

Methodological strategies for using stimulated recall in interpreting research

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Abstract

There is a recognized need in translation and interpreting studies to address the challenges and limitations of using retrospective techniques (verbal reports, retrospective reports, cued reports) in studies researching the cognitive processes involved in translation and interpreting tasks (Hild, 2015; Jääskeläinen, 2017; Saldanha & O'Brien, 2014). This article contributes to the discipline by providing methodological guidance to applying a retrospective technique, stimulated recall, used to access the conscious cognitive processes in interpreting process research. We present a brief review of studies that have used this technique in cognitive studies of the interpreting process and expertise. We then propose recommendations to guide researchers in making methodological decisions regarding the study design, data collection, and protocol data preparation for analysis. We hope to promote the validity of data collected through this technique, as reliability is crucial to increase the reproducibility and generalizability of the studies in this field to advance knowledge in our discipline.

Keywords: interpreting studies; research methods; retrospective protocols; stimulated recall; expertise studies.

1. Introduction

An essential part of the cognitive study of interpreting has focused on the process and the skills involved in such complex activity (Seeber, 2015; Ahrens, 2017). To unveil cognitive events that do not lend themselves easily to observation, researchers have used various methods throughout the years, from verbal reports and behavioral techniques to psycholinguistic and neurophysiological approaches (Seeber, 2015). Verbal reports are one technique that opens a valuable window into the conscious thinking while doing a task that underlie learning and expertise (Ericsson, 2006). In interpreting studies, retrospective reports are an established technique that has provided valuable insights into the process and development of interpreting skills, like strategic processing, problem-solving, and decision-making (Hild, 2015).

However, researchers in the field recognize the theoretical and methodological challenges of using these techniques and argue for increasing the validity and reliability of procedures (Hild, 2015; House, 2013; Jääskeläinen, 2017; Saldanha & O'Brien, 2014). Validity concerns revolve around the immediacy of the retrospection, the type of cue used to support retrospection, the level of interaction between researcher and participant, and the data analysis procedures. Critically, procedures for addressing these issues are scarce in the literature (Hild, 2015; Jaaskeläinen, 2017).

This article proposes methodological strategies for successfully applying a retrospective technique, *stimulated recall*, in interpreting tasks. These recommendations aim at increasing reliability and validity in the collection and analysis of recall protocols.

1.1. Verbal reports, retrospection, and stimulated recall

The theoretical underpinnings for verbal reports rely on one of the basic tenets of the information processing account of cognition, which states that the mind processes information for perception, codification, storing, retrieval, and use and that part of these processes can be verbalized (Neisser, 2014 [1967]; Newell & Simon, 1972). Ericsson and Simon developed verbal reports as a methodology to access the thoughts that were spontaneously heeded or attended to in short-term memory during the execution of a task (1980, 1987; Ericsson, 2006).

There are three types of verbal reports that correspond to either process observations or post-process observations: talk-aloud, think-aloud, and retrospective reports. Talk-aloud reports are concurrent verbalizations of an individual's thought processes while performing a verbally encoded task. Think-aloud reports involve converting heeded thoughts into verbal code for verbalization. In these two types of reports, if participants verbalize only the thoughts entering their attention as they perform the task (and not descriptions or explanations), this verbalization does not interfere with information being processed in short-term memory (Ericsson & Simon, 1987). On the other hand, retrospective reports are

verbalizations of the individual's memory for processes reported after performing a task. Because information decays after 10 seconds, retrospective reports access thoughts that are in long-term memory.

The stimulated recall is an immediate retrospective method based on Ericsson and Simon's central premise that cognitive operations still active in the participant's memory can be accessed and verbally reported as data (1980, 1984, 1987). Studies using this technique usually have the objective of eliciting data about the conscious thought processes that take place while an individual is performing a task (Gass & Mackey, 2017). Researchers in applied linguistics, second language acquisition, and other disciplines have used this technique to capture the conscious thinking language users have when, for example, identifying problems, making decisions, and choosing strategies to solve problems (Gass & Mackey, 2017); the mental models of librarians (Henderson & Tallman, 2006), and reasoning and decision making of medical students and physicians (Barrows et al., 1982; Gilbert et al., 1999; Pausawasdi, 2001).

In this technique, participants complete a task and immediately recall their thoughts while completing it. A stimulus is used as a prompt or cue to elicit the cognitive processes in operation during the task itself (Gass & Mackey, 2017). The purpose of the stimulus, like a video recording, is to present participants with a vivid cue that triggers recall of the thoughts they spontaneously had or attended to while completing the task for immediate verbalization.

This retrospective technique aims to reliably elicit the participants' thoughts while completing the task, like the conscious processes involved in comprehension, production, problem-solving, decision-making, and self-regulation, while the participant is still aware of those processes. It focuses on eliciting data only about these operations with the purpose of describing the conscious processes that underlie task performance.

1.2. Studies that use stimulated recall in cognitive studies of interpreting

In interpreting, due to the apparent limitation of concurrent verbalizations, retrospection has been the preferred approach to investigate and triangulate the factors at play in the interpreting process. Researchers working under the theoretical paradigm of expertise studies have used retrospection to establish the cognitive properties of superior performance and expert knowledge that constitute expertise in interpreting (Ericsson, 2006; Moser-Mercer et al., 2000; Tiselius, 2015).

To the best of our knowledge, the first researcher reporting the use of a retrospective technique in interpreting research is Sylvia Kalina's think-aloud study on the strategic discourse processing in simultaneous and consecutive interpreting (Kalina, 1992; Kohn & Kalina, 1996). Shortly after, Ivanova (1999, 2000) conducted a retrospective study to inquire about the cognitive and metacognitive processes and the development of interpreting skills as a function of experience. Based on the method reported by Ivanova (1999), Vik-Tuovinen (2002), Tiselius

and Jensen (2011), Englund Dimitrova and Tiselius (2014) also used retrospective protocols to identify qualitative differences in the level and focus of awareness of problems and problem triggers by experienced and inexperienced interpreters. Importantly, these studies show that one qualitative feature of experienced interpreters, compared to inexperienced ones, relies on their metacognitive monitoring skills, particularly awareness of difficulties and the contents of monitoring, which encompass cognition, behavior, and affect of the interpreter and interlocutors (Herring, 2019). Retrospective techniques have also shed light on the adaptability of the strategic processing in interpreting, which varies according to factors like language directionality (Bartłomiejczyk, 2006; Chang & Schallert, 2007) or communicative purpose (Gumul, 2006; Napier, 2004; Tang, 2018).

Retrospective protocols in these studies have provided valuable insights into the development of expertise, particularly the qualitative properties of metacognitive and strategic knowledge that differentiate experienced from inexperienced interpreters and present monitoring as one defining feature of skill acquisition in interpreters.

While the technique used in these studies is referred to as retrospective “comment”, “interview”, or “protocol”, they all use a prompt as in the stimulated recall methodology. However, a closer look at the procedures shows inconsistencies in applying the technique. Table 1 (annex 1) reviews 13 retrospective studies that have used a variation of the stimulated recall technique to obtain data about interpreters’ strategic processing. There is wide variation in the procedure, task length, delay of retrospection, type of stimulus, the interaction between researcher and participant, and the instructions directed to participants. Long tasks and delays in retrospection compromise the reliability of the recall as they increase the probabilities that participants begin to infer what they must have thought because their awareness of the task thoughts has vanished (Ericsson, 2006; Gass & Mackey, 2017). In some studies, the recall protocol had limited intervention of the researcher, while in other cases they played a more prominent role by asking probing questions about performance. This interference weakens the validity of reports as it directs the participants’ attention to thoughts that did not occur during the task execution and cue participants to comment, elaborate, explain, or justify themselves (Chi, 2006; Ericsson, 2006; Gass & Mackey, 2017). These elaborations, explanations, or justifications are not valid data as they do not correspond to thoughts the participant had when performing the task. Notably, with a few exceptions, reports of the methods to analyze protocol data are scant in the literature, undermining the results’ transparency and credibility and the possibility of comparing results across studies (Saldanha & O’Brien, 2014).

2. Using stimulated recall in interpreting research

This section provides specific strategies for the stimulated recall session procedure and protocol data preparation in a video-stimulated recall study. These suggestions stem from a review of the literature and the author’s experience in research projects whose objective

was to describe the comprehension and self-regulation strategies of experienced and inexperienced interpreters. We provide examples taken from our data to illustrate the suggestions. A comprehensive review of the theoretical foundations of verbal reports is beyond the scope of this article, but these have been addressed in the translation studies literature by Jääskeläinen (2011, 2017).

In this section, we use the following terms. The researcher refers to the person conducting the stimulated recall session. This session usually comprises two activities: a task and a recall protocol. The participant's task performance is recorded and immediately presented as a prompt to stimulate recall. The recall protocol consists of the researcher's instructions, and probing questions and participants' verbalizations.

2.1. Task selection and duration

As mentioned above, retrospection aims at accessing the memory of the conscious processes a person had while performing a task. A retrieval cue, like a video recording, is used for better recall reliability (Ericsson & Simon, 1987). The task may thus be brief so that the recall accesses the task representation while still active in the participant's memory. Consequently, the recall protocol must take place immediately after the task.

When studying the interpreting process, one option is to choose a brief interpretation task, with a complete speech of 1 to 2 minutes, with the recall protocol being conducted immediately after finishing interpreting the short speech. Another option is to segment a longer speech into a series of sentences, excerpts, or units of meaning (Englund Dimitrova & Tiselius, 2009). In this case, participants may interpret one segment, followed by the recall protocol. Then continue with the following segment and retrospection until the speech concludes. There are advantages and disadvantages to both approaches, but the ultimate decision will naturally depend on the research question and the focus of the study. For example, in a study on discourse comprehension, it may be suitable to use a complete-speech approach to not interfere with processes such as establishing global coherence or monitoring the plausibility of comprehension (Vik-Tuovinen, 2002). On the contrary, the segmented-speech methodology may be adequate if the study focuses on local problems, like the search for translation equivalents. In any case, the study design may include repeated trials to maximize data collection.

2.2. Selection of stimulus for recall protocol

A fundamental principle in choosing the type of stimulus for the recall protocol is that the stimulus needs to be vivid and representative of the task to access its representation still active in the participants' memory while not incurring additional cognitive effort (Englund Dimitrova & Tiselius, 2009). Prompts based on the source speech (source video or written transcript) may cue recall of thoughts involved in comprehension processes. However, the task of reading a transcript is cognitively different from listening to a speech and interpreting

it; thus, this new task has a high possibility of interfering with the recall of the original task under study. On the other hand, watching a video of the participant performing the task provides them with their verbal and non-verbal behavior as a vivid cue for the thoughts they had during the task (Hild, 2015).

2.3. Data recording

A video-stimulated recall study collects three main types of data: the video used as the stimulus for the recall (the stimulus); the verbal reports produced during the recall (the protocol data), and the output of the tasks performed, such as the target speech of an interpretation (the product data).

A portable device, such as a tablet or smartphone, will be helpful to record the participant's execution of the task. This device needs to be located close to the participant to capture performance. This recording will subsequently be the vivid stimulus to prompt the participant's recall of their conscious processes, so it needs to portray a clear view of the participant's face and body. A touchscreen device, in this case, is preferable to a video camera since the participant needs to have control to play and stop the video at will as they deliver their recall protocol.

For the collection of protocol and product data, researchers can use video or audio recording, depending on the research objectives. Video recording will provide rich data of the participants' verbal and nonverbal behavior, while audio recording will suffice if the research focuses on the participants' verbal production.

2.4. Recall procedure

As mentioned above, the purpose of using the stimulated-recall technique is to elicit data about the conscious thought processes a person had while performing a task, in order to describe their problem-solving, decision-making processes, strategic knowledge structures, among others.

Researchers may initiate the recall protocol by handing the participant the video recording of their performance and instructing them to verbalize their thoughts. For example: "Now I will show you the video recording of the task. Please tell me out loud what your thoughts were while you were [doing the task]. Feel free to pause the video if you need to make some remarks about what you were thinking while doing the task". An appropriate response would be a verbalization of thoughts the participant had while performing the task, for example: "I was thinking that, since I'm ignorant in this topic, I couldn't find the right term. So, I felt tempted to say 'milky way' or 'vía láctea', but I didn't know whether that was actually correct, so in a fraction of a second I had to come up with something that made sense, which didn't sound awkward".

The design may consider allowing the researcher to ask probing questions, if necessary, during the recall protocol. Examples of questions that researchers may use to cue recall are the following: “What were you thinking?”, “What were your thoughts while doing the task?”.

It is crucial to control the interaction between the researcher and the participant collected to increase data validity. It is important that researchers refrain from making evaluative judgments, asking specific questions, calling the participants’ attention to any aspect of their performance, or intervening beyond instructions and the general probing questions. Directed researcher questions can affect and compromise the procedure, as they direct the participant’s attention away from the recall to an aspect of the task that they may not be aware of, and it is thus out of their conscious experience; or it may lead the participant to “fill in” with information the participant believes is what the researcher wants to hear.

The best way to establish a standardized procedure is by elaborating a written script or set of instructions and probing questions. The script states standardized and specific instructions to express verbatim without variation across tasks and participants.

To preserve the validity of the protocol data, researchers may conduct a debriefing or semi-structured interview after the stimulated recall is complete. For example, this interview may focus on obtaining data about the participants’ assessment of the difficulty of the task and thus triangulate protocol data of strategies used with more elaborate data of interpreting difficulties encountered during the process.

2.5. Preparation of data for analysis

Two data types are available for analysis after a stimulated recall session: the task data (e.g., interpretation performance and product) and the protocol data (participants’ verbalizations). The approach a researcher will take to analyze these data will, of course, depend on the study’s approach, scope, research questions, and objectives. Both types of data are susceptible to be analyzed through quantitative, qualitative methods, or a combination of both. Regardless of the data analysis techniques, if researchers aim to describe interpreters’ thoughts while performing the task, it is important to prepare protocol data before further analysis. The purpose of this treatment is to identify verbalizations and researcher-participant interactions that do not correspond to the participants’ thoughts while executing the task.

Ericsson and Simon (1987) identify three types of verbal reports. Level 1 verbalizations provide information heeded by the central processor in the form in which it was heeded, for example, thoughts involved in reading, listening, or interpreting. Level 2 verbalizations entail the verbal encoding of information initially encoded in nonverbal form, for example, thoughts involved in visual processing. Finally, level 3 verbalizations are of particular concern as they result from researcher intervention or task design. These verbalizations are explanations or elaborations participants generate during the recall protocol. These comments are prone to occur

when task instructions ask for specific information; when probing questions cue participants to verbalize thoughts that they did not attend while performing the task; or as a result of participants watching themselves doing the task. Level 1 and level 2 verbalizations allow for accessing the thoughts involved when performing the task, while level 3 verbalizations do not describe the cognitive events involved in a task and should thus be excluded from the analysis. Table 2 presents examples for these three types of verbalizations taken from our data. In these cases, the researcher asked the appropriate question “What were your thoughts at this moment?”. Level 1 verbalizations refer to thoughts about verbal processing; level 2 comments refer to the participant’s visual processing, verbalized during the recall protocol; finally, level 3 comments do not refer to thoughts occurring during the task, but to explanations and elaborations produced by the participant in the context of the recall protocol.

TABLE 2

Examples of level 1, level 2, and level 3 verbalizations in our study data

TYPE OF VERBALIZATION	EXAMPLE
Level 1	<p><i>I couldn't remember the name of the animal, or the type of animal. I had the word "vertebrate" or something like that in my mind, but that was not the word. I was looking for the word "reptile," which was the word I needed.</i></p> <p><i>When [the speaker] said "It's the third planet in the blah, blah, blah...", I said "ok, I know this! I can remember it!"</i></p> <p><i>When I was listening to it I also began to try to list the different topics she was saying; I counted them with my fingers.</i></p>
Level 2	<p><i>[The speaker] made a movement, like this, she showed this part, so that helped me to remember something about the structure of... the bone structure of dinosaurs. That was an important, key element, so I could use that.</i></p> <p><i>There I was trying to put into words what I saw, the movements of her hands when she was explaining that difference.</i></p> <p><i>I closed my eyes and I... I don't need to see her at all, she's not giving me much, anyway. There's no body language that helps.</i></p>
Level 3	<p><i>I have some prior knowledge about this topic. In school, we are taught about these layers, the Earth, the Solar System, all about that.</i></p> <p><i>So if you have zero, zero idea about something you try just to give a general idea in this type of situation. Even though you know you are not getting the information you are supposed to be getting, you just give up, because you can't invent, unfortunately.</i></p>

It is thus highly advisable to run a preliminary analysis of the protocol data to identify level 3 verbalizations. As mentioned above, only recall verbalizations help determine cognitive processes that occurred during the task. As Henderson and Tallman (2006) point out, recall

thoughts refer to the immediate past (the task), describe thoughts that occurred during the task, are introspective, and refer to the individual's conscious awareness or "inner voice". The participant may also express views that arise during the recall protocol ("hindsight report"); these verbalizations refer to the present time (the protocol) and usually justify, explain, or provide information about the participant's experience, their beliefs, or the reasons for their behavior now that they are doing the recall. These verbalizations must be excluded from protocol analysis. Table 3 provides examples of these two types of thoughts and linguistic hints that help in their identification. Italics show how recall thoughts are usually expressed in the past tense, while underlined text shows comments generated during the protocol and expressed in the present tense and because of the protocol.

TABLE 3

Examples of recall thoughts and hindsight report

RECALL THOUGHTS	HINDSIGHT REPORT
<i>I got that she said "craters" and she talked about these mountains, hills... But it was difficult to say, didn't know how to interpret that part, because I missed a few words.</i>	[...] I mean, for me, <u>it's hard to...</u> One of the techniques that <u>I have to develop</u> is trying to wait, listen and then reformulate because what I think is if I'm not talking, I'm losing information. Because I'm <u>not doing my job properly, so I have to work on that</u> . But, I think... yeah, <u>I missed some information, and I tried to... say it in Spanish, but now that I listen I should have waited a little bit longer and try to reformulate because I think it wasn't that hard.</u>

As mentioned above, stimulated-recall studies require a carefully written script of the task instructions and probing questions from the researcher. However, it is reasonable to expect involuntary slips or deviations from the script during the recall protocol. In interaction, a researcher may inadvertently finish a participant's sentence or direct the attention to a specific aspect of the task or performance. These interventions—and the subsequent interaction from the participant—should be excluded from the analysis. The examples in table 4 show interventions that compromise data validity as they direct the participant's attention to a certain idea or process, and this necessarily diverts the participant's recall of thoughts that occurred while performing the task. In the first example, the researcher interrupts the participant's recall and finishes the sentence. In the third example, the researcher intervention directs the participant to initiate elaborative and explanatory comments. These verbalizations do not correspond to thoughts that occurred while performing the task. Depending on the length of the protocol, one intervention may compromise an entire protocol. Researchers may question the validity of the protocol if these interventions make up more than a certain threshold of a participant's data (e.g., 20%) or if they occur at the beginning of the protocol. If researcher interventions compromise data validity, then the entire protocol may be excluded from the analysis.

TABLE 4

Examples of researcher interventions

TYPE OF INTERVENTION	EXAMPLE
Finishing participant's sentences	<p><i>Researcher: I noticed again that you almost didn't move while you were watching the video. But ...</i></p> <p><i>Participant: I was just...</i></p> <p><i>Researcher: Focused?</i></p> <p><i>Participant: Yeah.</i></p>
Asking the participant to focus on specific information	<p><i>Researcher: Remember to pause it and remember to focus on the comprehension process.</i></p>
Researcher intervention leads to elaborative and explanatory comments	<p><i>Researcher: When you heard one of the ... One of the words about parts of the plant, I think you mention "angio...". When you heard that word, did you have any problems?</i></p> <p><i>Participant: No. There's some words and ... It's very important to have a Latin background.</i></p> <p><i>Researcher: Ok, so you heard it and automatically said...</i></p> <p><i>Participant: Although I couldn't associate it with the first at least, you can associate with the structure of the Latin word. It's not difficult to associate that structure, declination, etc... The second, "fungus, fungi" is a known word.</i></p>

3. Conclusion

This article aims to contribute to the research community in interpreting studies to increase the robustness of research designs and results in retrospective studies using stimulated recall. The literature review shows that although these methods require careful design and application, there is wide variation in their implementation across studies in our field. For that purpose, we present a series of strategies to support researchers in the methodological decisions they need to make when designing and implementing a research project that involves retrospection, like establishing the task length and delay of retrospection, the type of stimulus to use as prompt, limiting the researcher-participant interaction, and preparing data for protocol analysis.

These strategies should contribute to strengthening the validity and generalizability of research findings. Reliable methods applied consistently across studies increase research's internal and external validity, thus enabling reproducibility and generalization. This will ultimately contribute to the advancement of knowledge in our discipline.

The limitations of retrospective techniques are also acknowledged in the literature. Whether concurrent, retrospective, cued, or uncued, verbal reports access only to the conscious, controlled processes while still active in the participant's mind. Therefore, the accuracy and informativeness of verbalizations will depend on factors beyond task design and procedure (Gumul, 2021). Individual factors, like a participant's level of metacognitive awareness, personality, and willingness to express their thoughts to a researcher, also play a role in the quality

of protocol data. Also, even if the recall is conducted immediately after the task, the memory structures accessed by the task may not relate directly with the task that just occurred as participants may recall their own processes inaccurately (Gass & Mackey, 2017).

However, when rigorously applied, retrospective techniques like stimulated recall can provide the interpreting research community with a vast amount of valid and reliable data about the conscious operations and contents of memory that come into play during the interpreting process.

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5. Annex 1

TABLE 1

Review of procedures followed in retrospective studies in interpreting research. Legend: RP: Retrospective protocol; ST: Source text; TT: Target text; n/r: not reported

STUDY	PROCEDURE	STIMULUS	RESEARCHER INTERACTION	INSTRUCTIONS TO PARTICIPANTS	TASK LENGTH (MIN)
Ivanova (1999)	Interpretation + recall of ST + RP (English-Bulgarian)	Transcript of ST	Limited intervention, retrospection initiated by the subject	Asked to read the text segment by segment and try to recall everything about the thoughts that occurred to them in the course of the interpreting task	~4,5
Vik Tuovinen (2002)	Interpretation + retrospective comments (Swedish-Finnish)	ST recording + TT recording + ST transcript	Limited intervention (stop and play the tape)	Asked to stop the tape whenever they want to comment on it	7
Napier (2004)	interpretation + retrospective report with prompt + retrospective interview (English-ASL)	video of interpretation task	Playback of video, asking questions, taking notes	If omissions were noted, participants were asked to explain why they thought the omission might have occurred	30

Gumul (2006)	interpretation + retrospective session x2 (English-Polish)	dual-track recording of ST + TT	n/r	Asked to listen to the dual-track recordings and make comments whenever they felt they expressed something more explicitly than it was articulated in the source text	25
Bartłomiejczyk (2006)	interpretation + retrospective session x 2 (English-Polish)	dual-track recording of ST + TT	Limited intervention (answering questions or solving technical problems)	Asked to listen to the dual-track recording and try to remember what they had thought when interpreting the text	>7
Chang and Schallert (2007)	Interpretation + retrospective interview x4 + general interview (English-Chinese)	ST transcript + dual track recording	Provided prompts about hesitations, mistakes, or behavioral cues observed during the task	Asked to comment just whatever was on their mind when they were interpreting	n/r
Dimitrova and Tiselius (2009 - 2014)	interpretation /translation + retrospective interview (English-Swedish)	ST transcript	n/r	Asked to do retrospection	9.5 (int); n/r (trans)
Tiselius and Jenset (2011)	interpretation + RP (English-Swedish)	ST transcript	Limited intervention (sat behind the subject but not too close)	Asked to read the text segment by segment and try to recall everything about their thoughts in the course of the interpreting task	9.5
Díaz and López (2016)	interpretation + retrospective interview (English-Spanish)	ST transcript	n/r	Asked to reflect aloud about their performance, indicating problems found and their solution	10
Arumí Ribas and Vargas-Urpi (2017)	Interpretation + retrospective interview (Chinese-Spanish/Catalan)	Roleplay scripts	Semistructured interview	Asked to self-assess, explain their feelings, identify problems and solutions	5

Shamy and de Pedro Ricoy (2017)	interpretation + retrospective interview (English-Arabic)	ST video	Limited intervention (to reply to questions).	Statement about the purpose of exercise and explanation of the procedure	10
Tang (2018)	interpretation + retrospective interview x2 (English-Chinese)	ST transcript + TT recording	Asked stimulation questions	Asked to do the retrospection about their interpreting process while they were listening to the recording of their products and referring to the transcript of the source speeches simultaneously	7
Herring (2019)	Simulation of interpreter-mediated interaction (English-Spanish)	Outline of the main points of the interaction, probing questions	Handed participants written instructions, asked probing questions	Asked to share everything they remembered thinking during the interaction	n/r