



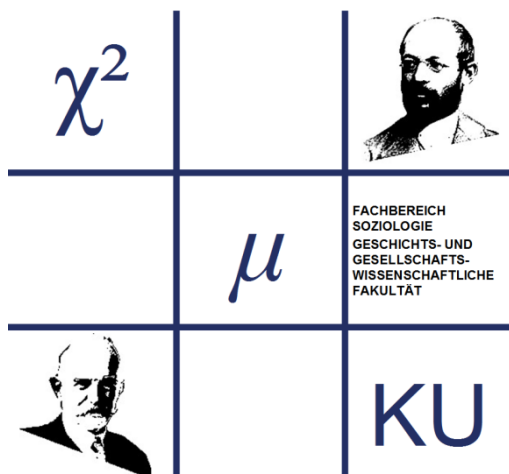
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Abstract:

This study is devoted to an analysis of presentation format differences in factorial survey experiments by the example of fear of crime as conceptualized by broken windows theory (Wilson & Kelling, 1982; Kelling & Coles, 1996). Guided by approaches from the psychology of cognition, we aim at a systematic comparison of aspects of the processing of factorial survey experiments based either on written or visual vignettes. The results of our study show that dropout rates do not differ between presentation formats while processing time and self-reported fatigue are reduced when using visual vignettes.

Keywords:

Factorial Survey, Vignettes, Presentation Modes, Visual Methods

1. Research Problem

Factorial survey experiments in the tradition of Paul F. Lazarsfeld and Peter H. Rossi are used to measure normative judgements, subjective beliefs or behavioral intentions by respondent's answers to a number of brief descriptions of hypothetical situations, persons, or objects, called vignettes (Auspurg & Hinz, 2015). The approach is based on the assumption that vignettes allow to mirror situations of everyday experience, thereby bringing in line individual answers with real-life judgement formation or decision-making. As compared to item-based questionnaire methods, vignettes comprise more detailed and more concrete information on the phenomena meant. It is stated that this leads to a more standardized imagination of the situation across respondents, inducing them to report their true opinions and to provide more valid responses (cf. Shamon et al., 2019). Due to their supposed advantages, vignettes have been increasingly applied in surveys (cf. Mutz, 2011; Wallander, 2009).

Previous methodological studies on factorial survey experiments revealed that, overall, it is still an open question whether factorial survey experiments actually help to improve measurement quality of normative judgments, subjective beliefs or behavioral intentions (cf. Eifler & Petzold, 2019; Petzold & Wolbring, 2018). In particular, the presentation form of factorial survey experiments still needs further clarification. In principle, there are different formats of presenting vignettes within the framework of a survey: The situation can either be described in a written form or presented by visual stimuli, e.g. by videos, photos or pictures. While the majority of studies apply written vignettes (Wallander, 2009), some studies use solely video vignettes (Krysan et al., 2009) or solely photo vignettes (Golden III et al., 2001). Another study combines written and photo information within single vignettes (Havekes et al., 2013). To our best knowledge, only two studies compared observed responses to both written and visual stimuli focusing on video vignettes (Rashotte, 2003; Eifler, 2007). Against this background, our study is devoted to analysing systematic differences between presentation formats of vignettes, in particular between written vignettes and photo vignettes.

We thereby start from the idea that different mechanisms apply when respondents are confronted with either verbal or visual material (Harper, 2002). In particular, the Dual Coding Theory (DCT; Paivio, 1979) allows for a systematic analysis of processing differences regarding verbal and visual information. DCT suggests two coding systems in human memory, one of which responsible for language or verbal information, the other responsible for pictures or non-verbal information. Both systems overlap and can operate simultaneously in principle. Processing verbal and/or visual information generates "internal mental images" (Sadoski & Paivio, 2013, p. 29) which represent information about situations. It is assumed that mental images of situations match experiences

with the same situations (e.g. Kosslyn & Pomerantz, 1977). Both written and visual information about situations is processed by both systems, but each in a different way: Written information is processed sequentially, i.e. by the verbal coding system first and by the non-verbal coding system subsequently; visual information is processed simultaneously by both coding systems at a time (Paivio, 1979; Sadoski & Paivio, 2013). Because of the sequential processing of verbal information, written vignettes can elicit diverging encoding processes by readers, thus leading to diverging mental images between subjects. Because of the simultaneous processing of visual information, photo vignettes facilitate a more standardized perception of the concrete situation without any loop way, thus leading to corresponding mental images of the presented situations between subjects. While verbal information requires more extensive information processing by a reader and more background knowledge, visual information presents the information directly. Accordingly, McCloud (1994) stated that verbal information is perceived, while visual information is received. As a result, photos can be considered to mirror real-life (Manghani, 2013; Rose, 2012) and to serve as a concrete point of reference for all who are confronted with them (Marion & Crowder, 2013, p. 31).

With regard to factorial survey experiments, photo vignettes not only allow for a more realistic presentation of the situations under study but also for evoking the feeling of experiencing the particular situation. While written vignettes facilitate a sequential presentation of information in the form of short stories, photo vignettes present the information simultaneously in the form of pictures, thereby activating visual and verbal mental representations and leading to emotional arousal at the same time.

In line with these considerations, we assume that the presentation of photo vignettes facilitates processing the information presented in factorial surveys. Consistently, we expect reduced dropout rates (H1a), reduced processing time (H1b), and a more positive respondent's evaluation (H2) in a factorial survey based on photo vignettes compared to a factorial survey using written vignettes.

2. Empirical Study

We conducted a split ballot experiment with a between-subjects design for examining presentation format differences in a factorial survey experiment. The study was part of a web survey on attitudes towards safety in public places, conducted at the Martin-Luther-University Halle-Wittenberg, Germany in 2014 (Schwarzbach & Eifler, 2020). The study was carried out as a full population survey of all enrolled students (N=20.000). An overall number of n=1.449 students started to

answer the survey and n=1.086 completed the survey and provided sufficient information. Each subject was randomly assigned to one of the two presentation formats, using either written vignettes (n=714) or photo vignettes (n=735). Table 1 contains the descriptive statistics for the sample.

Table 1: Descriptives

	Frequencies / M	Percent / SD
Presentation mode*		
Written	714	49.28
Photo	735	50.72
Dropout*		
No	1099	75.85
Yes	350	24.15
Interview time (s)**	465.57	236.98
Reported fatigue**		
No	848	78.08
Yes	238	21.92
Respondent's experience**		
Never	50	4.60
One – two times	250	23.02
Often	786	72.38
Respondent's gender**		
Male	388	35.73
Female	698	64.27
Respondent's age**	24.08	5.56
Total	1449* / 1086**	100.00

* Sample started questionnaire

** Sample completed questionnaire

We use written and photo vignettes that describe varying situations of everyday experience according to the Broken Windows Theory for the prediction of fear of crime (Wilson & Kelling, 1982; Kelling & Coles, 1996; Keizer et al., 2014; Keuschnigg & Wolbring, 2015). The two factorial surveys are based on the same 2⁴·3-within-subjects design (cf. Table 1, Appendix) where the dimensions referred to signs of social and physical disorder in urban neighborhoods that had been used in previous studies (Piquero, 1999; Taylor, 1999). A total of 48 vignettes resulted from a full combination of the dimensions and their levels. These were subdivided into six sets of eight vignettes

each and presented to the subjects. Because our focus here is on the differences between written and photo vignettes, we used the aggregated data referring to the respondent's level. For detailed information about the varied dimensions and levels see Table 1 in the appendix. A complete documentation of all written vignettes and their respective visual counterparts is available in the project description (Eifler & Schwarzbach, 2020). Figure 1 shows examples of photo vignettes and their respective written counterparts.

Figure 1: Examples of photo vignettes and written vignettes

Example 1: Photo vignette



Example 1: Written vignette

You are on a wide square. The place is only dimly lit but you will see a sign saying "This area is under video surveillance". The area looks neat and tidy. You realize two teenagers who hang around and drink alcohol. There are some additional adults nearby.

Example 2: Photo vignette



Example 2: Written vignette

You are on a wide square. The place is brightly lit. The area looks neat and well-kept. You see a young couple going for a walk. There are some additional adults nearby.

To evaluate the design's internal validity, it was examined how far the randomization of subjects across the experimental conditions of the split ballot experiment for analyzing presentation format differences of the factorial survey led to a parallelization of experimental groups. As follows from Table 2 (Appendix), there are no substantial differences with regard to the distribution of the respondents' age and gender across the two levels of the split ballot experiments. Deviations in respondents' experience with the situation is minimal. Accordingly, randomization of subjects to the presentation formats, i.e. written vignettes or photo vignettes, led to mostly parallel groups.

The key dependent variable referred to (a) paradata collected in the course of the web survey, i.e. the dropout rate and the required processing time, and (b) evaluation data based on self-reports of the respondents concerning the level of fatigue when completing the respective factorial survey that they had been assigned to. The reported experience with the situation presented to the subjects and their gender were used as control variables. The respondent's age was not introduced as a control variable because the age distribution revealed a high level of homogeneity within the sample (cf. Table 1).

3. Results and Conclusions

Die All analyses were based only on those subjects who indicated that they could imagine themselves in the situation that is presented in the vignettes and to whom the factorial survey appeared as realistic.

With regard to the dependent variable measured by means of the factorial survey, most subjects reported a lower level of feelings of safety in public places (cf. Table 3, Appendix). A comparison between formats revealed no relevant differences between presentation formats. This reflects that both formats stimulated similar responses on the aggregate level, i.e. across all vignettes.

In order to test our hypotheses regarding presentation format differences, three regression models with presentation format as independent variable and the dependent variables dropout rate, processing time and respondent's self-reported fatigue have been calculated using respondent's gender and experience with the presented situations as control variables. The respective average marginal effects (AMEs) for the three regression models (M1-M3) are reported in Table 2.

Table 2: Regression models: Effect of presentation format on dropout rate, processing time and respondent's fatigue

	Model 1	Model 2	Model 3
	Dropout rate	Processing time	Respondent's fatigue
Format: photo (ref. written)	-0.0346 (-1.54)	-53.61*** (-3.81)	-0.185*** (-7.72)
Respondent's age		0.290 (0.22)	0.00695*** (3.31)
Female respondent (ref. male)		10.59 (0.75)	-0.0597* (-2.41)
Respondent's experience (ref. never)			
One – two times		-20.53 (-0.66)	-0.0381 (-0.64)
Often		5.365 (0.17)	-0.0248 (-0.44)
<i>(Pseudo) R²</i>	0.0015	0.0133	0.0664
<i>AIC</i>	1603.8	14953.8	1077.7
<i>BIC</i>	1614.4	14983.7	1107.7
N	1449	1086	1086

t/z statistics in parentheses

Model 1, 3: Logistic regressions; predicted values (AMEs); robust SE

Model 2: Ordinary least squares regression; predicted values (AMEs); robust SE

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

It follows from Table 2 that no differences regarding the dropout rate occur between presentation format (AME=-0.035, n.s.). Overall, the dropout rate is with 24,15% relatively low in both formats as can be taken from Table 1. Accordingly, our results do not support hypothesis 1a which stated that respondents of photo vignettes are less likely to dropout the survey. As for the processing

time, a significant effect of the presentation format is revealed ($\beta/\text{AME}=-53.61$, $p\leq.001$). The results indicate that respondents who receive photo vignettes need about 54 seconds less time for processing the factorial survey compared to respondents who receive written vignettes. It can be concluded that photo vignettes ease the cognitive processing of the depicted information such that this information can be retrieved more quickly from memory. Accordingly, hypothesis 1b is supported by our results.

With regard to respondent's self-reported fatigue, hypothesis 2 referred to the assumption that respondents do easier and report less fatigue when processing photo vignettes as opposed to written vignettes. It can be taken from Table 2 that our results support this assumption. The probability that respondents get tired in the course of processing the factorial survey, is reduced by about 19% on average when respondents go through photo vignettes instead of written vignettes ($\text{AME}=-0.185$, $p\leq.001$).

Overall, we interpret our results as pointing towards the advantages of using photo vignettes in factorial surveys. This applies to the reduced processing time and to lower feelings of fatigue in the course of the survey when using photo vignettes instead of written vignettes. A lower responding time additionally should lead to a higher concentration and commitment of respondents in the course of the survey. Because no differences between the presentation formats occur with regard to dropout rates, the present study does not indicate that factorial surveys based on photo vignettes would be superior with regard to respondent's willingness to participate. Our results also leave questions of data quality when using different presentation formats of vignettes open. Further studies will have to show whether photo vignettes might facilitate less socially desirable responding. Finally, it must be considered that for using photo vignettes the interested situation needs to be visually displayable.

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