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Square but Straight: Measurement Tool Design to Improve Response Task Fluency and Certainty

Alice Audrezet¹ and Béatrice Parguel²

¹Department of Marketing, Assistant Professor, Institut Supérieur de Gestion, Paris, France

²Department of Marketing, CNRS researcher Paris-Dauphine University, France

alice.audrezet@isg.fr

Beatrice.parguel@dauphine.fr

Abstract: The assessment of overall customer satisfaction is an important issue in market research (Haumann et al. 2014, Homburg et al. 2014). After each online purchase, customers are asked to assess the product or service for which they have paid, usually on a five-point rating scales (e.g., Amazon, Trip Advisor). Comparable to bipolar scales, these tools are effective in making a distinction between polarized evaluations (i.e., either strong positivity or strong negativity). However, the literature on methodology reveals serious problems related to the mid-point displayed on these continuums (Kaplan 1972, Thompson et al. 1995). Actually, this mid-point inappropriately aggregates uncertain responses (difficult evaluation) with ambivalent (a combination of moderate to high positivity and negativity) or indifferent (low positivity and negativity) ones, when these different responses have been shown to reflect different attitudes and drive distinct behavioral responses (Yoo 2010, Thornton 2011). The Evaluative Space Grid (hereafter, ESG), developed in psychology by Larsen and colleagues (2009), could help address part of this methodological issue. The ESG comprises a 5x5 grid that measures both the degree of positivity of a stimulus and its degree of negativity within a bidimensional matrix. One dimension of the matrix is dedicated to the measurement of the respondent's degree of negativity ("not at all negative" - "extremely negative"), its degree of positivity ("not at all positive" - "extremely positive"). The combination of the two dimensions allows the respondent to choose which of the grid's 25 cells best describes its evaluation. The ESG has been validated in psychology with respect to unipolar measurement of positivity and negativity (Larsen et al. 2009). Applying the ESG in a service marketing context, Audrezet et al., (forthcoming) have recently demonstrated its relevance to measure overall customer satisfaction. Regarding the practical implementation of ESG, Larsen and colleagues (2009) formulate 2-minute generic instructions before using the ESG, which include the presence of an experimenter to accompany the respondents in their task. However, they do not discuss the extent to which the grid could be easy to use in self-administered surveys. Based on a rapid qualitative study we assume that the ESG could hinder response task fluency, which could negatively affect response certainty (Regier et al. 2014). This, in turn, could potentially be very detrimental to market research as response certainty is a crucial determinant of data and prediction quality (Fazio and Zanna 1978, Antil 1983). The present article builds on previous research to investigate the influence of different formats of the ESG on response task fluency and certainty. To do so, an experiment specifically manipulating the ESG dimension and the presence of verbal labels in the cells was conducted on a sample of 105 undergraduate students. We demonstrate that the use of verbal labels, rather than a reduction in response alternatives, is a promising way to increase response task fluency and, in turn, improve individuals' response certainty. This work advocates for tool design reflection to create responding behavior incentives and reduce survey drop-out rates which is especially challenging within self-administered electronic settings.

Keywords: Attitude certainty, processing fluency, attitude measurement, evaluative space grid, tool design

1. Introduction

The assessment of overall customer satisfaction is an important issue in market research because it is considered a barometer of business performance (Lee and Park 2014) that predicts other key marketing variables, such as profit or loyalty (Haumann *et al.* 2014, Homburg *et al.* 2014). Customer surveys, therefore, generally begin with or include a measure of the overall customer satisfaction resulting from a consumption experience. As an illustration, after each online purchase or booking experience, customers are systematically asked to assess the product or service for which they have paid, usually on a five-point rating scales (e.g., Amazon, Trip Advisor). Comparable to bipolar scales, these tools are effective in making a distinction between polarized evaluations (i.e., either strong positivity or strong negativity). However, the literature on methodology reveals serious problems related to the mid-point displayed on these continuums (Kaplan 1972, Thompson *et al.* 1995). Actually, this mid-point inappropriately aggregates uncertain responses (difficult evaluation) with ambivalent (a combination of moderate to high positivity and negativity) or indifferent (low positivity and negativity) ones, when these different responses have been shown to reflect different attitudes and drive distinct behavioral responses (Yoo 2010, Thornton 2011).

The Evaluative Space Grid (hereafter, ESG), developed in psychology by Larsen and colleagues (2009), could help address part of this methodological issue. The ESG comprises a 5x5 grid that measures both the degree of positivity of a stimulus and its degree of negativity within a bidimensional matrix (see Figure 1). One dimension of the matrix is dedicated to the measurement of the respondent’s degree of negativity (from “not at all negative” to “extremely negative”), and the other dimension is dedicated to the measurement of the respondent’s degree of positivity (from “not at all positive” to “extremely positive”). The combination of the two dimensions allows the respondent to choose which of the grid’s 25 cells best describes its evaluation. The ESG has been validated in psychology with respect to unipolar measurement of positivity and negativity (Larsen *et al.* 2009). Going further, applying the ESG in a service marketing context, Audrezet and colleagues (2016) have recently demonstrated its relevance to measure overall customer satisfaction.

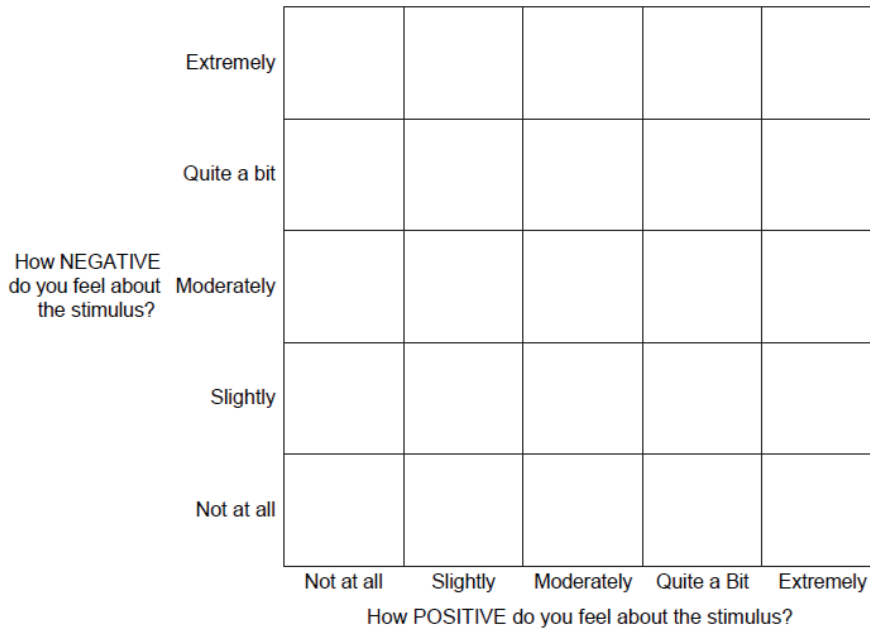


Figure 1: Evaluative Space Grid (Larsen *et al.* 2009)

Regarding the practical implementation of ESG, Larsen and colleagues (2009) formulate 2-minute generic instructions before using paper-and-pencil or computerized versions of the ESG. In both cases, their instructions include the presence of an experimenter to show the grid and accompany the respondents in their task. However, they do not discuss the extent to which the grid could be easy to use in self-administered surveys, which have become the most common mode of administration for customer satisfaction surveys. Yet, a rapid qualitative survey shows that the ESG could disrupt unfamiliar respondents, who may find it counterintuitive to distinguish variables they usually assess on a continuum, difficult to interpret certain zones (e.g., the dissatisfaction axis), and puzzling to face a 25-cell consideration response set. Consequently, the ESG could hinder response task fluency, which could negatively affect response certainty (Regier *et al.* 2014) or the subjective sense that one knows what one’s response should be. This, in turn, could potentially be very detrimental to market research as attitude certainty is a crucial determinant of data and prediction quality (Rucker and Petty 2004, Rucker *et al.* 2014).

To keep the ESG response task fluent, the results of our informal exploratory survey suggest developing starting instructions and offering an experience phase before collecting the assessment. In a less intrusive way, they also suggest that reducing the grid dimension and pre-identifying zones with the adjunction of labels could help the grid’s spontaneous understanding. Although these suggestions appear promising, their relevance remains unknown in the absence of further research. Therefore, the present article builds on previous research to investigate the influence of different formats of the ESG on response task fluency and certainty.

To do so, an experiment specifically manipulating the ESG dimension and the presence of verbal labels in the cells was conducted on a sample of 105 undergraduate students. The next sections present our conceptual framework, experimental methodology, and results. Finally, contributions for academics and practitioners conducting market research alike are discussed.

2. Conceptual framework

2.1 Processing fluency

Processing fluency refers to the ease of executing a cognitive task. This might result from the “perceptual fluency” (Whittlesea 1993, Winkielman *et al.* 2003) of a stimuli to be processed or from the “conceptual fluency” (Mandler *et al.* 1987) of the mental operations to be performed (Tulving and Schacter 1990). More precisely, stimuli that have been previously processed as well as mental operations that have been previously performed are easier (i.e., “more fluent”) to execute. The perception of such ease in the execution of a cognitive task affects judgments and behaviors. Consumer behavior literature highlights that processing fluency can influence individual evaluations of brands, purchase intention, and product choice (Lee and Labroo 2004, Labroo and Lee 2006, Novemsky *et al.* 2007) as well as eating or recycling behaviors (Capaldi 1996, White *et al.* 2011).

Although processing fluency has received a great amount of attention within marketing literature, its potential effects have been ignored by methodological research. In this study, we further extend previous research on processing fluency by suggesting that a fluently designed measurement tool should make the response task easier to execute and increase the respondent’s ability to use it and respond with certainty. The exploratory findings of our informal survey highlight two primary ways to improve the ease of executing response tasks by manipulating the ESG format: (1) a reduction of the ESG dimension and (2) the adjunction of verbal labels in the cells to characterize each response alternative in a clearer way. We examined the literature on the optimal number of response alternatives as well as the effects of verbal labels in measurement tools to construct a conceptual framework.

2.2 Reducing the ESG dimension

The debate regarding the optimal number of response alternatives began conjointly with the widespread use of rating scales (Cox III 1980). On the one hand, respondents may randomly respond when few alternatives are available (Lehmann and Hulbert 1972). On the other hand, as they exhibit limited ability in detecting small stimuli variations (Pollack 1952), respondents may not be able to make sense of too many response alternatives (Green and Rao 1970, Morrison 1972, Hulbert 1975), which results in random response behavior. Based on these two rationales, Alwin and Krosnick (1991) postulate a curvilinear relationship between the number of response alternatives and measurement reliability. However, when comparing various number of response alternatives, from 2 to 11, they only observe a monotonic relationship. These results has been confirmed by Alwin (1997) and Peterson (1997). Yet, as these studies did not consider more than 11 response alternatives, we cannot state that measurement reliability does not decrease beyond this.

Although the literature did not produce a definitive answer, it appears that “the most frequently used rating scale contains seven categories” (Peterson 1997, p. 11) . If we do not really know if individuals are able to discriminate between more than nine response alternatives, then we know from practice that they are used to answering questionnaires in their daily life and, therefore, suggest that they develop competencies regarding measurement tool formats. As respondents more often perform rating tasks on 9- rather than 25-point measurement tools, they should, thus, be more familiar with measurement tools that offer nine or fewer response alternatives, and perceive them as more fluent. Consequently, rating a stimulus on a 3×3 ESG (i.e., nine alternative responses cells) must be more conceptually fluent than rating it on a 5×5 ESG (i.e., 25 alternative responses cells). Based on this development, we formulate the following hypothesis:

H_{1a}: Compared with the 5×5 ESG, the 3×3 ESG results in better response task fluency.

However, as suggested by Cox III (1980, p. 420), “even a few response alternatives may be too many for the respondent if comprehensible instructions and labeling of response alternatives are not included to enable the respondent to conceptualize and respond in spatial terms.” This assertion invites us to explore the literature regarding the potential benefits of using verbal labels to clarify the meanings of ESG’s response alternatives.

2.3 Adding verbal labels in the ESG’s cells

Another way to improve the ease of use of ESGs might be to accompany response process with verbal labels to characterize the meaning attributed to the different response cells. As pointed out by the literature, verbal labels reduce the perceived ambiguity between response alternatives and increase measurement reliability (Zaller 1988, Alwin and Krosnick 1991). Garland (1990) also highlights their influence on a scale’s ease of use.

More precisely, he shows that labeled measurement tools are easier to understand and to complete as they reassure respondents about alternatives' precise meanings. This results in respondents' general preference for labeled measurement tools since verbal labels reduce the cognitive effort.

Applying this rationale to the ESG, an unlabeled format may appear difficult to process for the respondents who have to infer the meaning of those cells by combining the information from the two axes of the grid. On the contrary, adding verbal labels in the cells allows direct characterization of each response cell and implies one less step when executing the response task. This, in turn, should enhance the conceptual fluency of the response task; that is, the ease of the mental operations concerned with stimulus interpretation (Whittlesea 1993, Winkielman *et al.* 2003). We therefore formulate the following hypothesis:

H_{1b}: Compared with the unlabeled ESG, the labeled ESG results in better response task fluency.

2.4 Mediation role of response task fluency on the influence of tool format in response certainty

Working on processing fluency, Song and Schwarz (2008) also demonstrate that an individual's difficulty to read behavioral instructions (manipulated by a modification of font readability) results in barriers to executing the proposed behavior. Simply put, when individuals perceive a message as easy to process, they are more likely to engage in the behavior advocated by the message. Going further, White and colleagues (2011) suggest that the perceived ease of processing a message (namely, a recycling claim) leads to enhanced perceptions in the ease of engaging in the behavior (engaging in recycling). They actually show the mediating role of the ease of executing a cognitive task between a stimulus and one's self-efficacy, i.e., the "belief in [one's] abilities to perform a given action" (van't Riet *et al.* 2010, p. 340).

In this article, we aim to extend this rationale to the domain of response behaviors and suggest that response task fluency should increase the perceived ease of engaging in the act of responding. Indeed, people sometimes have difficulties to access the reasons for holding a given attitude (Wilson *et al.* 1989), meaning that they often lack ready-made attitudes when asked to report them (Hastie and Park 1986). Their attitudes may, therefore, be unclear, resulting in a discrepancy in response certainty. Following White and colleagues' (2011) demonstration of a mediating effect of processing fluency, we postulate that the ESG format will impact response task fluency, thus enhancing respondents' beliefs in their capacities to access their attitudes and finally resulting in better response certainty. We derive the following hypothesis from what precedes:

H₂: Response task fluency mediates the influence of the ESG format on response certainty.

3. Methodology

A between-subject online experiment is conducted to test the hypotheses. It provides three stimuli: the classic 5×5 ESG (the format proposed by Larsen and colleagues in 2009), a 3×3 reduced ESG, and a 3×3 reduced ESG with verbal labels. Figure 2 displays an illustration of two of the experimental stimuli.

The sample consists of 105 undergraduate students of a major university in Paris (mean age = 21 years, 50% women). Within a lab experiment, respondents were randomly assigned to one of the three experimental conditions. Their last visit to their doctor was used to observe the effects of the ESG formats on response task fluency and certainty. The multidimensional nature of patient satisfaction (Sitzia and Wood 1997) justifies the choice of this experimental setting.

After starting instructions to get more familiar with one of the three ESGs under survey, respondents' frequency of visits to their doctor was recorded to control for their involvement with their doctor, which may affect their satisfaction (Cho *et al.* 2004). Respondents then rated their overall satisfaction toward their doctor using the ESG they had been assigned to before assessing response task fluency and response certainty using a seven-point Likert scale. Response task fluency was measured using six items inspired by Lee and Aaker (2004) (i.e., "Using this grid to evaluate my last consultation was... simple/ clear/ obvious/ ambiguous [rev.]/ natural/ complicated [rev.]"). Response certainty was measured using four items borrowed from Petrocelli and colleagues (2007) (i.e., "I am sure that the opinion I have expressed on my last consultation truly reflects my evaluation," "My opinion of my last consultation is clear in my mind"). We checked the unidimensionality and the reliability of response task fluency and response certainty ($\alpha = .93$ and $\alpha = .87$, respectively).

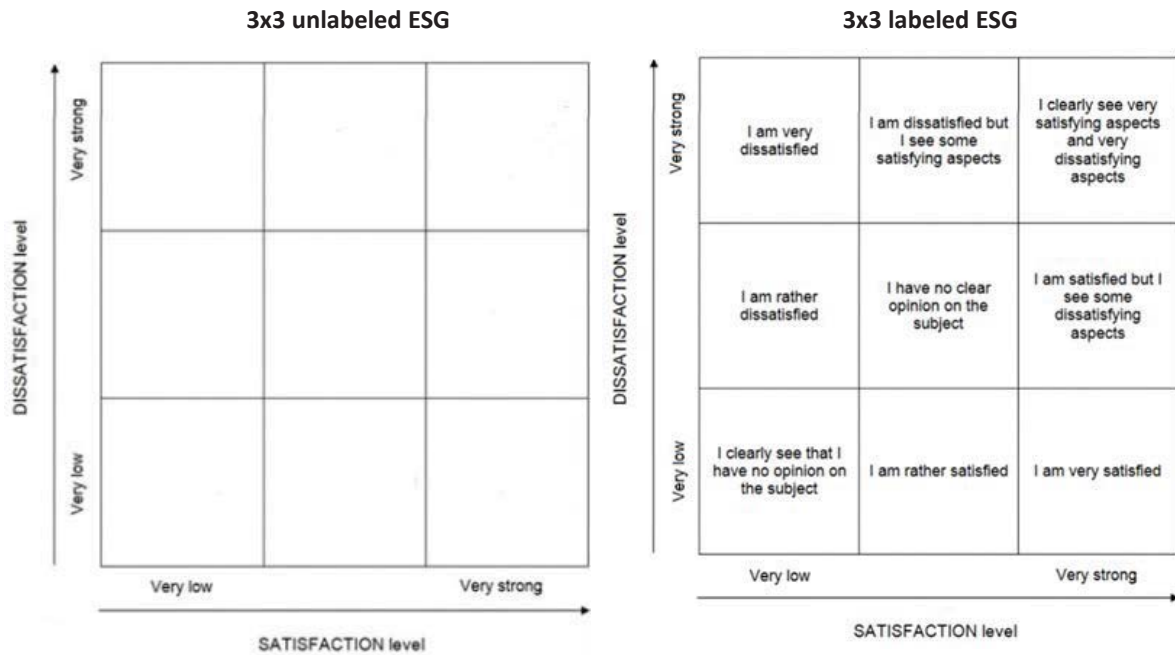


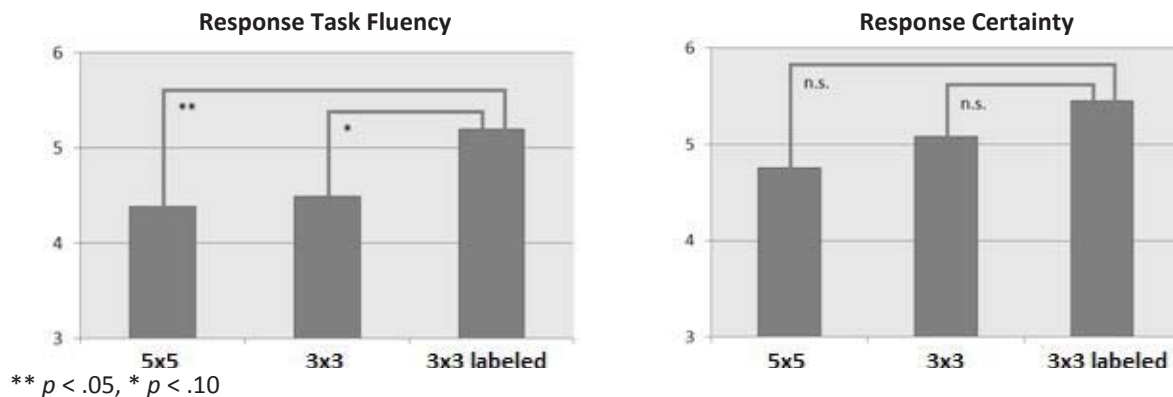
Figure 2: Illustration of experimental stimuli

4. Results

The results are presented in the following manner. First, we present the univariate analysis results and describe the main effects of the different ESG formats that were tested on response task fluency. Second, we delve into the potential mediating role of response task fluency to explain the effects of the ESG format on response certainty.

The first analyses pertain to the relative effects of the different ESG formats that were tested on response task fluency. These effects were tested using analyses of variance (ANOVA), including respondents' frequency of visits to their doctors as a covariate. As shown in Figure 3, the experimental stimuli influenced response task fluency ($F_{(2,100)} = 4.23, p < .05, \eta^2 = .08$) but not response certainty ($F_{(2,100)} = 1.68, p < .20, \eta^2 = .03$). Notably, respondents' frequency of visits to their doctors did not have any significant effect on dependent variables (all $F_s > .40$).

Focusing on the comparison of effects between the 5x5 and 3x3 formats, the results reveal no significant difference in response task fluency ($M_{5 \times 5} = 4.38, M_{3 \times 3} = 4.49; F_{(1,64)} = .10, n.s.$), providing no support for H_{1a} . However, the results show significant differences in the effects of the 3x3 labeled format compared with the unlabeled formats. Precisely, response task is more fluent in the case of the 3x3 labeled format compared with the 3x3 unlabeled format ($M_{3 \times 3 \text{ labeled}} = 5.18, M_{3 \times 3} = 4.49; F_{(1,68)} = 6.78, p < .05, \eta^2 = .09$) and the 5x5 unlabeled format ($M_{3 \times 3 \text{ labeled}} = 5.18, M_{5 \times 5} = 4.38; F_{(1,67)} = 6.94, p < .05, \eta^2 = .10$), thus supporting H_{1b} .



** $p < .05, * p < .10$

Figure 3: Univariate analysis results

To test of the mediating influence of response task fluency to explain ESG format effects on response certainty we followed the procedure proposed by Zhao and colleagues (2010). A bootstrapping procedure with 5,000 samples helped counteract the assumption of normality of the sampling distribution of the indirect effect (ab) as required by the Sobel test (Hayes 2009). For each analysis, the 3x3 labeled condition was coded 1, such that a positive effect of the independent variable on the mediator in the indirect path indicates the effect of the 3x3 labeled format. Mediation analyses also controlled for respondents' frequency of visits to their doctors. The results are displayed in Table 1.

First, when compared with the 5x5 unlabeled format, the 3x3 labeled format exerts a positive indirect effect ($ab = .44$) on response certainty through response task fluency (confidence interval of [.0984; 1.0324]). More precisely, when compared with the 5x5 unlabeled format, the 3x3 labeled format increases response task fluency ($a = .85$), which appears to increase response certainty ($b = .51$). Second, when compared with the 3x3 unlabeled format, the 3x3 labeled format exerts a positive indirect effect ($ab = .29$) on response certainty through response task fluency (confidence interval of [.0545; .6999]). More precisely, when compared with the 3x3 unlabeled format, the 3x3 labeled format increases response task fluency ($a = .68$), which appears to increase response certainty ($b = .42$). Altogether, these results emphasize the role of response task fluency as a mediator of the effects of the ESG format on response certainty, thus bringing support for H_2 .

Table 1: Mediation results

5x5 Unlabeled Format Compared with 3x3 Labeled Format		
Direct Model	Coefficient	T
ESG format → Response task fluency	.85	2.63**
Response task fluency → Response certainty	.51	3.47***
ESG format → Response certainty	.24	.59
Indirect Model		
Coefficient of mediation	.44	
Confidence interval	[.0984; 1.0324]	
3x3 Unlabeled Format Compared with 3x3 Labeled Format		
Direct Model	Coefficient	T
ESG format → Response task fluency	.68	2.60**
Response task fluency → Response certainty	.42	2.63**
ESG format → Response certainty	.12	.34
Indirect Model		
Coefficient of mediation	.29	
Confidence interval	[.0545; .6999]	

*** < .01; ** < .05; * < .10

5. Discussion

5.1 Summary

This study conducted a between-subjects experiment to assess the impact of measurement tool formats on response task fluency and certainty in customer surveys. It proves that the adjunction of verbal labels on the ESG has a positive influence on response task fluency, which actually mediates the relationship between the grid's format and response certainty. No such effects were found when reducing the grid's dimensions.

These findings extend the literature on the use of a bidimensional matrix to assess overall customer satisfaction. More precisely, Larsen and colleagues (2009) have developed the ESG in psychology and Audrezet and colleagues (2016) recently demonstrated its relevance to measure overall customer satisfaction in marketing. In this paper, we go further by testing formats that could be easier to process in an online self-administered context. Similar to the literature, which did not present a definitive answer about the optimal number of response alternatives in rating scales, we did not find any influence on the reduction of the ESG dimension on response task fluency and certainty; that is, respondents do not process the two grid axes separately, but rather as an integrated two-dimensional space. Our findings also support the methodological literature on verbal labels benefits. Taken together, such results have a relatively plausible interpretation linked to the design of the ESG. Although we expected that reducing the grid's dimension would increase response task fluency because respondents are more likely to be familiar with 9 than 25 response alternatives

tools, the grid's unexpected square design may have counterbalanced this potential gain. On the contrary, the adjunction of labels, likely to clarify the meaning of the different response alternatives, provides a real gain in response task fluency, which in turn improves response certainty.

5.2 Theoretical implications

From a broad perspective, this research extends the work on the influence of certain format or design parameters on response rate or data quality (Hu *et al.* 1996, Sheehan and McMillan 1999, Couper *et al.* 2001, Manfreda *et al.* 2002, Deutskens *et al.* 2004). In line with this body of research, we apply a framing effect approach to measurement tool design. We highlight that a small modification of the tool appearance improves the respondents' own belief in their capability to succeed in the response task. In other words, we argue that researchers as well as practitioners might design tools likely to achieve respondents' non-forced compliance to the response task through a positive reinforcement or an indirect suggestion that is easy to use. Thus, similar to other "choices architectures," measurement tools deserve design reflection to create responding behavior incentives or nudges (Thaler and Sunstein 2003).

From a specific point of view, this study extends the application boundaries in marketing of the concept of processing fluency, currently limited to the examination of traditional stimuli, such as pictures, sounds, or commercial messages (e.g. Reber and Schwarz 1999, White *et al.* 2011). This study illustrates how processing fluency can be applied successfully to the market research measurement tools' issues and contributes to the discussion on the measurement of individuals' overall evaluations in market research. More precisely, to analyze responding behaviors issues, we extend the so-called concept of processing fluency into response task fluency, a new variable that may be considered in future methodological research.

5.3 Managerial implications and directions for future researches

From a managerial point of view, response task fluency improvement may be even more relevant in an electronic setting, where respondents usually do not like to spend too much time reading instructions or answering surveys (Dolnicar *et al.* 2011). In light of the dictatorial rule of "five questions, two minutes completion" adopted by market research institutes when developing questionnaires, this new approach offers promising perspectives to address online survey challenges. First, because response task fluency improves the belief in one's ability to succeed in a response task, or self-efficacy, we argue that tool design reflection might offer an interesting way to reduce survey drop-out rates. From this perspective, future research could explore how to improve response task fluency for other existing tools or in the perspective of new tool development. It could also provide avenues for explaining consistent results in the methodological literature. For example, previous research pointed out that enhancing questionnaires with visual element, such as product images is a good way to improve response quality (Deutskens *et al.* 2004). It may be argued that this is because pictures increase response task fluency. More broadly, works on response task fluency could further explore how instruction design could enhance perceived processing fluency so as to initially engage respondents in the task of completing a questionnaire. Second, because response task fluency improves response certainty, reflections regarding a tool's design are relevant to reinforce data quality and, in turn, derive more relevant managerial predictions. As highlighted in previous researches, improving consumer certainty positively impacts consumers' behaviors (e.g. Maier *et al.* 2014). In the context of online data collection, response certainty improvement offers respondents a more comfortable posture, which may again result in a stronger benevolence.

5.4 Limitations

The present study has some limitations. First, we ran this study on a sample of students, although it has been shown that education level impacts response behaviors (Alwin and Krosnick 1991). We actually highlighted that educated individuals (undergraduate students) perceive that it is easier to answer using well-designed tools. Although we could argue that this effect would be even stronger among other profile of respondents because less-educated individuals might be even more influenced by the design of tools, a replication of the results on a more representative sample is necessary to test this. Furthermore, our study is limited to a specific context of evaluation; that is, respondents' last visit to their doctor. We do not expect that this specific context affects the results negatively because the study investigated the effects of tool formats rather than the absolute or relative evaluation of the doctor. Optimally, however, other contexts of evaluation, especially situations likely to generate ambivalence, such as food behaviors or societal issues, should be included to empirically ensure generalizability.

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