

2021-12-01

The Impact of Verb Type on the Variability of the Comp-trace Effect

Haydee Martinez
University of Texas at El Paso

Follow this and additional works at: https://scholarworks.utep.edu/open_etd



Part of the [Linguistics Commons](#)

Recommended Citation

Martinez, Haydee, "The Impact of Verb Type on the Variability of the Comp-trace Effect" (2021). *Open Access Theses & Dissertations*. 3426.

https://scholarworks.utep.edu/open_etd/3426

This is brought to you for free and open access by ScholarWorks@UTEP. It has been accepted for inclusion in Open Access Theses & Dissertations by an authorized administrator of ScholarWorks@UTEP. For more information, please contact lweber@utep.edu.

THE IMPACT OF VERB TYPE ON THE VARIABILITY OF THE COMP-TRACE EFFECT

HAYDEE MARTINEZ

Master's Program in Linguistics

APPROVED:

Sabrina Mossman, Ph.D., Chair

Nicholas Sobin, Ph.D.

Danielle Morales, Ph.D.

Stephen L. Crites, Jr., Ph.D.
Dean of the Graduate School

Copyright ©

by

Haydee Martinez

2021

THE IMPACT OF VERB TYPE ON THE VARIABILITY OF THE COMP-TRACE EFFECT

by

HAYDEE MARTINEZ, B.A.

THESIS

Presented to the Faculty of the Graduate School of

The University of Texas at El Paso

in Partial Fulfillment

of the Requirements

for the Degree of

MASTER OF ARTS

Department of Languages and Linguistics

THE UNIVERSITY OF TEXAS AT EL PASO

December 2021

Abstract

The C-t effect has been extensively researched with regards to its variability, however, matrix verbs have not generally been taken into account. The present study investigates whether verbs *believe*, *doubt*, *know*, *realize*, *say* and *think* differ in the strength of the C-t effect they induce—exploring syntactic analyses, epistemicity and grammaticalization to possibly identify what characteristics of verbs dictate the strength of the C-t effect. Subjects ($n=44$) were asked to complete 1 of 2 Grammaticality Judgement Tasks (GJT), which asked them to rate the grammaticality of items which included matched items with *that* involving both subject extractions, constructions without extractions, and extractions with the complementizer *whether*. The results demonstrated that verbs *believe*, *say* and *think* induced a stronger effect than was observed for *know*, *realize*, and *doubt*. Thus, the data supports the idea that the verbs with the most epistemic sense, induce a stronger effect with the least variability.

Keywords: C-t effect, verbs, epistemicity, grammaticalization

Acknowledgements

I would like to thank my advisor, Dr. Mossman—thank you for your patience and invaluable guidance throughout this process. Your confidence in my ability helped me work through moments of uncertainty. I am grateful for Dr. Morales, who took time out of her busy schedule to lend her expertise and be a part of my committee.

I would like to thank my friends and family for their help and encouragement throughout this process. Special thanks to my professors who have been instrumental in my education, especially Raquel Gonzalez and Dr. Bell— who made my experience at UTEP memorable. Dr. Bell, I am eternally grateful for your constant reassurance, optimism and support. You are the type of professor I hope everyone has. Profe, thank you for all your help, guidance and for all those times I “bugged” you in your office. Your Intro class allowed me to realize that Linguistics was the right path for me. Your kindness, knowledge, and encouragement has helped me and many others immensely. Gracias, Profe!

Dr. Sobin, without you none of this would have been possible. Thank you for allowing me to learn from you. Although I knew I had chosen the right path in Raquel’s class, your Syntax class cemented my passion for the subject. Your expertise and the excitedness with which you share your knowledge has made my time at UTEP worthwhile and even made syntax seem “kinda cute”. Thank you for everything.

I would also like to express my gratitude towards Dr. V. Dr. V, words cannot express how thankful I am for the guidance, support and motivation you have provided me. You have been with me every step of the way, cheering me on and I am eternally grateful for you. Finally, I would like to thank my parents. Thank you for your love, unconditional support and for the sacrifices you made which allowed me to get to this point. Thank you.

Table of Contents

Abstract	iv
Acknowledgements	v
Table of Contents	vi
List of Tables	viii
Chapter 1: Introduction	1
Chapter 2: Literature Review.....	3
2.1 Complementizer Distinction	4
2.2 Syntactic Framework	4
2.3 Epistemicity	7
2.4 Grammaticalization	8
2.5 Basis of Study	9
Chapter 3: Research Question & Hypothesis	11
3.1 Research question	11
3.2 Hypothesis	11
Chapter 4: Methodology.....	12
4.1 Participants	12
4.2 Materials.....	12
4.3 Procedure.....	13
4.4 Analysis.....	13
Chapter 5: Results	15
5.1 <i>Whether vs That</i>	15
5.2 No extractions.....	16
5.3 Verbs	17

Chapter 6: Discussion	20
Chapter 7: Conclusion.....	23
References	24
Appendixes	26
Vita	32

List of Tables

Table 1.1: Comparison of whether-type and that-type constructions	15
Table 2.1: Comparison of \emptyset / <i>that</i> for items without extractions	16
Table 3.1: Subject extractions with \emptyset / <i>that</i> for <i>believe</i> , <i>say</i> and <i>think</i>	17
Table 4.1: Subject extractions for verbs <i>know</i> and <i>realize</i>	18
Table 5.1: Judgements for the verb <i>doubt</i>	19

Chapter 1: Introduction

There is extensive literature on the complementizer-trace effect (Comp-trace or C-t effect): the phenomenon in which subjects cannot be extracted (or undergo long movement), over an overt complementizer unless its trace is in the context of a relative clause. Therefore, if a subject follows the complementizer *that*, it cannot be extracted. As objects are not as restricted in their movement, this effect is only present with subjects. Therefore, in the same context, objects can be extracted and still be deemed as grammatically acceptable constructions. The effect is demonstrated in the following sentences:

(1) Who did you say saw Marcos?

(2) % Who did you say that saw Marcos?

The effect holds when the C, *that*, is phonetically realized. Therefore, for some speakers of English, sentence (2) is not an acceptable construction.

First noted by Perlmutter (Pesetsky 2017), the C-t phenomenon has been and continues to be extensively analyzed. Chomsky and Lasnik (1977) proposed a universal language filter which attempted to explain the effect in languages that do not allow Subject-Pronoun deletion.

Chomsky and Lasnik (1977) proposed that filters, which were proposed as part of the UG, would impose a notion of well-formedness on surface structures and that these surface filters would account for some properties of complementizers and the complementizer system. They also highlighted the differences between complementizers *that*, *whether*, *for*, and *if*. However, the universal nature of the surface filter they proposed has been questioned in the literature.

The research that followed Chomsky and Lasniks (1977) theoretical paper demonstrated that the C-t effect is language specific and should be dealt with as such. Maling and Zaenen

(1978) looked at the role of the filter proposed by Chomsky and Lasnik in Dutch and Icelandic, focusing on whether surface filters could account for the syntax of these languages. Dutch and Icelandic have no personal pronominal subjects, but allow extraction of a subject clause headed by a C. Thus, their analysis provided evidence which successfully countered the idea that Chomsky and Lasniks filter was a language universal. After this point, the literature focused on the weakening of the effect and the variability associated with it, Sobin being one of the main researchers on this aspect.

Bresnan (1970) states that not every verb that takes a complement can occur with every complementizer in the complementizer system, concluding that the matrix verb dictates the choice of complementizer. Therefore, one element that may play an important role in the variability of the effect is the type of matrix verb—the most common verbs analyzed in relation to the effect are *say* and *think*. Kearns (2007) states that verbs *say* and *think*, the latter being an epistemic verb, are more likely to take a \emptyset (zero or null) complementizer—*think* having the highest rates of \emptyset complementizer and *say* having the second highest. This means that the complementizer is null, or not phonetically realized with these matrix verbs. Adger (2002) states that verbs such as *say*, *think* as well as *believe* and verbs such as these take a clausal complement which may be introduced by the complementizer *that*. Shim and Ihsane (2017) state that *believe*, *say*, and *think*, non-factives, may freely drop *that*, while dropping the complementizer results in the varied acceptability of the C-t effect in factive verbs such as *know* and *realize*. Therefore, the present study aims to (i) discover whether matrix verbs, specifically *believe*, *know*, *doubt*, *realize*, *say* and *think* differ in the strength of the C-t effect that they induce and (ii) to possibly identify what characteristics of the verbs dictate the strength of the C-t effect.

Chapter 2: Literature Review

In their theoretical paper *Filters and Control*, Chomsky and Lasnik (1977) set out to simplify the, at the time, current theory of grammar with the introduction of surface filters. In trying to present a theory that was adequately descriptive and explanatory and as minimal as possible, they proposed X-bar theory. They also proposed elements, such as Filters to be part of UG. Chomsky and Lasnik also presented surface filter (68), hereinafter referred to as the C&L filter, which states that a subject can only be extracted over a complementizer, *that*, if its trace is in the context of a relative clause. The C&L filter was proposed to be a language universal and part of the UG, but they later state in a separate filter that the C&L filter is only applicable for languages that do not allow subject- pronoun deletion.

There not only is no evidence that filters are an innate property of language, but Maling and Zaenen (1978) questioned this proposed universal. In their analysis, the C&L filter can only be universal if the following rule, which is the same as Chomsky and Lasnik's second filter concerning the C-t effect, holds.

- (3) The filter (68) is valid for all languages that do not have a rule of Subject PronounDeletion and only these. (= C&L (71)) (Maling and Zaenen 1978, 476)

Their analysis of Icelandic and Dutch data, which have no personal pronominal subjects and allow extraction of subject clauses headed by the Dutch and Icelandic counterparts to *that*, illustrated a violation to the filters proposed by Chomsky and Lasnik. The sentence below from Maling and Zaenen (1978) is an acceptable construction of Modern Icelandic:

- (4) Hver sagðir þú að ___ væri kominn til Reykjavíkur?
Who said you that was come to Reykjavik
nom. gen.

‘Who did you say that had come to Reykjavic?’ (Maling & Zaenen 1978, 478) Dutch and Icelandic then, violate the C&L filter and are not Subject-Deletion languages, thus also offering evidence against (3), the only condition which would make the C&L filter universal. Maling and Zaenen (1978) demonstrated that the C-t phenomenon is language specific and should be treated as such. Maling and Zaenens’ findings, which did not support the universality of the C&L filter but rather provided evidence that the effect is language specific, marked a shift in the literature pointing to a weakening of the effect in subsequent analyses of English. This weakening, or variability in grammaticality, has been analyzed in terms of complementizer type, licensing, case, and adverbs.

2.1 Complementizer Distinction

Chomsky and Lasnik (1977) also went on to analyze the complementizer system, drawing a distinction between complementizers *for*, *whether*, *if* and *that*. Sobin (1987) furthers this distinction. Conducting some of the earliest experiments regarding the variability of the C-t effect, Sobin (1987) focuses on the differences between complementizers *whether* and *that*. He found that acceptance of *that*-type constructions varied, while *whether*-type constructions were strongly rejected— marking a clear difference between *whether* and *that*. According to Sobin (1987) the ungrammaticality generally associated with the phenomenon across all complementizers may not be accurate as *that*-type constructions varied in acceptability, stating that these findings point to dialectal differences as complementizer distinction is relative to language variation.

2.2 Syntactic Framework

Sobin (1987, 2002, 2009) proposes that the variability of the C-t effect is subject to dialectal and individual differences- which is why constructions where the subject is extracted

over the overt instance of C are accepted by some speakers of English and not by others. The rules Sobin (1987, 2002, 2009) posits attempt to adequately explain what governs a speakers' decision on the inclusion (or omission) of the C *that*, one possibility being the adverb effect. Sobin (2002) builds on the variability found in his previous work (Sobin 1987) and focuses on the adverb effect, the idea that the inclusion of an adverb increases the acceptability of C-t constructions. His results aligned with most of the research on the effect, and that those sentences which included an adverb and demonstrated a clear C-t effect, showed that the addition of an adverb did increase the acceptability of those constructions. Although Sobin's account does not involve complexity, his results also fall in line with the "Complexity Principle". The principle states that more complex a construction is, the more likely it is to favor the instance of *that* (Tagliamonte & Smith, 2004). Sobin's analysis posits that although the C-t is still present, the inclusion of an adverb weakens the effect, resulting in an increase of acceptability for these constructions.

Sobin (2002) posits rules that would provide explanations for the acceptance of the realization of the \emptyset instance of the complementizer and of the phonetically realized C for some speakers of English. Differing from other analyses, mainly those from Browning and Rizzi (Sobin 2002), where an expansion of the CP layer is proposed, Sobin argues that the CP layer collapses or undergoes thinning. Under certain circumstances, Spec and head elements of CP 'fuse' and collapse into a single indexed head element. Early work on the C-t effect stated that the effect holds due to the lack of a co-indexed trace in subject position and the complementizer. Sobin's (2002) Fuse results in an indexed C and a licensed trace. One of the rules proposed, *Fuse a chain head* may trigger a collapse in SpecC if the chain head, an indexed *wh*-phrase or null operator, if the element in CP is overt. The head then bears the index of the chain keeping the

form of the overt element. The other rule, *Fuse a trace (a non-chain head)* states that a collapse is triggered if the trace is in SpecC and the element in CP is not phonetically realized—resulting in a licensed trace. Together these rules account for the overt and \emptyset C, and although *Fuse a trace* needs the CP element to not be overt, suspending this non-phonetic condition explains the variability of the C-t.

As the literature moved away from the idea that the ungrammaticality of the effect was due to the trace not being licensed, Sobin (2009) then argues that case in English needs to be activated and that not resolving case features early results in the C-t effect. Sobin proposed that case marking may be related to movement; therefore, for all arguments case could be dormant and only activated by probing for the DP. Resolving case as early as possible allows subjects to be treated similarly to objects, which are not constrained in their movement. As only certain configurations allow early case resolution, Sobin argues that a gratuitous *wh*-feature on the complementizer either a *fwh* free pass or *Fwh* terminal, triggers its movement. A complementizer *that* would need a free pass feature which would attract the subject up so that the next feature can pick it up. Sobin then posits two rules; first, the *[f]-null-C rule* where when C is null and has the free pass feature *fwh*, this rule values and resolves the case feature of DP allowing movement out of SpecTP. The second rule posited, *The OP rule*, states that case resolved by this rule allows an operator to move to SpecCP only if C bears a terminal feature *Fwh*, and either C or OP have to be phonetically realized. Not meeting the phonetic condition results in ungrammatical constructions. However, allowing this rule to relax its terminal feature in favor of a gratuitous feature, allowing for a broader form of the rule, would account for the variability in acceptability of some C-t constructions among speakers of English. With these rules, Sobin (2002, 2009)

seeks to explain why some speakers accept constructions demonstrating a clear C-t effect, but also when the \emptyset or *that* in these constructions can occur.

2.3 Epistemicity

Early literature focused on the variability of the effect but fails to look at the effect if any that verb type may induce on the C-t effect. In addition to complementizer type, adverbs and case, the semantic characteristics of the matrix verb could possibly play a role in variability. In particular, the epistemicity of verbs and the process of grammaticalization could potentially play a role in the variability of the C-t effect. Epistemic refers to or has to do with the belief and knowledge about possibilities and the like, that a speaker has (Traugott 1989). Epistemic modality refers to knowledge or belief in a proposition (Suhadi 2011) and an epistemic phrase refers to modality that has to do with propositions rather than events (Tagliamonte & Smith 2004), which can be expressed through lexical verbs such as *believe*, *doubt* and *think* (Suhadi 2011). Khemlani (2021) states that mental state verbs, such as *think*, *realize*, *doubt*, *know*, and *believe*, are often referred to as epistemic verbs. Thus, the verbs in this study are epistemic, although the degree to which they are identified as such varies.

The verbs *say* and *think* have been extensively researched within the context of the effect. Kearns (2007) states that the epistemic type verb, *think*, tends to have the highest rates of \emptyset . Similarly, Tagliamonte and Smith (2004) found that \emptyset is favored when the matrix verb is epistemic. The inclusion of other elements such as modal auxiliaries or negation, reduces the chances that the verb and subject are then operating as an epistemic phrase, increasing the possibility of overt *that*. They state that *think*, specifically *I think*, and *think* in the present tense favors \emptyset at the highest rates, followed by *know* and then *say*. Larsen-Freeman and Celce-Murica (2016) state that expressions of doubt such as the verb *doubt* which is the clearest case, poses a

clear link between *doubt* and negation. Thus, when negation is expressed with *doubt*, the clausal complement favors *that* (Iyeiri 2009).

2.4 Grammaticalization

These authors also look at the effect of grammaticalization- the process by which lexical words become more functional. They hypothesize that it is due to grammaticalization, that the verb favors *that* or \emptyset . According to Kearns (2007), the mental state verb *think*, along with other epistemic verbs have deviated from their original function through grammaticalization, shifting from their original lexical meanings to expressions of modality— favoring \emptyset over *that*. The data, starting from Old English, analyzed by Tagliamonte & Smith (2004) found the occurrence of *that* with epistemic parentheticals does not happen as frequently because epistemic verbs have grammaticalized away from their original function and meaning. Their historical overview of the literature states that the use of \emptyset became common by Early Middle English and that the rate of \emptyset higher in spoken data. This would support Shank's (2013) analysis that the verb *realize*, another mental state verb similar to *think*, is in the process of grammaticalization. It is through grammaticalization that there will be a decrease in the use of *that* as opposed to \emptyset from Middle to Present English. Shank found that as *realize* is relatively new, it still currently favors *that*, although their analysis of the data shows that the use of \emptyset is slowly increasing consistent with their hypothesis of grammaticalization. Shank also found that the verb *think* has stabilized in its process of grammaticalization, stating that the increase in frequency in the use of \emptyset results in a decrease in the frequency of the use *that*. Shank (2013) also states that *think* basically outlines the process that mental state verbs and epistemic parentheticals, such as *realize* will follow, eventually resulting in higher rates of \emptyset . Also undergoing grammaticalization, *doubt* has drifted from meaning an utmost state of unlikelihood to mean something more neutral, which would

help explain its occurrences with *that* instead of *whether*. However, according to Larsen-Freeman & Celce-Murica (2016) similar to *think* and *realize*, *doubt* has gradually increased in use as an epistemic, at least of doubt in its affirmative sense (pg. 161).

2.5 Basis of Study

The literature explored has dealt with different possibilities contributing to variability and strength of the effect and the theories posited to account for these. Since Chomsky and Lasnik's (1977) proposal of filter (68), experiments such as those by Sobin (1987, 2002) as well as theories explored by Sobin (2009), have demonstrated a weakening in what was once thought to be the ungrammatical nature of the C-t effect. These have explored the adverb effect, the differences between complementizers, and the type of constructions which generate a stronger effect (i.e. topicalizations) or a weaker effect (i.e. cleft sentences). The literature fails to explore how verbs vary in the C-t effect that they induce, a gap this study aims to fill. The particular topic of interest for this study is mainly derived from Sobin (2002). In his experiment, it was deemed that a certain sentence did not display a clear C-t effect, due to the surprising results of the following sentences.

(5) a) Who did you say that saw Elvis last week.

b) Who do they think that might visit the Pope? (Sobin 2002, 541)

Sixty-four percent of participants in the GMI (good/maybe/impossible) group rated sentence a) as Good, and the Likert rating group gave it an average rating of 4.58 on a scale of 0-5. Sentence b) was given a 2.67 average rating by the likert group and only 22 percent of the GMI participants rated the sentence as Good. Although the sentences did not produce results expected

of a C-t construction, the results allow one to question the effect if any, that the verbs posed in these particular constructions.

The analyses where grammaticalization has been explored have tried to provide explanations for the occurrence of \emptyset and overt *that*, but the theories explored in their research do not fully account for the variability of these occurrences with differing verbs. Knowing the aspects of verbs which influence whether they take \emptyset or *that* would then also help explain the variability that is attributed with the C-t effect for some speakers. What is it then about certain verb types that dictates whether the construction has overt *that* or not, and induces a stronger or weaker C-t effect?

Chapter 3: Research Question & Hypothesis

3.1 Research question

There is extensive literature on the complementizer-trace effect and on the variability surrounding the effect. Most of the research on its variability has focused on aspects such as adjectives increasing acceptance of that-trace constructions—there is little research on the effect that verbs have on the C-t effect. The present study aims to fill that gap. This study attempts to answer the following questions. 1) Do different verb types vary in the C-t effect they induce and 2) if so, which verb induces a stronger effect.

3.2 Hypothesis

The main hypothesis guiding this research is that there will be a difference in the effect induced by the verbs. Also, due to their epistemicity, the verb *think* will induce the strongest effect with the least variability, while *realize* will induce the weakest.

Chapter 4: Methodology

4.1 Participants

Undergraduate students at the University of Texas at El Paso were recruited via email from the Psychology and Languages and Linguistics departments. Participants include 37 females and 7 males between the ages of 18 to 40 ($M=24$). Although 47 students participated, data from three had to be excluded—two participants age fell outside of the range detailed above and one did not complete the tasks ($n=44$).

Participants self-reported to be proficient speakers of English. They were asked to take a language questionnaire (Birdsong, Gertken, Amengual 2012) to gauge their language background in case a statistically significant difference in the results of monolingual and bilingual participant was found, although none were expected and subsequently none were found. The university is an HSI (Hispanic Serving Institution), therefore a considerable portion of the student population at the university are bilingual. According to this measure, most of the participants were in fact bilingual Spanish/English speakers, and about half were Spanish dominant.

4.2 Materials

To test whether certain verbs induced a stronger C-t effect, participants were asked to take a grammaticality judgement task, henceforth GJT, presented as a questionnaire that was created for this study. The GJT consisted of 72 items, 12 items per each verb—*believe*, *doubt*, *know*, *realize*, *say* and *think*. These items included matched items with *that* involving both subject and object extractions, constructions without extractions, and constructions with the complementizer *whether*—which is a known unacceptable example when studying the phenomenon.

Two GJT's were created: one task asked participants to rate the grammaticality of the items presented as Good, Maybe or Bad (G/M/B). A rating of Good would constitute an example of a grammatical sentence in English, maybe being a possible sentence in English- one that the speaker might not say but wouldn't be surprised to hear, and Bad being an ungrammatical example of a sentence in English. The other task consisted of the same items but asked participants to rate the acceptability of these on a scale of 0 to 5, 0 being a totally unacceptable/ungrammatical example of a sentence in English and 5 a totally acceptable example. The explanations for the ratings for both tasks were included before the practice items were presented. (Appendix GJT: 0-5; GJT: GMB)

4.3 Procedure

Participants were sent a series of links; one was to the Bilingual Language Profile (2012) and the other link corresponded to the GJT they were randomly assigned to. The task (Appendix GJT: 0-5; GJT: GMB) included two warm-up questions to help familiarize the participants with the task at hand. After these practice questions, the 72 task items were presented in random order. Due to the Covid-19 pandemic, participants completed the task from home. As the task was not administered in person and was also not timed, participants were able to pace themselves and had the leisure of completing the task at their own convenience. This also meant that the ability to ask questions about the items or to provide feedback about the study was limited.

4.4 Analysis

In order to analyze the data, participants' answers were coded as either a 1, 2, or 3. A 1 corresponded to answers Bad on the G/M/B questionnaire and 0 and 1 on the 0-5 questionnaire. A 2 corresponded to Maybe for the G/M/B version as well as 2 and 3 on the 0-5 version, while a

3 corresponded to a rating of Good and a rating of 4 and 5. The coded data were then analyzed using a Wilcoxon signed rank test on SPSS.

Chapter 5: Results

No significant differences were found between the two tasks when analyzed using a Wilcoxon signed rank test; both tasks produced very similar results.

5.1 *Whether vs That*

According to the literature, *whether*-type constructions are known unacceptable, which is why they were included in the task. Participants across both tasks rated the items with the C *whether* as ungrammatical, both with object and subject extractions and across both tasks, regardless of the verb. As a known unacceptable, it was expected that the items with the complementizer *whether* would be rejected at higher rates. Although, the rate of rejection wasn't as drastic as the results Sobin (1987) found, the rate at which they were deemed acceptable was relatively low. Only about 3 participants rated these as possible grammatical constructions. Table 1.1 illustrates the average acceptability of *whether*-type constructions and *that*-type constructions.

Table 1.1: Comparison of *whether*-type and *that*-type constructions

	1	2	3
[wh] [subj] <i>whether</i>	86%	10%	4%
[wh] [obj] <i>whether</i>	80%	16%	4%
[wh] [subj] <i>that</i>	45%	33%	22%
[wh] [obj] <i>that</i>	30%	31%	39%

The items with the complementizer *that* varied in acceptability and were deemed as grammatical constructions at higher rates when compared to the *whether* items, which were generally rejected.

5.2 No extractions

Similarly, the results for the items without extractions were as expected. As the effect is not present in these constructions, they should be generally accepted as grammatical.

(6) Did Raquel *verb* (that) Erika likes dark chocolate?

Across both tasks, these constructions received the highest ratings with the most participants rating them as grammatical items, regardless of the overt/covertness of the complementizer.

There were no statistical differences between items without extractions with *that* and those with the \emptyset . In the example with the verb *say*, 95% of participants rated the item without extraction and \emptyset as grammatical, and 93% rated the item with *that* as grammatical. As shown in the table below, these items received few “1” judgements.

Table 2.1: Comparison of \emptyset /*that* for items without extractions

	1	2	3
believe [-wh] [+subj]	5%	18%	77%
believe [-wh] [+subj] that	7%	11%	82%
know [-wh] [+subj]	11%	11%	77%
know [-wh] [+subj] that	5%	0%	95%
realize [-wh] [+subj]	2%	14%	84%
realize [-wh] [+subj] that	2%	16%	82%
say [-wh] [+subj]	2%	2%	95%
say [-wh] [+subj] that	0%	7%	93%
think [-wh] [+subj]	5%	27%	68%
think [-wh] [+subj] that	2%	11%	86%

5.3 Verbs

According to the C-t effect, the items with subject extractions over the overt *that* should not be possible or considered grammatical, unlike objects, which are not as restricted in their movement. The literature, however, has noted that there is variability for the overt *that* constructions and some speakers may consider these as grammatical.

When the instances of \emptyset and *that* per verb, were compared, only some of these were statistically significant. The verbs *believe*, *say*, and *think* induced a significant C-t effect that was stronger than was observed for the other verbs. The data shows that although there was some variability in acceptance, sentences with \emptyset were preferred to their overt *that* counterparts. For a subject extraction sentence with the verb *believe*, 16% of the total participants rated it as “1”, while 61% participants rated the item with the same verb plus overt *that*, as “1” (N= 43, z= 37.5, p <.001). The \emptyset items with *say*, when compared to the items with the *that*, also showed to be statistically significant (N= 44, z= .000, p<.001) and *think* (N= 44, z=18, p<.001). The results are illustrated in the table below.

Table 3.1: Subject extractions with \emptyset /that for *believe*, *say* and *think*

	1	2	3
Believe [+wh] [subj]	16%	35%	49%
Believe [+wh] [subj] that	61%	16%	23%
Say [+wh] [subj]	2%	7%	91%
Say [+wh] [subj] that	32%	39%	30%
Think [+wh] [subj]	5%	18%	77%
Think [+wh] [subj] that	55%	30%	16%

It is interesting, that although the C-t effect is not present in the items with \emptyset , some participants still rated these constructions as ungrammatical. Also, although it should be noted that some participants rated the items with *that* as grammatical, that can be attributed to the variability in acceptance (Sobin 2002, 2009) that has been analyzed with the effect.

Comparatively, those sentences with the verbs *know* and *realize*, when \emptyset and *that* were compared did not provide results that were statistically significant. Subject extractions with *that* and those with \emptyset were accepted at similar rates. However, these verbs saw an increase in “1” ratings when the C was overt.

Table 4.1: Subject extractions for verbs *know* and *realize*

	1	2	3
Know [+wh] [subj]	41%	34%	25%
Know [+wh] [subj] that	45%	32%	23%
Realize [+wh] [subj]	18%	48%	34%
Realize [+wh] [subj] that	36%	39%	25%

The verb which provided the most interesting results was *doubt*. None of the extraction items provided significant results when compared to their overt C counterparts— including the object extractions. Almost 50% of the participants (across both tasks), rated the object extraction with the \emptyset C as ungrammatical, while only about 30% rated this item as grammatical (N= 44, z= .225, p= .822), illustrated in the following sentence.

(6) What did the man *doubt* the car crashed into?

As the wh-subject is not being extracted over the overt C, these results were not expected. The effect is not present; therefore, this item should favor a “grammatical” rating. Forty-two percent of the participants, across both tasks, rated the subject extraction with the overt C, as

ungrammatical, while only 16% rated this item favorably. The items where the effect is not present did not perform as expected. Even the object extractions were deemed to be ungrammatical constructions by a relatively high percentage of participants— only those sentences without extractions, such as (7), were rated as expected.

(7) Did Raquel *doubt* (that) Erika likes dark chocolate

Table 5.1: Judgements for the verb *doubt*

	1	2	3
Doubt [+wh] [subj]	48%	27%	25%
Doubt [+wh] [subj] that	42%	42%	16%
Doubt [+wh] [obj]	48%	23%	30%
Doubt [+wh] [obj] that	45%	34%	20%
Doubt [-wh] [+subj]	11%	36%	52%
Doubt [-wh] [+subj] that	9%	23%	68%

Chapter 6: Discussion

The two main hypotheses are (i) that there would be a difference in the strength of the C-t effect induced by the verbs, and (ii) that the verbs with the most epistemic sense, *think*, would induce a stronger effect, while those with the least epistemic sense, *realize*, would induce a weaker effect. The data presented here supports both these hypotheses.

Further, as found in the literature at large, extractions over *whether* are less generally acceptable than extractions over *that*. Similar to Sobin (1987), the results demonstrate that there is a clear distinction between these complementizers. While the acceptability of *that* varied, *whether* was rejected at higher rates, regardless of the verb. While about 4% of all participants may have given the *whether*-type constructions a favorable rating, they were mostly judged as being ungrammatical. And when they were judged as grammatical, this mostly happened on the items with the verb *doubt*. On the other hand, the items with *that* received favorable rating by at least 20% of all participants, regardless of the verb and of the type of extraction.

The verb *doubt* provided the most interesting results, as even object extractions were rated as ungrammatical. To me, as well as the people around me, the *doubt* items favored the overt *that*. One person mentioned that the sentences without the overt complementizer, needed *that* for them to rate them as grammatical constructions—the data did not support this. However, it cannot be said that this is attributed to the effect, or the intersection of the verb and the C-t effect. It may be that participants are not as familiar with the verb, or the combination of the verb and tense, and consequently rated something that they are unfamiliar with, relatively low.

There could be a few factors to consider when assessing these results. The verbs are not as far along in their process of grammaticalizing, varying degrees of epistemicity, or a distinction could be drawn between factive (*know*, *realize*) and non-factive verbs (*think*, *believe*). Shim and

Ihsane (2017) state that non-factives can freely drop the complementizer, while factive verbs vary- which could explain why the data demonstrated that *think* and *believe* preferred the instances of \emptyset while there was no preference with *know* and *realize*. However, looking at the results as a whole, including *say* and *doubt*, the data supports the idea that the more epistemic sense a verb has, the more likely it is to favor the instances of \emptyset as opposed to *that-* as demonstrated by the verbs *say*, *believe*, and *think*. An analysis of corpora found that *think* has the highest instances of acceptance with \emptyset , followed by *know* and *say* (Tagliamonte & Smith, 2004). The data from the present study are consistent with this analysis. Although the verb *believe* has not been as extensively analyzed as the other verbs presented in this study, its favoring of acceptability with \emptyset , in this case, can still be attributed to its epistemic sense. *Know* and *realize* performed similarly, with no significant preference for the overt or covert C, pointing to a lesser sense of epistemicity.

As a considerable portion of the literature has focused on monolingual English speakers, the grammaticality of some of the items, for example the *whether* constructions, may differ. When considering these results, it should be noted that most if not all of the participants are bilingual Spanish/English speakers in a region where both languages, and sometimes a mix of both, are used. Some participants in this study were more inclined to opt for neither a grammatical nor ungrammatical judgement but more so, a judgement somewhere in the middle. For example, the description for “Maybe” and “2 -3” in the tasks (Appendix GJT: 0-5; GJT: GMB), mentioned that this judgement could be assigned to a construction that they (the informants) might not say but wouldn’t be surprised to hear. The reason they may have chosen this may be due to the varying degrees of English proficiency of the population not only of the university, but of the general population in the region. With varying degrees of English use and

proficiency, there are also varying ideas of what could be acceptable constructions of English. Or the possibility of having heard these constructions, which may be ungrammatical for some English speakers, but aren't uncommon in a highly bilingual region.

Chapter 7: Conclusion

There were a few limitations that affected the study; therefore, some changes might be advisable for future studies. As the study was conducted entirely online, participants were not able to ask questions on items that they were unsure of and could also not provide any feedback. Adding the option for feedback or conducting the study in a manner in which feedback is possible, would be beneficial. Also, the study would have benefited from a larger sample size.

The results of the language questionnaire that was administered, revealed that all of the participants were bilingual Spanish/English speakers. As the University of Texas at El Paso is an American university, all the participants knew English, including the transnational student population. Although it was expected that a large percentage of the participants would be bilingual, it was interesting that there were no monolingual speakers in the sample. This could have had an impact on the on the results— either by influencing the sense of the verbs, or as an effect of proficiency due to the semantics of the verbs used in this study; which could be a topic for future research.

In conclusion, the initial hypothesis that there would be in difference in the effect induced by the verbs was supported. The secondary hypothesis stating that due to their epistemicity, *think* would induce the strongest effect and *realize* would induce the weakest effect was also supported. Although the literature has primarily looked at the syntax in order to try to provide an explanation for the C-t effect, the theories explored and rules that have been posited have not been able to fully account for its variability. Therefore, this study leans into the idea that in order to be able to adequately account for the C-t effect and its variability, other components of language, and not only syntax, should be taken into account.

References

- Bresnan, J. W. (1970). On Complementizers: Toward a syntactic theory of complement types. *Foundations of Language*, 6(3), 297–321. <https://www.jstor.org/stable/25000462>
- Birdsong, D., Gertken, L.M., & Amengual, M. (2012). Bilingual language profile: An easy-to-use Instrument to Assess Bilingualism. COERLL, University of Texas at Austin. Retrieved from: <https://sites.la.utexas.edu/bilingual>.
- Chomsky, N. & Lasnik, H. (1977). Filters and control. *Linguistic Inquiry*, 8(3), 425-504. Retrieved from <http://www.jstor.com/stable4177996>
- Hagstrom, P. (2001). Lx522 syntax 1: Questions and answers. Retrieved from http://www.bu.edu/linguistics/UG/course/lx522-f01/qna_f.html
- Huddleston, R. D., Pullum, G. K., & Al, E. (2016). *The Cambridge grammar of the English language* (9th ed.). Cambridge University Press. (Original work published 2002)
- Iyeiri, Y. (2009). The historical development of the verb doubt and its various patterns of complementation. In U. Römer & R. Schulze (Eds.), *Exploring the lexis-grammar interface* (pp. 153-169). John Benjamins Pub.
- Kearns, K. (2007). Epistemic verbs and Ø complementizer. *English Language and Linguistics*, 11(3), 475-505. doi:10.1017/S1360674307002353
- Khemlani, S. (2021). Epistemic verbs produce spatial models. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 43(43). <https://escholarship.org/uc/item/5bh0f6bh>
- Larsen-Freeman, D., & Celce-Murcia, M. (2016). *The grammar book: Form, meaning, and use for English language teachers*. National Geographic Learning, Heinle Cengage Learning.

- Maling, J. & Zaenen, A. (1978). The nonuniversality of a surface filter. *Linguistic Inquiry*, 9(3), 475-497. Retrieved from <http://www.jstor.com/stable/4178072>
- Pesetsky, David. (2017). Complementizer-trace effects. *The Wiley Blackwell Companion to Syntax*, (2nd ed.). <https://doi.org/10.1002/9781118358733.wbsyncom108>
- Shank, C. (2013). The grammaticalization of the verb ‘realize’: A diachronic corpus-based study. In M. Brdar, I. Raffaelli, & M. Ž. Fuchs. (Eds.), *Cognitive linguistics between universality and variation*. (pp. 411-445). Cambridge Scholars.
- Shim, J., & Ihsane, T. (2017). A New Outlook of Complementizers. *Languages*, 2(3), 17. <https://doi.org/10.3390/languages2030017>
- Sobin, N. (1987). The variable status of C-t phenomena. *Natural Language & Linguistic Theory*, 5(1), 33-60. Retrieved from <http://www.jstor.com/stable/4047574>
- Sobin, N. (2002) The C-t effect, the adverb effect and minimal cp. *Journal of Linguistics*, 38(3), 527-560. Retrieved from <http://www.jstor.com/stable/4176763>
- Sobin, N. (2009). Prestige case forms and the C-t effect. *Syntax*, 12(1), 32-59. <https://doi.org/10.1111/j.1467-9612.2008.01113.x>
- Sobin, N. (2020). Directing syntactic traffic. *Syntax*, 23(3), 241-274. DOI: 10.1111/synt.12194
- Suhadi, J. (2011). Epistemic modality and deontic modality: Two sides of a coin. *JULISA*, 11(2), 156–179.
- Tagliamante, S. & Smith, J. (2004). No momentary fancy! The Ø ‘complementizer’ in english dialects. *English Language and Linguistics*, 9(2), 289-309. [doi:10.1017/S1360674305001644](https://doi.org/10.1017/S1360674305001644)

Appendixes

GJT: 0-5

For the following task, please specify if the sentences/questions presented, are grammatically correct according to your own judgements.

0- Totally Unacceptable: Never would consider sentence to be grammatically correct. No one would say something like this.

1- Unacceptable: Not a grammatically correct sentence. Someone might say it, but they would probably correct themselves immediately after saying it

2- Unsure: Unsure if it would be an ungrammatical sentence. Not a bad example of grammaticality, but not the best.

3. Somewhat Acceptable- Sounds "iffy" but someone may say it.

4- Acceptable: A good example of a grammatically correct sentence

5. Totally Acceptable: Would always be considered grammatically correct.

There are different ways of saying something, which may be equally acceptable or not. Therefore, your judgement of one item should not affect how you judge another; each item should be judge individually. There are no wrong or right answers.

WARM-UP:

1. Jane likes Tarzan
2. Anna and Alan goed to the mall.

Believe:

1. Who did you believe bought a radio?
2. Who did you believe that bought a radio?
3. What did Tyler believe destroyed the house?
4. What did Tyler believe that destroyed the house?
5. Who do you believe whether wants another dog?
6. What did the man believe the car crashed into?
7. What did the man believe that the car crashed into?
8. Who did Jane believe Tarzan likes?
9. Who did Jane believe that Tarzan likes?
10. Which train do you believe whether she took?
11. Did Raquel believe Erika likes dark chocolate?

12. Did Raquel believe that Erika likes dark chocolate?

Doubt:

1. Who did you doubt bought a radio?
2. Who did you doubt that bought a radio?
3. What did Tyler doubt destroyed the house?
4. What did Tyler doubt that destroyed the house?
5. Who do you doubt whether wants another dog?
6. What did the man doubt the car crashed into?
7. What did the man doubt that the car crashed into?
8. Who did Jane doubt Tarzan likes?
9. Who did Jane doubt that Tarzan likes?
10. Which train do you doubt whether she took?
11. Did Raquel doubt Erika likes dark chocolate?
12. Did Raquel doubt that Erika likes dark chocolate?

Know:

1. Who did you know bought a radio?
2. Who did you know that bought a radio?
3. What did Tyler know destroyed the house?
4. What did Tyler know that destroyed the house?
5. Who do you know whether wants another dog?
6. What did the man know the car crashed into?
7. What did the man know that the car crashed into?
8. Who did Jane know Tarzan likes?
9. Who did Jane know that Tarzan likes?
10. Which train do you know whether she took?
11. Did Raquel know Erika likes dark chocolate?
12. Did Raquel know that Erika likes dark chocolate?

Realize:

1. Who did you realize bought a radio?
2. Who did you realize that bought a radio?
3. What did Tyler realize destroyed the house?
4. What did Tyler realize that destroyed the house?
5. Who do you realize whether wants another dog?
6. What did the man realize the car crashed into?
7. What did the man realize that the car crashed into?
8. Who did Jane realize Tarzan likes?
9. Who did Jane realize that Tarzan likes?
10. Which train do you realize whether she took?
11. Did Raquel realize Erika likes dark chocolate?
12. Did Raquel realize that Erika likes dark chocolate?

Say:

1. Who did you say bought a radio?

2. Who did you say that bought a radio?
3. What did Tyler say destroyed the house?
4. What did Tyler say that destroyed the house?
5. Who do you say whether wants another dog?
6. What did the man say the car crashed into?
7. What did the man say that the car crashed into?
8. Who did Jane say Tarzan likes?
9. Who did Jane say that Tarzan likes?
10. Which train do you say whether she took?
11. Where did you say whether Jane went?
12. Did Raquel say Erika likes dark chocolate?
13. Did Raquel say that Erika likes dark chocolate?

Think:

1. Who did you think bought a radio?
2. Who did you think that bought a radio?
3. What did Tyler think destroyed the house?
4. What did Tyler think that destroyed the house?
5. Who do you think whether wants another dog?
6. What did the man think the car crashed into?
7. What did the man think that the car crashed into?
8. Who did Jane think Tarzan likes?
9. Who did Jane think that Tarzan likes?
10. Which train do you think whether she took?
11. Did Raquel think Erika likes dark chocolate?
12. Did Raquel think that Erika likes dark chocolate?

GJT: GMB

For the following task, please specify if the sentences/questions presented, are grammatically correct according to your own judgements.

Good: Sounds like a sentence you may say;
A good example of a grammatical sentence

Maybe: Sounds like a possible English sentence, one that you may not say in that way but you would not be surprised to hear or read it;
Not necessarily bad, but also not the best example of a grammatical sentence

Bad: Sounds odd/wrong. A sentence you don't think anyone would say that way;
Not a grammatical sentence

There are different ways of saying something, which may be equally acceptable or not. Therefore, your judgement of one item should not affect how you judge another; each item should be judged individually. There are no wrong or right answers.

WARM-UP

1. Jane likes Tarzan.
2. Anna and Alan goed to the mall.

Believe:

1. Who did you believe bought a radio?
2. Who did you believe that bought a radio?
3. What did Tyler believe destroyed the house?
4. What did Tyler believe that destroyed the house?
5. Who do you believe whether wants another dog?
6. What did the man believe the car crashed into?
7. What did the man believe that the car crashed into?
8. Who did Jane believe Tarzan likes?
9. Who did Jane believe that Tarzan likes?
10. Which train do you believe whether she took?
11. Did Raquel believe Erika likes dark chocolate?
12. Did Raquel believe that Erika likes dark chocolate?

Doubt:

1. Who did you doubt bought a radio?
2. Who did you doubt that bought a radio?
3. What did Tyler doubt destroyed the house?
4. What did Tyler doubt that destroyed the house?
5. Who do you doubt whether wants another dog?
6. What did the man doubt the car crashed into?
7. What did the man doubt that the car crashed into?

8. Who did Jane doubt Tarzan likes?
9. Who did Jane doubt that Tarzan likes?
10. Which train do you doubt whether she took?
11. Did Raquel doubt Erika likes dark chocolate?
12. Did Raquel doubt that Erika likes dark chocolate?

Know:

1. Who did you know bought a radio?
2. Who did you know that bought a radio?
3. What did Tyler know destroyed the house?
4. What did Tyler know that destroyed the house?
5. Who do you know whether wants another dog?
6. What did the man know the car crashed into?
7. What did the man know that the car crashed into?
8. Who did Jane know Tarzan likes?
9. Who did Jane know that Tarzan likes?
10. Which train do you know whether she took?
11. Did Raquel know Erika likes dark chocolate?
12. Did Raquel know that Erika likes dark chocolate?

Realize:

1. Who did you realize bought a radio?
2. Who did you realize that bought a radio?
3. What did Tyler realize destroyed the house?
4. What did Tyler realize that destroyed the house?
5. Who do you realize whether wants another dog?
6. What did the man realize the car crashed into?
7. What did the man realize that the car crashed into?
8. Who did Jane realize Tarzan likes?
9. Who did Jane realize that Tarzan likes?
10. Which train do you realize whether she took?
11. Did Raquel realize Erika likes dark chocolate?
12. Did Raquel realize that Erika likes dark chocolate?

Say:

1. Who did you say bought a radio?
2. Who did you say that bought a radio?
3. What did Tyler say destroyed the house?
4. What did Tyler say that destroyed the house?
5. Who do you say whether wants another dog?
6. What did the man say the car crashed into?
7. What did the man say that the car crashed into?
8. Who did Jane say Tarzan likes?
9. Who did Jane say that Tarzan likes?
10. Which train do you say whether she took?

11. Did Raquel say Erika likes dark chocolate?
12. Did Raquel say that Erika likes dark chocolate?

Think:

1. Who did you think bought a radio?
2. Who did you think that bought a radio?
3. What did Tyler think destroyed the house?
4. What did Tyler think that destroyed the house?
5. Who do you think whether wants another dog?
6. What did the man think the car crashed into?
7. What did the man think that the car crashed into?
8. Who did Jane think Tarzan likes?
9. Who did Jane think that Tarzan likes?
10. Which train do you think whether she took?
11. Did Raquel think Erika likes dark chocolate?
12. Did Raquel think that Erika likes dark chocolate?

Vita

Haydee Martinez graduated with a B.A. in Linguistics from the University of Texas at El Paso in the Fall of 2019. During her undergraduate studies, she was in the Fast-Track program, which allowed her to get a head start in her graduate studies while also working on a campus-wide initiative to bring awareness to 2020 Census. In the Fall of 2020, she enrolled in the Master of Arts in Linguistics under the mentorship of Dr. Nicholas Sobin and Dr. Sabrina Mossman.