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Rhetorical features facilitate prosodic processing while handicapping ease of semantic comprehension

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ABSTRACT

Studies on rhetorical features of language have reported both enhancing and adverse effects on ease of processing. We hypothesized that two explanations may account for these inconclusive findings. First, the respective gains and losses in ease of processing may apply to different dimensions of language processing (specifically, prosodic and semantic processing) and different types of fluency (perceptual vs. conceptual) and may well allow for an integration into a more comprehensive framework. Second, the effects of rhetorical features may be sensitive to interactions with other rhetorical features; employing a feature separately or in combination with others may then predict starkly different effects. We designed a series of experiments in which we expected the same rhetorical features of the very same sentences to exert adverse effects on semantic (conceptual) fluency and enhancing effects on prosodic (perceptual) fluency. We focused on proverbs that each employ three rhetorical features: rhyme, meter, and *brevitas* (i.e., artful shortness). The presence of these target features decreased ease of conceptual fluency (semantic comprehension) while enhancing perceptual fluency as reflected in beauty and succinctness ratings that were mainly driven by prosodic features. The rhetorical features also predicted choices for persuasive purposes, yet only for the sentence versions featuring all three rhetorical features; the presence of only one or two rhetorical features had an adverse effect on the choices made. We suggest that the facilitating effects of a combination of rhyme, meter, and rhetorical *brevitas* on perceptual (prosodic) fluency overcompensated for their adverse effects on conceptual (semantic) fluency, thus resulting in a total net gain both in processing ease and in choices for persuasive purposes.

1. Introduction

Available evidence suggests that, comparable to findings in other art domains, rhetorical and poetic language enhance ease of processing in some cases (e.g., Kuchinke, Trapp, Jacobs, & Leder, 2009; McGlone & Tofighbakhsh, 1999, 2000; Menninghaus, Bohrn, Altmann, Lubrich, & Jacobs, 2014; Reber, Schwarz, & Winkielman, 2004), while hampering it in others (e.g., Giora et al., 2004; Jakesch, Leder, & Forster, 2013; Miall & Kuiken, 1994, 1998). Roman Jakobson's (1960) model of the "poetic function" of language stipulates that the poetic and rhetorical refinement of language tends to make it more ambiguous and hence more difficult to understand. Formalist poetics and several empirical studies similarly support the notion of higher cognitive processing demands in the context of exposure to artworks (Giora et al., 2004; Miall & Kuiken, 1994, 1998; Shklovsky, 1965/1917). We hypothesized that both the conflicting findings and the apparently contradictory hypotheses may actually not be alternatives but rather apply to different dimensions of language processing and may potentially co-occur in response to the same stimuli. To the best of our knowledge, previous research on both fluency and disfluency effects has not considered—let alone systematically studied—interactions of the two effects in responses to the very same stimuli (cf. the comprehensive theoretical reviews

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by Alter, 2013, and Alter & Oppenheimer, 2009). In the present study we therefore designed a series of experiments, in which we expected to find effects that both conform to and contradict the ease of processing hypothesis for the same set of linguistic stimuli, but on different processing dimensions. If these predicted findings materialized, an explanatory model would be called for that integrates both enhancing and adverse effects of rhetorical patterning on cognitive fluency.

Experimental research on rhetorical features of language has mostly tested the effects of single rhetorical target variables (McGlone & Tofighbakhsh, 1999, 2000; van Peer, 1990). However, far more than just one such feature is typically found even in single sentences of poetic or rhetorical language. Ceasar's famous saying, "veni vidi vici" (I came, I saw, I conquered)—to which Jakobson (1960) referred as an example without specifying its structure—features multiple layers of rhetorical parallelism: all three words are verbs, have two syllables, are rhythmically trochaic, begin with an identical consonant, end with an identical vowel, are used in the past tense and in the first person, and are asyndetically juxtaposed (i.e., the three verbs follow one another without any conjunction). Moreover, the whole utterance features three one word-sentences each of which omits expectable sentence parts (ellipsis of an expectable adverbial specification of space and/or time regarding "veni" and of a grammatical object for both "vidi" and "vici"); and the prosodic (intonational) grouping of these three short sentences is fully convergent with their syntactic grouping. Caesar's saying thus features two fundamental and frequently co-occurring types of rhetorical deviation: (1) layers of linguistically non-mandatory extra order (*hyper-regularity*) and (2) deviations from linguistic standard expectations (*hypo-regularity*).

The example shows just how much complexity of rhetorical patterning can already be studied within the confines of a three-word utterance. Given the typical concerns of experimental control and how little is known about the effects of rhetorical features, we chose a single-sentence paradigm. Our search for a larger set of comparable single sentences soon converged on proverbs, as proverbs, too, not only frequently include multiple rhetorical features, but, moreover, the very same combination of such features. This allowed for a systematic experimental modification of a whole set of rhetorical text properties across a broad range of different sentences. Analyzing a corpus of several hundred proverbs revealed that three rhetorical features are often jointly employed in proverbs (amidst an even broader range of rhetorical features used in a less consistent fashion): rhyme, meter, and rhetorical brevity (for a detailed description of these features, see the section "Materials" for Study 1, Experiment 1a). We considered these three features to represent a critical minimum of complexity that would allow us measuring interaction effects of rhetorical patterning that are likely to be routinely found in sentences featuring multiple rhetorical features (cf. Fechner's concepts of threshold level and interaction, 1876). Given that the selected target features are both phonological (prosodic) and syntagmatic in nature, the present study departs not only from single-feature designs in experimental research on rhetoric, but also from the prevailing focus on semantic figures, and specifically on metaphor, in cognitive research on rhetorical and poetic language.

For the dependent variables hypothetically affected by the experimental manipulation of the three rhetorical target features, we ended up choosing *ease of comprehension*, *succinctness* (or *praegnanz*), *beauty*, and *choice for persuasive purposes*. We included *ease of comprehension* as a dependent variable because it is known to affect the processing of figurative language (Forgacs et al., 2012; Gibbs & Beitel, 1995; Kemper, 1981; Thoma & Daum, 2006) and of artworks in general (Leder, Gerger, Dressler, & Schabmann, 2012), and, furthermore, it bears directly on the ease of processing. We included *succinctness* (or *praegnanz*), because we anticipated that rhetorical brevity should enhance succinctness ratings and thus reflect an important perceptual effect dimension of our stimuli. We included *beauty* because beauty scales are most frequently used for evaluating aesthetic appeal (Jacobsen, Buchta, Köhler, & Schröger, 2004), and beauty has been shown to frequently enhance ease of processing (Reber et al., 2004; Winkielman, Halberstadt, Fazendeiro, & Catty, 2006; Winkielman, Schwarz, Fazendeiro, & Reber, 2003). Finally, we included *choice for persuasive purposes* because higher persuasive power is a typical goal of rhetorical message enhancement and proverbial sentences are mostly used for purposes of admonishment and instruction.

We addressed the following issues: How do individual rhetorical features and their interaction affect perceived ease of comprehension, *praegnanz*, and beauty? How do the objective linguistic features (the rhetorical target features), the cognitive ease of semantic comprehension, and the perceptual as well as aesthetically evaluative dimensions of *praegnanz* and beauty influence which versions of the sentences are chosen for persuasive purposes? Can the same linguistic stimuli simultaneously enhance and reduce processing ease on different dimensions of language processing? If so, which theoretical options may integrate these contrary effects into a coherent account of processing rhetorical message features?

2. Hypotheses

Following Jakobson (1960), we hypothesized that the poetic and rhetorical treatment of language often places higher cognitive demands on semantic understanding, thereby exerting an adverse effect on ease of processing. We call this the *cognitive handicap hypothesis*. In accordance with this hypothesis (though lacking a special focus on features of rhetorical diction), lay beliefs tend to attribute lower levels of "ideal" fluency to poems—which prototypically feature the most poetic treatment of language—when compared to novels and short stories, and to the latter when compared to magazines and newspapers (Galak & Nelson, 2011). At the same time, the *cognitive fluency* hypothesis of aesthetic processing (Reber & Schwarz, 1999; Reber, Winkielman, & Schwarz, 1998; Reber et al., 2004) suggests that poetic and rhetorical language use is considered beautiful and pleasurable insofar as it enhances ease of processing. Cognitive fluency theorists have explicitly defined the "ease of mental operations concerned with stimulus meaning and its relation to semantic knowledge structures" as a "conceptual" rather than "perceptual" type of cognitive fluency (Alter & Oppenheimer, 2009; Reber et al., 2004). Here we measured the ease or difficulty of understanding the meaning of sentences through ratings for ease of comprehension. Measurement of reading times was not an option, because by definition, the experimental modification of our rhetorical target feature *brevitas* required us to alter the total length of the sentences. The rhetorical target features investigated in the present study all have a potential to reduce ease of comprehension. Rhetorical *brevitas* routinely entails the omission of typically expectable or even mandatory sentence parts; accordingly, rhetorical theory has acknowledged a potential conflict between making a message particularly short (through a high degree of *brevitas*) and maintaining ease of semantic comprehension (cf. Quintilian, 1953: IV 2, 46). Something similar holds for meter and rhyme. Both features limit word choice and often lead to artfully altered word morphology and unusual syntactic order. We therefore predicted that the rhetorical target features should negatively impact ease of semantic comprehension. This prediction differs from Jakobson's, however, in that we did not specifically predict greater ambiguity, as ambiguity poses but one specific type of greater cognitive challenge. Rather, we only predicted a general trend towards a greater

demand on semantic processing. Experiment 1a tested this hypothesis.

Regarding the question of which scale may capture the aesthetic effect of proverbial sentences—or at least important dimensions of this effect—as resulting from the co-occurrence of rhetorical brevity with rhyme and meter, we felt that a *praegnanz* scale (cf. "the law of *praegnanz*" in Gestalt psychology; Grossberg & Pinna, 2012; Koffka, 1935; Wertheimer, 1925) may serve this purpose. The German word blends the Latin, French, and English meaning of "pregnant" (in the sense of carrying a valuable content) with two further semantic ingredients: to be capable of leaving behind a strong "imprint" (which would be a literal translation of German *einprägen*)—or a strong impression—and to be "short" as well as "succinct/concise/pointed/put in a nutshell" (Kluge & Seebold, 2002, p. 716). Even though it does not encompass all these semantic dimensions to the same degree, "succinctness" is an altogether decent translation. We hypothesized that *praegnanz*/succinctness ratings should be enhanced in the sentence versions featuring one, two, or all three rhetorical target variables, with the highest ratings expected for the versions featuring all rhetorical variables (meter + *brevitas* + rhyme) and the lowest for the versions featuring none. Experiment 1b tested this hypothesis.

Experiment 1c was based on the fact that in experimental aesthetics as well as in lay concepts of aesthetic appeal, the single most important and most frequently used aesthetic appreciation term is *beauty* (Augustin, Wagemans, & Carbon, 2012; Bohrn, Altmann, Lubrich, Menninghaus, & Jacobs, 2013; Di Dio, Macaluso, & Rizzolatti, 2007; Istok et al., 2009; Jacobsen et al., 2004). Rhetorical and poetic language, too, is often praised for being beautiful. We therefore hypothesized that a beauty rating might similarly capture some dimensions of the overall aesthetic appeal of the sentences. In particular, we predicted that (1) the factor of rhyme should enhance beauty ratings in a way that is roughly similar to how it affects *praegnanz* ratings, since rhyme has previously been shown to promote ease of processing (Coch, Grossi, Skendzel, & Neville, 2005; Kramer & Donchin, 1987; Menninghaus et al., 2014; Rugg, 1984b) and ease of processing is known to often enhance judgments of beauty (Reber et al., 1998); (2) rhetorical brevity should have less of an enhancing effect on beauty than on *praegnanz* as it bears more on strikingness and compact power than on beauty; and (3) consequently, *praegnanz* effects should be clearly distinct from beauty effects.

Study 2 tested how the rhetorical target variables and the three cognitive and aesthetic dimensions (i.e., ease of comprehension, *praegnanz*, beauty) that Study 1 had investigated for causal relations with the rhetorical variables influenced the choice of a version of a sentence (compared to the other versions of that sentence) for *the purpose of persuasion*. Following standard assumptions of rhetorical theory, we predicted that sentences featuring the rhetorical target variables meter, *brevitas*, and rhyme, either individually or conjointly, would be preferred over those that did not feature any of these variables.

3. Study 1

In Study 1, participants' perceptions of (a) the ease of comprehension, (b) the *praegnanz* (succinctness), and (c) the beauty of the different sentence versions were assessed in three independent samples. In all of these samples, the participants were native German speakers and were all recruited at Freie Universität Berlin. For reimbursement, participants were given a choice of receiving either 5 Euros or course credit. Participants were only allowed to participate in one of the experiments in order to prevent familiarity effects. All participants gave informed consent in accordance with the Ethical Guidelines of the German Association of Psychologists (Deutsche Gesellschaft fuer Psychologie, 2004).

The between participants-design was chosen for all experiments in the present study, because many treatises of rhetoric (cf. Aristotle, 1926; Longinus, 1932; Quintilian, 1953) concur that rhetorical effort should be hidden and discrete, specifically where persuasive purposes are involved (as typically is the case with proverbs). This reasoning is driven by the concern that listeners could end up dismissing a message as "rhetorical" in the sense of being potentially dishonest, untrustworthy, manipulative, and the like, if they realize that the rhetorical extra effort that makes a sentence more beautiful or more striking may serve a speaker's pragmatic goal, which may not be identical with the listener's. In order to safeguard our studies against such an anti-rhetorical bias that would erase the potential benefits of rhetorical message enhancement we decided to prevent participants from making interpolations about the configuration of the dependent variables we were interested in. To this end, we collected the data for the various response dimensions under scrutiny—i.e., comprehensibility, *praegnanz*, beauty, and power of persuasion—separately and in a between participants-design. We report how we determined our sample sizes, all data exclusions (if any), all manipulations, and all measures in Experiments 1a–1c (Study 1), and in Study 2.

3.1. Experiment 1a

3.1.1. Participants and procedure

Twenty participants (10 male and 10 female) with a mean age of 26.2 years (*SD* = 4.7; Min = 21; Max = 40) took part in this experiment. The sample size was determined in accordance with previously published work that used similar single sentences as stimuli (e.g., Bohrn et al., 2013). (The same holds for the other experiments reported in this article.) The experiment was programmed in Presentation (Neurobehavioral Systems, Albany, CA, USA) and was run on Dell computers with 22-inch screens and 1024 × 768 screen resolutions. Each participant was seated in front of a computer in the laboratory and could run the experiment at a self-paced speed. After a short introduction, the sentences were presented on the computer screen one at a time in a pseudo-randomized order. Each participant rated all 4 versions of the 32 sentences, resulting in a total of 128 stimuli. To minimize positioning effects, the sentences were sorted into four blocks, each comprising eight sentences of each condition. Each of the 32 sentences occurred in each block, but in different conditions (i.e., different versions). The order of presenting these blocks was balanced across participants. In each trial, the sentences were presented centrally in black font (Arial, 18pt) on a white screen, with the rating scale depicted in the lower half of the screen. Participants rated the sentences by pressing a button on a keyboard with their dominant hand, with no time constraints placed on finishing the ratings. However, once a rating was given, it could not be altered, as the next sentence was displayed on the computer screen. Participants were asked to give their ratings spontaneously.

Ease of comprehension was assessed using a 7-point Likert scale ranging from 1 (*very difficult to understand*) to 7 (*very easy to understand*) in response to the question "How easy or difficult was it to understand the meaning of the proverb?"

3.1.2. Materials

From several collections and dictionaries of German proverbs, we selected 32 (older) proverbs that were pre-rated (see Supplementary Materials 1) as being unfamiliar. We used this criterion in order to avoid potentially confounding effects of familiarity on rhetorical feature processing, aesthetic appreciation, and choices made for the purpose of persuasion. Notably, proverbs *should* be familiar by their very definition, as using a proverb

typically means referring to a shared tradition of anonymous rules of practical wisdom (Arewa & Dundes, 1964; Barley, 1972; Gerrig & Gibbs, 1988). Strictly speaking, unfamiliar proverbs are not lexicalized entries in the extended lexicon of a given language (Bock & Brewer, 1980; Chafe, 1968). Hence the sentences used in the experiments are not proper or actual "pro-verbs," even though they share the same rhetorical features as their more familiar counterparts. Thus, the present study is not about the effects of currently used proverbs, but rather about the effects of the presence or absence of rhetorical features that can be found in unknown proverbs as well as in a variety of other sentences.

The 32 selected items employed three rhetorical features that a preanalysis had found to be most frequently used conjointly in a preselected corpus of 800 proverbs (for more details about both the selection process and the lexical parameters concerning word length and frequency in the stimuli used, see Supplementary Materials 1). These features are *brevitas* (artful shortness), *meter*, and *rhyme*.

Brevitas is a key feature supposed to make proverbs, maxims, sentences of wisdom, etc. more succinct and memorable. It is arrived at by taking away or omitting expected or recoverable parts of a sentence, including syllables of words (Quintilian, 1953: VIII 5, IX; see also Barthes, 1980). The selected sentences featured at least two and mostly three of the following six *brevitas*-promoting characteristics: complete absence of articles, complete absence of adverbs, complete absence of adjectives, complete absence of nouns, complete absence of verbs, and ellipsis of syllables (i.e., contraction of words).

Meter is a prosodic feature that supports a regularized prosodic beat. Time-sensitive measures such as event-related potentials have revealed that metered language reduces processing demands (Luo & Zhou, 2010; Magne et al., 2007; Rothermich, Schmidt-Kassow, & Kotz, 2012; Rothermich, Schmidt-Kassow, Schwartze, & Kotz, 2010; Schmidt-Kassow & Kotz, 2008).

Rhyme typically superimposes phonological recurrence on the final stressed syllables of word sequences, with sentences beginning and ending with rhyming words being a special variant of this recurrence. (German proverbs feature more routinely rhyme than do English proverbs.) Rhyme has previously been shown to support the ease of word and sentence processing and the appeal of the words and sentences (Coch et al., 2005; Kramer & Donchin, 1987; Obermeier et al., 2013; Rapp & Samuel, 2002; Rugg, 1984a, 1984b; Wagner & McCurdy, 2010; but see Acheson & MacDonald, 2011), to strengthen non-focused attention, and to enhance memorability (McQuarrie & Mick, 2009; Mothersbaugh, Huhmann, & Franke, 2002).

In the process of modifying the original sentences, it turned out to be very difficult to independently vary the features of *brevitas* and meter. Inserting additional syllables for the sake of changing the feature of *brevitas* typically affected meter as well. Likewise, if meter was to be modified, syntactic word order often could not remain the same—at least if the words were not replaced by other words, which we tried not to do as much as possible for reasons of experimental control. We therefore ended up treating the two rhetorical features of *brevitas* and meter as a single variable. A recent study has already provided behavioral evidence that meter and rhyme facilitate *prosodic fluency* and simultaneously enhance aesthetic evaluation (Obermeier et al., 2013); regarding rhetorical *brevitas,* though, no such evidence appears to be available yet. However, we suggest that rhetorical *brevitas* not only affects syntax (by omitting expectable parts of a sentence) and semantics (by reducing the number of expectable semantic constituents), but also prosodic fluency; after all, it is its very purpose to make the overall *gestalt* of a sentence highly compact and succinct. Admittedly, we do not provide any objective measure for prosodic fluency in the present study. However, the term serves at least the heuristic purpose of distinguishing these effects from other linguistic fluency effects that have previously been investigated, most notably effects driven by phonemic, lexical, syntactic, orthographic, and font features (cf. the extensive review by Alter & Oppenheimer, 2009).

In addition to the features of *brevitas*, meter, and rhyme, proverbs often use a broad variety of other rhetorical figures, including metaphor and allegory. For sentences that featured metaphorical elements, we kept these elements constant throughout the various conditions. Experimental modification of *brevitas*, meter, and rhyme has the advantage of leaving the imagery and semantics of the sentences mostly unchanged, whereas replacement of metaphors typically implies major changes of both the words and the imagery of a sentence.

By slightly altering wording and word order, our focus features *brevitas*/meter and rhyme were selectively eliminated, resulting in four versions of each sentence (which are all listed in Appendix A): +*brevitas*/meter, +rhyme; −*brevitas*/meter, +rhyme; +*brevitas*/meter, −rhyme; and −*brevitas*/meter, −rhyme. Great care was taken to keep content and, if possible, word stems as close to the original proverb as possible. The focus feature *brevitas*, however, required adding at least three syllables per proverb in order to deactivate the artful shortness.[1] The following English example (that was not part of our study) serves to illustrate the orthogonal variation of the variables *brevitas*/meter and rhyme as performed in our set of German proverbs:

- +*brevitas*/meter, +rhyme (original version): *East or West, home is best.* The sentence features *brevitas* by virtue of syntactic ellipsis ("East or West" stands for "Whether it's in the East or West", "home" for "being at home"), the complete absence of articles and adverbs, and an exclusive use of monosyllabic words. It moreover features two metrically identical kola each consisting of a *creticus* (Éast or Wést/hóme is bést), and also rhyme.
- +*brevitas*/meter, −rhyme: North or South, home is best.
- –*brevitas*/meter, +rhyme: Whether it's in the East or West, being at home is best.
- –*brevitas*/meter, −rhyme (fully de-rhetorized version): Whether it's in the North or South, being at home is best.

Two of the original 32 stimulus sets had to be retroactively excluded from the analysis. We discovered that in one case, rhyme was missing where there should have been rhyme, and in another case, the de-metered version actually featured a different type of metrical regularity rather than none. Thus, the final set of stimuli comprised 30 proverbs, and each proverb was presented in four versions.

3.1.3. Statistical analysis

We implemented a mixed-effects regression model with crossed random effects for participants and items (cf. Baayen, Davidson, & Bates, 2008) and tested for main effects and the interaction effect of rhyme and *brevitas*/meter using Wald-type tests. Subsequently, contrasts between all target feature combinations were tested using Sidak-corrected pairwise comparisons of linear predictions from the fixed effects of the mixed-effects model and delta-method approximations of standard errors. All analyses were done using Stata (2013).

[1] This was achieved by a variety of means: (a) missing articles were added; (b) in cases of syntactic ellipsis, typically ellipsis of the verb, the missing part of a standard sentence was added; (c) as proverbial rules routinely omit any qualification of adequateness and applicability in order to achieve brevity and compactness, it was logically plausible in multiple cases to add expressions of the type "often", "in most cases", and the like; and (d) monosyllabic words were occasionally replaced by longer synonyms or multiword analogues with the same meaning.

3.1.4. Results and discussion

Fig. 1 shows the average comprehensibility ratings of the four proverb versions. Average ratings were higher for proverbs without *brevitas*/meter (significant main effect *brevitas*/meter, $\chi^2(1) = 58.6$, $p < .001$) and without rhyme (significant main effect rhyme, $\chi^2(1) = 23.6$, $p < .001$). However, simple effects within factor levels were not similar as indicated by a significant interaction of the two factors (interaction effect rhyme × *brevitas*/meter, $\chi^2(1) = 65.2$, $p < .001$). Pairwise comparisons revealed that comprehensibility ratings of the fully de-rhetorized versions were significantly higher than those of all other versions, whereas the comprehensibility of the versions featuring rhyme or *brevitas*/meter or their combination was rated at an almost uniformly reduced level (*p*-levels shown in Fig. 1).

To the best of our knowledge, Jakobson's (1960) hypothesis that the superimposition of multiple parallelistic features on linguistic messages (in the present case, rhyme and meter, albeit combined with the additional requirement of *brevitas*) tends to render them more cognitively demanding, has never been empirically tested before the present study. Our data confirm Jakobson's hypothesis, at least for the specific set of rhetorical features as they are employed within the narrow confines of the tested sentences. The completely de-rhetorized versions of the sentences were judged to be easiest to understand. All versions featuring one or more of the rhetorical target features were ranked significantly lower in ease of comprehension, with no significant difference between the three rhetorical versions. As indicated, there appears to be a straightforward explanation for this effect. Sentences aimed at being artfully short, at artfully conforming to a poetic meter, and at featuring rhyme, face a reduced choice of words and high prosodic constraints on word morphology and syntactic word sequence. For these reasons they can easily end up being relatively difficult to understand.

The data presented here are not in line with a previous study in which the presence or absence of rhyme in aphorisms had no effect on ease of comprehension, but promoted truth attributions (McGlone & Tofighbakhsh, 1999, 2000). Importantly, this previous study tested the effects of only one rhetorical target variable (in sentences clearly featuring more such variables). Another study that modified two rhetorical variables over the course of two verses (as opposed to the three variables the present study modified in sentences of single-verse length) also did not find adverse effects on ease of comprehension and even found enhancing effects (Menninghaus et al., 2014). Again, we do not rule out the possibility that in a number of cases—for a variety of feature-, context-, and content-specific reasons yet to be specified—adverse effects of rhetorical patterning on ease of semantic comprehension do not materialize. We suggest, however, that the likelihood of finding the predicted adverse effects strongly depends on the complexity of the interaction between co-occurring rhetorical variables (Fechner, 1876) and, hence, on how great a share of the real complexity of rhetorical patterning is measured by the experimental design.

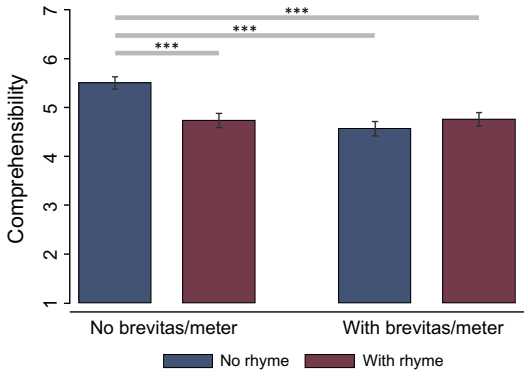

Fig. 1. Mean ratings of ease of comprehension for the different sentence versions. Error bars indicate 95% confidence intervals. Horizontal lines above bars indicate statistical significance of pairwise comparisons of means between two versions. *** $p < .001$.

Research on the benefits of cognitive disfluency (cf. the comprehensive theoretical review in Alter, 2013) suggests that greater cognitive challenges may contribute to a more profound semantic understanding of a message. Thus, reduced fluency may well have an intrinsic positive value rather than merely being a flip side of complex poetic and rhetorical language use. This assumption is in line with the understanding that poetry and other works of literature not only support the ease of prosodic processing and the pleasures taken in refined poetic diction, but also involve audiences in a sustained—and often fairly complex—search for meaning. However, in order not to further expand the already large number of variables under investigation, the present study did not include any investigation of the potential *function* of semantic disfluency for more profound content processing.

3.2. Experiment 1b

3.2.1. Participants, procedure, and materials

Twenty-seven participants (5 male and 22 female) with a mean age of 28.5 years (*SD* = 10.6; Min = 18; Max = 61) took part in this experiment. They answered an online questionnaire programmed with the survey tool Globalpark (Globalpark AG, Köln-Hürth, Germany). Each participant rated four versions each of 32 sentences, resulting in a total of 128 sentences that were presented in randomized order centrally and in black font (Arial, 18pt) on a white screen with the rating scale depicted in the lower half of the screen. Participants rated the sentences by mouse clicks. No time constraints were imposed on giving the ratings, although once given, a rating could not be corrected because the next sentence was shown immediately afterwards. Succinctness was assessed on a 7-point Likert scale ranging from 1 (*not at all succinct*) to 7 (*very succinct*). Prior to the ratings, participants were given an example of versions of a sentence that differed in succinctness. The same two proverbs as in Experiment 1a were excluded, resulting in a final set of 30 proverbs to be analyzed. We implemented the same statistical model and effect tests as for Experiment 1a.

3.2.2. Results and discussion

Fig. 2 shows the average *praegnanz* (succinctness) ratings of the four proverb versions. Average ratings were higher for proverbs with *brevitas*/meter (significant main effect *brevitas*/meter, $\chi^2(1) = 224.8$, $p < .001$) and with rhyme (significant main effect rhyme, $\chi^2(1) = 569.7$, $p < .001$). Simple effects within factor levels were not similar as indicated by a significant interaction of the two factors (interaction effect rhyme × *brevitas*/meter, $\chi^2(1) = 38.3$, $p < .001$). Pairwise comparisons revealed significant differences between *praegnanz* ratings of all proverb versions. Highest *praegnanz* ratings were observed for the original proverb version that combined rhyme and *brevitas*/meter, followed by the version with rhyme but no *brevitas*/meter. Although at a lower level, proverb versions with *brevitas*/meter but no rhyme still yielded higher *praegnanz* ratings than the fully de-rhetorized versions.

The data support the hypothesis that *praegnanz*, or succinctness, is an emergent property, to which the individual rhetorical features contribute in a synergistic fashion and that it serves to capture an important dimension of the readers' aesthetic appreciation of the sentence versions in a quantifiable fashion. Given that the lexical meaning of *praegnanz*, or succinctness, is intimately linked to shortness, one might surmise that the *praegnanz* effect we report

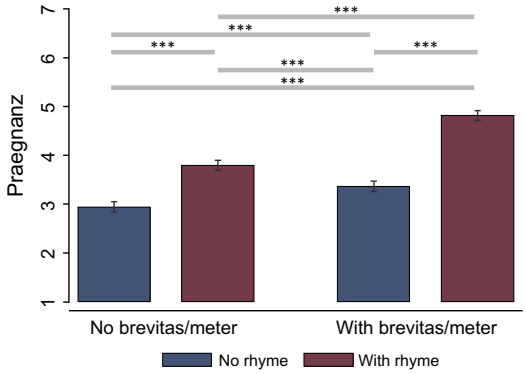

Fig. 2. Mean ratings of *praegnanz* for the different sentence versions. Error bars indicate 95% confidence intervals. Horizontal lines above bars indicate statistical significance of pairwise comparisons of means between two versions. *** $p < .001$.

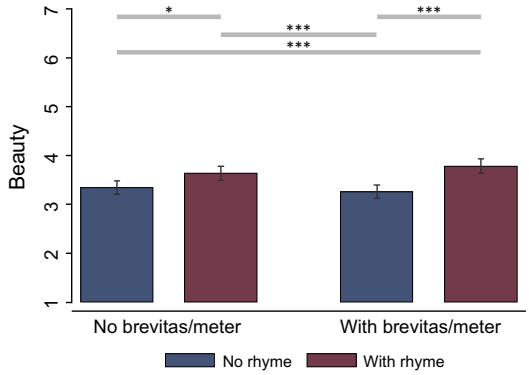

Fig. 3. Mean ratings of beauty for the different sentence versions. Error bars indicate 95% confidence intervals. Horizontal lines above bars indicate statistical significance of pairwise comparisons of means between two versions. *** $p < .001$; * $p < .05$.

for the compound variable *brevitas*/meter may actually be driven by *brevitas* alone. However, a recent study on beauty, *praegnanz*, and funniness effects in humoristic couplets (Menninghaus et al., 2014) reported significant *praegnanz* effects of both rhyme and meter even in the absence of additional differences in sentence length. The latter finding would nonetheless not permit any straightforward generalization, because in humorous couplets both rhyme and meter feature some very special characteristics that are not shared by the rhyme and meter patterns as employed in proverbs, prototypical lyrical verses and most other cases (for details, see Menninghaus et al., 2014).

3.3. Experiment 1c

3.3.1. Participants, procedure, and materials

Twenty participants (10 male and 10 female) with a mean age of 26.8 years ($SD = 4.5$; Min = 21; Max = 36) took part in this experiment. The materials and procedure were identical to Experiment 1a. Beauty was assessed on a 7-point Likert scale ranging from 1 (*not at all beautiful*) to 7 (*very beautiful*). The concept of beauty was not further specified; participants could thus interpret it in a way that was most intuitively meaningful for them. The same two proverbs as in Experiment 1a were excluded, resulting in a final set of 30 proverbs to be analyzed. We implemented the same statistical model and effect tests as for Experiment 1a.

3.3.2. Results and discussion

Fig. 3 shows the average beauty ratings obtained for the four proverb versions. Average ratings were similar for proverbs with and without *brevitas*/meter (non-significant main effect *brevitas*/meter, $\chi^2(1) = 0.16$, $p = .69$), but higher for proverbs with rhyme (significant main effect rhyme, $\chi^2(1) = 37.1$, $p < .001$). Descriptively, the data also indicate a positive contribution of *brevitas*/meter to the beauty ratings of rhymed versions; yet the interaction effect failed to reach significance ($\chi^2(1) = 3.5$, $p = .063$). Pairwise comparisons consequently revealed that beauty ratings of rhymed versions were consistently significantly higher than those of versions without rhyme. The results support the hypothesis that the rhetorical variables affect *praegnanz* and beauty ratings to different degrees.

3.4. Discussion of Experiments 1a–c

Experiment 1a confirmed the hypothesis that the employment of rhetorical or poetic features renders the semantic comprehension of sentences comparatively more demanding, or less fluent. The standard cognitive fluency hypothesis suggests that disfluent processing should result in disliking, including aesthetic disliking of the relevant stimulus (Reber et al., 1998). However, the results of Experiments 1b and 1c do not conform to this hypothesis. In fact, precisely the more rhetorical versions, i.e., those that had received relatively lower comprehensibility ratings in Study 1a, were rated higher in both *praegnanz* and beauty. Interestingly, if viewed separately from Experiment 1a, the effects reported in Experiments 1b and 1c do conform both to the theoretical stipulations of the cognitive fluency hypothesis and to empirical findings informed by this hypothesis (Bohrn et al., 2013; Gerger, Leder, Tinio, & Schacht, 2011; Kuchinke et al., 2009; Reber et al., 2004; Winkielman et al., 2003, 2006; but see Armstrong & Detweiler-Bedell, 2008). Metrical regularity and rhyme have previously been shown to facilitate word and sentence processing and to support a higher degree of aesthetic liking (Coch et al., 2005; Kotz et al., 2010; Kramer & Donchin, 1987; Obermeier et al., 2013; Rothermich et al., 2012; Rugg, 1984a, 1984b). Thus the findings of Experiment 1a do by no means refute the cognitive fluency hypothesis. Rather, they reveal a limitation of this hypothesis—or a need for further refinement—, since the same set of rhetorical variables can exert opposite effects on ease of processing at the levels of semantic and prosodic processing and can still have an overall positive net effect on aesthetic processing (for comparable findings, see Giora et al., 2004; Miall & Kuiken, 1994, 1998).

Theoretical aesthetics suggests that interactions of disfluency and fluency may be an important feature of experiencing aesthetic pleasure. If ease of processing were the only mechanism underlying judgments of aesthetic appeal, there would be a permanent risk of boredom (Armstrong & Detweiler-Bedell, 2008). Accordingly, classical theoretical aesthetics has stipulated that some challenges, including some that counterbalance beauty and ease of processing, are required in order for artworks to exert an appeal that is more than superficial and more lasting (for classical theoretical aesthetics, see the survey presented in Menninghaus, 2003, pp. 26–33; compare also "optimal stimulation" theories, esp. Berlyne, 1974; Giora et al., 2004; Hekkert, Snelders, & van Wieringen, 2003; Leder, Belke, Oeberst, & Augustin, 2004). The tension-release patterns found in virtually all music support this hypothesis: Both the "sweet anticipation" of release (Huron, 2006) and its actual experience depend on the prior building-up of tensions and on postponements of resolution rather than on an ongoing conformity to processing ease (Fitch, von Graevenitz, & Nicolas, 2009). In line with this view, processing ease is aesthetically valued as something *anticipated* or finally *(re)gained*, but far less so as something that is in place from the very beginning and that underlies the aesthetic trajectory in its entirety.

Based on the results of our experiments, we suggest that rhetorical patterning entails both positive and negative effects on processing ease. While the tension-resolution hypothesis stipulates a temporal trajectory from reduced to enhanced processing ease, the current data are also compatible with stipulating the co-occurrence of processing dimensions, of which one enhances and the other reduces cognitive fluency. After all, participants' post-reading ratings in Study 1a showed a clear negative net effect of the rhetorical target features on ease of comprehension, and, hence, no indication that the reading trajectory in the end resolved the perceived conceptual disfluency. To account for the compatibility of the ease of comprehension ratings with the *praegnanz* and beauty ratings, we stipulate a complex balance of different processing dimensions: Whereas the rhetorical target features made *semantic processing* more demanding, it is also likely that the very same features facilitated *prosodic processing*. As indicated by the *praegnanz* and beauty ratings, the resulting sum total appears to be such that the positive effects of the rhetorical features on aesthetic processing outweigh their negative effects on the ease of comprehension. In light of these results, perceptual and conceptual fluency (Reber et al., 2004) are not simply two different types of processing ease that yield converging effects in terms of hedonic processing and aesthetic evaluation; rather, the very same rhetorical features apparently can exert adverse effects on conceptual *and* enhancing effects on perceptual fluency.

Aesthetic liking of relatively disfluent stimuli has previously been reported in several studies. For instance, names of amusement parks that are more difficult to pronounce—and hence relatively non-fluent—were rated as indicating a type of entertainment that is both more likely to make one sick—an undesirable risk—and more likely to be adventurous—a desirable risk (Song & Schwarz, 2009). In this case, negative downsides (cognitive disfluency plus an undesirable risk for one's well-being) were similarly not detrimental for, but instead correlated positively with, higher expectations of hedonic reward. Similarly, ambiguity of images has been shown to promote aesthetic appreciation while reducing ease of processing (Jakesch et al., 2013). Notably, however, what we report in the present paper is not an aesthetic preference for disfluent stimuli, which is a phenomenon cognitive fluency theorists have already tried to come to terms with in several theoretical accounts (Bullot & Reber, 2013; Reber et al., 2004); rather, what we report is a case of aesthetic liking of stimuli that appear to yield both fluency *and* disfluency effects. Finally, a previous study has already reported preferences for scientific articles that are more difficult to read than newspaper reports, or a liking for poems that are more difficult to read than novels (cf. Galak & Nelson, 2011); however, the study did not investigate (a) specific dimensions of aesthetic perception/evaluation, (b) specific features of rhetorical diction driving this evaluation, and (c) complex blends of fluency-reducing *and* fluency-enhancing effects involved in it.

4. Study 2

In Study 2 we tested how our experimental modifications affect a key pragmatic goal of rhetorical message enhancement, namely *power of persuasion*. Persuasion studies in social psychology have revealed that actual effects of persuasion are notoriously difficult to predict because numerous factors other than rhetorical patterning—such as personal involvement and relevance, perceived strength of arguments, and extra-message factors such as source credibility—influence these effects. As a result, even the very same rhetorical features can result in opposite effects, depending on the other pertinent variables (Bumkrant & Howard, 1984; Petty & Cacioppo, 1986; Petty, Cacioppo, & Heesacker, 1981). Moreover, rhetorical theory specifically predicts that proverbs and other topical arguments exert their potential persuasive power only if used as rare "highlights" in an appropriate larger context (Quintilian, 1953), but not if presented serially in a completely context-free fashion. Confirming these predictions, a pilot study asking for ratings of *self-perceived* power of persuasion in response to a mere series of our context-free proverbs in different rhetorical versions did not yield any conclusive results. We therefore ended up not asking for ratings of actual self-perceived power of persuasion, but only for a speaker-based *choice* of the sentence versions *expected* to be most persuasive "in a suitable context," with the latter formula serving as an instruction to imagine potential contexts/scenarios that were likely to be in line with ecologically appropriate contexts of successfully applying topical arguments in rhetorical form. We hypothesized, in accordance with standard assumptions of rhetorical theory, that sentence versions featuring the rhetorical target variables *brevitas*, meter, and rhyme either individually or conjointly would be preferred over those that did not.

4.1. Methods

4.1.1. Participants

Twenty participants (10 male and 10 female) at a mean age of 26.9 years (SD = 7.7; Min = 18; Max = 44) took part in this experiment. All participants gave informed consent in accordance with the Ethical Guidelines of the German Association of Psychologists (Deutsche Gesellschaft fuer Psychologie, 2004).

4.1.2. Materials and procedure

The materials and procedure were almost identical to those in Experiments 1a and 1c, with the exception that participants did not see one sentence version at a time, but rather all four versions of a sentence on the computer screen. The order of the 32 quartets was randomized for each participant. Prior to the experiment, participants read an instruction on the screen telling them that proverbial sentences are routinely used for persuasive purposes and that, although they often come as a propositional statement asserting some truth (e.g., "Planets are very poor prophets"), they are mostly meant as advice or admonishment, aimed at motivating the listener to act in a fashion conforming to the proverb's message (e.g., "Don't believe in astrology/horoscopes"). Participants were asked: "Which version would you choose, if in a suitable context you were trying to motivate another person to behave in a way that conforms to the message driven home by the sentence (e.g., "be honest", "work hard", etc.)?"

4.2. Statistical analysis

The participants' choices of the most persuasive versions of the sentences presented were analyzed using McFadden's (1974) choice model with cluster-robust adjustment of standard errors to account for non-independence of choice across trials and within participants. Such models provide estimates of the probability of one alternative being chosen, compared to a reference category associated with a specific covariate of interest. We chose the fully de-rhetorized versions as the reference category, and coded effects of sentence versions using dummy variables indicating simple effects of rhyme, *brevitas*/meter, and the combination of rhyme and *brevitas*/meter. The model estimation was done using Stata (2013).

4.3. Results

Table 1 shows the odds of sentence versions featuring the rhetorical target variables being chosen as more persuasive than the version lacking all these variables. The odds for a sentence

Table 1
Effects of systematic modification of rhetorical features on individual choices of sentence versions for being most persuasive compared to the fully de-rhetorized version.

	Coefficient (SE)	*p*	OR (95% CI)
Rhyme	−0.45 (0.23)	.046	0.63 (0.41; 0.99)
brevitas/meter	−1.27 (0.20)	<.001	0.28 (0.19; 0.42)
Rhyme and *brevitas*/meter (original proverb)	0.64 (0.22)	.004	1.90 (1.23; 2.96)

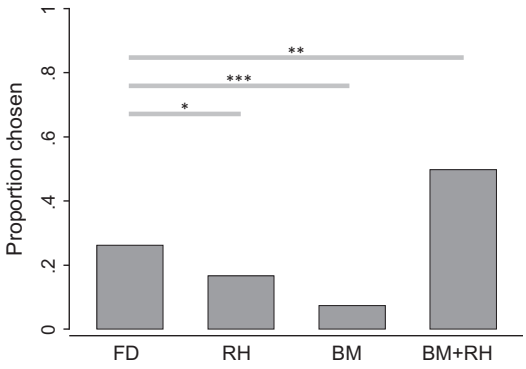

Fig. 4. Relative proportions of sentence versions chosen by participants as most persuasive in a forced-choice task. Horizontal lines above bars indicate statistical significance of simple effect tests of the proportion of a modified proverb version chosen relative to the fully de-rhetorized version. FD = fully de-rhetorized version; RH = rhyme only; BM = brevitas/meter only; BM + RH = brevitas/meter and rhyme (original proverb). * $p < .05$; ** $p < .01$; *** $p < .001$.

version featuring rhyme or *brevitas*/meter alone being chosen were significantly lower than for the version without any rhetorical features. In contrast, the version with both rhyme and *brevitas*/meter had significantly higher odds of being chosen over the version without any rhetorical features.

Fig. 4 illustrates these effects, showing the relative proportions of the sentence versions chosen by participants as most persuasive compared to the other versions.

4.4. Discussion

Conforming to our hypothesis, the original sentence versions featuring all three rhetorical target variables were strongly preferred over all other versions for persuasive purposes. However, contrary to our expectation, the versions lacking all rhetorical target features ended up being the second choice of preference for persuasive purposes, clearly ahead of the versions featuring one or two of the rhetorical target features. To better understand these results, we investigated how not just the rhetorical features, but also the dependent variables that Study 1 had shown to be causally dependent on the presence or absence of the rhetorical features (i.e., ease of comprehension, *praegnanz*, beauty), predict choices for persuasive purposes. We did so using the same choice model (McFadden, 1974). In this discussion, we only refer to the most important findings of these additional choice models (for all details, see Supplementary Materials 2). In the additional analyses, ease of comprehension turned out to be an important predictor of rhetorical choice behavior. In light of the fact that Study 1 had shown higher ease of comprehension for the versions lacking all rhetorical target features compared to the three rhetorical versions, these results indicate that higher ease of comprehension outweighed lower degrees of aesthetic *praegnanz* and beauty when versions were chosen for persuasive purposes, at least in the case of the two sentence versions featuring one (rhyme) or two (*brevitas*/meter) rhetorical variables. This trade-off, however, was clearly overridden when all three rhetorical target features joined forces: in these cases, the gains in *praegnanz* and beauty strongly overcompensated the adverse effects on ease of comprehension. Apparently caught in a conflict between aesthetic virtues and ease of semantic comprehension, the participants' choice behavior thus showed a nonlinear pattern, with a turnaround in favor of the rhetorical features only once a critical threshold level (in this case three interacting features rather than just two or one) had been reached (cf. Fechner's concepts of threshold level and interaction, 1876). Thus, participants made an all-or-nothing choice between versions with no rhetorical features and those that are very high in rhetorical features; the versions in between that show low to medium degrees of rhetorical patterning were not preferred. Notably, considering the all-or-nothing alternatives only, the highly rhetorical versions were strongly preferred over the versions lacking all rhetorical target features, regardless of the adverse effects on ease of comprehension. Conforming to this finding, the aesthetic virtue of *praegnanz*, which Study 1 had shown to be most strongly promoted by the interaction of all three rhetorical features, was a very powerful predictor of rhetorical choice behavior as well (see Supplementary Materials 3).

5. General discussion

Using single sentences, the present series of experiments provides nuanced empirical evidence for the long-standing hypothesis that rhetorical features profoundly affect language processing. Depending on the presence or absence of the rhetorical target features *brevitas*, *meter*, and *rhyme*, ratings for *ease of comprehension*, *praegnanz*, and *beauty* differed significantly, and so did choices for persuasive purposes. The co-occurrence of all three rhetorical target variables in a sentence enhanced the aesthetic dimensions of *praegnanz* and beauty and boosted the (expected) power of persuasion.

Viewed in isolation from Experiment 1a, the results of Experiments 1b, 1c, and 2 can be interpreted as lending renewed support to the cognitive fluency hypothesis (Reber et al., 2004; Winkielman & Cacioppo, 2001; Winkielman et al., 2006):

(1) The *praegnanz* and *beauty* ratings partially reflect patterns of perceptual recurrence (i.e., meter and rhyme) that build up und guide expectations and hence increase predictive power regarding the words to follow (at least at the phonological level).
(2) Similarly to patterns of spatial symmetry and compositional mirroring in the visual domains (Berlyne, 1974; Garner, 1974; Palmer, 1991; Palmer & Hemenway, 1978; Royer, 1981), patterns of temporal recurrence have previously been shown to promote overall ease of processing in the linguistic domain (Coch et al., 2005; Kramer & Donchin, 1987; Obermeier et al., 2013; Rothermich et al., 2012; Rugg, 1984a, 1984b).
(3) Hence, meter and rhyme effects appear to belong to a broad range of phenomena that conform to the stipulations of the cognitive fluency hypothesis.
(4) Moreover, the joint employment of *brevitas*, meter, and rhyme translates into higher odds of a sentence being chosen for the purpose of persuasion.

At the same time, conforming to Jakobson's (1960) anticipation, the results of Experiment 1a reveal that rhetorical patterning can also exert adverse effects on ease of semantic understanding. Viewed together, the present data thus reveal a remarkable dissociation: *Ease of semantic comprehension ratings were lower rather*

than higher for the sentence versions that were highest in aesthetic evaluation (as measured by *praegnanz* and beauty ratings). The same holds for choices for the purpose of persuasion, at least for the sentence versions that featured all rhetorical variables conjointly and were rated as least comprehensible. Previous studies have already shown that aesthetic liking can go along with features enhancing or reducing fluency (for references, see the introductory section), but the opposite findings typically were obtained using both different sets of stimuli and different experimental target features. Moreover, disfluency did not specifically enhance beauty ratings in these studies. To our knowledge, the present study is the first to show that fluency and disfluency effects can be measured with regard to both the very same sentences, the very same rhetorical target features, and even the very same dimensions of aesthetic evaluation (here beauty and *praegnanz* attributions).

Bullot and Reber (2013) have tried to explain the involvement of cognitive disfluency in many types of aesthetic appeal by stipulating a process of cognitive revaluation: Based on contextual information, recipients may interpret irritating formal patterns as serving a specific intention of the artist, thereby integrating the disfluent features into a higher, second-order fluency. This hypothesis can be understood to imply that a successful reading of the original sentence versions—one that is driven by expertise in rhetoric and by an extrapolation of the intentions of the speaker/writer—should reappraise the greater difficulty of semantic understanding as supporting the aesthetic appeal of rhetorical patterning and actually end up rating it as enhancing processing ease. However, we found no evidence for such a reappraisal. Therefore, three other theoretical options for explaining the data need to be considered:

(1) Heightened prosodic fluency along with other aesthetically appealing effects of rhetorical patterning may *(over)compensate* reduced ease of semantic comprehension, such that the net gain in overall fluency by means of rhetorical patterning outweighs the loss in fluency due to reduced ease of semantic comprehension. Study 2 provides indirect evidence for such a trade-off between cognitively handicapping and enhancing effects of rhetorical patterning: If one or two of the three rhetorical target features was selectively removed, the remaining feature(s) decreased rather than increased the power of persuasion, even though the relevant sentence versions were still rated higher in *praegnanz* and beauty than the fully de-rhetorized versions. This trade-off suggests a nonlinear dynamic of interaction between rhetorical patterning, its aesthetic appreciation, and pragmatic effects of linguistic utterances.

(2) Contrary to the assumptions of the cognitive fluency hypothesis, reduced ease of semantic processing may not even be in need of being cognitively reappraised or (over)-compensated by enhanced ease of prosodic processing in order for sentences to be perceived as beautiful and rhetorically succinct. Literary criticism strongly suggests that works of literature can *simultaneously* be aesthetically liked for their special treatment of language—the features of which may at least partly be explained by the cognitive fluency hypothesis—and for involving their readers in a cognitively more demanding processing of meaning—thereby also reaping typical benefits of cognitive disfluency, specifically, a more profound semantic understanding (cf. Alter, 2013). Even though our findings indicate some trade-off between higher prosodic fluency and higher semantic disfluency, the data for the original, highly rhetorical sentences are also compatible with this second theoretical option. Further research into this option would need to clarify how the different types of processing fluency and disfluency can be both decoupled and combined across the different dimensions of language processing.

(3) A third option would be to stipulate that a potential conflict between more challenging semantic processing and higher prosodic fluency may be suppressed by a predominant focus on the latter. For instance, enjoyment of a pop song in a foreign language that one insufficiently or barely commands may be explained by stipulating *a selective shift in* or *a differential deployment of attention and focus*: If one likes the musical genre, the melody, the musical arrangement, the voice of the singer, and the purely vocal expression of emotions implied in the performance, the disfluency of semantic comprehension may simply be bracketed and disregarded. Reading difficult poetry can (at least partly) result in a similar effect: meter, verse, and sound patterns may carry us away by means of prosodic entrainment, preventing us from interrupting the flow of reading because of unresolved difficulties in semantic understanding. Under this premise, the processing of semantic meaning might receive reduced or less focused attention; in this case, reduced ease of comprehension would not even become a serious problem (cf. Jacobs, 2015a, 2015b; van Holt & Groeben, 2005; van Peer, 2007).

We suggest that, specifically in the domain of language, fluency-reducing processing dimensions may be found for many other linguistic features known to promote cognitive fluency once the multitude of processing dimensions they may actually entail is addressed in sufficient complexity. Much further empirical and theoretical research is needed to arrive at a model that not only incorporates heightened cognitive demand, or reduced ease of comprehension, into an understanding of the aesthetically appealing and persuasive effects of rhetorical patterning, but that also accounts for the cognitive and affective processes involved in such blends. In this context, genre-dependent reader expectations regarding the "ideal" processing fluency of a text will need to be considered as well (Galak & Nelson, 2011). Moreover, measurements of on-line reading processes rather than just post hoc ratings may be helpful for understanding the respective temporal trajectories of fluency and disfluency effects. A multidimensional approach to processing ease appears to allow for applications in other domains as well. For instance, musical meter, melody, and harmony may each exert partly independent effects on overall processing ease; in individual cases, the respective fluency effects of each dimension may be positive or negative in different distributions.

In light of the finding that modest levels of rhetorical patterning exerted adverse effects on choices for the purpose of persuasion while the simultaneous employment of all three rhetorical target features reversed this adverse effect into a strongly enhancing effect, we would like to conclude on a more general note. Apparently, single rhetorical features cannot be ascribed stable effects independent of their interactions with other features. Rather, rhetorical features are highly sensitive to context, with the co-occurrence of other rhetorical features being an important dimension of this context sensitivity. Whereas the significance of context is well researched for word use, word semantics, and prosody (Adelman, Brown, & Quesada, 2006; Asher & Lascarides, 1995, 2003; Gerrig & Gibbs, 1988; Tyler & Marslen-Wilson, 1977), the context sensitivity of rhetorical features to other co-occurring rhetorical features still needs to be established as a concept, as an object of empirical research,

and as a property of linguistic utterances that calls for an integration into a more comprehensive understanding of sentences, discourses, and texts.

6. Limitations

Presently, the current findings apply only to proverb-type sentences, which we systematically modified and tested for the effects of three selected rhetorical target features. Follow-up studies involving other sentences/texts, other rhetorical target features, stimuli from other languages, more participants, a more granular analysis of participants (background, rhetorical expertise, etc.), and participants who are speakers of other languages are clearly called for, as are on-line measurements and neuroimaging measures of the processes that result in the effects reported here.

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Appendix A

Complete list of stimuli.

+*brevitas*/meter, +rhyme	+*brevitas*/meter, –rhyme	–*brevitas*/meter, +rhyme	–*brevitas*/meter, –rhyme
Pflegerlieb ist falsch und trüb.	Pflegergunst ist falsch und trüb.	Pflegerlieb ist oft heuchlerisch und trüb.	Pflegerliebe ist oft falsch und undurchsichtig.
Frühe Zucht bringt gute Frucht.	Frühe Zucht bringt gute Ernt'.	Frühe Zucht erbringt eine gute Frucht.	Eine frühe Erziehung bringt fruchtbare Resultate.
Gelehrter Witz ist selten nütz.	Gelehrter Witz bringt selten was.	Gelehrter Witz ist fast nie zu etwas nütz.	Gelehrter Witz bietet selten nützliche Ratschl äge.
Schöne Gestalt hat große Gewalt.	Schöne Gestalt hat mächtige Kraft.	Eine schöne Gestalt ist eine erhebliche Gewalt.	Eine schöne Gestalt übt große Macht aus.
Ungleiche Zeit macht ungleiche Leut.	Ungleiche Zeiten machen verschiedene Menschen.	Unterschiedliche Zeit bedingt auch andere Leut.	In ungleichen Zeiten entwickeln sich Menschen jeweils verschieden.
Vorbedacht hat Rat gebracht.	Vorgeschaut hat Rat gebracht.	Was gründlich vorbedacht, hat meist guten Rat gebracht.	Gründliche Vorausschau ist der beste Ratgeber fürs Handeln.
Viel Meinung bricht Einung.	Viel Meinung bricht Einheit.	An vielfältiger Meinung zerbricht jede Einung.	Unterschiedliche Meinungen verursachen Zwietracht.
Neuerung macht Teuerung.	Neuerung treibt Preise hoch	Neuerungen führen regelmäßig zu Teuerungen.	Produktinnovationen sind immer mit Preissteigerungen verbunden.
Schlampig macht wampig.	Schlampig macht dicker.	Schlampiges Verhalten bewirkt wampiges Aussehen.	Wer schlampig ist, wird schnell übergewichtig.
Streicheln tut verweicheln.	Liebkosen tut verzärteln.	Viel Streicheln führt zum Verweicheln.	Viel Liebkosen kann zu Verweichlichung führen.
Mann und Weib sind ein Leib.	Mann und Frau sind ein Leib.	Mann und Weib bilden einen Leib.	Mann und Frau sind zusammen eine Einheit.
Ehren beschweren, Würden sind Bürden.	Ehren bedrücken, Würden sind Lasten.	Ehren beschweren den Geehrten, Würden werden ihm Bürden.	Ehren und Würden stellen auch Belastungen dar.
Den Bürgen sollst du würgen.	Den Bürgen sollst du greifen.	Den Bürgen sollst Du notfalls würgen.	Notfalls ziehe den zur Rechenschaft, der sich für etwas verbürgt hat.
Guter Soldat erwägt seine Tat.	Guter Soldat erwägt, was er tut.	Ein guter Soldat erwägt im Voraus seine Tat.	Ein guter Soldat überlegt gründlich, was er tut.
Kein Übermut entläuft der Rut.	Kein Übermut entläuft der Straf'.	Kein Übermut entzieht sich der Rut.	Übermut erfährt immer seine verdiente Strafe.
Späte Reu ist selten treu.	Späte Reu ist selten echt.	Eine späte Reu ist nur in wenigen Fällen treu.	Späte Reue ist meistens unaufrichtig.
Späte Saat kommt mit Rat.	Späte Saat ist wohlbedacht	Späte Saat stützt sich oft auf guten Rat.	Späte Anfänge sind oft besonders gut überlegt.
Vor der Tat, halte Rat.	Eh du's tust, halte Rat.	Vor der Tat suche dir guten Rat.	Vor jeder Tat sollte man reiflich mit sich zu Rate gehen.
Frauengunst war nie	Frauengnad' war nie umsunst.	Frauengunst bekommst Du	Für ihre Gunst erwarten Frauen

(*continued on next page*)

Appendix A (*continued*)

+*brevitas*/meter, +rhyme	+*brevitas*/meter, –rhyme	–*brevitas*/meter, +rhyme	–*brevitas*/meter, –rhyme
umsunst.		niemals umsunst.	immer eine Gegenleistung.
Allzuspitzig ist nicht witzig.	Allzuspitzig ist nicht komisch.	Wer allzuspitzig argumentiert, ist nicht wirklich witzig.	Übertriebene Spitzfindigkeit wirkt meist nicht witzig.
Planeten sind üble Propheten.	Die Sterne sind üble Propheten.	Planeten sind höchst unzuverlässige Propheten.	Die Sterne sind keine vertrauenswürdigen Propheten.
Ungeduld hat häufig Schuld.	Ungeduld macht Missgeschick.	Ungeduld trägt häufig die Schuld.	Ungeduld ist die Ursache vielen Missgeschicks.
Güter brauchen Hüter.	Güter brauchen Pfleger.	Alle Güter brauchen ihre Hüter.	Güter müssen beaufsichtigt und gepflegt werden.
Wo Geld und Gut da ist kein Mut.	Wo Geld und Hab' da ist kein Mut.	Wo viel Geld ist und Gut, da fehlt es oft an Mut.	Besitz von viel Geld und Eigentum macht oft risikoscheu.
Klein und wacker baut den Acker.	Klein und wacker baut die Scholle.	Klein und wacker bestellt am besten den Acker.	Fleißige und unprätentiöse Arbeit bringt die besten Ergebnisse.
Das Gesicht verrät den Wicht.	Das Gesicht verrät den Schurken.	Am Gesicht erkennt man oft den Wicht.	Am Gesicht lässt sich ein schlechter Charakter erkennen.
Gut gemeint wird oft beweint.	Wohl gemeint wird oft bereut.	Was gut gemeint war, wird später oft beweint.	Gute Absichten führen oft zu bedauerlichen Ergebnissen.
Hehlen ist schlimmer als stehlen.	Hehlen ist schlimmer als klauen.	Zu hehlen ist noch schlimmer als zu stehlen.	Hehlerei ist eine noch üblere Untat als Diebstahl.
Viel Hände zerreißen die Wände.	Viel Hände zerreißen die Mauern.	Viele Hände zerreißen selbst starke Wände.	Viele Hände zerreißen selbst starke Mauern.
Verloren Ehr kommt nimmermehr.	Verloren Ehr kommt nie zurück.	Eine verlorene Ehr erneuert sich nicht mehr.	Einmal verlorene Ehre ist nicht wieder herstellbar.

Appendix B. Supplementary material

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.cognition.2015.05.026.

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