

Perceptual qualities of literary style

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This article reports the results of a study that investigated different aspects of the aesthetic perception of literary style. Excerpts from novels belonging to two broadly defined literary style categories, namely modern and postmodern style, were judged by the participants. Semantic scales corresponding to perceptual qualities of modern and postmodern literature were used. The results indicate that these scales can measure perceptual differences between the selected novels, and that the two novels categorized as modern were experienced differently from those categorized as postmodern. Some of the scales also predicted aesthetic preference for novels. Rating differences on the two scales *incoherent – coherent* and *formal – colloquial* predicted the ability to attribute novel excerpts. This finding seems to indicate that the ability to distinguish styles in regard to perceptual qualities helps readers to judge certain similarities of novels.

Keywords: style, novel, perceptual qualities, modern literature, postmodern literature, aesthetic preference, attribution, style categorization

Research on literary style

Reflection and research on style has a long tradition, which always combined theory and practical applications. The roots of stylistics can be traced back to antiquity. In the context of rhetoric, the adequate expression of arguments was considered in the *elocutio*, one of the five steps that make up the preparation and presentation of a public speech (Verdonk, 2006, p. 202). The term *style*, which seems to have been derived in Middle English from lat. *stilus* – pen around the 14th century, was originally used in a literal translation for the writing utensil. However, in a series of metonymic extensions, it was also applied to individual characteristics of handwriting, to individual ways of expression in writing and speech, and finally to individual expression in other arts such as painting and architecture (Verdonk, 2006, pp. 196–197).

Today, discussions about the correct definition and delimitation of the term style have largely given way to a pluralistic perspective. For example, it is assumed that styles can equally be investigated for individuals and for groups (cf. Habscheid, 2003) such as artistic movements or specific demographics (Dittmar, 2009). In the increasingly diversified cultures of the 20th century, styles of writing, speech, and clothing help to signal group membership, as well as values and attitudes (Hebdige, 1979; Sandig, 2006, p. 1). Contemporary stylistics is interested both in literary and non-literary texts (Jeffries & McIntyre, 2010, p. 30), and analyses style on different linguistic levels such as phonology, syntax, and semantics (Jeffries & McIntyre, 2010, pp. 34–61). Analyses of style can be used to attribute texts of unknown origin to authors and genres (Siefkes, 2012, pp. 109 – 10), and styles can give rise to processes of style interpretation in which readers search for further meanings (Nöth, 2009; Spillner, 1995).

For the present study, linguistically informed approaches to literary style were of specific interest. Focusing on literary stylistics, new approaches have been developed in corpus linguistics (e.g., Bubenhofer & Scharloth, 2012) and cognitive linguistics (Semino & Culpeper, 2002). Overviews of contemporary stylistics can be found in Fix, Gardt, & Knape (2008–2009), Jeffries & McIntyre (2010), Simpson (2014), and Verdonk (2002). Theories with an empirical focus are interested in the problems connected with analyzing and characterizing specific styles. Descriptive approaches to literary style were developed in the hermeneutic tradition (Croce, 1937; Spitzer, 1948; cf. also Green, 2006, p. 262), historical linguistics (Devoto, 1950), structuralism (Doležel & Bailey, 1969; Kraus, 1987; Riffaterre, 1973), and computer linguistics (Sedelow & Sedelow, 1972; Stewart, 2006). A practical application of the distinction between styles is author identification (Neme, Pulido, Muñoz, Hernández, & Dey, 2015; Tuldava, 2005).

The perceptual dimension of literary style

Style theories with an analytical or empirical focus have often relied on the notion of stylistic features to describe and distinguish styles, and characterize their relations to each other. This notion was first developed in structuralist stylistics (Doležel & Bailey, 1969; Wales, 1991, pp. 434–435). Specific styles have been characterized by specific bundles of features (Auer, 1989, p. 29; Sandig, 2006, p. 54) or sets of features (Siefkes, 2011, p. 20; Siefkes, 2012, p. 82). In literary stylistics, some approaches have tried to measure stylistic features associated with specific styles (Hoover, 2002; Lowe & Matthews, 1995; Scharloth & Bubenhofer, 2012).

However, stylistic features may be insufficient to adequately describe and distinguish styles. Stylistic features are usually understood as aspects of texts that can either be directly measured, or may be determined in an analysis (such as use

of metaphor, size of vocabulary, or syntactic complexity). However, higher-level evaluations seem to play an important role in our experience of styles. Many descriptions of styles contain adjectives such as *poetic*, *ornate*, *simple*, *elegant*, *clear*, or *playful*, or their respective nouns, which do not correspond to any aspects that can be measured. Rather, such qualities depend on the perception and evaluation of the reader. The use of such evaluative terms in literary reviews, discussions about style, and literary scholarship points towards their importance in our perception of style.

Many approaches to style fail to clearly distinguish between aspects that can be determined in a text via measurement or analysis, and experiences of readers. Although it has been investigated which terms readers use to characterize literary texts from different genres (Knoop, Wagner, Jacobsen, & Menninghaus, 2016), the contribution of stylistic qualities to such evaluations remains unclear. Generally, it seems plausible that some aspects of style are in the eye of the beholder, in the sense that they are mentally constructed in the process of reading or listening. For example, Michel (2001) gives lists of textual properties which he explicitly calls stylistic features: They range from genre-related features such as *scientific* or *aphoristic* and author-related features such as *restrained* or *understanding* to features pertaining to the expression of a given content, e.g. *unrealistic*, *ideological*, or *systematic* (p. 44). Qualities such as these cannot be measured directly, rather, these terms seem to capture stylistic impressions by readers. However, perceptual qualities are not only relevant in regard to readers' experience of literature, but also play an important role in literary reviews, in discussions about literature, and probably also in the self-perception of writers and their self-adjustments (with the aim of developing a style with certain properties).

On the basis of these reflections, the present approach assumes the following definition: Style consists in all specific characteristics in writing or speech of a person, or a group of persons; styles can be investigated on a continuum of scale, from individuals to large groups, where larger groups will usually have fewer characteristics in common. Although style influences measurable qualities of texts (such as sentence length, size of vocabulary, or complexity of syntax), it is experienced by readers in the form of perceptual qualities, such as *clarity* or *elegance*. The present study focuses on perceptual qualities of style, with the aim of understanding how readers experience and categorize it.

Theory and methods

Measuring perceptual qualities with semantic scales

For a fine-grained measurement of experiential qualities, the *semantic differential* approach (Osgood, Suci, Tenenbaum, 1957; Snider & Osgood, 1969) may be a good starting point. Semantic scales have been successfully used in the comparison of different literary styles (e.g., Salimpoor, 2003) and musical styles (e.g., Damiani, Jeric, Imberty, & Belardinelli, 2004). In a detailed study, Cupchik, Leonard, Axelrad, & Kalin (1998) have shown the influence of style on the evaluation of short story excerpts on cognitive and affective scales.

Building on these applications, we propose to understand suitable chosen semantic scales as corresponding to *perceptual qualities of style*, such as *elegant*, *simple* or *playful*. Perceptual qualities should be distinguished from *measurable stylistic features*, such as sentence length, frequency of metaphors, or size of vocabulary.

Obviously, not all possible semantic scales are relevant for a specific style: While it is plausible to assume that *simple – complex* captures a relevant property for most styles, the scale *light – dark* may be meaningful only for some styles, or for none at all. This observation leads to a problem of selection of semantic scales that may capture perceptual qualities. There is no *a priori* way of knowing which terms and concepts may be applicable to a specific style.

For the present study, six pairs of adjectives were selected that could be grouped into semantic oppositions. The selection was based on the results of a questionnaire, which asked for terms (adjectives and nouns) that the subjects thought would be applicable to modern and postmodern literature.¹ The questionnaire was answered by 21 persons (graduate students and researchers at the department of German linguistics at the University of Technology Berlin, and the department of linguistics at the University of Bremen). Only terms were considered that could be grouped into semantic oppositions describing aspects of the different styles, which resulted in six semantic scales.²

1. *Postmodern* and *modern* are, throughout the paper, understood as style categories; a category possesses (implicit or explicit) criteria for its delineation, and usually also a name.

2. The method for finding candidate semantic scales could be further refined. While the present study relied on experts' knowledge (of researchers and students of literature and linguistics) in the construction of the scales, laypersons, preferably with reading experience, could also be asked, and the resulting lists combined. An alternative approach (that has not been tested) consists in the compilation of a corpus of empirical style descriptions (literary reviews, broadcasts on literature, research articles, etc.), which would then be analyzed for terms used to describe perceptual qualities of the target styles.

Hypotheses and predictions

In this paper, different aspects of semantic scales, understood as perceptual qualities of style, are investigated in relation to literary style. To be sure that (some) semantic scales correspond to perceptual qualities, we need to test if we can construct scales whose poles are consistently associated with specific styles.

Hypothesis 1: Novel excerpts from some novels that belong to the broad categories *modern* and *postmodern* are rated differently on certain semantic scales, allowing us to interpret these scales as corresponding to *perceptual stylistic qualities*.

It was assumed that styles are connected with certain perceptual qualities experienced by readers, which can be used to differentiate between styles of single works, and possibly between style categories (though this would need further, much larger studies, cf. section 7).

Pilot studies had indicated that subjects might be influenced by questions which drew attention to different aspects of the text, and were designed to influence the level of emotional involvement. A second hypothesis was formulated:

Hypothesis 2: Priming for awareness of objective factors and priming for emotional involvement leads to a different perception of perceptual qualities, and/or to a difference in general aesthetic preference for novel excerpts.

In cognitive psychology, a specific class of implicit memory effects is called *priming*. Priming effects are present when the exposure to one stimulus influences the response to another stimulus. In experimental settings, priming is often employed to test specific factors that might influence the stimulus responses one is interested in (e.g., Mayr & Buchner 2007; Tulving, Schacter, & Stark, 1982). The present study employed priming by starting each questionnaire page with a priming block composed of some questions. We decided to compare two conditions primed in different ways, since comparison against an unprimed condition, where the priming block would be missing, might result in different levels of attention to the stimulus, and might lead to a quicker and more superficial completion of the questionnaire. Condition 1 primed for style and function of the novel excerpts (priming for an objective stance towards the literary stimuli); condition 2 primed for emotional involvement and personal experiences of the reader (priming for a subjective stance towards the literary stimuli).

A further question concerns the connection of perceptual qualities with general aesthetic preference. If we find that styles are consistently rated differently on semantic scales, these ratings may be predictive of aesthetic preference (liking). If they are, the semantic scales in question might be regarded as an aspect of

aesthetic evaluation processes; otherwise, they constitute separate aspects of aesthetic perception which have to be considered in addition to aesthetic preference.

Hypothesis 3: Ratings on semantic scales (corresponding to perceptual qualities) predict the aesthetic preference for novel excerpts in that style category.

A fourth, and final, hypothesis concerns one aspect of styles that is closely connected with its important role in culture and also in daily contexts, namely style-based *attribution of texts to authors*, which is a special case of style-based classification. That stylistic differences allow us to categorize artworks is an important aspect that has been described theoretically (Siefkes, 2012, p. 109; Siefkes, 2013, p. 4). Style-based categorization plays an important role in many practical contexts, for example in art history or archaeology, where artworks and artefacts are often attributed to artists, cultures, and times of origin on the basis of style.

However, experimental verification of style-based attribution of artworks has rarely been tried, possibly due to methodological problems. For example, it is obvious that artworks of the same artists often show different styles, since techniques such as adoption of different styles and stylistic eclecticism are widespread.

Hypothesis 4: The acuity of style perception of subjects predicts the successful attribution of novel excerpts in contexts of stylistic contrast.

If a connection exists between the perception of stylistic qualities and the recognition of text excerpts as produced by the same author, and belonging to the same novel, this result would confirm the function of style in categorization tasks. It could also be regarded as indirect proof for the important role of perceptual qualities in the recognition of style.

The study

Participants

Answers for the study, which was programmed and hosted on an online survey site (Fluidsurveys), were ordered via a crowdsourcing service (Crowdfunder). 649 subjects participated in this study (362 female, 287 male), the mean age was 35.8 years (SD 12.5). Answers were restricted to participants residing in Canada, United States and Great Britain, and the participants showed a wide distribution over these countries, coming from more than 100 different cities. Participants were offered a small compensation for their work. Mean completion time was 5:11 min. (SD 4:03 min.).

In recent years, the validity of scientific research based on crowdsourcing has been scrutinized in methodological studies. Buhrmester, Kwang, & Gosling (2011) compared studies conducted on Mechanical Turk (one of the largest platforms for crowdsourcing) with respect to several psychometric scales and found no meaningful differences between the populations. Paolacci, Chandler, & Ipeirotis (2010) replicated some classical cognitive experiments on reasoning via crowdsourcing and found that results were identical to those from the laboratory experiments. In comparative studies, it was demonstrated that crowdsourcing services deliver data samples of a quality equal to or higher than traditional university participant pools; the participants in these studies were older, more ethnically diverse, and had more work experience (Behrend, Sharek, Meade, & Wiebe 2011).

In crowdsourcing, it is very important to ensure that the participants are satisfied with the conditions offered by the researchers, including clarity of instructions and fairness of pay. Since there is no direct personal contact between subjects and researchers, contributor ratings are an important tool to guarantee that participants are satisfied with the conditions of the research. The contributor satisfaction for this study was high: On a scale from 1 (lowest) to 5 (highest), the overall contributor satisfaction was 4.5.

Materials

Two novels with a *modern* and two novels with a *postmodern* style were selected, in the following way. In a first step, a list of modern and a list of postmodern authors was compiled from various sources, including Wikipedia lists, and complemented by additional research. However, a writer might be classified as modern and postmodern for other than purely stylistic reasons. Therefore, 10 writers were sampled from each list whose work was judged to fit the stylistic categories modern and postmodern, and one novel from each writer was randomly selected (from the novels that were accessible; writers who had not written a novel, or whose novels weren't accessible, were replaced). From this sample, novels were chosen that had a certain stylistic coherence during the whole work (changes of style would have interfered with the attribution task), and that allowed the choice of two excerpts which weren't connected by place or person names, topic, or other content aspects.

The selection process aimed at finding novels with contrasting stylistic properties; it was supposed that novels commonly understood as belonging to the categories *modern* and *postmodern* would be different enough, in regard to their stylistic properties, to prompt readers to rate them differently on corresponding semantic scales (cf. hypothesis 1). Obviously, the selection of two novels from each of the categories isn't sufficient to make any assertions about modern and postmodern

novels in general. Different ratings for the selected novels would only allow us to conclude that *some* novels from these broad categories are perceived differently.

The chosen works were, for modern literature, *A Farewell to Arms* by Ernest Hemingway (1929/1994) and *After Many a Summer* by Aldous Huxley (1939/1955), and for postmodern literature, *American Psycho* by Bret Easton Ellis (1991) and *Microserfs* by Douglas Coupland (1995).³ From each novel, two excerpts were chosen, the opening and a second excerpt close to the middle that did not mention persons or locations from the first excerpt (mean length of both excerpts: 639 characters, min: 571, max: 679). All excerpts are reproduced in Table 6 in the appendix.

Study design and procedure

An online survey was created on a survey hosting website (FluidSurveys). The study had two conditions with differing priming questions. The questionnaire layout is shown in Table 7 in the appendix. The survey logic randomly chose one of the conditions (with different priming), and one of the four novels, for which excerpt 1 (the novel beginning) was presented. In each condition, subjects rated one stimulus from each style; if they had first been presented one of the modern novels, they got a postmodern excerpt in their second turn, and vice versa.

The attribution task (question 11) consisted in the presentation of two excerpts from the middle of the novels (labeled “excerpt 2”), from which the subjects had to choose the excerpt that belonged to the novel the beginning of which they had been shown (“excerpt 1”). This excerpt was randomly contrasted with one of the two novels in the other style (e.g. for a modern novel, the correct excerpt 2 was shown in comparison with one of the two excerpts 2 from the postmodern novels). Therefore, stylistic similarity was a hint towards the right answer in this task (in the sense that only the correct excerpt belonged to the same style category, *modern* or *postmodern*, in comparison with the first excerpt), but subjects were not told this.

3. Two of the selected authors are frequently mentioned in regard to their styles. Bret Easton Ellis has himself commented on this style as a key to understanding his work (cited in Jürgens, 1999; cf. Siefkes, 2012, p. 298). The style of Ernest Hemingway has been investigated in a number of book-length studies (Sutherland, 1972; Thomaneck, 1969) and remains a topic of literary criticism (Reich-Ranicki, 2008).

Results

Semantic scales and perceptual qualities of style

For aesthetic preference (liking scale) and for each of the 6 semantic scales, a 2×2 mixed design ANOVA was conducted with *Priming* and *Style* as factors, and ratings on one of the scales as dependent variable.

For all seven scales, the within-subjects factor *Style* showed a significant effect. Furthermore, for the six semantic scales, mean ratings for the two styles differed in the direction envisaged for the respective style (cf. Table 1).

Table 1. Ratings for modern and postmodern novel excerpts

Q.	Rating scale [0–100]	Modern (Hemingway & Huxley)		Postmodern (Ellis & Coupland)		Effect	
		Mean	SEM	Mean	SEM	F (1, 647)	p
4	Liking	55.27	0.857	48.10	0.967	47.51	< 0.001
5	incoherent – coherent	65.35	0.785	55.86	0.842	90.88	< 0.001
6	clear – ornamental	45.72	0.804	47.78	0.799	4.30	0.039
7	complex – simple	55.06	0.772	51.66	0.820	11.11	< 0.001
8	formal – colloquial	45.26	0.797	57.29	0.773	118.94	< 0.001
9	emotional – rational	51.79	0.743	47.25	0.764	21.16	< 0.001
10	serious – playful	41.04	0.797	46.70	0.811	26.95	< 0.001

Note. The table shows group means and standard errors of the mean (SEM) for the within-subjects factor *Style* (with levels *Modern* and *Postmodern*) for *Liking* (aesthetic preference) and six semantic scales ($n = 649$). All group differences were significant ($\alpha = .05$). No significant differences were found for the between-subjects factor *Priming*, therefore the table shows aggregated values combining both *Priming* conditions. Scales corresponded to numbers from 0 (left) to 100 (right). Significantly higher means are printed in bold: e.g., the two modern novels (Hemingway & Huxley) are liked better and perceived as more *coherent* than the two postmodern novels (Ellis & Coupland), which were, in turn, perceived as more *ornamental* than the two modern novels.

The between-subjects factor *Priming* (with levels *Style & genre* and *Readers's emotions & experiences*) did not become significant for any of the scales. Therefore in Table 1, group means are not split by the two differently primed conditions.

For all seven scales, similar patterns were found: The main effect for *Style* became significant, whereas neither *Priming* nor the interaction *Style* \times *Priming* reached significance. These results confirm that the tested semantic scales reliably measure differences in perception of the two stylistic groupings.

However, we should make sure that we selected appropriate semantic scales, namely scales that are not too strongly correlated. The correlation matrices for both styles are given in the appendix (Table 8 and Table 9). Due to the high participant number, effect sizes should be considered as more important than significance;

effect sizes for the significant correlations were generally weak. For both styles, the scales *clear – ornamental* and *incoherent – coherent* were negatively correlated, *complex – simple* and *incoherent – coherent* were positively correlated, and *formal – colloquial* and *serious – playful* were also positively correlated. It is plausible that semantic relations between the terms *clear*, *coherent* and *simple*, as well as between *colloquial* and *playful*, are responsible for these correlations. With coefficients between 0.2 and 0.4, these scales are not so strongly related that we could simply combine them, but the correlations might hint at the presence of underlying factors.

In order to test the possibility that some of the scales actually measured the same underlying factors, we calculated three exploratory factor analyses – one for the six scales measuring each style, and one that included all 12 scales (ratings for both styles). In factor analysis, the Kaiser-Meyer-Olkin measure (KMO) is used to indicate if the data is sufficiently correlated to warrant a factor analysis. In all three analyses, values for the KMO measure between 0.57 and 0.59 were found. KMO values below 0.6 are considered as hardly suitable for a factor analysis (Kaiser, 1974, p. 111), and we therefore refrain from interpreting the results of the analyses. Thus, we have found no indications that the tested scales could be reduced to a smaller set, or that underlying factors caused the observed rating differences, and can regard hypothesis 1 as confirmed.

To summarize, the two modern novel excerpts were rated as more *coherent*, *clear*, *simple*, *formal*, *rational*, and *serious*, and the two postmodern novel excerpts as more *incoherent*, *ornamental*, *complex*, *colloquial*, *emotional*, and *playful*. These results seem to indicate that the novels were connected with specific perceptual qualities which were consistently experienced by layperson readers of the novel excerpts.

Relations between semantic scales and aesthetic preference

If semantic scales capture some perceptual qualities that we experience in reading novels, one might speculate that some of these qualities also influence our aesthetic preference. For example, a novel might be preferred if it was perceived as more coherent. To test the connection between ratings on semantic scales and aesthetic preference (hypothesis 3), we calculated two multiple regression models. They tested the predictive power of ratings on the six semantic scales for the liking ratings, separately for the two modern and the two postmodern novels.

The results (cf. Table 2) tell us that general aesthetic preference, coded in the variable *Liking*, is predicted by about half of the semantic scales. Due to the large sample size, however, statistical significance alone can be misleading. If we take the effect size into account (indicated by the beta coefficients), only higher *coherent* and *playful* ratings substantially predict preference for both the modern and postmodern novels, and higher *formal* ratings substantially predict preference for the two postmodern novels.

Table 2. Relationship between ratings on semantic scales and preference

Q.	Scale	(A) Prediction of Liking ratings for Hemingway & Huxley. Model: $F(6, 642) = 35.51$; $R^2 = .249, p < .001$		(B) Prediction of Liking ratings for Ellis & Coupland. Model: $F(6, 642) = 71.76$; $R^2 = .401, p < .001$	
		β (standardized coefficient)	p	β (standardized coefficient)	p
5	incoherent – coherent	.487	< .001	.623	< .001
6	clear – ornamental	-.007	.856	.035	.308
7	complex – simple	-.101	.006	-.062	.065
8	formal – colloquial	-.016	.668	-.144	< .001
9	emotional – rational	-.054	.122	.074	.018
10	serious – playful	.256	< .001	.175	< .001

Note. The table shows the results of two linear regression models: (A) predicting preference for the two modern novels (Hemingway & Huxley) from ratings of these novels on six semantic scales, and (B) predicting preference of the two postmodern novels (Ellis & Coupland) from ratings of these novels on six semantic scales. Discounting very weak effects, higher ratings on the scales *incoherent – coherent* and *serious – playful* predicted higher preference for all novels, and lower ratings on the scale *formal – colloquial* predicted higher preference for the two postmodern novels (Ellis & Coupland).

It should be noted that the perception as more *coherent* and *playful* generally predicted higher liking ratings, although we know that the two modern novels were perceived as significantly more *coherent*, and the two postmodern novels as significantly more *playful*, than the novels belonging to the respective other style (cf. Table 1). We can therefore conclude that semantic scales contribute to aesthetic preference independently of a possible association of their poles with different styles. In other words, novel excerpts were generally preferred when perceived as more *coherent* and as more *playful*, even though these properties were differently associated with the two styles.

Attribution of excerpts to novels

The fourth and final hypothesis predicted a connection between perception of style and attribution of novel excerpts. To test hypothesis 4, it is necessary to decide how we can operationalize the concepts formulated in this hypothesis.

How should we operationalize acuity of style perception? For the six semantic scales we use, each style is associated with one pole, and the other with the opposite pole (cf. Table 1); a simple option therefore would be to measure the distance of a rating from the pole associated with this stylistic quality. For example, for the scale *incoherent – coherent*, we could have measured the distance of ratings for the two modern novels from the pole *coherent*, with which it is associated, and accordingly

the distance of ratings for the two postmodern novels from the pole *incoherent*. However, this method would have the disadvantage that it uses absolute values on the scales: If a subject generally rates lower or higher, this would change the calculated values on this scale. A better measure consists in calculating the rating difference between the two modern and the two postmodern novel excerpts. If a subject is able to perceive a stronger difference for a perceptual quality between both styles, this might well predict his or her success for the attribution task, where they had to choose the correct excerpt against an excerpt in the respective other style.

Table 3. Operationalization of the concepts in hypothesis 4 for experimental research

Concept	Operationalization
Acuity of perception of stylistic qualities by an individual	The rating difference this individual shows, for two styles, on semantic scales whose poles are associated with different styles (in this case, with two modern or two postmodern novels).
Attribution of literary excerpts in contexts of stylistic contrast	Attribution of excerpts as belonging to the same work and author, in comparison with excerpts from another style.

We therefore encoded rating differences for each scale in a new variable, which gave the difference between the two ratings. For each scale, this variable was calculated by subtracting the value for the style where the respective scale showed a higher mean rating.⁴ Obviously, some of the variance of these calculated scales rating differences is due to the fact that subjects were randomly presented one of the two modern and one of the two postmodern novels, leading to four combinations (the order was also randomized, resulting in eight permutations): Subjects comparing Hemingway with Huxley might have different impressions from those comparing Hemingway with Coupland, etc.

For the calculated variables which indicate, for each subject, the rating difference between the two styles, we calculated the mean and standard deviation after splitting the data by correct or incorrect attribution of novel excerpts (cf. Table 4).

Since the dependent variable is dichotomous (attribution was either correct or not), we used logistic regression analysis. The rating differences between the two styles on six semantic scales were used as regressors in two logistic regressions, with attribution of the two modern and the two postmodern excerpts as regressands. The results are shown in Table 5.

4. For example, for the variable *incoherent_coherent_diff*, the variable *incoherent_coherent_m* (modern) was subtracted from *incoherent_coherent_pm* (modern); for *clear_ornamental_diff*, the variable *clear_ornamental_pm* was subtracted from *clear_ornamental_m*, etc. This led to negative values when subjects differed from the majority in attributing the poles of the scales, e.g. when they perceived the postmodern novel excerpt as more coherent than the modern novel excerpt.

Table 4. Attribution of novel excerpts and acuity of style perception

Q. Attribution of excerpt 2 (against opposite style)		Modern novels (Hemingway & Huxley)	Mean (standard deviation) of rating differences between modern and postmodern novels							
		<i>N</i>	%	<i>incoherent – coherent</i>	<i>clear – ornamental</i>	<i>complex – simple</i>	<i>formal – colloquial</i>	<i>emotional – rational</i>	<i>serious – playful</i>	
11	Modern novels	Incorrect	125	19.3	1.87 (22.55)	-1.16 (24.01)	5.38 (21.87)	1.04 (25.35)	.62 (23.72)	2.50 (24.55)
		Correct	524	80.7	11.31 (25.64)	2.83 (26.29)	2.93 (27.24)	14.65 (28.02)	5.47 (25.30)	6.42 (28.30)
	Postmodern novels	Incorrect	179	27.6	5.08 (22.01)	2.61 (27.19)	3.90 (26.53)	6.68 (25.98)	2.35 (26.46)	1.71 (24.93)
		Correct	470	72.4	11.17 (26.32)	1.86 (25.42)	3.21 (26.23)	14.06 (28.53)	5.37 (24.48)	7.17 (28.49)

Note. The table shows the numbers for correct and incorrect attribution of novel excerpts in answer to question 11 (cf. Table 7), and mean (within-subjects) rating difference for the two modern novels (Hemingway & Huxley) and the two postmodern novels (Ellis & Coupland), split by correct and incorrect attribution. Mean differences for scales which significantly predicted attribution success (cf. Table 5) are marked in bold.

Table 5. Relationship between acuity of style perception and attribution of novel excerpts

Q.	Scale (rating diff. between the two modern and the two post-modern novels)	Binary logistic regression predicting attribution of the two modern novels. The model explained 9.2% of variance (Nagelkerke R^2), with $\chi^2(6) = 38.25$, $p < .001$. Correct classification 65.6% (specificity 59.2%, sensitivity 67.2%, cut-off value 0.78).			Binary logistic regression predicting attribution of the two postmodern novels. The model explained 4.1% of variance, with $\chi^2(6) = 18.80$, $p < .005$. Correct classification 62.2% (specificity 50.3%, sensitivity 66.8%, cut-off value 0.70).		
		β	Wald's χ^2	p	β	Wald's χ^2	p
5	incoherent – coherent	.014	8.707	.003	.009	5.364	.021
6	clear – ornamental	.002	.184	.668	-.006	2.318	.128
7	complex – simple	-.006	1.872	.171	.000	.001	.982
8	formal – colloquial	.017	15.833	.000	.007	4.295	.038
9	emotional – rational	.007	2.653	.103	.004	1.271	.259
10	serious – playful	-.003	.534	.465	.004	1.348	.246

Note. The table shows the results of two binary logistic regression models with rating differences between the two modern novels (Hemingway & Huxley) and the two postmodern novels (Ellis & Coupland) on six semantic scales as regressors and attribution of modern and postmodern novel excerpts (with levels *correct* and *incorrect*) as regressands. In both models, the rating differences (between modern and postmodern novels) on the scales *incoherent – coherent* and *formal – colloquial* significantly predicted attribution success, but the effects were larger for Hemingway & Huxley.

For both attribution tasks (modern excerpts and postmodern excerpts), rating differences between modern and postmodern novels on the two scales *incoherent – coherent* and *formal – colloquial* significantly predicted attribution success. Rating differences on the other four scales did not contribute significantly.

We can conclude that these two scales correspond to perceptual qualities that helped people to attribute excerpts correctly, whereas the perceptual qualities corresponding to the other scales did not help them. If we go back to Table 1, we can see a plausible explanation: Mean ratings for these two scales differ more than for the other scales. Obviously, the two modern and the two postmodern novels were perceived as markedly different on these two scales. Although the other four scales also show significant differences for both styles, allowing all six scales to be categorized as perceptual qualities, the scales *incoherent – coherent* and *formal – colloquial* capture more characteristic differences between these two styles.

Hypothesis 4 is therefore confirmed for the two scales which show the largest mean rating differences between the two modern and the two postmodern novels. Rating differences for an individual on these scales predict his or her success in attributing a novel excerpt, which had to be chosen against an excerpt in another style. Since these two scales showed the largest mean rating difference, it is possible that the influence on the other scales did not reach significance. In this case, the effect would be more general, and we might assume that a third factor, namely stylistic sensitivity, causes rating differences of an individual and attribution success in situations of stylistic contrast. Independently of this question, we can infer two important properties of style reception from the results:

- (i) Style-based categorization helps us to attribute literary texts to works and authors

The attribution task used in this study is an example of style-based categorization. To our knowledge this is the first controlled experimental verification of style-based classification in literary style, a potentially important property of style (Siefkes, 2012, pp. 109–110; Siefkes, 2013, pp. 3–4).

- (ii) Style-based categorization is connected with perceptual qualities experienced by readers of novels

If a reader judges these perceptual qualities more precisely, this will help him/her to discriminate styles which strongly differ in regard to these qualities. The results therefore support the assumption that perceptual qualities connected with specific styles help us to distinguish and recognize styles (Siefkes, 2012, pp. 80–87).

General discussion

The goal of this study was to better understand perceptual qualities of literary style. Four hypotheses were formulated to investigate how style is perceived and interacts with preference for and attribution of novel excerpts. The results support hypothesis 1: All six semantic scales show significant differences between the two style categories. The two novel excerpts that had been categorized as modern (Hemingway and Huxley) are perceived as more *coherent*, *clear*, *simple*, *formal*, *rational* and *serious*, while the postmodern novels (Ellis and Coupland) are perceived as more *incoherent*, *ornamental*, *complex*, *colloquial*, *emotional* and *playful*. An obvious limitation of such descriptions is that they cannot be proven to be

exhaustive; there is always the possibility that further scales are found to be relevant for a specific style.⁵

This outcome for literary style is in accordance with experimental work in other areas such as architectural styles (Siefkes & Arielli, 2015). It hints towards a promising approach of experimental style research, namely studies that connect perceptual qualities with measurable features, two aspects of style that have rarely been combined in empirical investigations. For example, the differences between the novels in our test could also be measured on a number of dimensions (sentence length, syntactic complexity, size of vocabulary, number of foreign words, technical or colloquial terms, etc.), and the connection between measurable features and perceptual qualities could then be calculated (with regression analysis).

The present study used only a small number of novel excerpts. The aim was to show that perceptual qualities are a relevant aspect of style and that semantic scales are suitable to measure these perceptual qualities. Due to the small number of novels tested, generalizations for the broadly defined categories *modern* and *postmodern* cannot be drawn on this basis. It was only demonstrated that *some* novels which arguably belong to these categories are experienced differently.

It was assumed that the novels belonging to the same stylistic category would be more similar in regard to their stylistic properties than those belonging to different stylistic categories, an assumption that was borne out. By grouping the results for two modern and two postmodern novels, and comparing them with each other, it was demonstrated that works can be grouped by stylistic similarity, and compared with the proposed method. However, a number of methodological problems would have to be solved in order to make more general claims for the categories *modern* and *postmodern* (cf. section 3.6 for a discussion). In this respect, the present study was method-oriented, testing an approach that may be developed further, aiming towards a method for comparing any two stylistic categories that allow for a precise delimitation.

Hypothesis 2 was not supported. There is no evidence for an influence of priming for awareness of objective factors (style, time of writing, and genre), in comparison to priming for emotional involvement. Furthermore, pilot studies had not shown effects for two other priming differences, namely style and genre vs. content (where questions related to the plot and characters were asked), and style and genre vs. author empathy (where questions related to the intentions and emotions of the writer were asked). Thus, the results seem to show that this method of

5. The approach used in the present study for the construction of candidate scales to be tested is described in cf. section 2.1. It could be further refined, and alternative methods may also be useful, cf. footnote 1. Generally, the approach used for selecting scales should be specified, so that other researchers can repeat the procedure (for the same or for other styles).

priming (with the use of questions between the stimulus and the target questions) generally does not result in different ratings of literary stimuli.

Hypothesis 3 postulates that the acuity of style perception influences general aesthetic preference. The results show that ratings on some of the scales significantly predicted aesthetic preference (liking), but the effects were mostly weak. These differences did not move in the direction of the pole of each scale that was associated with the style: Higher ratings towards one pole of the scales (towards *coherent* and *playful*, respectively) predicted higher liking ratings for both styles, even though coherence was more strongly associated with modern, and playfulness with postmodern novel excerpts (cf. section 0). This demonstrates that certain stylistic qualities contribute positively or negatively to general aesthetic preference, independently of their association with one style. Intuitively, one might have expected a different result: Since modern novels were rated to be more coherent and serious, and postmodern novels to be more incoherent and playful, shouldn't these perceptual qualities then also be judged as appropriate for the respective styles, and therefore positively valued? However, the results seem to indicate that readers generally prefer certain perceptual qualities of style over others.

It would be worthwhile to investigate if this result depends on the expertise of readers. Experts (authors, literary scholars, or students of literature) might value stylistic unity more than laypersons and therefore evaluate perceptual qualities more positively when they fit the respective style. They might, for example, give higher preference ratings to modern novels when they perceive them to be more *serious*, and higher preference ratings to postmodern novels when they perceive them to be more *playful*. If we assume that the subjects in our study were mostly laypersons (they were not selected in regard to literary expertise), it seems that laypersons are generally able to perceive stylistic differences (e.g. novels with modern style as more *serious* and novels with postmodern style as more *playful*), but that they do not perceive these properties as an integral part of the style, and do not draw the conclusion that the presence of, for example, *seriousness* or *incoherence* should be valued differently according to the style of the novel.

In regard to hypothesis 4, we can draw the conclusion that acuity of style perception is connected with the ability to attribute excerpts to larger works in contexts of stylistic contrast. Obviously, the patterns of perceptual qualities that characterize styles (cf. hypothesis 1) help us to distinguish works from each other based on their style. This result points towards the importance of literary style for distinguishing and categorizing works.

Limitations and further work

The study reported in this article focused on the experience of style by non-expert readers. The aim was to show that perceptual qualities should be treated as an integral part of style. The definition of style that can be investigated with this method should be clearly distinguished from other related concepts. For example, the concept of *voice* allows for the distinction between author's voice, narrator's voice, and character's voices. In the present study, direct speech is simply treated as one aspect of the style of a novel excerpt, contributing to the overall stylistic impression (see Table 6). While the proposed method could be used to compare the speech of different characters, it cannot tease apart the various voices (including the narrator's) that contribute to it.

It should be kept in mind that the perceptual qualities of style investigated here are specific for the novels in question, and do not epitomize the modern or postmodern style *per se*. A selection of two novels from each style category is obviously not enough to draw general conclusions about the respective category. The present study aimed to investigate stylistic differences between *some* novels that can be categorized as modern and postmodern in regard to their style. Further research could aim to establishing a general relationship between these (or other) stylistic categories and perceptual qualities experienced by readers. However, such a study would have to include a much larger sample of texts, and it would also have to solve the problem of delineating more clearly the categories in question. If this proves difficult for broad categories such as 'modern' and 'postmodern', the developed methodology could be applied to compare smaller and less contested stylistic categories. The present study should therefore be regarded as a proof-of-concept for the investigation of perceptual qualities of style.

The results of this study therefore cannot be understood as support for the notion of epoch styles (Fix & Wellmann, 1997; Müller, 2009), a concept that assumes that many or all literary works of an epoch have the same style. If we decouple stylistic terms such as *modern* and *postmodern* from a strict chronological sense, we may assume them to describe broad stylistic categories that are used, for example, in reviews and discussions with the intention to capture stylistic aspects.

Furthermore, stylistic categories cannot be supposed to be co-extensive with the general labels *modern literature* or *postmodern literature*. A novel may be considered modern or postmodern because of its narrative structure, or even aspects of its content. The methodology of the present study was tailored to capture perceptual qualities connected with styles at the level of specific literary texts. It isn't suitable to investigate non-stylistic distinctions that may be connoted by the terms *modern* and *postmodern*.

While the present study was too small for results that could be generalized for the style categories modern and postmodern, it was intended to show that perceptual qualities are connected with styles, and that semantic scales can be used to capture stylistic impressions on the level of specific literary texts. Using a much higher number of novel excerpts, it could be tested if some or all of the present results may be generalized to the categories *modern* and *postmodern* (or any other stylistic category distinction that is of interest). For such a study, a higher number of participants may be needed to avoid habituation effects, which could occur when many novel excerpts are presented to the same subjects, leading them to expect certain stylistic qualities and contrasts. It will also be necessary to reflect more thoroughly on the style categories used, and to devise a more advanced method for determining which novels should be categorized as modern and postmodern, possibly using experts' opinions on appropriate criteria for the respective categories. The complexity of these issues is considerable; the present study could only provide a first step in this direction.

Acknowledgements

This work was supported by a Feodor Lynen Postdoctoral Fellowship from the Alexander von Humboldt Foundation. Two anonymous reviewers of the journal *Scientific Study of Literature* made a number of helpful suggestions which significantly improved this article.

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Appendix

Table 6. Novel excerpts used as stimuli

Style	Stimulus	Author / Novel / Year of publication / Excerpts used as stimuli
MODERN	NOVEL 1	Ernest Hemingway, <i>A Farewell to Arms</i> , 1929 (p. 3)
	EXCERPT 1	In the late summer of that year we lived in a house in a village that looked across the river and the plain to the mountains. In the bed of the river there were pebbles and boulders, dry and white in the sun, and the water was clear and swiftly moving and blue in the channels. Troops went by the house and down the road and the dust they raised powdered the leaves of the trees. The trunks of the trees too were dusty and the leaves fell early that year and we saw the troops marching along the road and the dust rising and leaves, stirred by the breeze, falling and the soldiers marching and afterwards the road bare and white except for the leaves.
		Ernest Hemingway, <i>A Farewell to Arms</i> , 1929 (p. 141)
	EXCERPT 2	I saw the carriage coming. It stopped, the horse's head hanging in the rain, and the waiter stepped out, opened his umbrella, and came toward the hotel. We met him at the door and walked out under the umbrella down the wet walk to the carriage at the curb. Water was running in the gutter. "There is your package on the seat," the waiter said. He stood with the umbrella until we were in and I had tipped him. "Many thanks. Pleasant journey," he said. The coachman lifted the reins and the horse started. The waiter turned away under the umbrella and went toward the hotel.
	NOVEL 2	Aldous Huxley, <i>After Many a Summer</i> , 1939 (p. 9)
	EXCERPT 1	It had all been arranged by telegram; Jeremy Pordage was to look out for a coloured chauffeur in a grey uniform with a carnation in his button-hole; and the coloured chauffeur was to look out for a middle-aged Englishman carrying the Poetical Works of Wordsworth. In spite of the crowds at the station, they found one another without difficulty. "Mr Stoyte's chauffeur?" "Mr Pordage, sah?" Jeremy nodded and, his Wordsworth in one hand, his umbrella in the other, half extended his arms in the gesture of a self-deprecatory mannequin exhibiting, with a full and humorous consciousness of their defects, a deplorable figure accentuated by the most ridiculous clothes.
		Aldous Huxley, <i>After Many a Summer</i> , 1939 (p. 119)
	EXCERPT 2	He took them into the house. Here was the little electric mill, hardly larger than a coffee-machine, in which he ground his own flour as he needed it. Here was the loom at which he had learnt and was now teaching others to weave. Next he took them out to the shed in which, with a few hundred dollar's worth of electrically operated tools, he was equipped to do any kind of carpentry and even some light metal-work. Beyond the shed were the still unfinished greenhouses; for the vegetable plots weren't adequate to supply the demands of his transients. There they were, he added, pointing through the increasing darkness to the lights of a row of cabins.

POSTMODERN	NOVEL 3	Bret Easton Ellis, <i>American Psycho</i> , 1991 (p. 3)
	EXCERPT 1	ABANDON ALL HOPE YE WHO ENTER HERE is scrawled in blood red lettering on the side of the Chemical Bank near the corner of Eleventh and First and is in print large enough to be seen from the backseat of the cab as it lurches forward in the traffic leaving Wall Street and just as Timothy Price notices the words a bus pulls up, the advertisement for <i>Les Miserables</i> on its side blocking his view, but Price who is with Pierce & Pierce and twenty-six doesn't seem to care because he tells the driver he will give him five dollars to turn up the radio, "Be My Baby" on WYNN, and the driver, black, not American, does so.
		Bret Easton Ellis, <i>American Psycho</i> , 1991 (p. 187)
	EXCERPT 2	The one bathroom at Chernoble is unisex. Two other couples are already there, one of them in the only stall. The other couple is, like us, impatiently waiting for the stall to empty. The girl is wearing a silk jersey halter top, a silk chiffon skirt and silk sling-backs, all by Ralph Lauren. Her boyfriend is wearing a suit tailored by, I think, William Fioravanti or Vincent Nicolosi or Scali – some wop. Both are holding champagne glasses: his, full; hers, empty. It's quiet except for the sniffing and muted laughter coming from the stall, and the bathroom's door is thick enough to block out the music except for the deep thumping drumbeat. The boy taps his foot expectantly.
	NOVEL 4	Douglas Coupland, <i>Microserfs</i> , 1995 (p. 1)
	EXCERPT 1	This morning, just after 11:00, Michael locked himself in his office and he won't come out. Bill (Bill!) sent Michael this totally wicked flame-mail from hell on the e-mail system – and he just wailed on a chunk of code Michael had written. Using the <i>Bloom-County</i> -cartoons-taped-on-the-door index, Michael is certainly the most sensitive coder in Building Seven – not the type to take criticism easily. Exactly why Bill would choose Michael of all people to wail on is confusing. We figured it must have been a random quality check to keep the troops in line. Bill's so smart. Bill is wise. Bill is kind. Bill is benevolent. Bill, Be My Friend ... <i>Please!</i>
		Douglas Coupland, <i>Microserfs</i> , 1995 (p. 185)
	EXCERPT 2	Near the EPROM shelves, Karla, Todd, and I were marveling at the pyramids of hostess products, the miles of computing magazines, the cascade of nerdiana lifestyle accessories: telecom wiring supplies, chips, pornography, razors, Doritos, chemicals for etching boards, and all the components of the intangible Rube Goldberg machines that lie just beneath the Stealth black plastic exterior of the latest 1,299.99 gizmo. The only thing they <i>don't</i> have is backrubs. Karla tried to find tampons and failed. " <i>Make mental note,</i> " she said, speaking into an imaginary Dictaphone machine. " <i>Fry's sells men's but not women's hygiene products.</i> "

Note. From each novel, the beginning and an excerpt near the middle were chosen.

Table 7. The design and questions of the study

Condition 1			Condition 2							
You will read short passages from two novels. Please consider the style and genre.			You will read short passages from two novels. Please consider your feelings and personal experiences.							
Stimulus NOVEL EXCERPT 1			Stimulus NOVEL EXCERPT 1							
	Question text	Question type		Question text	Question type					
1	Which style does this novel have? <input type="checkbox"/> Realist, <input type="checkbox"/> Romantic, <input type="checkbox"/> Stream of consciousness, <input type="checkbox"/> Modern, <input type="checkbox"/> Postmodern, Other: _____	Checkbox	PRIMING BLOCK	What do you prefer in this passage? <input type="checkbox"/> Explanations, <input type="checkbox"/> Characters, <input type="checkbox"/> Landscape and surroundings, <input type="checkbox"/> Plot and suspense, <input type="checkbox"/> None, Other: _____	Checkbox					
						2	Can you guess the time of writing? [in smaller print:] (before 1800, 1800–49, 1850–99, 1900–49, 1950–99, 2000–today)	Text (with list of answer examples)	How does this passage make you feel? [in smaller print:] (e.g. happy, sad, hopeful, melancholic, bored, surprised, disgusted, etc.)	Text (with list of answer examples)
Do you like this passage?		Do you like this passage?								
4	not at all _____ very much	Slider	TARGET BLOCK	not at all _____ very much	Slider					
Please rate this passage on the following scales:			Please rate this passage on the following scales:							
5	incoherent _____ coherent	Slider		incoherent _____ coherent	Slider					
6	clear _____ ornamental	Slider		clear _____ ornamental	Slider					
7	complex _____ simple	Slider		complex _____ simple	Slider					
8	formal _____ colloquial	Slider		formal _____ colloquial	Slider					
9	emotional _____ rational	Slider		emotional _____ rational	Slider					
10	serious _____ playful	Slider		serious _____ playful	Slider					
[next page, without return possibility]										

<p>11 Please read the two passages below. One of them is an excerpt from the novel whose beginning you read on the previous page. Please guess which one.</p> <p><input type="checkbox"/> NOVEL EXCERPT 2 from the same novel [correct answer]</p> <p><input type="checkbox"/> NOVEL EXCERPT 2 from contrasting style</p>	<p>Multiple choice</p>	<p>Please read the two passages below. One of them is an excerpt from the novel whose beginning you read on the previous page. Please guess which one.</p> <p><input type="checkbox"/> NOVEL EXCERPT 2 from the same novel [correct answer]</p> <p><input type="checkbox"/> NOVEL EXCERPT 2 from contrasting style</p>	<p>Multiple choice</p>
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Note. The layout shown here was looped once with changing style, i.e. a subject either rated a modern excerpt and then a postmodern, or a postmodern and then a modern. The sliders went from 0 (left side) to 100 (right side) and were preset to 50. The questions in the priming block (Q1–Q3), and the sliders corresponding to semantic scales (Q5–Q10),⁶ were shown in random order. Checkbox questions allowed more than one answers, multiple choice questions allowed one answer. For both question types, answer options (except “None” and “Other”) were randomized.

Table 8. Correlations between the ratings of modern novels on six semantic scales

Scale		incoherent – coherent	clear – ornamental	complex – simple	formal – colloquial	emotional – rational	serious – playful
incoherent – coherent	<i>r</i>	1					
	<i>p</i>						
clear – ornamental	<i>r</i>	-.298	1				
	<i>p</i>	< .001					
complex – simple	<i>r</i>	.237	-.246	1			
	<i>p</i>	< .001	< .001				
formal – colloquial	<i>r</i>	-.086	.200	.104	1		
	<i>p</i>	.028	< .001	.008			
emotional – rational	<i>r</i>	.064	.053	.101	.061	1	
	<i>p</i>	.104	.178	.010	.121		
serious – playful	<i>r</i>	-.115	.197	.049	.281	.039	1
	<i>p</i>	< .001	< .001	.213	< .001	.325	

Note. The correlation table shows the Pearson correlation coefficient *r* and the two-tailed *p*-value.

6. The six semantic scales alternated in orientation; thus, acute perception of style on one scale implied movement of the scales in different directions (lower values for three scales and higher values for the other three scales). This alternating orientation was intended to minimize interference between the sliders.

Table 9. Correlations between the ratings of postmodern novels on six semantic scales

Scale	incoherent – coherent	clear – ornamental	complex – simple	formal – colloquial	emotional – rational	serious – playful
incoherent – coherent	<i>r</i> 1 <i>p</i>					
clear – ornamental	<i>r</i> –.347 <i>p</i> < .001	1				
complex – simple	<i>r</i> .224 <i>p</i> < .001	–.186 < .001	1			
formal – colloquial	<i>r</i> –.112 <i>p</i> .004	.189 < .001	.125 .001	1		
emotional – rational	<i>r</i> .087 <i>p</i> .027	–.014 .722	.145 < .001	–.078 .048	1	
serious – playful	<i>r</i> –.109 <i>p</i> .005	.207 < .001	.217 < .001	.384 < .001	–.002 0.961	1

Note. The correlation table shows the Pearson correlation coefficient *r* and the two-tailed *p*-value.

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