Tracing Cognitive Processes at the Point of Purchase – The Validity of Concurrent and Retrospective Verbal Reports

Abstract

In a 2 (method) x 2 (purchasers vs. browsers) experiment in a store, the validity of concurrent (thinking aloud) and retrospective reports (video-cued thought protocols) on consumers’ in-store cognition was analyzed. Concurrent protocols are more complete, less suspect of fabrication and contain more immediate verbalizations. However, comparing cognitive processes between purchasers and browsers are in accordance with predictions from mind-set theory, thereby indicating that both types of reports can provide valid insights into cognitive processes at the point of purchase.

Keywords: shopping behaviour, point of purchase, process tracing

Track: Consumer Behaviour
1. Introduction

During the last years, consumer research has paid more attention to consumers’ in-store behaviour. The reason is that many purchase decisions are made on the spot, i.e., at the point of purchase (Cobb & Hoyer, 1986; Rook, 1987). But not only do consumers visit stores for purchasing: they spend much time in retail environments browsing and collecting information regarding future purchases, or just for the fun of it (Babin, Darden, & Griffin, 1994; Kalcheva & Weitz, 2006). Hence, understanding the processes that underlie shopping behaviour is important to both marketers and retailers.

Two process tracing techniques have been used to analyze consumers’ in-store cognition: thinking aloud (Payne & Ragsdale, 1978; Titus & Everett, 1996) and video-cued thought protocols (Büttner & Silberer, 2008; Silberer, 2005). Both techniques are based on verbal reports. With thinking aloud, participants are asked to concurrently verbalize their thoughts while visiting a store. These verbalizations are recorded on tape and are analyzed for cognitive processes later on. Video-cued thought protocols are a variant for collecting verbal reports retrospectively: The shopping episode is recorded on video. Immediately afterwards, the video is presented to the participants and they are asked to comment it concurrently with the thoughts remembered from the shopping episode.

The validity of verbal reports has been questioned and provoked research interest within cognitive psychology. In their seminal work, Ericsson and Simon (1993) provide a theory and a review of the empirical evidence. They conclude that verbal reports are useful, given that they are applied properly and that their limitations are kept in mind. However, there is no research on the quality of verbal reports that are collected on consumer cognition while shopping. This paper addresses this issue and seeks answers to two research questions: First, can verbal reports provide valid insight into consumers’ cognitive processes while shopping? Second, are there differences in validity between concurrent and retrospective reporting?

2. Theoretical framework

2.1 Concurrent and retrospective reports

With verbal reports, the major threats to validity are reactivity and nonveridicality (Russo, Johnson, & Stephens, 1989). Reactivity means that the original process is altered by assessing it, i.e., by eliciting verbal reports. Nonveridicality arises when the underlying process does not correspond to the verbalized process. This paper focuses on nonveridicality.

Nonveridicality is produced by omitting or fabricating mental events (Russo, Johnson, & Stephens, 1989). Two major sources contribute to this: impression management (Schlenker & Weigold, 1992) and limitations of the cognitive system (Ericsson & Simon, 1993). Impression management involves tailoring one’s behaviour in order to influence what others think of them. Hence, participants’ reports might be biased towards social desirability (Paulhus, 1991). Social desirability effects will mainly be relevant in sensitive areas of shopping behaviour (Dahl, Manchanda, & Argo, 2001). Given that both thinking aloud and video-cued thought protocols include the presence of an experimenter, no fundamental differences between the two techniques are expected with regard to social desirability.

A major limitation of the cognitive system is that only contents of short-term memory can be verbalized (Ericsson & Simon, 1993). This limits verbal reports to conscious processes and affects concurrent as well as retrospective reports. However, when verbalizing concurrently, executing a task (i.e., shopping) and verbalizing compete for the same cognitive resources; hence, either the execution of the task or the verbalizing might be impaired (Styles, 2006). While an impaired task execution is an issue of reactivity, impaired verbalization produces nonveridicality: the verbal reports are not comprehensive in situations where the execution of the task demands a lot of cognitive resources. This might be alleviated...
by the experimenter encouraging the participants to think aloud. Such interventions, however, have to be nondirective in order not to provoke justifications (Ericsson & Simon, 1993).

Whenever verbal reports are assessed after executing the task, the problems with limited capacity are reduced. However, only information that has been heeded during the execution of the task can be recalled (Ericsson & Simon, 1993). Moreover, some information cannot be recalled although it has been heeded: forgetting occurs. Fidler (1983) provides evidence that retrospective reports are indeed less complete than concurrent reports. Forgetting is basically a problem of recall from memory. Given the crucial role of contextual factors for recalling information from episodic memory (Raaijmakers & Shiffrin, 1992), this problem can be attenuated by providing adequate cues. With video-cued thought protocols, the video of the shopping episode is used as such a recall aid.

In addition, human memory is rather a constructive process than an objective image of the past (Braun, Ellis, & Loftus, 2002). Hence, fabricated mental events might intrude into retrospective reports. Anchoring verbalizations with the video leaves less room for interpretation on behalf of the participants and thus fabrication of mental events will be less likely. Hence, video-cued thought protocols can be assumed to be less prone to forgetting and fabrication than uncued retrospective reports (Guan, Lee, Cuddihy, & Ramey, 2006).

However, the problems of retrospective reporting cannot be eliminated completely by using video-cued thought protocols. Moreover, the problem that only information that has been heeded before can be reported is not addressed by providing recall cues. Hence, the following hypotheses are derived:

**H1:** Retrospective reports are less complete than concurrent verbal reports.

**H2:** Retrospective reports are more prone to fabrication than concurrent verbal reports; i.e., they contain more thoughts that could not have occurred during the original task.

Another difference between concurrent and retrospective reports is the information processing between the original cognitive process and the reporting. Concurrent reporting mainly demands verbal encoding of the cognitive processes; retrospective reporting includes more high-level processes. Hence, concurrent reporting can be assumed to produce more direct access to cognitive processes, whereas retrospective reports are more enriched with other contents of long-term memory, e.g., explanations for their actions.

**H3:** Retrospective reports contain more verbalizations at a higher level of abstraction than concurrent verbal reports.

### 2.2 Mind-sets and cognitive processes

Testing the validity of verbal reports directly is no trivial task because it is nearly impossible to find a criterion for validation that is not based on some other form of verbal reports (Harte & Koele, 1997). This study used an experimental design that manipulated the types of cognitive processes that are prevalent. If the empirical differences in cognitive processes reflect those differences predicted by theory, this can be seen as indicator of the validity of the data (nomological validity).

The model of action phases and mind-sets (Gollwitzer, 1996) served to predict differences in cognitive processes. According to this model, the process from wishes and desires to action can be segmented into different stages. In the predecisional phase the individual is primarily focused on forming an intention by balancing and evaluating different alternatives. This intention is transformed into volition in the preactional phase where thoughts concerning the planning of the action dominate. The action itself is carried out in the actional phase and evaluated in the postactional phase. What makes the model valuable for the purpose of this study is that it assumes different cognitive activities to be more dominant in particular phases as a result of a different mind-set of the individual. In the predecisional phase individuals are supposed to be open-minded regarding new information about
alternatives and process information about their desirability, whereas in the actional phase they avoid a new evaluation of the chosen goal but ensure its realization (Gollwitzer, 1996).

Mind-sets can be linked to shoppers’ motivational orientations. Here, two groups of shoppers can be distinguished: those who come to the store with a clear intention to buy a specific product, and those who come to browse in the store without a particular purchase intention. The two groups should differ regarding the mind set they are in. As the individuals in the purchasing goal group already have the goal of buying a specific product (the reason for their visit to the store), they should be in the actional phase. The browsing goal group can assumed to be mainly in the predecisional phase during their visit to the store. Therefore, the corresponding mind-sets suggest that the browsing group will mainly be concerned with searching and evaluating different alternatives. In the purchasing group, cognitions concerning the realization of goals and evaluation of goal achievement should dominate.

**H4:** Thoughts of purchasers will mainly revolve around the realization of their goal and the evaluation of goal achievement, whereas thoughts of browsers will mainly revolve around perceiving and evaluating product alternatives.

### 3. Method

The study was conducted in a store for electronic and electrical goods that had a medium sized CD department. We applied a 2 (method) x 2 (motivational orientation) between subject design. Motivational orientation was induced by a shopping task the participants had to solve. In the browsing condition, the scenario was that participants wanted to bridge the time before meeting some friends by browsing in the CD department. The task in the purchase scenario was that they had promised their friends to buy a CD as a present for a friend and entered the store for buying this CD; the title was provided in the scenario.

The method conditions were thinking aloud (TA) and video-cued thought protocols (VCTP). In the VCTP condition, participants were equipped with a head-mounted video camera that recorded the shopping episode from their point of view. After the shopping episode, the video was presented on a laptop computer and participants were asked to comment it with the thoughts they remembered. TA participants were asked to verbalize their thoughts during the shopping episode. They were provided with a mobile phone that was connected to a member of the research team. The motivation was to render the task more natural to participants and to provide an opportunity to encourage thinking aloud when participants stopped to do so. TA participants were also equipped with the head-mounted camera that collected both the shopping episode and participants’ verbalizations. Participants (N = 130; M_{age} = 24.7 years; 54 % female) were recruited in classroom and by word of mouth. When arriving at the store, they were randomly assigned to one of the experimental groups.

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
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<tbody>
<tr>
<td>1 Searching / perceiving alternatives</td>
<td>“Ah, the new XY album has been released.”</td>
</tr>
<tr>
<td>2 Evaluation of alternatives</td>
<td>“This CD is too expensive here”</td>
</tr>
<tr>
<td>3 Selection of alternatives</td>
<td>“… so I decided not to buy it.”</td>
</tr>
<tr>
<td>4 Intentions / goals</td>
<td>“Ok, first looking for the XY CD...”</td>
</tr>
<tr>
<td>5 Goal pursuit / problems</td>
<td>“The CD isn’t here, so I have to continue…”</td>
</tr>
<tr>
<td>6 Evaluation of goal achievement</td>
<td>“This has been successful. Shopping is finished”</td>
</tr>
<tr>
<td>7 Orientation</td>
<td>“Where can I go downstairs?”</td>
</tr>
<tr>
<td>8 Mere description of behavior</td>
<td>“Then I went to the Alternate section…”</td>
</tr>
<tr>
<td>9 General explanations</td>
<td>“Usually, I do not shop a lot for CDs”</td>
</tr>
<tr>
<td>10 Related to study</td>
<td>“…I wasn’t aware of the camera anymore”</td>
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The verbal reports collected during (TA) or after the shopping episode (VCTP) were analyzed in the laboratory from the recorded video files. Coding was limited to the episode
that participants spent in the CD department. A student, who was naïve to the research hypotheses, matched each discrete verbalization to one of the established cognition categories (table 1) or discarded it if it did not fit any. The categories 1 to 7 refer to cognitive processes while shopping; the categories 8 to 10 are artefact verbalizations. Moreover, the coder rated for each verbalization whether it was in descriptive (“then I noticed the XY album”), immediate (“oh, the new XY album”) or reflective terms. Verbalizations were rated as reflective whenever they referred to one of the cognition categories 1 to 7 and were qualified by an explanation (“I noticed the XY album because the cover was quite funny”). The resulting categorizations were discussed with the author until consensus was established.

4. Results

Field observation and screening the videos showed that participants complied with the task, i.e., the experimental manipulation. The hypotheses were tested using 2 (method) x 2 (motivational orientation) ANOVAs at an α-level of .05. To test H1, the total number of verbalizations (except the artefact verbalizations 8-10) was calculated for each individual. To control for differences in length of the shopping episode, the sum was standardized by time spent in the CD department (means presented: number of verbalizations per 10 min). Concurrent protocols (M = 48.4) contained more verbalizations than video-cued thought protocols (M = 35.1), F (1, 81) = 11.5, p < .001, \( \eta^2 = .124 \). Hence, H1 is supported. Neither the main effect for motivational orientation, F < 1, nor the interaction, F (1, 81) = 1.38, p = .244, were significant.

To test for fabrication of mental events (H2), the number of verbalizations “general explanations” (standardized by time as above) served as independent variable because those verbalizations represent thoughts that are unlikely to have occurred during the original shopping episode. Concurrent protocols (M = 6.9) contained more thoughts on general explanations than video-cued thought protocols (M = 1.8), F (1, 81) = 21.0, p < .001, \( \eta^2 = .246 \). The finding that VCTP contain more thoughts that could not have occurred during the shopping episode suggests that VCTP are more prone to fabrication of mental events and thus supports H2. The main effect for shopping orientation, F (1, 81) = 1.1, p = .296, and the interaction effect, F < 1, were not significant.

For H3, the relative proportions of descriptive, reflective and immediate verbalizations were calculated for each individual (100 % = an individual’s total number of verbalizations 1-7). On average, 67.7 % of a VCTP participant’s verbalizations were classified as descriptive, 20.8 % as reflective, and 11.3 % as immediate. With TA participants, 4.6 % of the verbalizations were classified as descriptive, 5.9 % as reflective, and 89.1 % as immediate. The mean proportion of reflective thoughts is higher in the VCTP group, F (1, 81) = 25.6, p < .001, \( \eta^2 = .240 \), and the mean proportion of immediate thoughts is higher in the TA group, F (1, 81) = 418.6, p < .001, \( \eta^2 = .838 \); this indicates that VCTP verbalizations are more abstract and thus support H3. No significant results were found for the main effects of motivational orientation and the interaction effects, all Fs < 1.

To test the mind-set hypotheses (H4), the relative proportions of the verbalizations from the categories were calculated for each individual (100 % = an individual’s total number of verbalizations 1-7; Figure 1). A set of 2 (motivational orientation) x 2 (method) ANOVAs with cognition categories 1 to 7 as independent variables demonstrates that the main effects for motivational orientation are mainly in accordance with H4: purchasing participants report more goal-related thoughts; browsing participants verbalize more thoughts on the evaluation and selection of alternatives (Figure 1). Moreover, the ANOVAs yielded no significant main effects for method and no significant interaction effects. This indicates that the validity of verbal protocols is not affected by either using VCTP or TA.
5. Discussion

Overall, the study yielded a number of differences between concurrent protocols and video-cued thought protocols. First, thinking-aloud protocols are more complete than video-cued thought protocols; this is in accordance with results from laboratory research on consumer decision making (Fidler, 1983) and on software usability (Guan, Lee, Cuddihy, & Ramey, 2006). Second, video-cued thought protocols are more prone to the fabrication of mental events. This calls for a thorough cleaning of the data during which those verbalizations suspect of fabrication have to be deleted from the final analysis. Finally, thinking aloud provides a more direct access to cognitive processes, whereas retrospective verbalizations are more elaborated, i.e., they are enriched with further contents of long-term memory. This additional information, however, has to be treated with caution: they could have been constructed ad hoc in the interview situation and might not correspond to the real causes of consumers’ behaviour (Nisbett & Wilson, 1977).

A limitation of these results is that they are based on comparing thinking aloud with video-cued thought protocols. Hence, they cannot provide insight into the completeness and fabrication of concurrent verbalizing. However, the results on cognitive processes and motivational orientation are in accordance with predictions derived from mind-set theory. This indicates that verbal protocols can indeed provide valid insights into the cognitive processes that underlie shopping behaviour. The fact that no differences between the methods in the mind-set results were found, suggests that both types of verbalizations can produce valid data: fabrication can be handled by thoroughly cleaning the data, and lack of completeness does not “invalidate the information that is present” (Ericsson & Simon, 1980, p. 243).

The results suggest that thinking aloud be used when the primary goal is an immediate, direct access to cognitive processes and when completeness of the reports is important. Video-cued thought protocols are more adequate when the focus is more on salient “critical incidents” during the shopping episode than on completeness. They can provide a deeper understanding of the motivational aspects and personal preferences that underlie shopping behaviour. In sum, the results are encouraging for further process tracing research at the point of purchase.
6. References


