP structure is acquired and used, their judgements reveal a non-facilitative influence from L1 Chinese, as the *TP structure is accepted to a high degree, as is the SP structure. This indicates co-activation of both the L1 and the L2 in the parsing of these structures. While OTT data from the L2 group indicate development towards a target-like grammar, such development is not evident in judgement; in other words, L1 influence on judgements does not decrease. This pattern suggests that production and acceptance do not necessarily develop in parallel and, furthermore, that languages are not acquired and stored independently. Our data indicate that both the L1 and the L2 are activated, and that participants struggle to reject structures that can be parsed by one of their previously acquired languages. Thus, acquiring SP structure is less challenging than learning to reject *TP structure. The discrepancy between production and acceptability judgements demonstrates that there is no one-to-one relationship between production and acceptance and underscores the importance of using multiple methods when investigating learner language. If we had used only one of the two tests, we would probably have reached different conclusions than the current ones.

A potential limitation on the generalisability of our results is the relatively small number of participants and trials. Additionally, the participants in the two groups differ in terms of the contexts of their language learning and their level of education. In our analysis, we attribute the difference between the two groups primarily to the presence of L2 English in the L3 group. However, there are also other relevant differences between the two groups: The L3 learners had higher levels of education and had received explicit instruction in English and in Norwegian. Thus, their metalinguistic knowledge was probably more advanced, which may have made them more aware of linguistic differences between the L3 and the L1, as well as of similarities between the L2 and the L3. Another difference is that, on average, the L2 learners had lived in Norway longer (5–14 years) than the L3 group (0–9 years). We acknowledge that these differences might have influenced our results.

DATA ACCESSIBILITY STATEMENT

The data that support the findings of this study are available from the author upon reasonable request.

ETHICS AND CONSENT

This study was reviewed by the Norwegian Centre for Research Data (NSD, Reference number: 288610) on behalf of the data controller institution and was assessed to comply with applicable personal data protection legislation. Informed consent was obtained from all participants prior to data collection.

AUTHOR CONTRIBUTIONS

Michela Iacorossi performed the data analysis and contributed to the analysis and discussion where relevant. Otherwise, the study was designed, conducted, and authored jointly by Xurui Zhang and Guro Busterud.

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