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READERS' BACKGROUND CHARACTERISTICS AND THEIR FEEDBACK ON DOCUMENTS: THE INFLUENCE OF GENDER AND EDUCATIONAL LEVEL ON EVALUATION RESULTS

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ABSTRACT

What is the influence of demographic variables such as gender and educational level on the reader feedback collected under the plus-minus method? To answer this question, an analysis was made of the problems detected in four public information brochures. The average amount of feedback per participant did not vary among the four brochures, but the severity of the problems did. Male participants mentioned more problems than female participants, but the problems detected by female participants were on average more severe. Highly educated participants detected more problems than participants with a lower level of education. No differences in problem types mentioned were found between male and female participants, and only one difference was found between the two educational levels: Highly educated participants focused more strongly on the structuring of information. In general, brochure characteristics had more effect on the types of feedback collected than the two demographic participant characteristics.

In the wake of the increasing practical interest in evaluating documents, a methodology of document evaluation is gradually being developed. The growing body of methodological research has resulted in the availability of a great variety of evaluation methods (and variations on methods), some preliminary insights about successful and less successful evaluation approaches, and a growing awareness

of uncertainties and questions that need to be answered [1, 2]. Most of the research literature available focuses on the effects various data collection methods have on the quality and nature of the feedback collected. An equally important but as yet very underexposed research issue concerns the way participants' background characteristics affect the feedback they give. This factor may interact with the type of method that is used. It is conceivable that, say, the participants' educational level would have different effects under methods engaging participants as self-reporting evaluators than under methods observing participants in a realistic use situation.

So far, only three studies can be found that explicitly address the way participants' background characteristics affect the feedback they give on documents. In the context of instructional design, Wager carried out a small-scale study comparing the feedback of learners with different levels of aptitude [3]. She investigated the nature and usefulness of feedback given by three low-aptitude students, three high-aptitude students and a mixed group of three. The low-aptitude students identified more basic problems in the learning materials (e.g., problems with words), while the high-aptitude students were better able to pinpoint inadequacies and provide supplementary instructions. The mixed group provided the greatest variety of feedback. In a follow-up experiment, Wager found a revision on the basis of the mixed-group results to be the most effective. However, the number of participants in the three aptitude conditions was so small that the results may have easily been biased by the peculiarities of the individual participants.

In the context of questionnaire pretesting, Diamantopoulos, Reynolds and Schlegelmilch conducted an experiment to explore the influence of participants' expertise in questionnaire design and their prior knowledge on the problems detected in questionnaires [4]. Two groups of participants were recruited for this study: students who had and students who had not followed a course on questionnaire design. The prior knowledge of the (British) participants was manipulated in the questionnaire: the "high prior knowledge" group received a questionnaire about British political affairs and the "low prior knowledge" group received exactly the same questionnaire about the Spanish situation. Both expertise and prior knowledge appeared to facilitate the participants' ability to identify problems in the questionnaire, and there were no interaction effects. Questionnaire expertise was particularly helpful to detect problems with respect to ambiguous questions, leading questions and missing response alternatives. Prior knowledge facilitated the detection of double questions and, again, missing response alternatives. In a follow-up experiment by Reynolds and Diamantopoulos, however, the overall positive effect of prior knowledge was not confirmed [5]. It appeared to be helpful only for detecting problems with double questions.

All in all, little is known yet about the influence participant characteristics have on the feedback collected on documents. The only thing that can be safely concluded is that the background characteristics of participants seem to matter.

Similar conclusions can be drawn from adjacent research in the area of comprehension monitoring among adult readers [6]. Readers with high verbal ability appear to use more "evaluation standards" in their assessment of text quality than lower-ability readers—i.e., they involve a greater variety of criteria in their evaluation—and are especially more inclined to attend to high-level text features in their evaluation activities. A complementary line of thought is provided by Hayes, who experimentally demonstrated the existence of a so-called "knowledge effect" [7]. Prior knowledge regarding the topic of a brochure may have a detrimental effect on the readers' ability to pinpoint vague, incomprehensible or incomplete information in a text.

In this article, we try to contribute to this discussion by reanalyzing the feedback we gathered on public information brochures using the plus-minus method and an additional questionnaire. The plus-minus method is a troubleshooting and self-reporting evaluation technique in which target readers have to evaluate rather than use a document [8, 9]. Participants are asked to read the document and put pluses and minuses in the margin for positive and negative reading experiences, respectively. In a subsequent interview, they are asked about their motives for all pluses and minuses. This results in a list of potential reader problems, which forms the input for revision. The aggregated feedback on brochures appears to be valuable input for a revision, leading to higher appreciation and often to an increased effectiveness [8]. In our analyses, we will zoom in on the origins of the feedback. Three factors are included: the brochure evaluated, the participants' gender, and their educational level. Our main research question is: To what extent can the feedback of "plus-minus" readers be ascribed to textual factors (the brochures evaluated) and to general demographic factors (the participants' gender and educational level)?

DESIGN OF THE STUDY

Our analyses concerned the reader feedback we collected on four brochures. The brochures were evaluated under similar methods by readers from the target audience. The exact composition of the samples was determined in consultation with the public information officers responsible for the brochures. Below, we will discuss the independent and dependent variables used in this study and present our research hypotheses.

Independent Variables: Brochures, Gender, and Educational Level

Three kinds of independent variables were used in this study, one regarding the brochures that were evaluated and two regarding the participants' background characteristics.

The four brochures included in this study were Dutch public information brochures on various topics. Two of them were informative. The brochure entitled "Rent Subsidy" provided information to tenants about rent subsidies available to those whose expenditure on rent is higher than a recommended proportion of their income. The second informative brochure, entitled "Victim Aid: You Have a Right to It," informed victims of crime, traffic accidents and discrimination about the emotional and practical assistance available, and about the possibilities of receiving compensation for material or immaterial damages. The other two brochures had overt persuasive aims, and focused on the younger segment of the population. The brochure "Do You Know? Do You Care? The Ten Most Asked Questions about Alcohol" was intended to urge young people to use alcohol in moderation, by providing them with factual information about the risks of alcohol abuse. The other persuasive brochure, "Safe sex or no sex," warned young people of the risks of AIDS and other sexually transmitted diseases, and informed them about safe and unsafe sexual behavior.

The four brochures were all evaluated with the plus-minus method and an additional questionnaire. The two informative brochures were evaluated by 30 readers from the target audience, the two persuasive brochures by 35 target readers. Table 1 gives an overview of the number of male and female participants in the study. Although the male-female ratio differed per brochure, overall, the participants were quite evenly spread over the two genders.

With regard to educational level, two levels were distinguished. Highly educated participants had a college degree or were studying at a university or college for higher professional education. Participants with a lower level of education had attended schools for (lower or intermediate) vocational education, lower general secondary education or primary education. Table 2 provides an overview of the distribution of the participants across the two educational levels. At the request of the commissioning departments, the lower educational level was

Table 1. Number of Participants by Gender

Brochure	Male	Female
Rent subsidy	20	10
Victim aid	12	18
Alcohol	23	12
Safe sex	14	21
Total	69	61

generally overrepresented. About 70 percent of the participants had a lower level of education.

Due to the divergence of target audiences with respect to age—with two brochures aiming at the younger segment of the population, and two at a maximum age range—the age of the participants was not used as an independent factor in our analyses. However, in order to correct the outcomes for differences in age, we used the participants' ages as a covariate in our statistical analyses. To complete the overview of participants in our research, Table 3 presents the distribution of participants across age categories.

Dependent Variables: Number, Nature, and Importance of Reader Comments

The effects the independent variables had on the feedback collected can be established on various aspects. We included the number, nature, and importance of

Table 2. Number of Participants by Educational Level

Brochure	High	Low
Rent subsidy	8	22
Victim aid	15	15
Alcohol	5	30
Safe sex	10	25
Total	38	92

Table 3. Number of Participants by Age Category

Brochure	15-25	26-40	41-65	66+
Rent subsidy	7	12	8	3
Victim aid	6	11	6	7
Alcohol	35	—	—	—
Safe sex	29	6	—	—
Total	77	29	14	10

the reader comments in our analyses. Therefore, two additional operations were carried out.

In order to establish effects on the nature of the reader feedback, we categorized all reader comments into problem types. We distinguished between the following problem types:

- *Comprehension:* Readers report problems of clarity and problems with the applicability of information, or with difficult syntax or choice of vocabulary.
- *Acceptance:* Readers disagree with factual information, value judgments or advice, or do not endorse the reasonableness of the regulations described.
- *Relevance:* Readers claim that certain information should not be included in the brochure, or at least could be cut down.
- *Completeness:* Readers ask for more information about the topic of the brochure or for more elaboration on a certain point.
- *Structure:* Readers report problems with the ordering of information in textual units, or with the signaling of the structure (e.g., headings).
- *Appreciation:* Readers simply prefer another formulation but do not mention a problem with comprehension or acceptance.
- *Graphic design:* Readers are critical of the brochure's layout or illustrations.
- *Correctness:* Readers notice a violation of syntax, spelling or punctuation rules.

We independently coded all the reader problems detected in the brochures, so that each reader problem was assigned to just one problem category. The initial coding agreement varied from .72 to .82 (Cohen's kappa). In the event of disagreement, the final classification of a problem was determined in consultation.

In order to establish effects on the importance of the reader feedback, we collected additional data about the importance of the reader problems detected. For each brochure, we asked ten experts—five text and communication experts and five subject-matter experts—to rate the importance of individual problems in a brochure on 5-point scales. The collective ratings of the ten experts formed a sufficiently reliable scale to assess the importance of the reader problems, with Cronbach's alpha ranging between .70 and .80.

First, we investigated the entire set of reader problems without distinguishing between problem types. We focused on the number of problems detected and on the mean importance rating of the problems. Then we explored the nature of the problems by focusing on the problems detected per problem type. Again, we used two comparable criteria in our analysis: the relative frequency of problems mentioned per problem type and the mean importance ratings of the problems detected in a certain category.

Research Hypotheses

Given the lack of substantial and unambiguous earlier research, the research had to be predominantly exploratory. However, some research hypotheses could

be formulated in advance. Below, we discuss our expectations for the three independent variables.

Regarding the influence of the brochures evaluated, both generic and specific differences were expected. We expected generic differences in the nature of the feedback between the informative and persuasive brochures (H1). In the two informative brochures, rather complex information is provided as a service to the reader. Therefore, comprehensibility, structure, and completeness of information were expected to be key factors in the readers' evaluation activities. In the two persuasive brochures, unasked-for information is provided to the readers in order to affect their opinions, attitudes, and behavior. Acceptability, appreciation, and perceived relevance of the information offered could be expected to be of particular interest here. In addition to such systematic differences, there may of course also be differences due to peculiarities of each of the brochures.

Regarding the influence of gender, we reckoned with the possibility of differences in feedback between male and female participants—not only in general terms, but particularly in relation to the topics of the brochures—but we were unable to formulate clear-cut hypotheses in advance about the direction of these differences. So our analysis was entirely exploratory regarding the gender variable.

Regarding the educational level of participants, several hypotheses could be formulated. First, we expected the highly educated participants to mention more problems in the brochures than the participants with a lower level of education (H2). Second, we expected these differences to be clearest for problems concerning high-level aspects of the presentation (i.e., the structuring of information), which require linguistic and metalinguistic skills that are likely to correlate with educational level (H3). The differences were expected to be less clear for problems concerning the content of the brochures. For instance, there seems to be a trade-off regarding comprehension problems. On the one hand, participants with a lower level of education are likely to have more comprehension problems in the texts. On the other hand, highly educated participants will be better equipped to monitor the comprehension problems they encounter and report them. They may even try to judge the comprehensibility for people with a lower level of education ("For me, this is clear enough, but I don't think my cousin would understand this"). Third, based on the literature on comprehension monitoring, we expected the highly educated participants to involve a broader spectrum of problem types in their evaluation activities than participants with a lower educational level (H4). Apart from hypotheses about the numbers of problems detected, there were no reasons to expect any differences in importance of the feedback between the two educational levels.

All in all, only for the effects of brochure and educational level some specific hypotheses could be formulated. The rest of our analyses had to be exploratory. Our research hypotheses are as follows:

H1 The nature of the reader problems differs between informative and persuasive brochures: (a) in informative brochures, readers focus more on comprehensibility, structure, and completeness; (b) in persuasive brochures, readers focus more on acceptance, appreciation, and relevance.
H2 Highly educated participants detect more problems in a brochure than participants with a lower level of education.
H3 Highly educated participants focus more strongly on high-level text features (structure) than participants with a lower level of education.
H4 Highly educated participants incorporate a broader range of problem types in their evaluation than participants with a lower level of education.

RESULTS

Results Regarding the Entire Set of Problems

We will first discuss the analysis of the number of reader problems and their importance ratings within the entire set of reader problems, without distinguishing between problem types. The data were analyzed with an analysis of variance. The results can be seen in Table 4.

The findings regarding the effects of the brochures on the amount of feedback collected suggest that the amount of (self-reporting) reader feedback on a brochure may be more or less constant, regardless of the characteristics (size, quality, topic) of the brochure. Even though the importance of the problems detected varied considerably, as indicated by the effect size, the number of problems mentioned per participant did not differ between the four brochures. The number of problems per participant varied between 9.7 ("Rent Subsidy") and 10.6 ("Safe Sex"), but

Table 4. Analysis of Main Effects for the Entire Set of Problems

	F-value	Significance	Effect size (eta^2)
Brochure			
Number of problems	$F(3,129) = 1.075$	n.s.	—
Mean importance rating	$F(3,129) = 14.274$	$p < .001$	.275
Gender			
Number of problems	$F(1,129) = 7.655$	$p < .01$	.063
Mean importance rating	$F(1,129) = 6.512$	$p < .05$	.054
Educational level			
Number of problems	$F(1,129) = 38.786$	$p < .001$	.256
Mean importance rating	$F(1,129) = 1.097$	n.s.	—

these differences were not significant. According to the experts, the feedback on the "Rent Subsidy" brochure was most important, and the feedback on the "Safe Sex" brochure received the lowest importance ratings. The other two brochures scored in between.

The effects of gender are a bit puzzling. The overall effects suggest that male participants provided more feedback than female participants. But there were several (often stronger) interaction effects with other variables—i.e., the brochure ($p < .001$, $eta^2 = .256$), the educational level ($p < .05$, $eta^2 = .053$), and a combination of the two ($p < .001$, $eta^2 = .177$). Unlike the overall trend, female participants provided more feedback on the "Victim Aid" brochure than male participants, and the number of comments on the "Safe Sex" brochure was the same for male and female participants. The educational level appeared to have a stronger effect on male participants than on female participants, but this finding, too, appeared to differ between the brochures. Interestingly enough, the findings regarding the quality of the feedback were the mirror image of those relating to its quantity: According to the experts, the female participants provided feedback of a higher quality. There were no interaction effects in this respect.

The effects of educational level were more straightforward. Highly educated participants detected significantly more problems in the brochures than participants with a lower level of education, thus confirming our hypothesis (H2). As indicated by the effect size, the difference between the two groups of participants was substantial. The quality of the feedback, however, did not differ between the two educational levels.

Results Per Problem Category

A distinction between types of problems may help us pinpoint the priorities and blind spots of the participants. We will first discuss the results concerning the problem types focused on, and then move on to the quality of the feedback collected within each problem type. Again, the significance of the results was tested using an analysis of variance. Table 5 presents an overview of the results regarding the relative attention to the various types of problems.

As Table 5 shows, the brochures evaluated had a strong effect on the types of problems mentioned by readers. Three of the observed differences followed our expectations regarding the generic distinction between informative and persuasive brochures, thus partly confirming our research hypothesis (H1). In the two informative brochures ("Rent Subsidy" and "Victim Aid"), the information structure was deemed to be especially important. In the two persuasive brochures ("Safe Sex" and "Alcohol"), relatively much attention was paid to the relevance of the information offered and stylistic appreciation.

Two other results may be interpreted as only partial confirmations of our research hypothesis. First of all, consistent with our expectations, in the case of the two persuasive brochures, more attention was given to problems with the

Table 5. Main Effects of Brochure, Gender, and Educational Level on Types of Problems Mentioned

Problem type	Brochure	Gender	Educational level
Comprehension	$p < .001$, $eta^2 = .310$	—	—
Acceptance	$p < .001$, $eta^2 = .158$	—	—
Relevance	$p < .001$, $eta^2 = .178$	—	—
Completeness	—	—	—
Structure	$p < .001$, $eta^2 = .256$	—	$p < .05$, $eta^2 = .051$
Appreciation	$p < .001$, $eta^2 = .195$	—	—
Graphic design	—	—	—
Correctness	—	—	—

acceptance of information than in the case of the informative "Rent Subsidy" brochure. Interestingly, however, participants treated the informative "Victim Aid" brochure in the same way as they treated the two persuasive brochures, in that a lot of attention was paid to problems with acceptance. This is understandable, since there were many instances in the procedures to which victims could object. Secondly, in line with our expectations, the readers of the informative "Rent Subsidy" brochure produced the highest scores for comprehension problems, and the readers of the persuasive "Safe Sex" brochure the lowest. However, the readers of the other two brochures did not follow the same pattern. In contrast to what we would have expected, relatively much attention was paid to the comprehensibility of the (persuasive) "Alcohol" brochure—possibly due to the brochure's emphasis on factual information—and relatively few attention to that of the (informative) "Victim Aid" brochure—possibly due to the prevalence of structural problems in that brochure. No significant differences were found for the completeness of the information, graphic design and correctness problems.

In strong contrast to the influence of the brochures, the participants' background characteristics were hardly related to the kinds of feedback they gave. Not one significant difference was found between male and female participants. With respect to educational level, only one main effect was found, in accordance with our hypothesis (H3): highly educated participants focused significantly more strongly on the structure of the brochures than participants with a lower level of

education. This confirms our hypothesis and corroborates earlier findings in research into comprehension monitoring, indicating that more highly educated readers focus more strongly on high-level text features.

In addition to these main effects, however, some interaction effects were found, suggesting that gender and educational level may still exert an effect. With respect to comprehension problems, interaction effects were found between brochure and gender ($p < .05$, $eta^2 = .081$) and brochure and educational level ($p < .005$, $eta^2 = .113$). Male and female participants differed with respect to the amount of attention they gave to the comprehensibility of the information in the brochures. In the "Rent Subsidy" brochure, male participants focused more on comprehension problems than female participants. In the other three brochures, female participants paid more attention to comprehensibility issues. In the "Alcohol" brochure, highly educated participants concentrated considerably more on comprehension problems than participants with a lower level of education. But in the "Safe Sex" and "Rent Subsidy" brochures, participants with a lower level of education focused more strongly on comprehension. And in the "Victim Aid" brochure, both educational levels focused comparably strongly on comprehension. With respect to problems with acceptance of information, an interaction effect was found between brochure and educational level ($p < .05$, $eta^2 = .078$). In the case of the "Victim Aid" and "Rent Subsidy" brochures, participants with a lower level of education focused more strongly on acceptance than highly educated participants. However, in the case of the "Alcohol" brochure, highly educated participants focused more on problems with acceptance of information. And in the "Safe Sex" brochure, the two educational levels had a similar focus on acceptance. Finally, with respect to correctness problems, there was an interaction effect between brochure and gender ($p < .005$, $eta^2 = .124$). These interaction effects offer some support for the assumption that gender and educational level matter, but they do not give us a clue about the exact way in which evaluation results may be affected by these background variables.

Finally, we also tested the assumption that highly educated participants will mention a wider variety of problem types in their evaluation activities than participants with a lower level of education. This hypothesis (H4) was confirmed by the data: Highly educated participants focused, on average, on 5.5 different problem types whereas participants with a lower educational level involved only 4.3 different types of problems in their evaluation ($p < .001$, $eta^2 = .110$). No main effects were found for the brochure and gender. However, there was a three-way interaction among the variables gender and brochure, indicating that the differences between the two educational levels was not consistently valid for all brochures. In one particular case (i.e., females evaluating the "Alcohol" brochure) even an opposite tendency was found in the range of problem types mentioned by the two educational levels.

Possible differences in the importance of the problems detected in each category were investigated using the experts' importance ratings. Table 6 presents the

Table 6. Main Effects of Brochure, Gender, and Educational Level on Importance of Problems

Problem type	Brochure	Gender	Educational level
Comprehension	$p < .05$, $eta^2 = .095$	—	—
Acceptance	$p < .05$, $eta^2 = .135$	—	—
Relevance	—	—	—
Completeness	$p < .001$, $eta^2 = .327$	—	—
Structure	$p < .001$, $eta^2 = .283$	—	—
Appreciation	$p < .01$, $eta^2 = .211$	—	—
Graphic design	$p < .001$, $eta^2 = .256$	—	—
Correctness	—	—	—

results of this analysis. As can be seen, neither gender nor educational level affected the importance of the problems detected by participants in any of the categories. The brochure, on the other hand, had a significant (and often very strong) effect on most of the problem types. There were no interaction effects with the demographic variables.

As might be expected, problems regarding the acceptance of the information were deemed most important in the two persuasive brochures. The same applies to problems regarding graphic design issues. Possibly, the experts were attentive to the peripheral cues which, according to Petty and Cacioppo's Elaboration Likelihood Model, should be included in persuasive messages to influence the less involved segment of the audience [10]. Another expected tendency that was confirmed was that information structure was judged to be more important for the two informative brochures than for the persuasive ones. For the other three significant problem types—comprehension, completeness, and appreciation—no clear distinction between informative and persuasive brochures could be made, indicating that the specific deficiencies of the individual brochures may have had a strong influence here.

DISCUSSION

In this study, we set out to explore how participant characteristics affect the feedback collected during a reader-focused evaluation of brochures. With respect to the number of problems detected, male and particularly highly educated

participants appeared to be the most productive. However, when the relative importance of the problems detected was considered, female participants proved to produce more substantial criticism, and no differences were found regarding the two educational levels. With respect to the influence of educational level, these results agree with our expectations. The findings regarding the influence of gender deserve further exploration—i.e., we would be interested in more comparative research into the feedback of male and female participants on documents. In the same vein, the interaction effect between gender and educational level may be an interesting area for further investigation: What caused the educational level to have a stronger effect on male than on female participants regarding the number of problems they mentioned?

The strong interaction effect we found between gender and brochure supports the assumption that the influence of gender may be connected with the topic covered in the brochure. It is well imaginable that women view the information on, say, safe sex from an entirely different perspective than men. Gender differences in the alcohol brochure may correlate with differences in drinking behavior. Excessive alcohol use occurs considerably more often among young men than among young women [11]. Gender differences in the brochure on victim aid may be caused by differences in the kinds of crimes male and female participants have been confronted with or have in mind while evaluating the brochure. For the recruitment of participants, it seems important to be alert to these types of differences that may relate to gender.

With regard to the types of problems mentioned by the participants, our results may be considered to relativize the influence of gender and educational level on the evaluation results. Invariably, the effects of the brochure were notably larger than the effects caused by the participants' background characteristics. The strong influence of the brochure on the readers' reactions is confirmed by earlier research by Schriver, who found that the version of a manual (original vs. revised) had a stronger effect on the participants' task performance than native language, gender, or task experience [12, pp. 452-458].

The only differences regarding problem types that were found concerned the distinction between highly educated participants and participants with a lower level of education. In accordance with the results of earlier comprehension monitoring research, we found that the highly educated participants are able to focus on a wider range of problem types simultaneously, and pay more attention to structural problems in the brochures [6]. As such, the results presented in this article can be seen as a practical confirmation—with real target readers responding to a functional text—of the results provided by the more artificial data gathered in the research on metacognition and comprehension monitoring.

One practical guideline can be derived from the fact that the number of problems detected per participant per brochure was more or less stable, irrespective of the importance of the problems detected. Given this result, it seems to be crucial for an evaluation's surplus value that a brochure is optimized before

the evaluation begins. In the context of usability testing, Kantner and Rosenbaum wrote about first gathering "the low-hanging fruit" to make sure that a usability test can focus on the user problems that are really difficult to detect [13]. Another implication of this result would be that the number of problems detected in a brochure is not a valid indicator of the quality of the brochure (at least with a self-reporting approach such as the plus-minus method).

In this article, we focused on rather general demographic variables. Our results, especially those concerning the influence of the gender of the participant, suggest that it may be more fruitful to investigate the influence of more specific participant characteristics that are more univocally linked to the topics of the brochures. Such variables may be the participants' prior knowledge, their reading ability and reading habits, their involvement, or their past experiences.

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