Social Influences on Moment-to-Moment and Retrospective Evaluations of Experiences

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INTRODUCTION

In this paper we present two studies examining differences in participants' moment-to-moment and retrospective evaluations of an experience, depending on whether they are alone or in the presence of another person. Findings support our hypotheses that joint consumption leads to similar patterns, or "coherence," in moment-to-moment evaluations and that greater coherence leads to more positive retrospective evaluations. In study 1, we trace the emergence of coherence to processes of mimicry and emotional contagion by comparing evaluations for pairs of participants who could see each other's expressions with pairs who could not see each other. In study 2, we trace contagion by coding participants' facial expressions and head movements.

BACKGROUND

Many common consumption situations such as theme park rides, guided tours, watching television, or attending a class, involve the presence of others, whether family members, friends, or strangers. During many of these situations, consumers may not speak with each other, but they may nevertheless sense the reactions of their companions through body postures, facial expressions, and gestures. As a consequence of this nonverbal communication, consumers may come to feel either in sync or vastly out of step with their companions in the shared experience. This awareness of others' feelings may

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eventually color consumers' later reactions as the experience unfolds, heightening or dampening their enjoyment. In this way, going through an experience with someone else may feel very different than consuming alone. Our research has two intended contributions. The first relates to testing the effect of social presence on consumers' temporal pattern of evaluations. Our second, and perhaps more important contribution, addresses the relationship between the temporal pattern of responses and participants' overall retrospective evaluations of the experience. That is, we explore the links from mimicry of expression to shared patterns of evaluation and also from shared patterns of evaluation to retrospective judgments.

Recent research demonstrates that people often mimic the nonverbal expressions of others by, for example, smiling, slouching, or jiggling their foot to mirror the behavior of a companion.[1] This mimicry can occur outside conscious awareness.[2] Beyond physical expression, this "chameleon effect" may also lead to emotional contagion in which moods transfer between people.[3] Behaviors such as facial expressions may reflect underlying feelings but processes of afferent feedback may also cause people who are mimicking behaviors to adopt the corresponding underlying affective state. That is, moods may cause expressions, but expressions may also cause moods. One study found, for example, that sitting facing another person for a few minutes may cause the less expressive person to assume the mood of the more expressive person.[4]

Observing another person's expressions may also lead to contagion of emotion through conscious processes. Observation of another person's pleasure or displeasure with an experience may provide information about the nature and quality of an experience, causing an adjustment of their own

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1 . Tanya L. Chartrand & John A. Bargh, *The Chameleon Effect: The Perception-Behavior Link and Social Interaction*, 76 PERSONALITY & SOC. PSYCHOL. 893, 906 (1999).

2 . *Id.*

3 . Elain Hatfield et al., *Primitive Emotional Contagion*, *in* EMOTION AND SOCIAL BEHAVIOR 151 (Margaret S. Clark ed., 1992); Roland Neumann & Fritz Strack, *Mood Contagion: The Automatic Transfer of Mood Between Persons*, 79 J. PERSONALITY & SOC. PSYCHOL. 211, 221 (2000).

4 . Howard S. Friedman & Ronald E. Riggio, *Effect of Individual Differences in Nonverbal Expressiveness on Transmission of Emotion*, 6 J. NONVERBAL BEHAV. 96, 101–02 (1981).

expressions and feelings. For example, upon observing another person's laughing, a consumer may reason, "perhaps this movie is funnier than I thought" and so begin to smile more, laugh more, and in time feel more amused. Whether through conscious or non-conscious processes, people who can observe each other may copy each other and come to share similar moods. Importantly for the present research, we refer to any type of copying and adoption of another's emotions through conscious or non-conscious processes as "mimicry and emotional contagion," a broader use of the term than is found in the literature on non-conscious mimicry.

Research further suggests that mimicry and emotional contagion may go back and forth causing a temporal association between people's moods. Hence, people who can observe each other may come to share a pattern of moods, which leads to "*mutual entrainment*, in which one rhythmic process causes or is caused to oscillate with the same frequency as another."[5] This phenomenon is present, for example, when people who work together share the same highs and lows over a shift or a week. Mutual entrainment may also occur between people interacting over shorter periods with no obvious, external cyclical structure.[6]

How might such social processes influence how we think retrospectively about the experience? Previous literature on judgments about experiences primarily focused on evaluations of experiences at the individual level. It concluded that these judgments can be predicted by two key moments in an experience—the peak and the final moment felt by consumers.[7] At least one report indicates that an

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[5] . Peter Totterdell et al., *Evidence of Mood Linkage in Work Groups*, 74 J. PERSONALITY & SOC. PSYCH. 1504, 1505 (1998) (emphasis added). *See generally* JOSEPH E. MCGRATH & JANICE R. KELLY, TIME AND HUMAN INTERACTION: TOWARD A SOCIAL PSYCHOLOGY OF TIME (1986).

[6] . Aimee L. Drolet & Michael W. Morris, *Rapport in Conflict Resolution: Accounting for How Face-to-Face Contact Fosters Mutual Cooperation in Mixed-Motive Conflicts*, 36 J. EXPERIMENTAL SOC. PSYCH. 26, 45 (2000); Linda Tickle-Degnen & Robert Rosenthal, *The Nature of Rapport and Its Nonverbal Correlates*, 1 PSYCH. INQUIRY 285, 289–90 (1990).

[7] . *See, e.g.*, Hans Baumgartner et al., *Patterns of Affective Reactions to Advertisements: The Integration of Moment-to-Moment Responses into Overall Judgments*, 34 J. MARKETING RES. 219, 220 (1997); Barbara L. Fredrickson & Daniel Kahneman, *Duration Neglect in Retrospective Evaluations of Affective Episodes*, 65 J. PERSONALITY & SOC. PSYCH. 45, 54 (1993).

individual's true measure of an experience can be derived only from a moment-to-moment sampling of their thoughts and feelings throughout the experience.[8] Nevertheless, prior research has found that retrospective evaluations correlate strongly with the peak and the final moment.[9] When asked to assess overall quality or about their intentions to go through a similar experience again, people often construct a snapshot view of the experience, drawing from select moments in arriving at their judgment.[10]

While the previous research on evaluations of experiences has shown that the peak and final moment are instrumental in explaining variations in global evaluations, there is relatively little research on the effect of shared experiences. Our central predictions are that: 1) joint consumption leads consumers to produce similar patterns, or "coherence," in their ongoing evaluations of an experience; 2) greater coherence leads to more positive retrospective evaluations of the experience; and 3) the effect of the coherence is greater than that contributed by the peak and final moment experienced by each individual. Our contention is that sharing experiences may lead to a sense of connectedness (as manifested in the mutual entrainment of mood and co-movement of evaluations), and that this sense of connectedness will contribute independently to the evaluations of the experience. We further contend that this contribution exceeds that provided by the peak and final moment, which are individual-specific.

We briefly present the results of two studies that look at the effect of social influence on both the moment-to-moment and retrospective evaluations of an experience. In our first study, we measured moment-to-moment and retrospective evaluations for consumers who are assigned to view a short film either: 1) alone; 2) with another person whose facial expressions and body posture they could not see; or 3) with another person whom they could see. In a second study, we videotaped participants as they watched a film with another

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8 . Daniel Kahneman, *Experienced Utility and Objective Happiness: A Moment-Based Approach*, *in* CHOICES, VALUES AND FRAMES 673 (Daniel Kahneman & Amos Tversky eds., 2000).

9 . Fredrickson & Kahneman, *supra* note 7, at 220; Daniel Kahneman et al., *When More Pain is Preferred to Less: Adding a Better End*, 4 PSYCHOL. SCI. 401, 403 (1993)

10 . Kahneman et al., *supra* note 9, at 404.

person in order to gather direct evidence for mimicry of expression and its effect on participants' evaluations.

EXPERIMENT 1

Fifty-seven undergraduate students participated in this study. Seventeen of these participants were assigned to single-person sessions, while the other 40 were assigned to two-person sessions. Of those assigned to the latter, half underwent a "mere presence" condition (where they sat together but could not see each other), and half underwent a "full presence" condition (where they could also see each other). Participants used a joystick to continuously indicate their reactions to a video clip. They were to push the lever to the left if they did not like it at the moment (0 = "dislike very much") and pushing it to the right if they liked the video at the moment (10 = "like very much"). After watching the video clip, participants indicated their evaluation of the program and the experience.

RESULTS

To explore differences in co-movement, we analyzed the time series of participants' joystick evaluations using a method called cross-spectral analysis, which is particularly suited to comparing two time series in terms of underlying cyclical patterns that conventional correlational analysis would be unable to uncover. Cross-spectral analysis identifies covariation at different frequencies or periodicities through a statistic called squared coherence. These statistics were in turn used to derive a "weighted coherence" measure,[11] which reveals the extent to which two individual's evaluations move along similar high (every 2-to-28-seconds) or low frequency cyclical patterns (every 30-to-421-seconds).

We examined the difference in weighted coherence for individuals in observing pairs as compared to three controls: 1) non-observing false pairs (people who were in the full presence condition, but not paired with each other); 2) alone false pairs (people who were alone and whose data was

[11] . Stephen W. Porges et al., *New Time-Series Statistic for Detecting Rhythmic Co-Occurrence in the Frequency Domain: The Weighted Coherence and its Application to Psychophysiological Research*, 88 PSYCH. BULL. 580, 585 (1980).

randomly paired with another individual in the same condition); and 3) mere presence pairs. We first compared the high frequency range and then moved to the low frequency range. We performed a one-way MANOVA on both types of coherence, while contrasting type of presence (observing vs. control was significant ($F(2,77) = 15.7$, $p < .001$)). While there was no effect from type of presence on high frequency coherence ($F < 1$), there was a significant effect from type of presence on low frequency coherence ($F(1,78) = 27.45$, $p < .001$). Post-hoc comparisons showed that low frequency coherence for observing pairs in the social presence condition was significantly higher as compared to the controls ($M_{observing} = .42$, $M_{alone\text{-}false} = .22$, $t(79) = 5.25$, $p < .01$; $M_{mere\ presence} = .29$, $t(79) = 3.55$, $p < .01$; $M_{non\text{-}observing\text{-}false} = .27$, $t(79) = 4.00$, $p < .01$). There were no significant differences in low frequency coherence in the three control conditions (all p's $> .10$).

Using the SPSS mixed procedure in order to accommodate correlated errors in dyads, we ran two regressions, testing a base model with only peak and final moment experiences, as well as an augmented model that also included low and high frequency coherence, type of presence (observing vs. control), and interaction terms. The base model with peak ($b = .46$, $t(76) = 4.2$, $p < .001$) and final moment ($b = .35$, $t(75) = 5.72$, $p < .001$) was significant, as expected. In the augmented model, low frequency coherence emerged as an independent predictor of program evaluation ($b = 3.13$, $t(26) = 2.02$, $p = .05$), while peak affect ($b = .42$, $t(69) = 3.79$, $p < .001$) and final moment ($b = .35$, $t(66) = 5.57$, $p < .001$) continued to be significant. Further, there was a marginally significant interaction between type of presence and low frequency coherence ($b = 3.84$, $t(27) = 1.94$, $p = .06$), with the effect of low frequency coherence being higher among observing pairs compared to the control. Interestingly, high frequency coherence did not have any effect on evaluations. A model run on only the three control conditions showed no significant effects for low or high frequency coherence, with only peak and final moment being significant.

Study 1, however, does not provide direct evidence regarding mimicry and contagion. To obtain this evidence, we surreptitiously videotaped pairs of participants as they watched a short film and coded for their facial expressions,

as well for instances in which either person stole a glance at the other. These data can then be analyzed directly for shared patterns of expression, and we can compare these shared patterns to the time-series of evaluations.

EXPERIMENT 2

In our second study we examined three slightly different ways that participants might influence and be influenced by each other's emotional expressions: 1) through emotion contagion—observing the emotional expressions of the other person (who is not looking directly back); 2) by expressing an emotion that is observed by the other person (but not looking directly back at that person), peripherally registering the observation and changing expressions as a result; and 3) through processes of empathy—looking at the other person who is concurrently looking back and noticing if the other person is expressing the same or a different emotion. We surreptitiously videotaped forty participants (ten pairs of two in full presence and ten pairs of two in mere presence) and coded their facial expressions and body/head movements on a moment-to-moment basis as they watched a video clip. Consent for videotaping was subsequently obtained, and data for the two participants who objected to the videotaping were discarded. We expected that these emotional processes would underlie the sense of coherence obtained in experiment 1, and therefore we also collected reactions to the video on the joystick.

RESULTS

We used time series regression on the emotional expression data to examine whether a participant's emotional expressions in one moment were influenced by the other participant's emotional expressions in the preceding moments and whether participants looked at these expressions, controlling for own past emotions. We postulated that individuals' own emotions at any particular time would be a function of three factors: 1) their own unreciprocated observation of the other person's emotions (Own Look x Other's Emotion); 2) the other's unreciprocated observation of their own emotions (Other's Look x Own Emotion); and 3) the congruity or incongruity of emotions observed by both individuals (Matched Look x

Congruity/Incongruity x Sum of Absolute Values of Both Emotions).

Results showed that emotional contagion occurred among pairs of participants who could observe each other's expressions. It did not occur among those who were unable to see each other. More specifically, for the full presence condition, we find that the emotional expressions of a person can be predicted not only by his or her own prior expressions, but also by: 1) unreciprocated observations of the other person's expressions (a positive effect that emerges immediately and lasts two-to-three seconds); 2) by peripheral registration of being observed by the other person while not looking back (a negative effect that emerges one-to-two seconds later); 3) shared mutual looks and observed emotions of matched valence (a positive effect that emerges immediately and lasts up to five seconds); and 4) by shared mutual looks and observed mismatched emotions (a negative effect that emerges two-to-three seconds later and lasts up to four seconds). Further, the social effects described above were bi-directional suggesting that such influences were mutual rather than the result of a leader-follower pattern. Results for the mere presence condition revealed only the non-social influences on current emotions —e.g., the participant's own prior emotions and the emotional content of the program.

In addition, a regression analysis showed that the factors that led to emotional contagion explained the degree of low frequency coherence in moment-to-moment evaluations of the program. Specifically, participants' reciprocated (b = .08, $t(7)$ = 2.73, p<.05) and unreciprocated observations (b = .004, $t(7)$ = 3.09, p<.05) of each other's positive emotions led to greater low frequency coherence, while observations of mismatched (b = -.04, $t(7)$ = -6.97, p<.001) or negative (b = -.005, $t(7)$ = -2.79, p<.05) emotional expressions led to lower coherence. This result lends support to our assertion that this low-frequency synchrony in evaluations is a consequence of empathy and emotional contagion. In addition, as in the previous study, low frequency coherence, which we interpret as a form of rapport with the other participant, is an independent predictor, beyond peak and final moment, of participants' summary judgment of the experience for participants in the full but not the mere presence condition.

In sum, results for study 2 provide evidence that participants who could see one another influenced each other's emotional expressions, sometimes pulling each other toward the same expression, sometimes causing participants to abandon their own feelings, and sometimes reinforcing and thus sustaining an expression. The behaviors that drive emotional contagion, such as observing the other person, also appear to influence the degree of low frequency coherence, or synchrony, in participants' evaluations of the program. The greater this synchrony, the more participant liked the experience.

DISCUSSION

Our results show that shared experiences lead to a very different dynamic as compared to experiences that are consumed alone. Individuals' moment-to-moment evaluations of an experience appear to change as a consequence of being with someone else. Further, their retrospective evaluations may be influenced by factors that depend on whether they are consuming the experience with someone else or alone. Specifically, our studies showed that the moment-to-moment evaluations by participants who could observe each other's expressions covaried with each other more closely over broad than over narrow time intervals. This result suggests that participants were evaluating each local element of the experience according to their own idiosyncratic likes and dislikes. Over a broader range of time, however, participants' evaluations moved up and down together in a shared rhythm, reflecting a more global sense of agreement about the experience. Results of our second study in which we videotaped participants' expressions, suggest that this global agreement or synchrony resulted from participants' intermittent observations of one another throughout the experience. Contagion also appeared to result from unreciprocated looks, which led to adoption of the expressions of the other person, and from reciprocated (i.e., shared) looks, which led to reinforcement of emotional expressions. This process led to synchrony of evaluations.

CONCLUSION

Our findings have important implications for

understanding how people's judgments and behaviors may be influenced by the actions of others around them. Subtle nonverbal cues such as smiles or even quick glances at each other may cause or affect the sense of synchrony, causing people to converge or diverge in their judgments. One way in which such effects may manifest is in the judgments arrived at by jurors during a trial, whereby they may be influenced not just by the nonverbal cues from a lawyer or a plaintiff/defendant, but also by cues from their fellow jurors. Our results suggest, for example, that jurors who connect better with each other nonverbally (either in a positive or negative sense) may attribute this connection to the experience or to one of the protagonists in the case, causing an upward or downward bias in judgment. An open question is whether people who experience such synchrony also trust the judgments of others or evaluate evidence differently compared to those who do not experience it.

Our findings have larger or broader implications for the emergence of empathy. We argue that two basic processes are at play when people interact with each other: a) emotional contagion, wherein emotions of others seep into and color the emotions experienced by the self, and b) shared emotional experience, wherein the emotions of others serve as a source of information about the emotions experienced by the self and hence signal the extent to which one shares or does not share the same perspectives. Importantly, both processes contribute to the development of connectedness or synchrony, one representing a more primitive or automatic source of influence and the other a conscious process that weighs the informativeness of the nonverbal cues. While it may be possible to de-bias the effects of such conscious processes, it may be less easy to reduce the extent to which people may be influenced by basic contagion. Making people aware of the fact that they are being influenced by such cues may thus help only to a limited extent.