Investigating Cognitive Processes in Foreign Language Learning: Use of Introspective Measures

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Abstract.-

Findings in foreign language research are dependent on the data elicitation measures that the researcher selects in order to answer the target research questions. The present article provides a detailed account of the different introspective measures that researchers commonly opt for to collect data about learners’ learning processes, which are unobservable. The focus will be placed on various methods, like verbal reports and stimulated recalls. In addition to describing the procedures for every elicitation measure, the researcher reviews some of the studies that used such tools. The aim is to provide researchers with some insights into how effectively they can have access to learners’ internal thought processes. This will help in adjusting teaching practices according to learners’ needs.

Key words-
research, cognitive, foreign, learners, introspection
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1. Introduction

Research is a way of finding out answers to questions. Language research seeks to answer the following two questions: what knowledge do learners have of the foreign language? how can that knowledge be internalized, organized, and used by learners? (Gass and Mackey 2005). The most important point at this level is that the cognitive processes underlying learning are not observable. All that is observable is what a learner produces, either in writing or in speech. therefore, one of the major concerns of researchers has been the search for methods that enable them to tap the internal, unobservable, mental operations involved in internalizing, storing, organizing, and retrieving the target language. This article first addresses some of the basics of foreign language research. Then, it highlights what
elicitation measures are usually employed to investigate learners’ unobservable processes. Finally, it explores some studies that relied on using introspection to find more about language learning.

2.- Some principles of research methodology

The present section highlights some practical suggestions for researchers, as suggested by (Mackey and Gass, 2005). This is summarized in the following diagram.

![Fig 1. Some elements of research](image)

The first step of any research is the identification of research questions. These latter need to be current and interesting, in order not to find oneself falling into a ‘so what’ response to the investigation. When generating research questions, researchers should make sure to keep them narrow so that they can be answered. Broad questions should be broken down into smaller questions.
Researchers may come up with research questions from observing learners, reading the relevant literature, the conclusion sections of research articles, or analysis of existing research that may lead to identification of gaps which the researcher finds important to investigate. While research questions are questions for which answers are being sought, research hypotheses are used to express what the answers of the investigation might be. They are based on observations or on what the relevant literature in a specific field suggests.

Another crucial element of research is feasibility, which involves whether or not it will be possible to gather the necessary data using the target sample so as to answer the research questions. Hence, the study should be designed with a thorough understanding of the setting and the population as limitations in these might constrain the investigation.

The researcher can use different data elicitation instruments, such questionnaires, interviews, tests. Each one should cover what it intends to cover. This is referred to as validity. Hence, if the researcher’s aim is to unveil learners’ cognitive strategies, then the methods should include items that represent all the cognitive strategies. The reliability of the investigation depends on the criterion of consistency, i.e. the degree to which the results of the research instruments are consistent. Addressing this issue means answering the question: to what degree the results will be the same if the research instruments will be administered again? Researchers can increase the reliability of their studies through careful planning, piloting, and validating any measures.

Another important principle is referred to as triangulation. There are two types: investigator triangulation and methodological triangulation. Whilst the former involves the use of different observers and interviewers, the latter entails the use of different research tools in a particular study.
A related issue is to what extent can the results can be generalized to a larger population. This is especially the concern of quantitative research. Generalizability is dependent on the sample: larger samples are more representative of the population and, thus, the results can be said to be generalizable. Qualitative research gives more importance to the depth understanding of the target phenomenon. Duff (2006) suggested a strategy that can be used in qualitative research to examine generalizability, which is based on asking the participants about their judgements concerning generalizability/representativeness of the target phenomenon.

Finally, the researcher is recommended to provide enough information about his study to allow other researchers to repeat the study as it was originally conducted. This is referred to as replicability. According to Van der Veer et al. (1994, cited in Mackey and Gass 2005) these replication studies check the reliability of the original results. They are two types of replication: virtual and conceptual (Polio and Gass 1997). Virtual replications, in which everything is copied, are almost impossible, because no group of participants is the same as another one. Conceptual replications which are relatively realistic, require researchers to carefully consider the theoretical claims of the original study.

2.- Research instruments for investigating cognitive processes

So far, there has been a focus on some of the standards of research methodology that should guide and underlie any EFL researcher. As this article’s main aim is confined to ways of investigating the cognitive processes underlying learning, the remaining sections will be addressing the set of research instruments which can be used in such a type of investigation. At this level, it should be first mentioned that the choice of an elicitation measure is related to the research questions asked.
In research on cognitive processes introspective methods are usually employed. Introspection refers to the process by which individuals are helped to report the mental steps they go through when carrying out a task (Dornyei, 2007). Introspection can be through verbal reports (i.e. think aloud and retrospective methods), stimulated recall, diaries, interviews and questionnaires, in addition to uptake sheets. They differ in terms of the time of introspection (before, during, after the task), the form (oral or written), the amount of support to the task (Mackey and Gass, 2005).

2.1. Verbal reports

Verbal reporting involves asking individuals to vocalize what is going through their minds as they are solving a problem or performing a task. Verbal reporting allows researchers to observe how individuals may be similar or different in their ways of approaching foreign language learning. The usual procedure is that the participants are given a task to complete and asked to provide an ongoing report of their thought processes while performing the task. This is referred to as think aloud or online tasks. Retrospective report takes place when the participants are required to verbalize their thoughts after doing the task (McKay, 2006).

Brown and Rodgers (2002) point out that there are two principles that should be adhered to in conducting verbal reports. They are:

1. Time intervening between mental operations and the verbal report should be minimized as much as possible. This implies that students’ verbal report should occur while the task is being processed or after completing the task as soon as possible;
2. Verbalization places additional cognitive demands on the mental processing, which suggests that the researcher should allow his participants to use their mother tongue.

The procedure that can be followed in verbal reporting may include the following steps (Mckay 2006):
1. Familiarising the participants with verbal reports through a practice session. This can be done by having them do a task and asking them to externalize their thoughts. The researcher may model the verbal reporting himself;
2. Checking the equipments which are necessary before undertaking the study;
3. Giving simple and clear directions through telling the participants that they need to say everything they are thinking of, and to imagine that they are talking to themselves about what they are thinking of;
4. Receding into the background during the think aloud, and speaking only when students stop the verbal report by reminding them to think aloud.

2.2.- Stimulated recall

The second type of introspective methods is the stimulated recall. It can be used to prompt the participants to recall the cognitive processes, sometime after performing the task, using a stimulus (Dornyei, 2007). It is based on the assumption that a reminder (visual/oral) of the event will stimulate recall. Hence, stimulated recalls are carried out with some degree of support: audiotapes; videotapes; written products. For example, providing learners with audio or video recordings of themselves speaking. While hearing or watching these stimuli, learners are asked to recall their thought processes.

Mackey & Gass (2005) recommend using this type of data elicitation as soon as possible after the event that is the focus of the recall. This is to increase the likelihood that the data being accessed are from short-term memory. Furthermore, the stimulus should be as strong as possible to activate memory structures, and consequently get reliable data.
2.3.- Diaries

They are also called logs or journals. A diary is an account of language learning experiences which are hidden and inaccessible to teachers (Bailey & Ochsner, 1983). They, thus, provide insights into language learning processes, as well as a second method to be used to achieve triangulation of data. Bailey (1990), Mackey and Gass (2015) recommend the following steps in conducting a study using journals:

1. The learner should provide a detailed account of the target learning experience;
2. Diaries should be studied to find out patterns and significant events;
3. Learners should be encouraged to regularly write on their journals;
4. Some guidelines are helpful to be included, such as the amount of writing for each entry;
5. Learners should be asked to include examples to further explain what they record.

3.4.- Interviews and questionnaires

Cohen (1998) added oral interviews and written questionnaires as approaches that can be used to investigate mental processes, namely language learning strategies. They can be structured, unstructured, and semi-structured. In the first type, learners have to answer a specific set of questions with no elaboration involved. A famous example is Oxford’s Strategy Inventory for Language Learning (1990), which has long been used to investigate the frequency of using different strategies by learners. It uses a five Linker-scale items: never or almost never true of me, generally not true of me, somewhat true of me, always or always true of me. The unstructured formats require the participants to discuss general areas such as “what do you do to learn English?”. In semi-structured interviews and questionnaires, there are specific prompts but the exact
shape of the respondents’ reply is not predetermined by the researcher (Cohen, 1998).

2.5.- Uptake sheets

They are used in order to investigate learners’ perceptions about what is going on in the classroom: what they noticed and learnt (Gass and Mackey, 2005). They are usually given to learners in the beginning of lessons. They are a good source for triangulating data with the researcher’s own observations of the lessons.

3.- Examples of studies

The present section reviews some of the studies that had used introspection in order to investigate language learners’ mental processes. The focus will be on four different investigations. Goh (2002) used retrospective protocols and diaries to investigate listening strategies and tactics as used by Chinese learners of English. The subjects had to listen to listening texts with pauses: at each pause the participant was asked to say how they had tried to understand that part. For purposes of triangulation, the participants were also asked to record their listening strategies in diaries. The results revealed learners’ cognitive (such as inferencing and translation) and metacognitive strategies (such as selective attention) that learners used to understand listening texts.

Barkaoui et al. (2012) used stimulated recall so as to find the strategic behaviours used in speaking tasks by test-takers, in the Internet-based Test of English as a Foreign Language. The participants were recorded while completing each speaking task. Then, they were asked to verbalize their thoughts while watching themselves doing the task. The subjects were also allowed use their L1, and to replay the recording as they wanted. Stimulated recall helped the researchers uncover different types of speaking strategies, including communicative, cognitive, metacognitive.

Krishnan and Hoon (2002) studied learners’ thoughts and perceptions of learning. The purpose was to use such data to improve
teaching. After raising the participants’ awareness about journals and their usefulness, they were asked to record their thoughts and feelings on a daily basis about different issues, such as what they did in the classroom, how they used English outside their classes, if they spoke English and with whom, if they achieved their goals. Researchers found that learners’ journals provided rich data that can be used in order to have a better understanding of what learners want.

Finally, Mackey et al. (2001) used uptake sheets in order to study the language forms that learners could attend to during the lesson. The participants were given uptake sheets in the beginning, for six sessions, in which they had to report what any items they noticed (grammar, vocabulary, pronunciation), who produced such forms (themselves, other peers, the teacher), and if the forms were new to them.

5.- Conclusion

This article has been discussing some of the elements of research, including ways of finding and formulating research questions, generating hypotheses, as well as the different principles guiding researchers (reliability, validity, triangulation, feasibility, generalizability, replicability). Taking all these elements into consideration researchers may carry out investigations of the mental processes underlying language learning, for example studying learners’ strategies in relation to a specific skill (like listening or writing), how students approach specific problem solving tasks, and learners’ thoughts about classroom practices. In this context, introspective elicitation measures appeal to researchers because they are useful tools that assist in uncovering the various cognitive processes which might not be evident through simple observation. The literature in this field recognizes different introspection measures, from which one can choose based on the research questions raised.
6.- References


