HEDONIC RAREFACTION ACCOMPANIES POSITIVE HEDONIC CONTRAST

Debra A. Zellner, Ke'Nesha Jones, Jennifer Morino and Scott Parker
Montclair State University, Montclair NJ 07043 USA (zellnerd@mail.montclair.edu) and American University, Washington DC 20016 USA (sparker@american.edu)

Abstract

Subjects rated their liking for (Experiment 1) and their preferences between (Experiment 2) weakly hedonically positive test paintings. Some subjects first saw and rated some hedonically negative context paintings. Those subjects reported greater liking for (Experiment 1) and larger preferences between (Experiment 2) the test paintings than did subjects who saw and rated only the test paintings. Experiment 1 shows positive hedonic contrast. Interpreting preference as an index of hedonic difference, Experiment 2 shows that positive contrast is accompanied by expansion (rarefaction) of the hedonic spacing among stimuli. This is the reverse of what happens with negative hedonic contrast – shrinkage (condensation) of hedonic spacing.

When people evaluate stimuli that vary in hedonic value, the ratings often exhibit contrast. For example, a stimulus preceded by a series of very good stimuli will be judged as worse than it would be otherwise. This is negative hedonic contrast. Conversely, a stimulus preceded by a series of very bad stimuli will be judged as better than it would be otherwise. This is positive hedonic contrast.

Negative hedonic contrast has been shown in previous research (e.g., Zellner, Rohm, Bassetti, & Parker, 2003 and Zellner, Allen, Henley, & Parker, 2006) using fruit juices. Some of the juices were given at full strength (hedonically positive context juices) and others were diluted (hedonically neutral test juices). Some subjects consumed only the dilute test juices and other subjects consumed the dilute test juices after consuming the full-strength context juices. Those subjects who consumed only the dilute test juices gave them higher hedonic ratings than did the subjects who first drank the hedonically positive full strength context juices.

Another study found similar effects using hedonically neutral test birds which were presented alone or preceded by hedonically attractive context birds (Zellner et al., 2003). Subjects who first rated the hedonically attractive context birds rated the hedonically neutral test birds as less attractive than did those subjects who viewed only the test birds.

Positive hedonic contrast has also been demonstrated (Dolese, Zellner, Vasserman, Parker, 2005). Dolese et al. (2005) had one group of subjects view and rate five paintings from Francisco Goya's Dark Period (hedonically negative context stimuli) before viewing and rating two pastoral paintings by Goya (hedonically neutral test stimuli). This group rated the hedonically neutral pastoral paintings as more hedonically positive than did subjects who viewed only those paintings.

Hedonic condensation, a reduction of preference between test stimuli, has been found to co-occur with negative hedonic contrast. When good stimuli precede hedonically neutral stimuli not only do they make those neutral stimuli less hedonically positive, but they also reduce the preference between them.

Zellner, Allen, et al. (2006) demonstrated this condensation effect by having subjects rate their degree of preference between paired mediocre test juices either when those juices were preceded by pairs of hedonically positive juices or when they were presented alone. Subjects who first tasted the hedonically positive juices first not only reported liking the

mediocre juices less than did those subjects who tasted only the mediocre juices (negative hedonic contrast), but they also reported smaller preferences between the mediocre test juices. Similar results were found with subjects evaluating the attractivenesses of pictures of birds (Zellner, Mattingly, & Parker, 2006).

Although condensation has been found to accompany negative hedonic contrast, this phenomenon has not been demonstrated in situations producing positive hedonic contrast. The present study investigates whether condensation also accompanies positive hedonic contrast.

Experiment 1

Dolese et al. (2005) found positive hedonic contrast when subjects rated five hedonically negative context stimuli (paintings from Goya's Dark Period) prior to rating two hedonically neutral test stimuli (pastoral works by Goya). The present study attempts to replicate that finding using four of the Dark Period paintings as context stimuli followed by four of Goya's pastoral paintings as test stimuli.

Method

Participants.
Twenty-eight undergraduate students from Montclair State University (seven males and 21 females) served in the experiment. Their mean age was 21 years. Subjects were tested individually.

Stimuli.
The eight stimuli were colored pictures of paintings cut out of art books pasted on individual 28x17.5-cm pieces of white cardboard. The paintings were eight works by Francisco Goya from two distinctly different periods. The two pairs of "test paintings" were slightly hedonically pleasant pastoral paintings: *The Swing, The Vintage, The Washer Women, and The Crockery Seller.* The four "context paintings" were hedonically unpleasant paintings from Goya's Dark Period: *The Incantation, The Witches' Sabbath,* a section of *Old Men Eating Soup,* and a section of *Pilgrimage of San Isidro.*

Procedure.
The 28 subjects were randomly assigned to one of two groups: the Context Group and the No Context Group. Subjects in the Context Group were asked to look at four paintings from Francisco Goya's Dark Period followed by four of Goya's pastoral paintings. Subjects in the No Context Group were only asked to view four of Francisco Goya's pastoral paintings. Subjects were tested individually.

The subjects were asked to rate how much they liked each picture by using a 201-point bipolar hedonic scale. A rating of –100 indicated that the subject thought the picture the "most unattractive imaginable"; 0 indicated the subject found it "neither attractive nor unattractive"; and +100 meant that the subject found the picture the "most attractive imaginable". Subjects were asked to rate the pictures based on how much they would like to hang it on a wall in their home. They viewed and rated the pictures one at a time. All subjects were tested individually.

Subjects in both groups, Context and No Context, were shown all pictures in counterbalanced orders.

Results

We calculated the average rating given to the four test paintings for each subject as well as the average rating given to the four context paintings by Context Group subjects. Subjects in the Context group rated the pictures from Goya's Dark Period as unattractive (M = -34.3, SD = 26.9). Context Group subjects rated the test pictures (M = 47.0, SD = 23.2) as significantly more attractive than did the No Context Group subjects (M = 20.9, SD = 24.6), t(26)=2.89, p=.008. See Table 1.

Table1. Mean hedonic rating (standard deviations) for the context and test pictures of the Context and No Context groups.

Group	Context pictures	Test Pictures
Context	-34.3 (26.9)	+47.0 (23.2)
No Context		+20.9 (24.6)

Discussion

Like Dolese et al. (2005), we found positive hedonic contrast when hedonically negative paintings preceded hedonically neutral test paintings. The hedonically neutral test stimuli were rated as more hedonically positive when preceded by the hedonically negative context stimuli than when presented alone.

Experiment 2

Positive hedonic contrast was demonstrated in the previous experiment. In the present study, using the same stimuli as those used in Experiment 1, we investigate whether condensation accompanies positive hedonic contrast as it does negative hedonic contrast (Zellner, Allen, et al., 2006; Zellner, Mattingly, & Parker, 2006). If first viewing hedonically negative context paintings reduces preferences among the hedonically neutral test paintings, then we will have found condensation to accompany positive contrast.

Method

Participants.
Forty Montclair State University undergraduate students from the psychology department subject pool (eight males and 32 females) served in the experiment. Their average age was 19 years.

Stimuli.
The stimuli were the same colored pictures of paintings used in Experiment 1.

Procedure.
The 40 subjects were tested individually. They were randomly assigned to one of two groups (the Context Group and the No Context Group). All subjects were shown two pairs of hedonically neutral pastoral paintings (the test pairs) and were asked to report, for each pair, if

they preferred one of the paintings to the other and if so, how much more they liked the preferred one on a 10-point scale ranging from 1 (slightly more) to 10 (extremely more). Context Group subjects rated their preferences immediately after first viewing and giving preference ratings for two pairs of hedonically unpleasant paintings from Goya's Dark Period (the context pairs). Subjects in the No Context group viewed and rated only the two pairs of hedonically neutral pastoral test paintings.

Results

We calculated the average preference rating given to the two pairs of test paintings for each individual subject, as well as the average preference rating given to the two pairs of context paintings by Context Group subjects. There was a significant difference between the groups' mean preference ratings for the two pairs of pastoral test paintings, $t(38)=2.17$, $p<.04$. Context Group subjects reported a greater preference for one test painting over another ($M=4.8$, $SD=1.8$) than did No Context Group subjects ($M=3.4$), $SD=2.1$). Context Group subjects' preferences between context stimuli ($M=3.4$, $SD=1.9$) were about equal to the No Context Group's preferences between test stimuli. See Table 2.

Table 2. Mean preference rating (standard deviations) for the context and test pictures of the Context and No Context groups.

Group	Context pictures	Test Pictures
Context	3.4 (1.9)	4.8 (1.8)
No Context		3.4 (2.1)

Discussion

The findings of the study were the opposite of what was found to accompany negative contrast. Negative hedonic contrast is accompanied by condensation, a reduction of preferences (Zellner, Allen, et al., 2006; Zellner, Mattingly, & Parker, 2006). But here, with positive hedonic contrast, we find an increase in preferences. We call this phenomenon, the opposite of condensation, rarefaction.

General Discussion

This is the first demonstration of the phenomenon of rarefaction. Condensation accompanies negative contrast but rarefaction accompanies positive contrast. We do not know why these two sorts of contrast should not be accompanied by the same effects on preference. In fact, the range-frequency theory of Parducci (1965; 1968) predicts that condensation should occur in both directions.

The range-frequency theory (Parducci, 1965; 1968; 1995) predicts that when either very good or very bad stimuli precede mediocre ones contrast should occur. It does. In previous research we found that good stimuli make mediocre ones worse (Rota & Zellner, 2007; Zellner et al., 2003) and in this and Dolese et al. (2005) we found that bad stimuli make mediocre ones better.

Wedell, Hicklin and Smarandescu (2007) elaborate the theory to say that allocations of attention over the stimulus range alter the scale-values of stimuli so as to affect discriminability. In this view, extending the stimulus range requires that attention be spread more thinly over the range and thus stimulus similarities are enhanced and differences are less readily discriminated. It should not matter, then, whether the context stimuli are expanding the range toward the hedonically positive end of the scale or the hedonically negative end of the scale. Interpreting preference ratings in our experiments as representing hedonic differences, the elaborated range-frequency theory predicts that a decrease in preference should occur under all conditions where we find contrast, whether positive or negative contrast. That is, condensation should occur but rarefaction should not.

We find the predicted condensation in situations where we see negative hedonic contrast (Zellner, Allen, et al., 2006; Zellner, Mattingly, & Parker, 2006), but not where we see positive contrast (the present study). Since an increase in the size of the range occurs both in the studies where we have seen condensation and the present study where we see its opposite, the elaborated range-frequency theory cannot explain the present case of rarefaction (increase in preference). Therefore, some other mechanism must explain condensation and rarefaction.

One possibility is that the effects on preference have something to do with the structure of the hedonic scale (Parker & Zellner, 1988). When hedonically good stimuli precede mediocre stimuli, the hedonic ratings of those stimuli are often pushed from slightly above to slightly below hedonic neutrality (e.g., Zellner et al., 2003). In this study, the mediocre test stimuli are moved from slightly to moderately above hedonic neutrality. It could be that people just don't put a lot of effort into discriminating between two stimuli which are only slightly hedonically negative. If the stimuli are not intolerable, but just not good, people might not care which of the two is slightly better. However, once stimuli get up into the moderately good range, it might be more valuable to discriminate between them. This possibility is roughly consistent with Wedell et al.'s (2007) view that attentional mechanisms govern discrimination. It requires the additional assumption that for hedonic judgments, attention is not spread evenly over the stimulus range nor governed by stimulus density but rather that particular regions of the hedonic scale are more attention-grabbing than others.

References

Dolese, M. J., Zellner, D. A., Vasserman, M., & Parker, S. (2005). Categorization affects hedonic contrast in the visual arts. *Bulletin of Psychology and the Arts, 5*, 21 – 25.

Parducci, A. (1965). Category judgment: A range-frequency model. *Psychological Review, 72*, 407-418.

Parducci, A. (1968). The relativism of absolute judgments. *Scientific American, 219*, 84-90.

Parducci, A. (1995). *Happiness, pleasure, and judgment: The contextual theory and its applications*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Parker, S. & Zellner, D. (1988). The difference between goodness and badness. In H. Ross (Ed.), *Fechner Day 88: Proceedings of the Eleventh Annual Meeting of the International Society for Psychophysics* (pp. 161-166).

Rota, L.M. & Zellner, D.A. (2007). The categorization effect in hedonic contrast: Experts differ from novices. *Psychonomic Bulletin & Review, 14*, 179-183.

Wedell, D.H., Hicklin, S.K., & Smarandescu, L.O. (2007). Contrasting models of assimilation and contrast. In D.A. Stapel & J. Suls (Eds.), *Assimilation and contrast in social psychology.* New York: Psychology Press (pp. 45-74).

Zellner, D. A., Allen, D., Henley, M., & Parker, S. (2006). Hedonic contrast and condensation: Good stimuli make mediocre stimuli less good and less different. *Psychonomic Bulletin & Review, 13*, 235 – 239.

Zellner, D.A., Mattingly, M.C., & Parker, S. (2006). Categorization cuts condensation. In D.E. Kornbrot, R.M. Msetfi, & A.W. MacRae (Eds.), *Fechner Day 2006: Proceedings of the 22nd Annual Meeting of the International Society for Psychophysics* (pp. 327-330).

Zellner, D. A., Rohm, E. A., Bassetti, T. L., & Parker, S. (2003). Compared to what? Effects of categorization on hedonic contrast. *Psychonomic Bulletin & Review, 10*, 468 – 473.