On Applying Simultaneous Introspection in Researching Language Acquisition

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Abstract Introspective reports have been long employed in psychology as a valid method of observing and researching human behaviour. However it was only at the time when cognitivism found its way to L2/FL teaching and learning that the employment of introspection was possible and that introspection was treated as a valid and reliable method of research, be it simultaneous, consecutive or delayed consecutive (retrospection). The first studies in SLA carried out by means of introspection in the early 1970s investigated the competence of native speakers and their intuitions about L1, whereas at the beginning of the 1980s introspection studies focused on L2 reception and production. This article quotes examples of a number of studies in SLA, as well as those in which thinking-aloud protocols (TAPs) were used in studying the language processing of multilinguals. However the main aim of this article is to offer a critical insight into the value of introspection for researching multilingualism, together with some guidelines for implementing introspective research methods when studying language learning processes.

1 Introduction to Introspective Methods

Introspective methods have been used in second language acquisition research for over twenty years now. Their use reflects a shift in emphasis from the language product to the process which underlies generation of this product. Introspective reports became empirical tools of measurement of human behaviour in psychology a long time ago, whereas they have gained recognition as a research method in SLA only fairly recently. The development of cognitivism in L2/FL teaching and learning allowed for the introduction of introspection as a valid and reliable

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method of research. The use of introspective methods came into being with the challenge to the hegemony of behaviouristic theory, which explained the mechanisms and structure of cognitive processes of the human mind by stimulus–response formula. Its inadequacy led to a feeling of dissatisfaction among applied linguists and made them look for methods that would enable them to probe the subjects' internal states. Data obtained in those experiments have become fundamental in psychology, although there are still many doubts raised about "the new methods" of introspection, about their being highly speculative and subjective in language research (Gabryś-Barker 1995).

The pioneers of introspective methods began this work at the turn of the 20th century. Most of them used the method to investigate the contents of human consciousness, reducing it to sensory and imaginal components reported on by their subjects. The number of studies undertaken was relatively small and they are now understood to be more anecdotal than scholarly. The first thinking aloud protocols (TAPs), which were assumed to be verbalizations of thinking processes of the subjects, were performed in psychological experiments. They were simply descriptions of what had been said by the subjects and not their actual verbalized thoughts. As a consequence, they were very selective, biased and unsubstantiated. The first protocols were used by Watson and Rayner (1920) to illustrate thinking processes involved in a problem-solving situation. They were very unsystematic and full of interpretative remarks (Gabryś-Barker 2011).

The term *introspection* means to reflect, to look inside oneself. When formalized and applied as a research method, it means to verbalize one's own thoughts and thinking processes. It is the process of externalizing what goes on in one's brain either at a given moment, on completion of a certain action or after a time lapse (Gabryś-Barker 2011). Ericsson and Simon (1984) see verbalized behaviour as a form of human activity that can be explained like any other behaviour by developing a model, this time a model of information processing, which would describe how data is accessed and encoded (verbalized) in response to stimuli one is exposed to at a given moment. What is more:

> Each verbalization is understood as deriving from the cognitive process that underlies it. As a result, verbalization must comply with all the constraints that have been identified for cognitive processes. In turn, cognitive processes consist of a set of sub-processes, which follow one another and are being transformed under the influence of a series of information processes. Information is stored in short term memory (STM—with a limiting capacity of about 15–20 s) and in long term memory (LTM—with permanent storage but slow access time). Information just received is stored in STM and is easily retrieved and articulated at the time of performing a task. (Gabryś-Barker 2011: 122)

Verbalizations are functions of time as they reflect cognitive processes in two ways: either directly, i.e. when the time of the task performance is concurrent with the verbalization or indirectly, i.e. when the information is retrieved from STM or LTM after the completion of the task. The data in both times of verbalizations will not be homogenous because of forgetting and interpretative processes that may occur. Table 1 presents how Ericsson and Simon (1984) describe levels of verbalization processes.

Table 1 Levels of verbalization

Level of verbalization	Description	Comment
VOCALIZATION	Articulation of oral encodings, where no thinking processes take place. In self-directed verbalizations (e.g. in the case of thinking aloud protocols—TAPs), they are individual and depend on the subject's interpretation of the instruction s/he is given or on the semantic content of the task	A direct process in which information encoded is vocalized (articulated), i.e. in a language task a phrase or a sentence is pronounced or read aloud by the subject with no cognitive processes taking place
DESCRIPTION and/or EXPLICATION OF CONTENT	"Labelling" information and recoding it in an idiosyncratic way, characteristic of a subject/informant	Encoded verbalizations where the information attended to by the subject (level 1) is modified by recording processes, i.e. the subject generates a verbal representation of the information s/he has got stored in his/her mind by means of filtering it for the purposes of the task
EXPLANATION OF THOUGHTS	Ideas that rush through the subject's mind or any other, even emotional, reactions to the information (task) s/he is to solve. it involves a process of interpretation	The subject reports his/her ongoing thinking, embracing not only its verbal aspects, i.e. word associations and interferences from L1 and L3 (for example) but also personal, emotional responses to the task

2 Focus of Introspective Research

In an earlier discussion of the object of introspection (Gabryś-Barker 2008) I pointed out that the focus of introspection may be in any of the various aspects of language production the experimenter wishes to investigate. His/her interest may lie in the cognitive structure of the IL (interlanguage) of the informants. In other cases, when for example L2 achievement is to be measured, an affective aspect of a language performance may be in focus. In the case of measuring affective aspects involved in L2 learning, such as motivation and attitudes, introspection becomes a complementary tool to all kinds of interviews and questionnaires. Table 2 presents examples of studies of different aspects of foreign/second language performance where a whole variety of introspective methods and their combinations has been deployed.

The selection of studies in Table 2 is by no means exhaustive, however it is representative of the method as they are either the earliest, the most recent or the best-known studies in different areas of language learning research. Learner-related behaviour described in the studies focuses on:

Table 2 Introspection-based SLA studies

Research focus	Studies
Learning strategies	Stevick (1981); Wenden (1982); Cohen (1984); Yamashita (2002)
Reading in a foreign language	Cavalcanti (1982); Cohen (1986); Bowels (2004)
Translation	Krings (1986); Zimmermann and Schneider (1986); Schneider and Zimmermann (1987); Ronowicz et al. (2005); Schlesinger (2000)
Lexical search	Zimmermann and Schneider (1986); Haastrup (1985); Williams and Hammarberg (1998); Herwig (2001)
Spoken language	Schwartz (1980); Dechert et al. (1984); Cohen and Aphek (1981); Faerch and Kasper (1987)
Writing in a foreign language	Raimes (1985); Beare (2001); Sachs and Polio (2007); Wang and Wen (2002)
Language transfer	Dewaele (2001); Jessner (2003); Gabryś-Barker (2005)
Pragmatics	Kasper and Rose (2002); Liu (2006); Taguchi (2008)
Language awareness	Tomlin and Villa (1994); Leow and Bowles (2005)

(a) the way learners attend to language input they are exposed to when performing a language task
(b) the way they arrive at spoken utterances (the process of speech production)
(c) the way the text is being processed (reading comprehension, the reading process in L2 itself)
(d) the way the text is being generated (the writing process)
(e) the way lexical items are learnt at the stage of input (inferring and guessing using other languages or other compensation strategies)
(f) the way lexical items are retrieved from memory (the use of recall strategies).
   (Gabryś-Barker 2011: 132)

More recently simultaneous introspection has also been used in studying multilinguality. The research projects presented in Table 3 are examples of my own studies on multilingual mental lexicon and lexical processing in trilingual language acquisition/learning. Research issues were explored with the aid of simultaneous introspection, in which the complexity of multilingual language interaction in the mental lexicon was observed from various perspectives.

The aim of this article is not to elaborate on the findings of the above studies but to comment on the difficulties encountered at different stages of the research when implementing simultaneous introspection as data collection method.

Table 3 Simultaneous introspection in MLA studies

Study	Type of language tasks used	Research focus	Year
Study 1	Cloze task (in L2 English) Translation from L1 (Polish) into L2 (English)	Retrieval strategies of restricted collocations Metaphoric interpretations Psychotypology Learner profiles	1993
Study 2	Translation of the text from L2 (English) into L3 (Italian)	Learner profile (approach to the task, metalinguistic awareness, language transfer)	1995
Study 3	Translation from L2 (English) into L3 (Italian) (English/ Italian)	Language transfer at the level of lexis and syntax Transfer of training Language competence in language transfer	1998
Study 4	Translation from L1 (Polish/ Portuguese) into L2 (English) Translation from L2 (English) into L3 (German)	Lexical search processes Acquisition versus learning Transfer of training	1999
Study 5	Translation (as above)	The influence of the language of input (L1 versus L2) on the TL output Implicit versus explicit processing Lexical transfer	2005
Study 6	Translation (as above)	Inner/private speech Activation of individual languages Levels of metalinguistic awareness	2005
Study 7	Translation of a semi-authentic text	Interlingual language transfer in syntactic processing Transfer of training (explicit metalinguistic knowledge) The affective dimension of language processing	2008

Source Gabryś-Barker (2010)

3 Difficulties Encountered and Methodological Recommendations for the Use of Simultaneous Introspection

Implementing simultaneous introspection means first of all following a clearly designed sequence, at each stage of which some methodological and procedural problems may emerge (Table 4).

The difficulties encountered appear at different stages of research in relation to:

- facilitating subjects' performance
- selection of research tasks for verbalisation
- criteria of data classification (objective and focus of the study)

Table 4 Stages in simultaneous introspection

Stage	Objective/focus
1. Training session	To develop the subjects' awareness of verbalizations
	To expose the subjects to sample TAPs
2. Selection of an appropriate task to be performed	To formulate research questions
	To analyze the nature of the task and its degree of openness to verbalizations
	To formulate instructions to the task
3. Preparation of the subjects	To explain the instructions to the task
4. Performance of the task and simultaneous thinking aloud	To record the verbalizations of individual subjects
5. Transcription of the verbalizations	To produce TAPs of the thinking processes

- TAP coding system
- incompleteness of data.

I will comment on difficulties and problems and recommend possible solutions that can facilitate the use of simultaneous introspection for data collection purposes in researching language acquisition.

4 Facilitating Subjects' Performance (Stages 1 and 3)

First of all, the problems may arise due to the subjects' inability to verbalize caused by their unfamiliarity with this type of task. So it may be assumed that the success of verbalization processes, and consequently the type and richness of data retrieved, are very much determined by the initial training of the subjects. This entails exposure to introspective methods and thinking aloud materials in an overt manner, preferably with discussion and comments. In many cases warm-up exercises are used to attune the subjects to the verbalizations or to give them some initial practice. Such exercises allow the researcher to intervene to help the subjects in their verbalizations by stopping them from lapsing into silence. Some training also constitutes a form of monitoring the subjects before they perform verbalizations proper on their own, without the intervention of a researcher. However, the extent to which pre-training is given should depend on the informants, their personal characteristics and on the nature of the task to be performed.

5 Selection of Research Tasks for Verbalisation: Degree of Automaticity and Reactivity Effects (Stage 2)

Secondly, the type of task selected will or will not be conducive to verbalization. The tasks used in my studies were translation tasks involving different input and target languages.

Translation tasks allow us to use simultaneous introspection successfully, as a written translation is a non-immediate task that involves mostly conscious processing. In other words, it is open to verbalization, as observed in my earlier study (Gabryś 1993).

One of the criticisms of the thinking aloud method points to reactivity as a significant factor in language processing, which means that thinking aloud may disturb and trigger different cognitive processes during the verbalization task. However, as other research shows (Leow and Morgan-Short 2004), reactivity is minimal and cannot be considered a significant factor in distorting thinking aloud as a process.

6 The Criteria for Classification of TAP Data and Coding Systems (Stage 5)

The third area of difficulty posed by the use of simultaneous introspection is the way data is transcribed as a thinking aloud protocol (TAP) by means of an appropriate coding system reflecting the study focus. This needs initially to be determined by clear-cut criteria for the data classification. Table 5 presents a simplified coding system.

Once TAPs have been transcribed, the data needs structuring, that is to say, the relevant fragments of the produced script have to be selected. Any researcher using
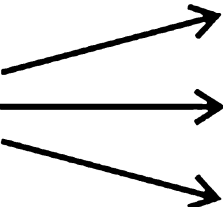
Table 5 A simplified TAP coding system

Coding sign	Description
(0.5)	Five seconds pause in the verbalization
(hm)	Non-verbal manifestations of non-automatized thinking
(aha)	
(oh)	
⟶ (raising)	Raising intonation, questioning oneself about the solution to the problem
⟶ (flat)	Flat intonation, an ongoing thinking process
⟶ (falling)	Falling intonation, an answer/choice is being made

Table 6 The object of introspection as criterion of data structuring

Object (objective)	Examples
1. Cognitive	1. Strategies of recall
2. Affective	2. Comments on success and/or failure of performance
3. Social	3. Asking for assistance in performance of the task
Declarative versus procedural knowledge	Comments on grammatical/lexical rules versus comments on strategies
Modality of language use	1. Verbalized comments versus those in the written text
1. Spoken versus written	
2. Receptive versus productive	2. Comprehension comments versus produced language solutions
3. Combination of the above	
Continuity of the verbalization process versus a discrete research aspect	1. Focus on pauses (as marked in TAPs) in the verbalization processes
	2. Focus only on the researched phenomena, e.g. errors, strategies etc.

simultaneous introspection is aware of major difficulty in the deployment of this type of methodology, i.e. abundance of data which may not only be idiosyncratic but also highly unstructured. However, there are certain procedures which allow us to overcome this obstacle. Faerch and Kasper (1987), the first and most ardent advocates of introspective methods in SLA research, propose the object of introspection (the type of information gathered) to be the main data-structuring criterion (Table 6).

7 Completeness of Data

Simultaneous introspection has certain drawbacks and it is often criticized because of:

- the inaccessibility of certain cognitive processes for verbalization,
- the inconsistency of actual behaviour and verbalization,
- the interfering character of verbalization, i.e. influence on the performance of an informant (reactivity),
- the incompleteness of reports.

However, in the case of translation tasks which are most often used in introspective research, these criticisms and alleged drawbacks become quite irrelevant. In a process of written translation, introspection utilizes information stored by informants in their STM, i.e. information which is still accessible at the time of verbalization. Besides, processes verbalized do not require on the part of the informant any kind of selection, interference or speculation on the language

sample, but straightforward information on what he or she is actually doing at that very moment and whatever thoughts pass through his or her mind.

8 Closing Comment

As mentioned earlier, introspection is often questioned as to its reliability. This is mostly due to the assumed effects of reactivity on verbalization processes. In other words, it is believed that a significant influence is exerted by language on thinking processes and interpretation of these thinking processes at the moment of verbalization. However, studies on validity of simultaneous introspection do not confirm that reactivity occurs in all research contextsppendix (Bowels 2010). Reactivity can be diminished by an appropriate form of informant preparation and training in verbalization. What is more, the higher the level of informant language proficiency for the type of task chosen and the more explicit the instructions to the task are, the more reliable verbalizations are. Available statistical calculations allow a researcher to measure the validity of the introspective method used in a given study as the data collection tool (as demonstrated by Bowels 2010). I would recommend the use of simultaneous introspection, together with delayed introspection (post-task verbalization) and retrospection (for example in the form of a questionnaire or interview), which express the informants' reflection on their own language performance to complement the concurrently received data.

Introspection as a data collection tool, and thinking aloud protocols in particular, can perform different functions under different circumstances. From a cog-

TAP 1	Task: Translation of the text from L2 (English) into L3 (Italian), L1- Polish
Sample data	- *ah—I'll read it first—przeczytam (czyta)* When Albert... I've won the big prize—*kurcze nie wiem—hm hm—czasy—(czyta)* When Albert entered the office- *(pisze)*Quando Alberto—*enter -entrare- entered—entre—o—r—a— entrato in—past definite—czyli simple past—czyli—passato prosimo— entered—(pisze) entrare*—entrato in—*l'oficio—l'uficio—nel'oficio—(pisze)* nel'oficio—*double f—(powtarza) officio–officio-officio...*
Object of analysis	• attendance to input: holistic versus fragmentary
	• the use of metalanguage and consciously acquired rules
	• automatic recall of nominal phrases
	• importance of accuracy in grammar and spelling

TAP 2	Task: Translation of the text from L2 (English) into L3 (Italian)
Sample data	*(reads)* Nobody was working—*to będzie czas ciągly—(powtarza) nobody was working- czas ciągly czyli imperfetto czyli a -work—lavoro- (pisze)* nessun—*tylko czy to będzie tak jak po angielsku—was working—working—liczba pojedyncza—nikt nie pracowal—(pisze)* nessun—*nie wiem czy to bedzie podwojna negation—bo jak w polskim—(pisze)* nessun lavorava—*napiszę-* a tutti impiegati.
Object of analysis	• examples of transfer between L1, L2 and L3 • focus on grammatical accuracy • verbalisation exclusively in L1

TAP 3	Task: Translation of the text from L2 (English) into L3 (Italian)
Sample data	*(czyta)…* were still talking about the lottery—*and—znowu będzie imperfetto- to zreszta podają poniżej—parlare di—parlavano—(pisze)* impiegati parlavano—*vamo—di lottery—lotterija—to bedzie po hiszpańsku—no to ja muszę sprawdzić w slowniku—*loteria—*parlavano di lotteria—czyli będzie (pisze)* della lotteria—*della lotteria.*
Object of analysis	• grammar focus (again) • use of grammatical rules • references to Spanish (L4): perceived language distance

TAP 4	Task: translation of the text from L2 (English) into L3 (Italian)
Sample data	*(czyta)* Jules—*jak to się będzie wymawiało—po włosku—*Jules—*nie—(czyta)* his best friend—*I—il—migliore—miglior—(pisze)* miglior amico—*il suo miglior amico—a jeszcze zapomnialam—(czyta)* impiegati parlavano—*still still—to jest—nie—ancora—nie pamietam—musze sprawdzić—still ancora—nie wiem czemu mi sie skojarzyło z już—yet—still—*impiegati ancora parlavano—*nie wiem czy będzie przed parlavano…*
Object of analysis	• focus on word order (L2/L3 language transfer) • need of assistance (dictionary) in lexical search

nitive perspective verbalizations (TAPs) can be viewed as a window to the cognitive processing of information, by means of which we can find out among other things, about processing strategies, cross-linguistic influences and the language problems encountered by a learner in a given language performance. As such, verbalizations have been presented in this article. However, I do believe that from a socio-cultural perspective, introspection can also be seen as a form of reflection on one's cognition and affectivity and thus a significant learning tool. It allows learners to become more aware of the idiosyncracies in their own learning process, whereas for teachers it may offer guidance on their learners' cognitive and affective profiles.

A.1 Appendix: Sample Think-aloud—Protocols

A.1.1 Study 1: Multilingual Learner Profile (Gabryś-Barker 2011)

A.1.2 Study 2: The Role of the Language of Input in Multilingual Language Processing (Gabryś-Barker 2005)

Source text: *New wine commission for Dão wine* (L2 input)

Yesterday, at the inauguration of Jorge Teixeira as the new president of the Dão Region Vintners Commission (CVRD), in Viseu the Secretry of State for Agriculture and Food, Cardoso Leal, called attention to "the need to develop markets". Jorge Teixeira, who is well-known in the PS, has promised to continue the work started by his predecessor Alvaro de Figueiredo with "aggressive marketing". Jorge Teixeira, as President of CVRD, will now be one of the three representatives to the Government for the cooperatives and private sectors of Dão wine producers. The inauguration ceremony of the new president of the CVRD was punctuated by a speech given by Alvaro de Figueiredo. This ex-member of parliament for the PSD, who many will agree has affected Dão wines profoundly in the last few years, gave a necessarily positive summing up of his actions whilst in charge of the commission. "From the climate of stagnation, the official region has moved on to a situation of technological and commercial development adapted to these modern times", said Alvaro de Figueiredo, who also congratulated himself on the existence of more than 20 producers-bottlers (who produce the already famous "wine from Dão"), six wine centres and the complete restructuring of seven of the ten co-operative cellars of the official Dão Region today.

Task: translation of the L2 (English) input text into L3 (German)

Think-aloud protocol (an sample of the transcription):

(reads) at the inauguration of Jorge Teixeira as the new president—hm—of the Dão region Vinters Commission—ok—Gestern wahrend—hm—não sei—die Inauguration—I don't know—Inauguration—von Jorge Teixeira als—als- dativ- no accusativ—als(..) als(..) what—so, als neuen -não- eh- Present—hm—der komition—how should I know- der komition des Vitners Dão Gegend (laughter)— hm—CVRD—komma- in Viseu der- hm- der what- what's he called—Stäats hm Sekretar für Landwirtschaft und Essen- essen—ok—und essen- Cardodo Leal (.x) so where was I—Landwirtschaft und Essen cardoso Leal—call attention (twice) must nach (laughter) hm- I don't know- hm- called attention—Attention -nein— pass auf—nein- (.x)- pointed out- called attention (laughter) say it the other way— hm- hat gesagt das es war -ne es ist (.) sehr wichtig -hm-neu—como se escreve— how do you write neu—neu markets—I don't know—neue—neue- kaufen Platz— Platze—Kaufen platze -zu bauen oder so was (.3) so (reads) Jorge Teixeira who is well known in—der—den—hm- I don't know—der—well known—is important— hm- recognized—hm—den—berühm in PS ist (reads) has promised to continue the work (.) promised—God—promise—verspr spre—versprachen—ok—Jorge

Teixeira hat versprechen—ne—hat—has promised to continue the work started by his prede- hat versporchen—das ein—die werk—main dein sein sein—predecessor whatever—I don't know how to say that—die werk sein—hm—weiter fuhren—hm- hat versprochen—das die werk sein- etwas—wieter führen—wurde (.) werde wurde werden nein—dass es die werk sein predecessor wieterführen—werd wird—no it is past—has promised to continue—present perfect—to continue the work started by his predecessor—hm (writes) die werk sein predecessor weiter fuhren—let's say wird—oh I forgot something here—hat versprichen—dass es die werk sein (.3) predecesor (.) Alvaro de Figueiredo weiter führen wird mit (laughter) aggressive marketing—right—I don't know—it is probably marketing in German as well—mit aggressive—stark—mit stark marketing (twice)—it's international—isn't it—hom predecessor (laughter) Jorge Teixeira again—als Präsident—der den die—how should I know—Komition die probably—als Präsident (.1) CVRD (reads) will now be one of three representatives (.1) hm (.1) wird jetz ein der—ein oder—ein der (.10) where was I—I lost myself—where am I—will now be one of the three representatives—ein der drei—drei drei—representatives don't know—für die regierung—regierung—I don't think it is Regierung—whatever—God—für die regierung—für die cooperatives—und privat Sektoren (.1) hm producers—I don't know Produktoren -so für die cooperatives and private (.4) oh—für die—hm—und privat Sektoren der—I don't know—der Dão Wein Produktores -(reads) the inauguration ceremony—ceremony—ceremony—I don't know—Zeremon (laughter)the inauguration hm (.1) ersten Tag—I don't know (.1) really really really don't know—let's say inauguration ceremony of the new president of the CVRD (writes) the inauguration ceremony für den neuen Prasident der CVRD. (subject 3).

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