We explore how the heterogeneity of an experience changes the influence of the most intense moment of an experience (peak) on retrospective evaluations of the experience as a whole. Prior research has shown the peak is a powerful predictor of overall evaluations (Fredrickson, 2000). This phenomenon–described by the peak-end rule–is an example of judgment by prototype (Kahneman, 2003). Instead of representing the entirety of an experience in memory, people instead store an abstraction of the experience drawn from a few key moments. In this paper we manipulate the heterogeneity of experiences in order to change reliance on a prototype representation.

Two streams of research hint how the heterogeneity of an experience will moderate the peak effect. Replications of the peak-end rule across different types of experiences reveal that the peak effect is less robust for long, complex experiences such as a vacation (Kemp, Burt, & Furneaux, 2008) or the events of a week (Ben-Zeev, Young, & Madsen, 2009) or day (Miron-Shatz, 2009). This pattern is consistent with the literature on categorization. Prototype models tend to perform best for simple stimuli such as patterns of dots (e.g., Smith & Minda, 2002). Exemplar models, in which every stimulus is stored in memory, better predict categorization for complex, feature-rich stimuli such as imaginary creatures (Yamauchi & Markman, 2000). If heterogeneity increases the complexity and feature-richness of an experience, people should shift from using a prototype representation to an exemplar representation. This shift may reduce the peak’s impact on retrospective evaluations.

**Study 1**

Study 1 (N = 930) was designed as both a pretest and an opportunity to test the effect of heterogeneity on the predictive power of peaks and ends. Participants viewed and rated their liking of 20 paintings and each painting’s similarity to the other paintings in the set. Participants viewed either 20 paintings of the same style (homogenous condition, 9 style replicates) or 20 paintings drawn randomly from all 9 styles (heterogeneous condition). Finally, participants indicated their overall enjoyment of the set.

Following Kahneman and colleagues (e.g., Shreiber & Kahneman, 2002; Fredrickson & Kahneman, 1993), we tested the the peak-end rule by examining the correlations between online and retrospective evaluations. Both peak and end liking ratings were more closely correlated to overall enjoyment in the homogenous condition (zpeak = 3.8, *p* < .0001; zend = 4.11, *p* < .0001; Steiger, 1980).

**Studies 2A & 2B**

Study 2A (N = 386) demonstrates that the addition of a highly enjoyable peak (vs. moderately enjoyable peak) produces greater retrospective enjoyment for participants viewing a more homogenous set of art. Participants viewed 10 paintings for 20 seconds each. As in Study 1 we manipulated heterogeneity by presenting participants with paintings all of the same style (homogenous) or 2 paintings of each of five styles (heterogeneous). Both conditions had five replicates that were collapsed together during the analysis. In all conditions, eight of the paintings were selected to be moderately liked based ratings in Study 1 (Mbackground = 45.3). For half of the participants we added two highly liked paintings (Mhipeak = 74.2) and for the remaining participants we added two moderately liked paintings (Mlopeak = 59.8).

Participants in the homogenous condition indicated a greater increase in retrospective enjoyment due to the higher peak (Mhipeak = 68.2, Mlopeak = 54.6) than participants in the heterogeneous condition (Mhipeak = 64.0, Mlopeak = 59.3) (*F*(1, 382) = 5.21, *p* < .05).

In Study 2A, participants in the high peak condition also experienced a set with a higher mean liking rating. Study 2B corrected this by changing the 8 moderately liked paintings across conditions to keep the mean consistent despite the changing intensity of the peak (Moverall = 51.1).

Replicating Study 2A, participants in the homogenous condition indicated a greater increase in retrospective enjoyment due to the higher peak (Mhipeak = 74.8, Mlopeak = 63.4) than participants in the heterogeneous condition (Mhipeak = 65.6, Mlopeak = 67.4) (*F*(1, 609) = 6.80, *p* < .01).

**Study 3**

In Studies 1 and 2, heterogeneity was achieved by mixing art from disparate styles. However, the styles themselves also vary in how similar one painting is to the next. Using the similarity ratings from Study 1, we selected the styles for which paintings were most similar to one another (Pollock Drip) and most different from one another (Watercolor Portraits). For just these styles, participants in Study 3 (N = 562) were presented with sets containing either high or low peaks, as in Study 2B.

Participants with the more similar set indicated a greater increase in retrospective enjoyment due to the higher peak (Mhipeak = 74.8, Mlopeak = 63.4) than participants with the less similar set (Mhipeak = 65.6, Mlopeak = 67.4) (*F*(1, 558) = 8.32, *p* < .01).

**Study 4**

In Study 4 (N = 784), we manipulated the perceived homogeneity of a set with processing style. Participants viewed a series of 8 Navon figures–large letters made up of many smaller letters–(Navon, 1977) and were prompted to respond with either the large letter (global processing) or the smaller letter (local processing). Local processing may reduce the perceived similarity between stimuli, in turn reducing reliance on prototypes and decreasing the magnitude of the peak effect. In all other aspects Study 4 replicates the homogenous condition of Study 2b.

Participants in the global processing condition indicated a greater increase in retrospective enjoyment due to the higher peak (Mhipeak = 78.8, Mlopeak = 69.8) than participants with the less similar set (Mhipeak = 68.3, Mlopeak = 64.5) (*F*(1, 780) = 8.01, *p* < .01).

**Conclusion**

Over four studies we demonstrate that high peaks have a larger influence on retrospective evaluations of experiences when those experiences are more homogenous or are processed more globally. Our results both provide evidence for the mechanism underlying the peak effect– prototype representations of experiences–and suggest boundaries–heterogeneous experiences. Although we happily concede that other mechanisms may also produce peak effects (e.g., distinctive, memorable peaks represented as exemplars, Montgomery & Unava, 2009).

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