Experimental design

1. Background

Speakers often say more than what the spoken message literally means. The implicit meaning of what a speaker says must be recovered from the speaker's knowledge or goals.
While replicating the study of Bergen and Grodner (2012) we will look at sentences of the form "Some investments lost money" and what influence speakers knowledge has on the comprehension of them. An example stimulus used in this study can be seen below (Table 1). These sentences can imply that not all investments lost money or that the speaker doesn't know whether all investments lost money. The former one is so-called a strong implicature, whereas the latter one is so-called a weak implicature. A scalar implicature can arise whenever a speaker uses a weaker expression than a salient alternative. This means, that if the speaker chooses to say "Some P are Q" instead of saying "All P are Q", there is a scalar implicature. Some theorists have argued that the strong implicature is generated automatically and mandatorily upon encountering a weak expression regardless of the context (Levinson, 2000, cited by Bergen & Grodner, 2012). However, recent evidence demonstrates that the strong implicature is not obligatorily generated whenever a weak scaler expression (i.e. some) is encountered (Bergen & Grodner, 2012). This indicates an effect of context on online implicature generation. An aspect that remained unclear was the role of the speaker's knowledge in implicature generation. Speaker knowledge here refers to what a speaker knows about the topic they are talking about. The original paper (cf. Bergen & Grodner, 2012) tries to shed light on the role of speaker knowledge and provides evidence that speaker knowledge affects incremental implicature generation and perceivers incorporate speaker knowledge immediately if the stated perspective is made sufficiently salient. This means that a perceiver will set what a speaker says into the context of what they know about the speaker. The purpose of this study is to replicate the original study and see if we can find similar findings.

Sample Stimulus Item With a Complement Continuation

Sentence type	Example
Context	
Full-knowledge	At my client's request, I meticulously compiled the investment report.
Partial-knowledge	At my client's request, I skimmed the investment report.
Trigger	
Scalar	Some of the real_estate investments lost money.
Focused	Only some of the real_estate investments lost money.
Continuation	
Complement	The rest were successful despite the recent economic downturn.

Note. Each stimulus item consisted of a context sentence, followed by a trigger sentence, followed by a continuation sentence.

Table 1. Sample stimulus sentences divided into context conditions, trigger conditions, and the complement continuation (Bergen & Grodner, 2012).

2. Hypotheses

We are interested in replicating the results of the original study which investigated whether implicature generation caused by encountering the existential quantifier "some" is sensitive to the speakers' knowledge state. Along with the original study, we hypothesize that speaker knowledge will affect the generation of scalar implicatures, in that full-knowledge (knowing whether the stronger statement was true) will lead to a generation of strong implicatures and partial- knowledge (considering it merely possible that the stronger statement was true) will facilitate the generation of weak implicatures. Differently from the original study where they examined every predefined language region in sentences, we will only focus on language regions where significant effects of knowledge were found in the original paper. The language regions we focus on are called critical language regions. These are quantifier regions (e.g. consisting of "some of") in trigger sentences (see 3.2) and predicate regions (e.g. consisting of "were successful") in complement sentences (see 3.2). Besides, we will leave out the analysis for the factor continuation (see 3.2), because there were no effects found as well.

Precisely, it is expected that:

1. Full-knowledge will lead to a longer reading time of the critical regions of trigger sentences and shorter reading time of the critical regions of complement sentences under scalar conditions, compared to partial-knowledge. It is because the first integration of a strong implicature causes more effort but once created it will be beneficial for processing the subsequent complement information.
2. The level of knowledge should make no difference in the reading time of the critical regions in both trigger sentences and complement sentences under focused conditions. It is because the focus particle "only" has the effect of asserting the not-all interpretation. As a result, contextual information about the speaker's knowledge should not alter interpretation for both trigger sentences and complement sentences.

3. Materials, Design & Procedure

3.1 Participants

Participants in the study by Bergen and Grodner (2012) were native English-speaking College students. Because of time constraints, we will not recruit native English-speakers.

We will simply require our participants to have good English language knowledge (at least B1 (self-declared) according to the English language level (CEFR)).

3.2 Materials & Design

The study is a 2 X 2 X 2 within-subjects multifactorial design. The three factors with two levels each are knowledge-context (full vs. partial), trigger-type (scalar vs. focused), and continuation-type (complement vs. cancelation). We will use the sentence passages provided by Bergen & Grodner (2012). There are 24 stimulus passages which consist of 3 sentences and a comprehension question. The first sentence is the one displaying the speakers' knowledge which is either full- or partial-knowledge. The participant will see a sentence in first person singular that gives some information about what someone did or knows. The context of the sentence can be full-knowledge if it is such that it is likely that the subject of the sentence has full knowledge on what was described in the sentence. Otherwise the context is partial-knowledge. For example, the sentence "In the school parking lot, I carefully inspected an old bus" would be stating that the speaker has full knowledge, whereas "In the school parking lot, I passed by an old bus." would state that the speaker has partial knowledge (Bergen and Grodner, 2012). The second sentence is of the form Some P are Q and contains a trigger which is either scalar (Some) or focused (Only Some). The third sentence then is a continuation one which either is a complement to the trigger describing the set that is not Q or a cancelation sentence which contradicts either a strong or a weak implicature.

Of these 24 passages each has 6 different conditions in which knowledge-context, trigger-type and continuation-type alter. These 6 conditions are: full-scalar-complement (c1), full-focused-complement (c2), partial-scalar-complement (c3), partial-focused-complement (c4), full-scalar-cancelation (c5), partial-scalar-cancelation (c6). The passages are pseudorandomly mixed with 65 fillers consisting of 2- to 4-sentence first-person passages. Besides, we create 6 experimental stimuli and 6 fillers by ourselves to make the practice trial.

3.3 Procedure

The experiment consists of four parts:

1. introduction & instructions
2. practice phase
3. main test phase
4. post-experiment questionnaire

Participants are at first presented with written instructions about the task. These instructions include an example of a trial, showing how experimental stimuli will look like.

Next, the practice trials follow, which are exactly like the main trials.

After that, the main test phase begins where sentences are presented in a noncumulative, self-paced word-by-word display.

Each trial goes as follows:

- Each trial begins with dashes standing for non-white-space characters of the sentences.
- Participants have to press the spacebar to replace these dashes with the words, everytime they do so the word which was displayed before disappears, the time between button presses is recorded.
- Sentences are displayed in the order: knowledge sentence, trigger sentence, continuation sentence.
- Following each passage, participants have to answer a yes-or-no comprehension question.

Finally, the experiment terminates with a post-experiment survey asking participants to optionally supply socio-demographic information and feedback.

References:

Bergen and Grodner. (2012), "Speaker Knowledge Influences the Comprehension of Pragmatic Inferences", *Journal of Experimental Psychology: Learning, Memory, and Cognition,* pp. 1450 - 1460.