

1 Gert De Sutter, Timothy Coleman and Anne-Sophie Ghyselen
2 **Intra- and Inter-textual Syntactic Priming in**
3 **Original and Translated English**

4 A Corpus-based Exploration of the *that*/zero-alternation

5
6 **Abstract:** This article presents and discusses the results from a corpus-based
7 study on the variation between English complement clauses with and without
8 *that* in original versus translated English. The study is primarily aimed at disen-
9 tangling the effects of, on the one hand, *intratextual* structural priming, i.e. the
10 influence from a relevantly similar construction produced earlier in the (target)
11 text, and, on the other hand, *intertextual* priming from the source text to the
12 target text, i.e. the influence from a relatively similar source language construc-
13 tion encountered in the to be translated stretch of source text. The results indi-
14 cate that whereas regular intratextual priming has the expected effect in the
15 original English texts, this effect disappears in the translated texts, where inter-
16 textual priming turns out to be the most relevant mechanism.

17 **Keywords:** complementizer variation, *that*-complement clause, zero-
18 complement clause, structural priming, source-language transfer

19 **1 Introduction**

20 It is well-known that, in present-day English, the complementizer *that* is op-
21 tionally present in a range of lexico-grammatical contexts, most typically in
22 finite object complement clauses, esp. those depending on a (frequent) verb of
23 utterance, cognition, or perception in the matrix clause, as in (1).
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- (1) *Dirk says / claims / points out / tells us / reports / believes / thinks / understands / feels / sees (that) the field of Cognitive Sociolinguistics has evolved considerably over the past 10 to 15 years.*

25

26 The choice between English complement clauses with or without *that* (in what
27 follows: *that*-CCs and zero-CCs) is one of the most extensively studied grammat-
28 ical alternations of modern linguistics: it suffices to sample the state-of-art sec-
29 tions and reference lists in Shank, Plevoets, and Van Bogaert (2016), Kruger and
30 Van Rooy (2016) and Wulff, Gries, and Lester (2018) – to mention just a few
31 recent studies rooted in different linguistic subdisciplines – to get an impression
32 of the size and diversity of this body of existing work.

33 In this literature, the choice between *that*-CCs and zero-CCs in real language
34 use has been claimed to be sensitive to a wide range of language-internal (lexi-
35 cal, grammatical, semantic, information-structural, rhythmic, etc.) as well as
36 lectal (mode, register, region, etc.) variables, which makes it an interesting case
37 for Cognitive Sociolinguistics. Studies into the interplay between language-
38 internal and lectal conditioning variables are core to the socio-cognitive enter-
39 prise, which sets out to model variation in language usage in a more realistic
40 way (e.g. Geeraerts and Kristiansen 2015: 370). Applied to *that* vs. zero, the mul-
41 tifactorial analysis by Shank, Plevoets, and Van Bogaert (2016), for instance,
42 shows that the strength of the effect of several lexical and grammatical variables
43 is heavily dependent on the text's *mode* (spoken vs. written). Or, for another
44 example, Kearns (2007) shows that, in New Zealand and Australian English, the
45 presence of intervening material between the onset of the complement clause
46 and its lexical head in the matrix clause less strongly triggers the presence of
47 *that* than it does in American and British English. This interplay between lectal
48 and language-internal variables is also found in learners of English: in sen-
49 tences with short CC-subjects or when the complement clause is non-adjacent to
50 its governing verb in the main clause, Spanish learners tend to overuse *that*-CCs
51 in English to a larger extent than German learners do (Wulff, Gries, and Lester
52 2018: 112). These are examples of one of the three main ways in which lectal and
53 language-internal variables can co-determine grammatical choices according to
54 Levshina, Geeraerts, and Speelman (2013: 35), viz. *lectally moderated variation*,
55 where the impact of semantic, formal, discourse-pragmatic, etc. variables varies
56 across different lects.¹

1 In fact, Levshina, Geeraerts, and Speelman (2013) are primarily concerned with seman-
tic/conceptual variables, but their observations can easily be extended to other kinds of lan-
guage-internal variables. The two other ways of interplay are (i) independent lectal and lan-

57 The present study aims at investigating the variables conditioning the
 58 choice for *that* or zero in original English versus English translated from Dutch –
 59 see Kruger (2018), Kruger and Van Rooy (2016), Kruger and De Sutter (2018), and
 60 De Sutter and Vermeire (2020) for earlier studies with a focus on the *that*/zero-
 61 alternation in translated language. Original and translated language can be
 62 seen as constituting different “lects” in which the grammatical choice at stake is
 63 possibly determined in subtly different ways – and just like is the case for other
 64 dimensions of lectal variation, such differences between lects, in the exact
 65 range of relevant predictors and/or in the strength or direction of their effects,
 66 can potentially tell us something about the import of these conditioning
 67 variables. More precisely, we will follow up on a question left unanswered in De
 68 Sutter & Vermeire (2020), viz. the one as to the relative importance of, on the
 69 one hand, regular (i.e. intratextual) structural priming, and, on the other hand,
 70 structural influence of the source-text pattern as factors co-determining the
 71 choice for *that* or zero in translated language.

72 **2 Structural Priming and Source-language** 73 **Transfer**

74 Structural priming – the tendency for speakers to reuse recently processed
 75 grammatical structures – is a pervasive psycholinguistic phenomenon that has
 76 been shown to play a role in all kinds of different languages (as well as *between*
 77 languages, see below) and for several kinds of “free” grammatical choices. Spe-
 78 cifically for the *that*/zero-alternation, priming effects have been demonstrated
 79 in Ferreira (2003) and Jaeger (2010), among others. All other things equal, the
 80 participants in Ferreira’s (2003) experiments were consistently more likely to
 81 produce a *that*-CC target sentence when primed with a *that*-CC prime sentence
 82 than in other priming conditions, and more likely to produce a zero-CC after a
 83 zero-CC prime compared to other conditions. Jaeger (2010) reports relevantly
 84 similar priming effects in real-language data from the Switchboard corpus of
 85 telephone dialogues. However, in other existing quantitative corpus-based work

guage-internal variables, i.e. when lectal variables have an independent effect on the grammat-
 ical choice under investigation (a situation which happens rarely, the authors observe) and (ii)
 socioconceptually mediated variation, i.e. “when samples from different genres or varieties
 have different frequencies of the conceptual features that trigger the use of the one or the other
 near-synonym” (Levshina, Geeraerts, and Spelman 2013: 35).

86 on the *zero/that*-alternation, structural priming is generally *not* included in the
 87 analysis, and this also applies to the abovementioned studies by Kruger and De
 88 Sutter (2018) and De Sutter and Vermeire (2020) on *that* vs. zero in translated
 89 English.²

90 De Sutter and Vermeire (2020) do include a variable *source structure* in their
 91 model, in line with the general hypothesis in translation studies that one of the
 92 basic mechanisms giving rise to frequency differences between original and
 93 translated texts is source-language transfer, i.e. “when both source and target
 94 language share a formal-linguistic feature, it is likely that translators are influ-
 95 enced by the availability of this feature in the source text and transfer it to the
 96 target text” (De Sutter and Vermeire 2020: 13). Since Dutch finite declarative
 97 complement clauses feature an obligatory complementizer *dat*, their expecta-
 98 tion is that, if the corresponding sentence in the Dutch source text has a *dat*-
 99 complement clause, the odds for a *that*-CC in the English translation will in-
 100 crease (compared to cases where the Dutch original does not have a *dat*-
 101 complement clause construction, but, e.g., direct speech, or an infinitival sub-
 102 clause, or a prepositional alternative). This expectation is not completely borne
 103 out by the data, i.e. there is no statistically reliable transfer effect to be observed
 104 in Dutch source sentences with a *dat*-CC (probably because of a ceiling effect,
 105 the threshold level for the occurrence of *that* in the translations being very high
 106 already; see Wulff, Gries, and Lester 2018 for similar observations in learner
 107 English). Still, the results do provide corroboration for the relevance of the
 108 source structure variable: the deviance plots from a MuPDAR analysis show
 109 that, when there is *no* corresponding *dat*-clause in the source text, translators
 110 more often opt for a zero-CC than non-translators would do in otherwise similar
 111 lexico-grammatical contexts.

112 In their discussion, De Sutter and Vermeire (2020: 28) label this as “a classic
 113 case of structural priming” – but this, on second thought, is conflating two
 114 related but separate potential sources of influence. On the one hand, priming
 115 can operate *between* languages: in experimental settings, it has been shown
 116 that, in cases where two languages display relevantly similar grammatical al-

² Priming is included in the suite of language-internal predictors investigated in the studies by Hinrichs, Szmrecsanyi, and Bohmann (2015) and Grafmiller, Szmrecsanyi, and Hinrichs (2018) on the related phenomenon of *relativizer variation* in present-day English, though (i.e. the choice between *which*, *that* and zero in contexts such as *the ideas which/that/∅ Dirk’s work gave us*), where it is found to have the expected effect. To be more precise, the presence of *that* or *which* in the previous relevant slot significantly diminishes the chances of the zero variant. The zero variant itself seems to prime less well – see Hinrichs, Szmrecsanyi, and Bohmann (2015: 822–823) for discussion.

117 ternations, bilinguals' grammatical choices in language A are sensitive to the
 118 influence of prime sentences from language B (see, e.g. Hartsuiker, Pickering,
 119 and Veltkamp 2004). Applied to the practice of translation, in which the transla-
 120 tor constantly shifts between the source and target texts and languages, the
 121 kind of source-language transfer effect described above could indeed be seen as
 122 a special kind of cross-linguistic priming, i.e. the translator's grammatical
 123 choice in the target language can be influenced by them just having been ex-
 124 posed to a relevantly similar source language structure while processing the to
 125 be translated stretch of text. On the other hand, translators are also text produc-
 126 ers just like other authors, so they may at the same time be influenced by more
 127 regular structural priming, i.e. their grammatical choices in the target text may
 128 be subject to priming influence from a relevantly similar target language con-
 129 struction produced earlier in the target text. This triggers the empirical question
 130 which of these two mechanisms, which we could call *intertextual* (i.e. from
 131 source to target text) and *intratextual* (i.e. within the target text) priming, re-
 132 spectively, has the strongest effect on translators' grammatical choices. The
 133 present study is, to our knowledge, the first to include these two variables in the
 134 same corpus-based investigation with a view to disentangling their effects.

135 3 Data

136 Our study uses the data set compiled by De Sutter and Vermeire (2020), who
 137 culled all English sentences containing one out of a list of 123 private, public or
 138 suasive verbs from the English component in the Dutch Parallel Corpus (DPC;
 139 Macken, De Clercq, and Paulussen 2011), which contains both original English
 140 and translated English. This data set originally consists of 4,818 sentences in
 141 which a private, public or suasive verb is followed by a mutually exchangeable
 142 zero-CC or *that*-CC. Cases where the matrix clause is in sentence-medial or final
 143 position were removed from the data set, as well as instances of a couple of
 144 other infrequent and syntactically atypical contexts (see De Sutter and Vermeire
 145 2020 for details). All sentences were subsequently annotated for the response
 146 variable *complementizer* (zero-CC, *that*-CC) and a range of language-internal and
 147 lectal variables³, which were found to be (potentially) relevant in previous stud-

3 There is hardly any natiolectal variation in the English component of the DPC; most English texts are British. For the present analysis we removed the very few US-English texts from our data set.

148 ies: *register* (broad commercial texts, specialized commercial texts, political
 149 texts, journalistic texts, fiction), *text status* (translated English, original Eng-
 150 lish), *degree of attraction of the verb in the matrix clause to a complement clause*
 151 *construction* (LemmaConstrFreq), measured on an independent corpus and
 152 normalized to 100,000 tokens, type of *subject* in the matrix clause (pronoun,
 153 noun, expletive *it*, no overt subject), aspect (simple, progressive/perfect), tense
 154 and modality of the governing verb (present, past, modal, non-finite), polarity
 155 of the matrix clause (positive, negative), distance between the governing verb
 156 and the onset of the complement clause, measured in characters without spaces
 157 (MCVerbToCCLength), and *source structure* (or intertextual priming: *dat*, zero);
 158 see De Sutter and Vermeire (2020) for an elaborate presentation of the annota-
 159 tion procedure of these variables.

160 For the present study, we randomly selected 1,000 original English in-
 161 stances and 1,000 translated English instances from this existing data set. From
 162 the former subset, we removed all L2 translations (i.e. translations into the
 163 translator’s second language, n=265), to rule out the potential influence of L1 vs
 164 L2 translation. The complete data set thus contains 1,735 instances, with their
 165 annotations from De Sutter and Vermeire (2020). These instances were then
 166 annotated for two additional variables, viz. occurrence of *intratextual priming*
 167 and *distance from the intratextual prime to the target*. The former variable was
 168 operationalized by looking for *that*-CC or zero-CC primes in the previous con-
 169 text, which consisted of the 15 preceding sentences. We only focused on zero-
 170 and *that*-primes which are syntactically and functionally identical to the so-
 171 called target construction, i.e. in which the *that*- or zero-CC also functions as a
 172 finite object complement clause depending on the matrix clause verb; in case of
 173 multiple primes, we only selected the prime that was closest to the target con-
 174 struction. The distance from the prime to the target was measured in terms of
 175 characters (without spaces); it obviously also happened that no prime was
 176 available in the previous context.

177 In order to measure the relative importance of intertextual and intratextual
 178 priming on the choice between *that*-CC and zero-CC, we fitted two generalized
 179 linear mixed-effect models (glmm). Model 1 included all data, with the above-
 180 mentioned variables as fixed factors and matrix verb and text-id (which is con-
 181 sidered a proxy for author/translator) as random factors. The numerical vari-
 182 ables *LemmaConstrFreq*, *MCVerbToCCLength* and *distance from prime to target*
 183 were logarithmically transformed, since a preliminary analysis showed that
 184 these were significantly right-skewed. The predictor intertextual priming was
 185 not included in this first model, as it only relates to the translated data. To test
 186 the impact of intertextual priming, a second model was built for the translated

187 data only. This model included the same predictors as model 1, without of
 188 course the predictor text status (translated or not). For both models, we adopted
 189 a stepwise procedure, starting from a null model containing only the random
 190 intercepts and then incrementally adding fixed effects which significantly re-
 191 duced the AIC value of the model. Finally, we also checked for significant two-
 192 way interactions between register, text status, intertextual and intratextual
 193 priming. We avoided overfitting by taking into account the rule of thumb that
 194 the number of regressors multiplied by 20 should not be higher than the least
 195 frequent level of the response variable (cf. Harrell 2015: 72).

196 4 Results

197 The significant fixed effects emerging from the glmm-model 1 are visualized in
 198 Figure 1. This model, containing 7 significant fixed effects, outperforms an in-
 199 tercept-only model significantly ($\chi^2(13) = 153.62, p < 2.2e-16$); the marginal R^2
 200 square value is 0.36, the conditional R^2 value is 0.62, and the c-score is 0.93;
 201 these indicate that the model performs very well in explaining and predicting
 202 the variation at hand.

203 Due to reasons of space, we will mainly focus on the effects of the two cen-
 204 tral predictors in this study, viz. *intratextual priming* and *text status*. As can be
 205 seen in Figure 1, the overall probability of *zero-CC* is very low. Nevertheless,
 206 both text status and intratextual priming influence the choice between *that-CC*
 207 and *zero-CC* significantly, with non-translated English showing a higher proba-
 208 bility of using *zero-CC* (compared to translated English); also, the probability of
 209 having *zero-CC* increases significantly when there is a preceding *zero-CC* prime
 210 (compared to a preceding *that-CC*). All other language-internal predictors show
 211 the expected effects (see Kruger 2018; Kruger and De Sutter 2018): the probabili-
 212 ty of *zero-CC* increases when its matrix verb is frequently followed by a com-
 213 plement clause, when the distance between the governing matrix verb and the
 214 onset of the complement clause is small, when the matrix verb is in the present
 215 or past tense, in fictional and journalistic texts, and when the CC is preceded by
 216 a positive matrix clause. The distance between the prime and the target does not
 217 have a significant effect, neither as a main effect nor in interaction with other
 218 predictors. There were no other significant two-way interaction effects.

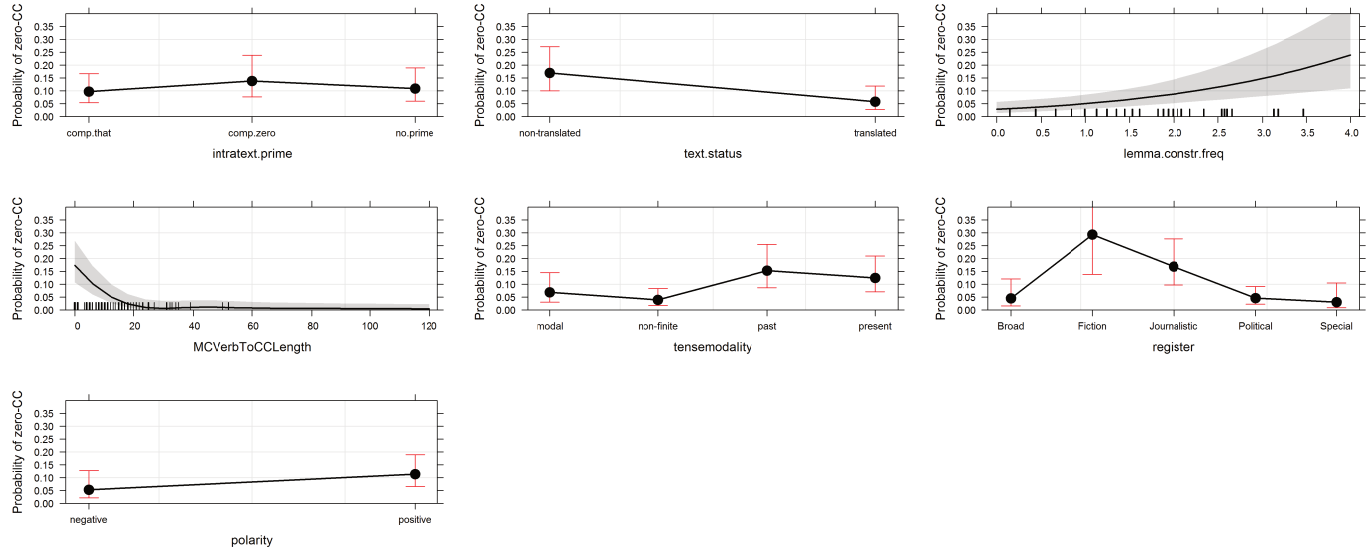
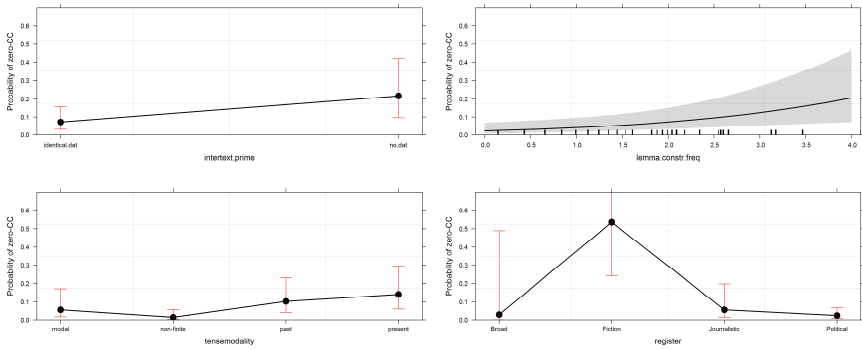


Fig. 1: Effect plots of the glmm with that-CC vs. zero-CC as response variable, fitted on the complete dataset (translated and original English). For clarity's sake, we limited the upper limit of the y-axis to 0.4 (instead of 1.0).

220 The second glmm – fitted on the translated part of the dataset alone – also out-
 221 performs a null model significantly ($\chi^2(13) = 153.62, p < 2.2e-16$; marginal $R^2 =$
 222 0.50 , conditional $R^2 = 0.71$, c-score = 0.95). Next to the significant effect of three
 223 language-internal predictors (lemma.constr.freq, tensemodality and register), in
 224 the expected direction, Figure 2 also shows that the choice between *that*-CC and
 225 zero-CC in translated texts is influenced by intertextual (cross-linguistic) prim-
 226 ing only; the probability of *that*-CC increases when there is a syntactically and
 227 functionally identical *dat* in the Dutch source sentence, the probability of zero-
 228 CC increases when there is no *dat* in the source sentence, even despite the over-
 229 all tendency of translators to mainly use *that*-CC. The effect of intratextual prim-
 230 ing, which was significant in the model on the entire dataset, disappears com-
 231 pletely. Again, no significant two-way interactions were found.



232
 233 **Fig. 2:** Effect plots of the glmm with *that*-CC vs. zero-CC as response variable, fitted on the
 234 translated part of the dataset. For clarity's sake, we limited the upper limit of the y-axis to 0.7
 235 (instead of 1.0).

236 **5 Discussion and Conclusion**

237 A number of interesting observations emerge from both statistical models. First,
 238 model 1 did not yield any significant two-way interactions, suggesting that the
 239 language-internal predictors in the model are *not* moderated by the lectal pre-
 240 dictors *register* and *translation status of the text*. Translators and authors thus
 241 seem to decide between *that*-CC and zero-CC on exactly the same grounds, the
 242 only difference being that translators more frequently opt for the most frequent
 243 and most formal option, viz. *that* (cf. Wulff, Gries, and Lester 2018 for a similar

244 finding in learner English). Second, next to a range of influential language-
245 internal and -external predictors, model 1 also reveals that the choice between
246 *that*-CC and zero-CC is significantly impacted by *intratextual priming*. Although
247 this type of predictor is often not taken into consideration in (syntactic) alterna-
248 tion studies, the present study shows that it is a powerful predictor, that needs
249 to be taken into account when one aims to adequately model linguistic variation
250 (also see Gries 2005; Szmrecsanyi 2006; Lester 2019). Third, model 2 revealed
251 that the response variable in translated texts is *not* influenced by intratextual
252 priming, but only by intertextual (or crosslinguistic) priming. Hence, our results
253 suggest that priming as a cognitive mechanism affects translators differently
254 than it does non-translators: linguistic choices in translations are primarily
255 influenced by intertextual and less so by intratextual priming, a finding which
256 seems to reflect the considerably different way in which translators produce
257 texts. Empirical research of translation processes has indeed shown that trans-
258 lators, after an initial source-text-based reading phase, basically switch back
259 and forth between source sentence and translation-in-progress, with most
260 source-text fixations around 4-6 words to the right of the word being translated
261 (Carl, Dragsted, and Jakobsen 2011). Online and post-production revision, in
262 which the translator re-reads (parts of) the translated text – an intratextual
263 process – are obviously an integral part of the translation process, too, but it
264 seems that there is not much room for intratextual priming to play a role in this
265 stage, in which no real language production is going on anymore, but rather
266 correcting, editing and revising (stretches of) words which have been produced
267 in an earlier stage. This hypothesis seems to be confirmed, to some extent, by
268 Englund Dimitrova's (2015) process-based study into the explicitation of coher-
269 ence relations from Russian into Swedish, which indicated that explicitation is
270 mainly an automated process which occurs in professional translators during
271 the actual (bilingual) drafting phase, and not so much during later (monolin-
272 gual) phases. Obviously, future research is needed to investigate the relation-
273 ship between intra- and inter-textual priming more closely, from both product
274 and process perspectives. Ideally, such research also explores the degree to
275 which priming is moderated by lectal and socio-cognitive variables (e.g. lan-
276 guage mode, but also salience of the construction or, in certain registers, align-
277 ment with the speech partner).

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PROOFS