

Article

Narrative Construction of Product Reviews Reveals the Level of Post-Decisional Cognitive Dissonance

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Abstract: Social media platforms host an increasing amount of customer reviews on a wide range of products. While most studies on product reviews focus on the sentiments expressed or helpfulness judged by readers and on their impact on subsequent buying this study aims at uncovering the psychological state of the persons making the reviews. More specifically, the study applies a narrative approach to the analysis of product reviews and addresses the question what the narrative construction of product reviews reveals about the level of post-decisional cognitive dissonance experienced by reviewers. The study involved 94 participants, who were asked to write a product review on their recently bought cell phones. The level of cognitive dissonance was measured by a self-report scale. The product reviews were analyzed by the Narrative Categorical Content Analytical Toolkit. The analysis revealed that agency, spatio-temporal perspective, and psychological perspective reflected the level of cognitive dissonance of the reviewers. The results are interpreted by elaborating on the idea that narratives have affordance to express affect.



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Keywords: post-decisional cognitive dissonance; product review; narrative construction; automated linguistic analysis

1. Background and Aim

With the rapid growth of social media services, the ability of users to create and publish contents online has led to active virtual communities that share a wealth of product information. These online product reviews are frequently subjected to linguistic analysis to reveal the sentiment expressed. The term sentiment refers to an “attitude, thought, or judgment prompted by feeling [1] (p. 1). Sentiment analysis has been found to be useful in predicting product sales [1–12]. Furthermore, sentiment has an influence on the perceived helpfulness of the online product review as well [13–16], and it has been found to be a useful guide in the product or service innovation process [17,18]. However, little attention has been paid to the question of how sentiment as measured in product reviews is related to the authors’ psychological states; that is, to their attitudes. This study addresses this question; more specifically, it focuses on what can be learnt from product reviews regarding the level of cognitive dissonance experienced by the reviewers.

A considerable amount of research has been devoted to the relationship between online reviews and product sales. In a recent meta-analysis, Li, Chen, and Zhang [19] gathered data from 28 articles. They found that factors such as the number of online reviews, star ratings, and sentiments expressed in the reviews had an effect on product sales. While the number of reviews had the strongest effect on sales, the effects of sentiment and star rating were also considerable, albeit somewhat weaker. However, another study [7] suggests that the best predictor of product sales is the interaction between the number of online reviews

and the sentiment extensive literature demonstrates that sentiment has a general effect across product types such as technical devices [1,2,4,6,12,16], computers [6,11], cars [8], movies [5,9], books [1,3], capital stocks [7], and other product types [1,10,15,17]. Fan, Che, and Chen [8] utilized sentiment analysis to increase the accuracy of sales predictions as compared to predictions solely based on historical sales data. The increased accuracy was achieved by reducing forecasting errors.

While sentiment and star rating have been considered as two measures of the same construct, that is, attitude, assessed by a content measure and a quantified measure, respectively, current research scrutinizes the relationship between them. Chen, Luo, and Wang [4] argue that sentiment is a better summary of opinion than star rating, referring to the finding that sentiment entered in the sales prediction model as a predictor produced better model fit than star rating did. Recently, Li, Wu, and Mai [11] found that numerical rating mediated the effects of textual sentiments.

Many studies indicate that the sentiment expressed in an online review also has an effect on the perceived helpfulness of the review [13–16]. A common finding of these studies is a negativity bias showing that online reviews with negative evaluation tend to be more influential than reviews expressing positive evaluation, e.g., [13]. However, the existing findings on the importance of valence are inconsistent. Eslami, Ghasemaghahi, and Hassanein [14] found that neutral sentiment also had an effect on perceived helpfulness besides negative sentiment.

Yin, Bond, and Zhang [16] demonstrated that discrete emotions mentioned in the online review had an effect on perceived helpfulness. Yin and his colleagues explored the effects of referring to anxiety and anger in the online review. They found that online reviews mentioning anxiety were considered more helpful than those mentioning anger, since anxious reviewers were perceived to have given more deliberation to the contents of their reviews.

Furthermore, sentiment analysis also serves as a guide for innovation targeted at product design [17,18] and new services [20]. Sentiment analysis has the potential to effectively help the innovation process by revealing positively and negatively evaluated features of new products or services. In this vein, Ireland and Liu [19] demonstrated that sentiment analysis performed by computational methods was as accurate as a manual sentiment analysis at identifying positive and negative product features.

The above empirical literature on sentiments expressed in online product reviews (summarized in Table 1) substantiates the view that sentiment is a highly important feature of these reviews. Although the concept of the sentiment has been defined as an attitude, it has been considered as a feature of the online review content and not as a feature of the person providing the online review. We identify the lack of studies on the reviewers' attitude as a research gap, and this study aims to explore how the content feature of the sentiment is related to the reviewers' attitudes, more specifically to the reviewers' cognitive dissonance. The construct of cognitive dissonance has been introduced by Festinger [21]. The construct refers to a psychological state when a person realizes that there is a logical inconsistency between his or her cognitions. Cognitive dissonance is very likely to arise after a purchase, since the negative aspects of the selected alternative and the positive aspects of the non-selected alternatives often raise inconsistency between cognitions, e.g., [22]. Early approaches to post-purchase cognitive dissonance considered it to arise immediately after purchase and before getting product experience. However, recent theories argue that cognitive dissonance can also be experienced over a longer period both before, e.g., [23] and after the purchase, e.g., [24,25]. Cognitive dissonance is a psychological, and even physiological, state characterized by a sense of discomfort, which motivates the experiencer to reduce or eliminate it. One way to escape from the state of cognitive dissonance is to enhance the positively evaluated features of the purchased product. Consequently, a positive sentiment found in the content of an online product review may arise from two distinct psychological states. Positive sentiments may reflect either genuine satisfaction with the product or an attempt at self-justification resulting from

the aversive state of cognitive dissonance. Due to this psychological difference, it seems to be reasonable to search for differences in how the contents of online product reviews are constructed.

Table 1. Variables predicted by the sentiment analysis reported in the literature review.

Authors	Predicted Variable	Product Type
Archak et al. [2]	Sales	Digital camera, camcorder
Berger et al. [3]	Sales	Book
Chen et al. [4]	Sales	Cell phone
Chintagunta et al. [5]	Sales	Movie
Chong et al. [6]	Sales	Digital camera, television, Hi-Fi sound system, computer, etc.
Das & Chen [7]	Sales	Stock message board
Fan et al. [8]	Sales	Car
Fang & Zhan [1]	Sales	Beauty, book, electronic and home products
Fowdur et al. [9]	Sales	Movie
Guo et al. [10]	Sales	Toy
Li et al. [11]	Sales	Computer
Wu et al. [12]	Sales	Digital camera
Cao et al. [13]	Helpfulness	Software
Eslami et al. [14]	Helpfulness	Digital camera
Hong & Pittman [15]	Helpfulness	Nutritional supplements
Yin et al. [16]	Helpfulness	Electronics
Ireland & Liu [17]	Product design	Chair
Zhang et al. [18]	Product design	20 product categories including Electronics, Beauty, Home and Kitchen, etc.

It can be argued that writing an online review of a purchased product may be accompanied by re-experienced cognitive dissonance, since reviewers are likely to recall the decision-making process preceding the purchase. Consequently, writing a product review draws their attention to the rationality of their buying decision. Furthermore, product reviews are available to an interested public facing a rather similar situation, that is, striving for a good purchase decision. Although the readers are imagined, they nevertheless motivate the reviewers to elaborate on the rational reasons for the buying decision. This focus and context may lead to a state of cognitive dissonance while writing a product review after the purchase, even when already having some experience with the product.

2. A Narrative Psychological Approach to Product Reviews

The present study focuses on the effects of cognitive dissonance on the narrative construction of product reviews. Communication seems to sensitively reflect the state of cognitive dissonance. As Festinger [21] notes, he became interested in the study of cognitive dissonance when seeking an answer to the question why people overstated the effects of an earthquake in their communication. He found that it was cognitive dissonance that explained the exaggerations. However, most researchers subsequently concluded that communication was actually not the result but the cause of speakers' cognitive dissonance. That is, these researchers suggest that speakers occasionally make statements that elicit cognitive dissonance in them. The present study returns to Festinger's original view considering cognitive dissonance as a possible source of effects on language use.

The study applies a narrative approach to reveal the effects of a state of cognitive dissonance on the construction of product reviews. This narrative approach holds the view that people make their sometimes-elusive subjective experiences meaningful by imposing

a narrative structure on them, e.g., [26]. The narrative approach fits well the study of the construction of product reviews, since people usually have to provide a meaningful summary of their sometimes-heterogeneous experiences with the product: in most cases, product experiences accumulate over a considerable time span, and they may vary both in valence and intensity.

To deal with the narrative construction of product reviews, we use a conceptualization of narrative that is based on several compositional categories [27]. This study considers the following three compositional categories of narratives. Agency refers to the level of control that characters have over the events narrated. Spatio-temporal perspective refers to the spatio-temporal location of the narrator's point of view and the spatio-temporal location of events recounted in the narrative. This narrative feature reflects how the act of narration and the actions narrated are related to each other through their spatio-temporal location. Spatio-temporal perspective has three forms. In most cases, the narrator's point of view is located in the present of narration, while narrative actions are located in the past. This arrangement is labelled as the Retrospective form (e.g., I went to the store.). However, both the point of view and the action can be conjointly located either in the past of the narrated actions or in the present of narration. These two forms are labelled as the Experiencing (e.g., It looks great.) and the Metanarrative (e.g., I remember quite well.) perspective forms, respectively. Finally, psychological perspective includes linguistic elements explicitly indicating the characters' mental states in the narrative.

The study examined the hypothesis that the narrative construction of product reviews would reflect the level of cognitive dissonance of the reviewer. The hypothesis was mainly based on the conceptualization of cognitive dissonance as having not only a cognitive but also an affective component, e.g., [28], and on available empirical evidence showing that narrators' affective state was systematically related to the construction of narratives, e.g., [29–32]. More specifically, the following hypotheses were tested regarding the three narrative compositional categories and the level of cognitive dissonance.

(1) A study conducted by Gobbo and Raccanello [30] found a relationship between the intensity of narrators' affective state and the level of agency in their narratives. High intensity of narrators' affective state corresponded to high levels of agency in their narratives, since a high level of agency is indicative of a high level of responsibility for the narrated actions, which in turn increases the intensity of the related emotions. In line with this finding, the first hypothesis predicted that higher level of agency in product reviews would reflect more intense affective states and thus higher levels of cognitive dissonance.

(2) Other studies found a systematic relationship between affective intensity and present-tense verb use [31], or, more generally, the use of the spatio-temporal perspective [32]. Pillemer [31] interpreted the frequent use of present-tense verbs as an indicator of high affective intensity. Pólya, László and Forgas [32] found that readers of a narrative perceived the narrator's affective state as more intense when the narrative used the spatio-temporal perspective forms including present-tense verbs, that is, taking either the Experiencing or the Metanarrative perspective forms, compared to the narrative that used the Retrospective perspective form. On the basis of these results, the second hypothesis predicted that more frequent use of the Experiencing and the Metanarrative perspective forms would indicate higher levels of cognitive dissonance, while more frequent use of the Retrospective perspective form was expected to be associated with lower levels of dissonance in product reviews.

(3) Cognitive dissonance is a result of predominantly inconsistent cognitions, and the intensity of cognitive dissonance is contingent on the number of relevant inconsistent cognitions [21]. The higher the number of inconsistent cognitions, the more intense the state of cognitive dissonance. Considering this theoretical assumption and the observation that cognitions are marked in narratives by the linguistic markers of psychological perspective, the third hypothesis predicted that higher frequencies of psychological perspective would reflect higher levels of cognitive dissonance in product reviews.

3. Method

3.1. Participants

The study involved 94 native Hungarian participants (42 men and 52 women), whose age varied between 26 and 68 years ($M = 34.64$, $SD = 9.26$).

3.2. Measures

Cognitive dissonance was measured by the Cognitive Dissonance Scale [28]. The 22-item Likert scale measures three dimensions of cognitive dissonance including Emotional (e.g., After I bought this product, I felt uneasy), Wisdom of purchase (e.g., I wonder if I really need this product), and Concern over deal (e.g., After I bought this product, I wondered if I had been fooled). Each item is rated on a 7-point scale. Items were translated into Hungarian, and the obtained Hungarian version was verified by the back-translation procedure. The Hungarian version of the scale showed high internal consistency (Cronbach's $\alpha = 0.882$).

Furthermore, to obtain a more detailed picture of the reviewers' psychological state, Product Evaluation and Product Satisfaction were also measured. Respondents indicated Product Evaluation on a 9-point scale ranging from 1 (very negatively) to 9 (very positively) in response to the question, "How do you evaluate your cell phone?" Similarly, participants rated the level of Product Satisfaction on a 9-point scale ranging from 1 (not at all satisfied) to 9 (very satisfied) in response to the question, "To what extent are you satisfied with your cell phone?"

3.3. Procedure

The participants were recruited by a convenience sampling method. An invitation to participate in an online survey was posted on social media sites, which was addressed to those who had bought a cell phone during the previous six months. All prospective participants were encouraged to share the invitation on social media sites accessible to them, regardless of whether or not they themselves chose to participate in the study. The invitation contained the link to the online form. After giving informed consent, each participant wrote a product review about their recently bought cell phone. The instructions read as follows: Please imagine the situation that you are writing an online product review on your recently bought cell phone. Please describe how you reached the decision to buy a new one. How did you choose it? How did you buy it? What experiences do you have with it? Participants were informed that their product reviews would not be made publicly available on the internet. Then the Cognitive Dissonance Scale was administered. Participants were instructed to report the level of dissonance they currently felt instead of post-purchase dissonance assessed by the original scale. Finally, participants' Product Evaluation and Product Satisfaction were assessed with the respective scales.

4. Product Review Analysis

Two research assistants independently judged whether or not each product review was a narrative. Adopting the criterion proposed by Prince [33], they coded those reviews as narratives which included at least three conjoined events. The judges agreed that all product reviews were narratives.

The contents and structure of the product reviews were analyzed with the Narrative Categorical Content Analytical Toolkit (NarrCat; [34]). NarrCat enables automated quantitative analysis of the previously mentioned three compositional categories of narrative construction, among other narrative categories. Agency includes verbs describing activity (e.g., choose, buy) and passivity (e.g., receive, hold), and words describing intention (e.g., aim, target) and constraint (e.g., must, forbidden). The three spatio-temporal perspective forms (Retrospective, Experiencing and Metanarrative) are based on distinct configurations of verb tenses and deictic terms (e.g., now, here, then, there). (For detailed definitions of these forms, see Section 2 above). Psychological perspective refers to the explicit description of the characters' inner mental states. Psychological perspective has two subgroups,

cognitive (e.g., think, remember) and emotional (e.g., curious, happy) states and processes. Emotions are further divided into the subgroups of positive and negative emotions.

The unit of coding was the word in the analysis of Agency and Psychological perspective, while it was the clause (defined as having one main verb with its arguments) for Spatio-temporal perspective.

The reliability of the automated analysis was assessed by manual coding of about one third of the product reviews (30 out of 94). Two reliability measures were computed. The measure of sensitivity was computed as the ratio of the number of units identified correctly by automated coding and the number of units coded under the corresponding manual code. The measure of precision was computed as the ratio of the number of units identified correctly by automated coding and the total number of units coded automatically under that code. These measures were above 80 percent for all narrative compositional categories, which is the consensual criterion level for a reliable psychological text analysis.

Furthermore, product reviews were subjected to thematic analysis to refine the data obtained by narrative analysis. Recurring themes in the product reviews were sorted under six inductively defined thematic categories (see Table 2), which were composed of customized dictionaries.

Table 2. Definitions and total frequencies of thematic categories.

Thematic Category	Definition	Total Frequency in Product Reviews
Brand	Name of companies and phone prototypes	40 (42.5%)
Technical specification	Any physical or functional part of the product	29 (30.8%)
Information gathering	Search for information on the cell phone	21 (22.3%)
Price	Reference to any information about the cell phone's price	41 (43.6%)
Problem	Reference to any problem with the cell phone	66 (70.2%)
Emotional relation	Emotional relation to the cell phone	14 (14.9%)

5. Results

Participants bought their cell phones between 4 and 165 days before participation in the study ($M = 96.87$, $SD = 59.69$). The cell phones were highly valued by the participants (see Table 3). The mean value of Product Evaluation was 8.09 ($SD = 1.23$) and the mean value of Product Satisfaction was 7.43 ($SD = 1.31$) on a nine-point scale. Accordingly, the mean level of post-purchase cognitive dissonance was low ($M = 1.19$; $SD = 0.37$ on a seven-point scale). The majority of the participants (78 persons, 83.0%) reported a moderate level of cognitive dissonance. Sixteen participants (17.0%), however, reported to have not experienced cognitive dissonance after the purchase. The maximum value of cognitive dissonance was 4.50. The occurrence of cognitive dissonance was further confirmed by the obtained correlations between self-report measures. The level of post-purchase cognitive dissonance negatively correlated with both Product Evaluation ($r = -0.39$; $p < 0.001$) and Product Satisfaction ($r = -0.42$; $p < 0.001$), while Product Evaluation and Product Satisfaction had a strong positive correlation ($r = 0.50$; $p < 0.001$). The level of cognitive dissonance and the temporal distance between buying the cell phone and writing the review were uncorrelated ($r = -0.02$, n.s.).

Table 3. Descriptive statistics of the self-report measures and relative frequencies from the product review analysis.

MEASURES	All Product Review N = 89		Cluster 1 High Involvement Product Review N = 68		Cluster 2 Low Involvement Product Review N = 21	
	Mean	SD	Mean	SD	Mean	SD
SELF-REPORT MEASURES						
Cognitive Dissonance Scale	2.26	0.81	2.36	0.84	1.96	0.62
Emotional	2.01	0.76	2.11	0.81	1.70	0.50
Wisdom of purchase	3.22	1.70	3.32	1.71	2.87	1.66
Concern over deal	2.24	0.98	2.32	1.03	2.00	0.77
Product evaluation	8.09	1.23	8.09	1.17	8.10	1.45
Product satisfaction	7.44	1.31	7.34	1.41	7.76	1.18
PRODUCT REVIEW ANALYSIS						
Relative frequencies of narrative compositional categories (NarrCat)						
Agency	59.21	38.74	74.23	32.50	14.22	7.83
Spatio-temporal perspective						
Experiencing form	41.04	17.02	44.08	15.00	31.22	19.70
Metanarrative form	6.19	9.07	7.61	9.71	1.61	4.14
Retrospective form	52.76	19.49	48.31	17.21	67.17	19.83
Psychological perspective						
Cognition	1.34	1.62	1.19	1.48	1.82	1.97
Emotion	2.03	1.77	2.32	1.73	1.10	1.58
Relative frequencies of thematic categories						
Brand	1.91	3.75	2.12	4.19	1.22	1.61
Accessories	0.65	1.18	0.63	0.99	0.73	1.69
Information gathering	0.35	0.71	0.38	0.70	0.23	0.73
Price	0.91	1.37	0.97	1.36	0.71	1.39
Problem	1.35	1.12	1.25	1.15	1.69	1.00
Emotional relation	0.58	1.06	0.35	0.96	0.12	0.37

The length of the product reviews varied between 30 and 475 words. The mean length of product reviews was 81.08 words ($SD = 70.67$). Due to the considerable variance in length, absolute frequencies gained from narrative analysis were transformed into relative frequencies. The level of agency was calculated as the ratio of the sum of active verbs plus intentions divided by the sum of hits in all four subcategories and multiplied by one hundred. The absolute frequencies of psychological perspective and thematic categories in each narrative were divided by the total word count of the narrative and multiplied by one hundred. Finally, the absolute frequency of each spatio-temporal perspective form in each narrative was divided by the total number of clauses in the narrative and multiplied by one hundred. As a result of these transformations, all relative frequencies varied between 0 and 100. Descriptive statistics of the product review analysis are shown in Table 3.

To explore whether the construction of product reviews reflected the level of cognitive dissonance, results on the narrative compositional categories were examined in combination and not separately. To this end, a cluster analysis was conducted on the relative frequencies of the narrative compositional categories shown in Figure 1. To define the number of possible clusters, hierarchical clustering was applied (Ward method and squared

Euclidean distances): a two-cluster layout proved to be stable, then the final clustering was performed by *k*-means cluster analysis. Cluster 1 had 68 cases and Cluster 2 had 21 cases.

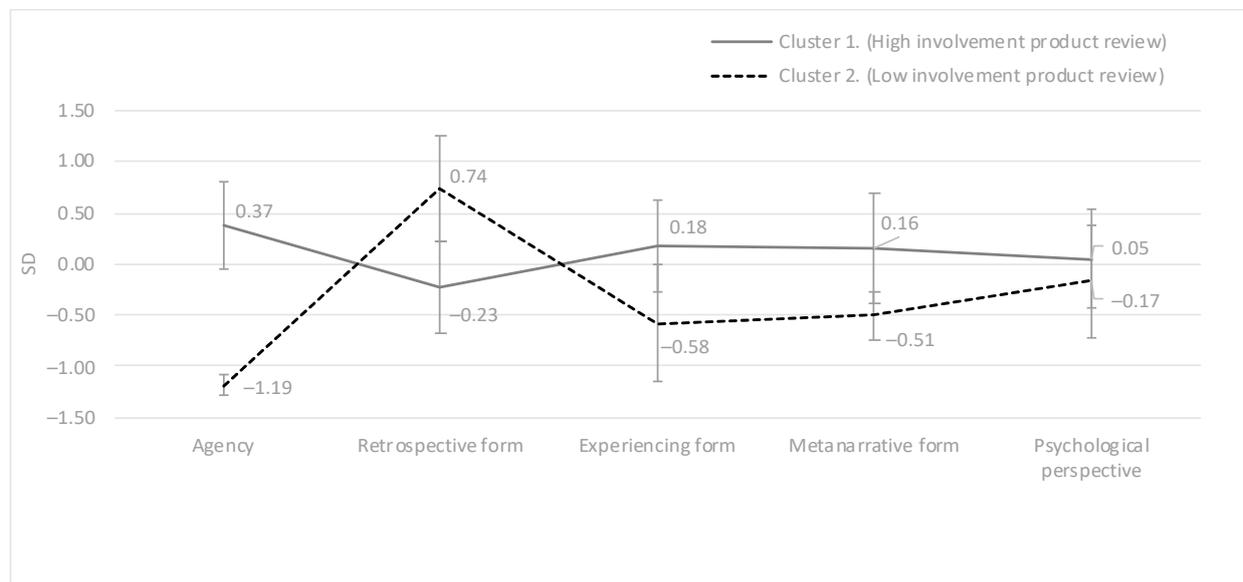


Figure 1. Profiles of the two clusters of product reviews based on the relative frequencies of narrative compositional categories (standardized data).

A subsequent multivariate analysis of variance indicated a difference in narrative construction between the two clusters of product reviews ($F(12,76) = 15.37$; $p < 0.001$). Follow-up ANOVAs indicated differences in the following compositional categories. Product reviews in Cluster 1 had a significantly higher level of agency ($F(1,89) = 10.24$; $p = 0.002$), significantly more occurrences of the Experiencing ($F(1,89) = 10.11$; $p = 0.002$) and Metanarrative perspective forms ($F(1,14) = 7.56$; $p = 0.007$), and significantly fewer occurrences of the Retrospective perspective form ($F(1,89) = 17.93$; $p < 0.001$). However, no difference was found in psychological perspective ($F(1,89) = 0.78$; n.s.). Psychological perspective was then further analyzed at the level of the cognition and emotion subcategories. While there was no difference in the frequency of cognitive verbs ($F(1,89) = 2.48$; n.s.), product reviews in Cluster 1 contained significantly more emotion words ($F(1,89) = 8.19$; $p = 0.005$).

The two clusters of product reviews were also compared for the frequencies of thematic categories. Absolute frequencies within each review were transformed into relative frequencies by dividing them by the total word count of the review. Independent samples *t*-tests showed that the two clusters of product reviews differed in the relative frequency of information gathering ($t(87) = 2.15$; $p = 0.036$) and brands ($t(87) = 1.93$; $p = 0.05$). As can be seen in Table 1, product reviews in Cluster 1 referred more frequently to information gathering and brands than product reviews in Cluster 2. No significant difference was found in any of the other thematic categories (all *ts* < 1; n.s.).

Based on these differences, product reviews in Cluster 1 were considered as high-involvement reviews. Participants writing these reviews invested more effort in finding the best product. High involvement was reflected in the self-perception of being more agentic in the purchase process and mentioning more information gathering and brands. Accordingly, high involvement product reviews were accompanied by more intense affect reflected in more frequent use of the Experiencing and the Metanarrative perspective forms, less frequent use of the Retrospective perspective form, and more frequent references to emotional states and processes. Product reviews in Cluster 2 were considered as low-involvement reviews. Low involvement was also reflected by the above mentioned variables, but they showed the opposite pattern in this case.

To see whether the construction of product reviews reflected the level cognitive dissonance, the authors of high and low-involvement reviews were compared for the level of cognitive dissonance. Independent samples *t*-tests revealed that participants writing high-involvement product reviews experienced significantly higher levels of overall cognitive dissonance than those writing low-involvement reviews ($t(87) = 2.03, p = 0.045$, see Table 1). A significant difference was found on the Emotional subscale of the Cognitive Dissonance Scale ($t(87) = 2.17; p = 0.033$). Highly involved reviewers experienced more intense negative affect than those writing low-involvement product reviews. However, no difference was found on the other two subscales of the Cognitive Dissonance Scale; that is, Wisdom of purchase ($t(87) = 1.07$; n.s.) and Concern over deal ($t(87) = 1.31$; n.s.).

Authors of the two clusters of product reviews were also compared for Product Evaluation and Product Satisfaction. No difference was found either in the level of Product Evaluation ($t(87) = -0.02$; n.s.) or in the level of Product Satisfaction ($t(87) = -1.25$; n.s.) between highly and weakly-involved reviewers.

6. Discussion

The study found that the majority of the participants were in the state of cognitive dissonance at a moderate level while writing a product review long after the purchase. This observation is based on the result obtained by the self-report measures of cognitive dissonance and further confirmed by measures of Product Evaluation and Product Satisfaction. The negative correlations found between the level of cognitive dissonance and the other two product measures are in line with past empirical results, e.g., [28], and thus they support the idea that the state of cognitive dissonance may arise long after the purchase, e.g., [24,25]. The fact that some participants did not experience cognitive dissonance is well reconciled with the observation that dissonance is not aroused in every purchase [25,28] or it may fade away by time.

The study focused on the relationship between the construction of product reviews and the cognitive dissonance experienced by reviewers. In line with the hypothesis, the narrative construction of product reviews was generally found to reflect the actual level of cognitive dissonance. Higher levels of cognitive dissonance were reflected in higher levels of agency, more frequent use of the Experiencing and Metanarrative spatio-temporal perspective forms and less frequent use of the Retrospective perspective form. Finally, more frequent references to emotional states, albeit not the overall frequency of psychological perspective, reflected higher levels of cognitive dissonance as hypothesized.

The results can be explained by considering the impact of cognitive dissonance-related negative affect on narrative construction. As Gobbo and Raccanello [30] argue, affective intensity is linked to the level of agency in narratives by the narrator's sense of responsibility for their actions. According to the authors' view, a high level of agency shows high responsibility for actions, and thus it is accompanied by a more intense affective state. This link explains that higher levels of agency in product reviews were associated with higher levels of cognitive dissonance. Furthermore, the use of verb tense reflects affective intensity, since it is systematically linked to the immediacy of the narrated experiences [31]. The use of present verb tense, and accordingly, the use of the Experiencing and Metanarrative perspective forms reflect ongoing experience and thus indicate high affective intensity, while the use of past verb tense, and accordingly, the use of the Retrospective perspective form shows the narrator's distance from the recounted experiences, and thus it is informative on low affective intensity [32]. However, the hypothesis on the use of psychological perspective is confirmed only by the subcategory of Emotions. This may be due to the effect of emotional responses to product-related experiences elicited by reviewing the product.

It is reasonable to assume that the results obtained on the relationship between the construction of product reviews and cognitive dissonance can be extended to online product reviews. This extension has an important consequence, since it enables measurement of, and research on, cognitive dissonance and product involvement outside the laboratory without using standard psychological measures. It is worth noting that the construction of

online product reviews has high ecological validity, since customers share their product experiences to help their peers as opposed to research participants or those involved in commerce. In this way, research on online product reviews may contribute to the clarification of questions on which available empirical findings are inconclusive. One such question concerns the relationship between cognitive dissonance and purchase involvement as pointed out by George and Edward [22], for example. This study found that the level of cognitive dissonance and product involvement were directly proportional to each other. A unique contribution of the study to the field is that these constructs were measured in two distinct ways: while the level of cognitive dissonance was measured by a self-report scale, product involvement was operationalized as a configuration of the use of narrative compositional categories and emerging themes.

Analytical research on online product reviews may also contribute to a better understanding of understudied issues such as the temporal course of cognitive dissonance reduction, for example. It is a central idea of the theory of cognitive dissonance that people experiencing dissonance are motivated to reduce it [21]. However, it is a methodological challenge to reveal the temporal course of cognitive dissonance reduction in laboratory settings, since it would require a large number of participants. By contrast, the extremely large number of online product reviews readily available on the internet enables researchers to answer this question if there is available data on the date of purchase. For researchers focusing on these and similar questions, social media provide expansive virtual laboratories, while automated text analysis offers valuable methods for psychological research in these virtual environments. The potential of measuring the construct of attitude through language analysis has been recognized in the social psychological research as well [35].

The narrative analysis of online product reviews may also be used for practical purposes, since it may inform marketing efforts to reduce the level of cognitive dissonance. It is practically important for manufacturers to reduce cognitive dissonance, given that customers experiencing this discomforting state tend to conceal their related actions/choices from others, and they feel uncomfortable after the purchase, which possibly impairs customer experience. Cognitive dissonance influences how people feel about themselves, leading to negative feelings they want to avoid, which may prevent them from repeatedly purchasing from the same manufacturer or service provider [36,37]. One way to effectively reduce the discomforting state of cognitive dissonance is to provide information that positively reinforces a previous buying decision [38]. Individuals vary in their thresholds of cognitive dissonance, e.g., [28], and the narrative analysis of online product reviews can be used to personalize strategies marketers implement to help consumers cope with the uncomfortable feelings related to cognitive dissonance, e.g., [39].

Various methods of linguistic analysis are employed in studies of online product reviews. Nevertheless, the most frequently studied linguistic features are sentiment words and phrases, sentiment shifters, part of speech category and syntactic dependency [40]. This study, however, took an approach different from previous empirical approaches inasmuch as we aimed to reveal the narrative structure of product reviews. The narrative approach proved useful in that the narrative analysis of product reviews revealed important aspects of the reviewer's current mental state including both the level of experienced cognitive dissonance and the level of product involvement. Although participants were not explicitly requested to write a narrative all product reviews met the minimum criterion for a narrative structure defined as a sequence of at least three conjoined events [33]. The usefulness of the narrative analysis lies in that imposing a narrative structure on rather elusive experiences generates meaning, e.g., [26]. Furthermore, it can be argued that narrative structure well reflects the narrator's affective state as demonstrated by the narratives of participants being in the state of cognitive dissonance: a specific pattern of compositional features was associated with higher scores on the Emotional subscale of the Cognitive Dissonance Scale. The fact that narrative structure is influenced by affect can be explained by referring to the basic structure of the narrative. The narrative typically has a sequence of facing a problem and making an effort for overcoming the problem terminated by a desirable solution.

In most cases, this narrative sequence is accompanied by rising tension and its final reduction. The focus on a problem-solving process and the related tension curve support the idea that narrative structure has an affordance to express affect. This explanation focuses on the impact of attitude change on communication. Pasquier and Chaib-draa [41] argue that differences in conversational partners' attitudes have an important role in structuring interpersonal communication. According to the authors' view, the conversation begins when one of the interlocutors aims to align attitudes with his or her conversational partner, and the conversation ends when their attitudes become consistent. It can be argued that the current state of attitudes may also contribute to narrative construction as a form of communication. In this case, the narrator strives to develop a consistent attitude by integrating sometimes heterogeneous experiences into a coherent narrative.

6.1. Limitations and Future Directions

The study has several limitations, which restrict the generalizability of the findings. First, the study focused on only one type of products. Second, more importantly, the majority of participants reported only moderate cognitive dissonance, and a minority reported to have not experienced cognitive dissonance at all. Furthermore, although the study attempted to simulate the construction of an online product review, participants were aware that their reviews would not be publicly available on the internet. This condition might reduce the potential of the product review writing task to elicit cognitive dissonance.

The finding of this study that the narrative construction of product reviews reflects whether the sentiment is coming from genuine satisfaction with a product or from the state of cognitive dissonance raise important questions in this research field. First of all, it would be worth to explore whether readers of online product reviews are able to differentiate between online reviews written in a state of satisfaction and those written in a state of cognitive dissonance. Then, more to the point of our study, it would be important to assess whether online reviews written in a state of cognitive dissonance influence product sales to the same extent as online reviews reflecting positive product experiences. Further important question is whether cognitive-dissonance-motivated online reviews influence the perceived helpfulness of the reviews, and whether such reviews may effectively inform the product design process.

6.2. Conclusions

The present study significantly broadens the scope of utilizing the linguistic analysis of product reviews. The study shows that product reviews offer themselves for narrative analysis, since they have a basic narrative structure. Furthermore and more significantly, findings of the study demonstrate that important factors of reviewers' psychological state may be revealed by narrative analysis. The narrative approach employed in the present study thus contributes to extend substantially the scope of linguistic analysis of texts available in social media.

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