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Effects of Arousal on Attraction: Physical Characteristics and Trait Information

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Abstract

This study is designed to investigate the effects of physiological arousal on attraction when faces are accompanied by mitigating information. 54 participants were asked to report their level of attraction to photographs of faces that were accompanied by positive or negative traits. We manipulated the level of arousal of those in the experimental groups with electric shock and exercise, while those in the control group received no shock or exercise. We expected participants who were aroused to report being more attracted to the attractive faces, and less attracted to unattractive faces than participants who were not aroused. We also expected participants who were aroused to neglect trait information more than participants who were not aroused. The misattribution effect, in which subjects are more attracted to attractive faces when aroused than when not aroused, has been widely researched. While many studies support the theory of misattribution and related theories, we hope to contribute knowledge about the effect of trait information on arousal and attraction. In the shock condition, participants rated positive traits significantly lower in the post-test than the pre-test, $p < .016$. This pattern of results partially supports a neglect interpretation of the effects of arousal and suggests that future research on arousal's effects should focus on neglect as well as misattribution.

Effects of Arousal on Attraction: Physical Characteristics and Trait Information

Two important types of love involved in relationships are passionate love and companionate love (Sprecher & Regan, 1998). Passionate love is characterized by feelings of excitement, physiological arousal, intense attraction, nervousness, and tends to peak early in a relationship and then decline. A number of studies suggest that physiological arousal tends to amplify feelings of romantic attraction (e.g., Dutton & Aron, 1974). However, another consequence of intense physiological arousal could be a neglect of certain mitigating information about one's new partner that may be important in predicting the long-term prospects of the relationship, such as not having anything in common with them or living incompatible lifestyles (Sprecher & Regan, 1998). In this paper, we examine evidence for these two effects of arousal on attraction.

Arousal Can be Misattributed to Romantic Attraction

Much of the initial research on the connection between attraction and arousal was based on the Misattribution Theory. The basis of this theory is that when people are aroused, they can misattribute the reason for their arousal to attraction. Schacter and Singer (1962) found evidence of misattribution, though not with attraction. After being injected with epinephrine, which causes arousal, their participants were more likely to adopt a confederate's emotions (either happy or angry) than participants who were not aroused. Schacter and Singer explained participants' behavior by proposing that emotion was a combination of arousal and a cognitive label for the arousal.

Dutton and Aron (1974) hypothesized that under the right circumstances, arousal could be labeled as romantic attraction. Male subjects crossed either a high shaky bridge, or a low stable bridge, and were thus physiologically aroused or not aroused. Their attraction to a female confederate who was standing in the middle of the bridge was then measured. They found that

participants who crossed the high shaky bridge (and were more aroused) were more likely to call and ask the confederate out on a date than participants who crossed the low stable bridge (and were less aroused). The difference in the dependent variable across the two groups suggests that individuals on the high shaky bridge misattributed the arousal that was caused by the bridge as attraction to the confederate. While their results supported the Misattribution Theory, the study had a confounding variable. Participants were not randomly assigned to one of the two bridges; they simply stopped men that were walking across the two bridges already. So, they had no way of knowing if the men on the high shaky bridge were asking the confederates out because they were naturally more risk-seeking than the men on the low stable bridge, or because they were more physiologically aroused.

A second study investigating misattribution and attraction addressed this issue of random assignment. White, Fishbein, and Rutsein (1981) found that subjects who were aroused from exercising liked an attractive female confederate more than subjects who were not aroused. In addition, they found that aroused subjects disliked an unattractive confederate more than those who were not aroused. This could be described as a polarization effect: attraction to unattractive confederates decreased (or moved even further towards the unattractive pole), and attraction to attractive confederates increased (or moved even further towards the attractive pole). White, Fishbein, and Rutsein's results support the Misattribution theory, but this theory does not explain the polarization effect they found.

An alternative theory that takes the polarization effect into account is Response-Facilitation (Allen, Kenrick, Linder, & McCall, 1989). This theory claims that general arousal facilitates one's dominant response to a situation. Attraction is the dominant response when you see an attractive person. Conversely, aversion is the dominant response when you see an

unattractive person. According to Response-Facilitation, these dominant responses related to attraction take over when a person is aroused and cause the polarization effect found in White, Fishbein, and Rutsein (1981).

Arousal May Lead to Neglect of Mitigating Trait Information

Extensive literature on the Misattribution Theory and Response-Facilitation Theory supports misattribution of arousal to attraction and the polarization effect. To further the research that has already been conducted, we wanted to examine another potential effect of physiological arousal: the neglect of mitigating information. We define mitigating information as information that has the potential to change the severity of one's judgment about something else. Little research has been done including both mitigating information and attraction, but research on aggression and mitigating information exists, and is helpful to understanding the effects attraction could possibly have. Johnson and Rule (1986) found with a sample of all males that when mitigating information was presented to a subject *after* he was insulted by a co-worker, the subject reported more annoyance and higher levels of aggression than when mitigating information was presented to a subject *before* he or she was insulted by a co-worker. This supports the assumption that when mitigating information was presented after provocation, it tended to be neglected. When subjects became aroused *after* the mitigating information was presented, they paid more attention to the information than subjects who became aroused before the information was presented.

To examine the effects of arousal on polarization of attraction and neglect of mitigating information, we presented participants with facial photographs accompanied by mitigating information (character traits such as kindness or intelligence). Subjects were randomly assigned

either to be aroused or to not be aroused at all. We then measured their attraction to faces, wondering how much attention they would pay to the character traits versus physical appearance.

We hypothesized that in an un-aroused state, participants would be more influenced by desirable or undesirable characteristics than they would be in an aroused state. Arousal would cause them to neglect those characteristics that they would otherwise take into account. We also assumed that arousal would facilitate the dominant response, leading participants to rate attractive faces as more attractive after being aroused and unattractive faces as less attractive after being aroused than their counterparts in the control condition.

Method

Participants

Participants included 54 college students from a small, Midwestern liberal arts college. 50 percent were female, 50 percent were male, and the age range was 18 to 22, with an average of 20.16. Ethnic groupings were: 90.7 % White, 7.4% Asian, and 1.9% Black. Participants were offered extra credit in psychology classes if they participated in the study.

Materials

Our stimuli included attractive and unattractive faces, and positive and negative traits. We obtained the faces from two separate databases with similar photographs (Minear & Park, 2004; Solina, Peer, Batagelj, Juvan, & Kovac, 2003), and from our personal photographs. Each photograph was a headshot of the front of the face, smiling, about five feet away, with a white background. We used a web-based survey to pre-test the attractiveness of the faces. The survey was available on the web for three weeks. Questionnaire takers were asked to rate sixteen male Caucasian faces and sixteen female Caucasian faces on a Likert scale of one to ten, one being the least attractive and ten being the most attractive. We used eight of the photographs in our study,

four rated as attractive (5.5 and up on a 10 point scale) and four rated as unattractive (4.5 and below on a 10 point scale).

The positive traits were chosen from Buss et al. (2001). Buss and colleagues obtained ratings of traits most desirable in a romantic partner, and compiled a list of eighteen characteristics. Men and women separately ranked the importance of the same eighteen traits. For each sex, we chose eight of these eighteen traits by starting with the top eight ranked traits, throwing out ones that were not compatible with our methods, and adding the next highest ranked traits. Examples of traits incompatible with our study were “mutual attraction,” because our subjects will be rating their attraction to photographs, and “good looks,” because a photograph will be presented with the traits.

The eight traits we used for men, in rank order, were: emotional stability/maturity, dependable character, pleasing disposition, education/ intelligence, good health, sociability, refinement/neatness, and ambition/industriousness. The eight traits we used for women, in rank order, were: emotional stability/maturity, dependable character, pleasing disposition, education intelligence, ambition/industriousness, sociability, good health, and good financial prospect. The negative traits were the opposite of the positive traits, for example: “immature” in response to maturity, or “poor social skills” in response to sociability. Their rank orders were opposite the positive traits. One set of traits paired with a face consisted of 4 all positive or all negative traits. We chose the traits in such a way that their rank orders all added up as similarly as possible. For example, if a rank number from one through eight were attached to each trait; two sets might be 1, 2, 7, 8 and 3, 4, 5, 6. Each set added up to 18.

In addition to the eight stimuli described above, we also created a distraction section. The distraction section consisted of 16 faces from the databases that we had not used previously,

and sets of traits that had not been used previously. Example traits are “This person has an affinity for chocolate cake and ice cream”, and “If left in a room by himself, this person will pick his nose excessively.” All the face and trait combinations were put on a PowerPoint presentation. The entire presentation consisted of 8 stimuli (as a pre-test), 16 meaningless faces (distraction section), and again the 8 stimuli (post-test). Participants responded to each face/trait combination by answering the prompt, “Imagine you are going on a blind date with this person. How happy are you about that?” using a scale from 1 to 6, with six being “Very happy.”

We included two arousal conditions and one control condition in our study. To manipulate arousal, we used electric shock and exercise. We decided to use shock and exercise as our means of arousal because we wanted to have one aversive form of arousal and one neutral, and possibly even positive form of arousal. The shock device was manufactured by Petsafe® and was a remote dog trainer, model number PDBDT-305. It was purchased new through Amazon.com. The instructional guide confirms the safety of this device several times, and includes these statements: “The Petsafe® Remote Trainer has been proven safe, comfortable, and effective for all pets over 8 pounds,” “While the stimulation is unpleasant, it is harmless.” The power source for this device is two 3-volt Lithium Batteries, each approximately the size of a nickel coin.

We tested this device on ourselves extensively, and on 8 pilot study participants. Every level (1 through 10) of the device was tested on ourselves and two of the pilot study participants. The shocks were perceived as uncomfortable, but not acutely painful. This observation was confirmed by all of the pilot study participants.

Before beginning, we told participants an approximation of the following: “The electronic device will be strapped to the outside of your forearm. If at any time you become too

uncomfortable and want the device removed, you may unbuckle it yourself, or ask one of the researchers to unbuckle it for you. You may also ask that the shocks stop being administered. If you feel unable to continue the study, please say so and you are of course free to leave. Do not feel that you are obligated to stay if you are uncomfortable.”

The shocks were administered by strapping the device to the participant’s forearm, and then pressing a button on a remote control. Pressing this button elicited a brief shock of the level the remote control was set on. Holding the button down would *not* result in a continuous shock, and the next shock had to be administered by pressing the button a second time. Before beginning the study, we determined the level of shock (1 through 10) that should be administered to each participant. We began with one of the lowest levels (which was not too uncomfortable for any of the 8 people we tested the device on), and ask them if the shock was too uncomfortable. If they said no, we moved the remote to the next level, shocked the participant again, and asked them the same question. We repeated this process until they said yes, the level was too uncomfortable, or until we reached level 10. When a participant said that the level had become too uncomfortable, we moved back to the previous, lower level, and administered the rest of the shocks on that level. Shocks were administered during the post-test in intervals that averaged 10 seconds each. Brigham, Maass, Martinez, & Whittenberger, also used electric shock as a source of arousal and stated it was an effective source (1983).

For the exercise condition, we had participants step up and down on a stair-stepper block for two minutes. The step was about 6 inches high.

Procedure

We gave each participant an informed consent, then led them to room with a computer sitting on a table, where they were asked to sit. The PowerPoint presentation of faces and traits

was opened on the computer. For participants in the arousal conditions, we explained the survey and asked them to fill out the first 24 questions, then walk out of the room when they were finished. When they came out, we led them back in and either shocked them, or had exercise. Afterwards we told them to finish the remaining 8 questions on the survey, fill out a demographics form, and leave the room when they were done.

For participants in the shock condition, we entered an adjoining room with a two-way mirror. The participants were shocked through the mirror while being watched by the researchers. Before beginning, we told participants an approximation of the following: “The electronic device will be strapped to the outside of your forearm. If at any time you become too uncomfortable and want the device removed, you may unbuckle it yourself, or ask one of the researchers to unbuckle it for you. You may also ask that the shocks stop being administered. If you feel unable to continue the study, please say so and you are of course free to leave. Do not feel that you are obligated to stay if you are uncomfortable.”

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For the exercise condition, we had participants step up and down on a stair-stepper block for two minutes. The step was about 6 inches high. For both conditions, after leaving the room and being led back to a common area, participants were debriefed.

Results

We expected that those participants in the arousal (exercise and shock) conditions would be less influenced by desirable or undesirable characteristics paired with faces than those in the control condition. We also expected a polarization effect of arousal: participants in the arousal conditions should show greater attraction to the attractive faces and less attraction to the unattractive faces than participants in the control condition.

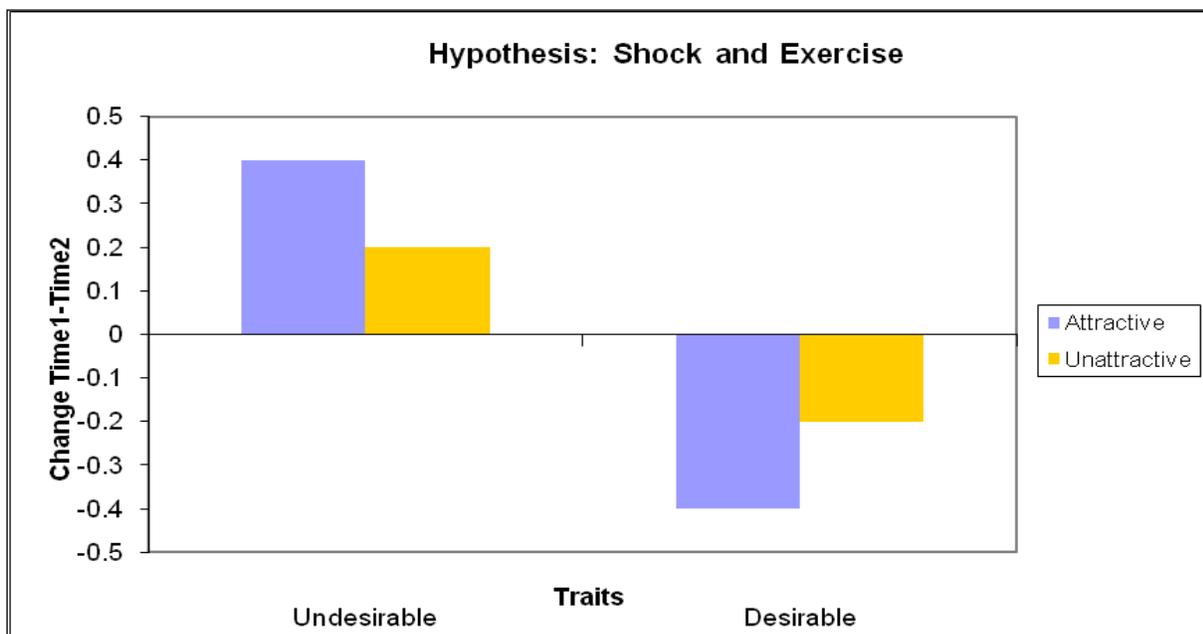


Figure 1. Graph of hypothesized results for the shock and exercise conditions.

Participants' ratings of each face were analyzed using a 3 (condition: shock, exercise, or control) by 2 (attractiveness of face: attractive or unattractive), by 2 (desirability of traits: positive or negative), by 2 (time: pre-test and post-test) mixed factorial design with repeated-measures on the last three factors. Thus we predicted a four way interaction between condition, attractiveness of face, desirability of traits, and time. Although the four way interaction was not significant, $F(2, 51) = .99, p < .375$ (see Figure 2), the pattern of means is somewhat supportive of a neglect interpretation of the effects of arousal: responses to undesirable traits became more positive after shocks, while responses to desirable traits became more negative after shocks.

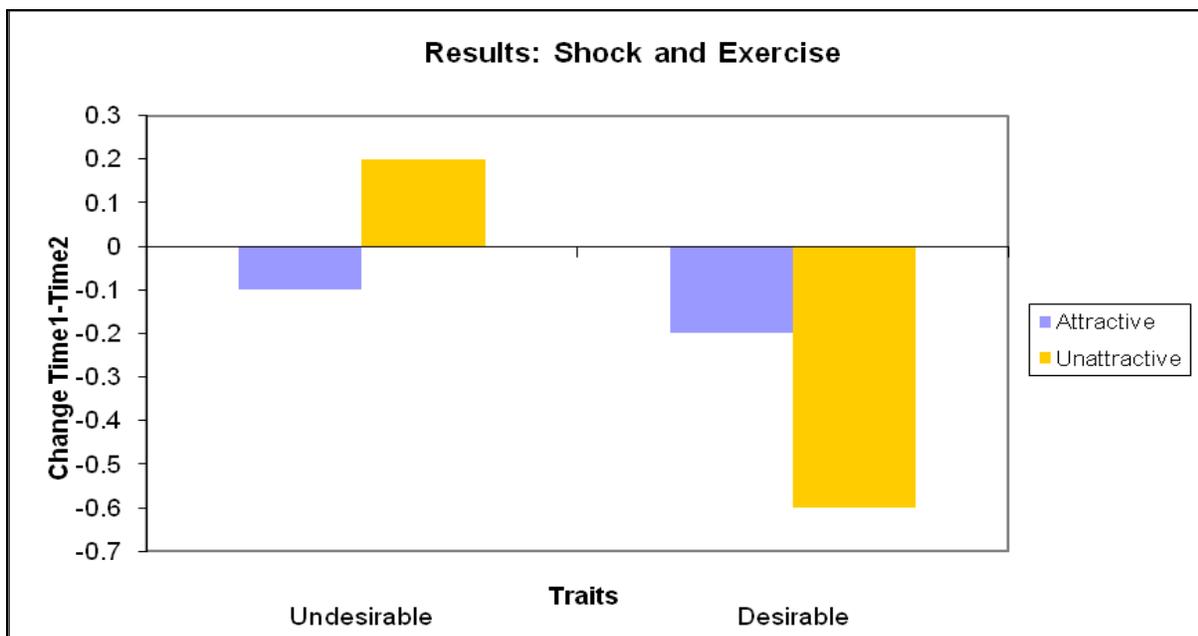


Figure 2. Graph of change from pre-test to post-test in ratings of faces for the arousal conditions.

The interaction between condition, time, and traits was significant, $F(2, 51) = 4.46, p < .016$ (see Figure 3). Ratings of attractive traits decreased from $M = 4.00$ in the pre-test to $M =$

3.597 in the post-test, while ratings of unattractive traits did not change. The interaction between physical attractiveness, condition, and time was not significant.

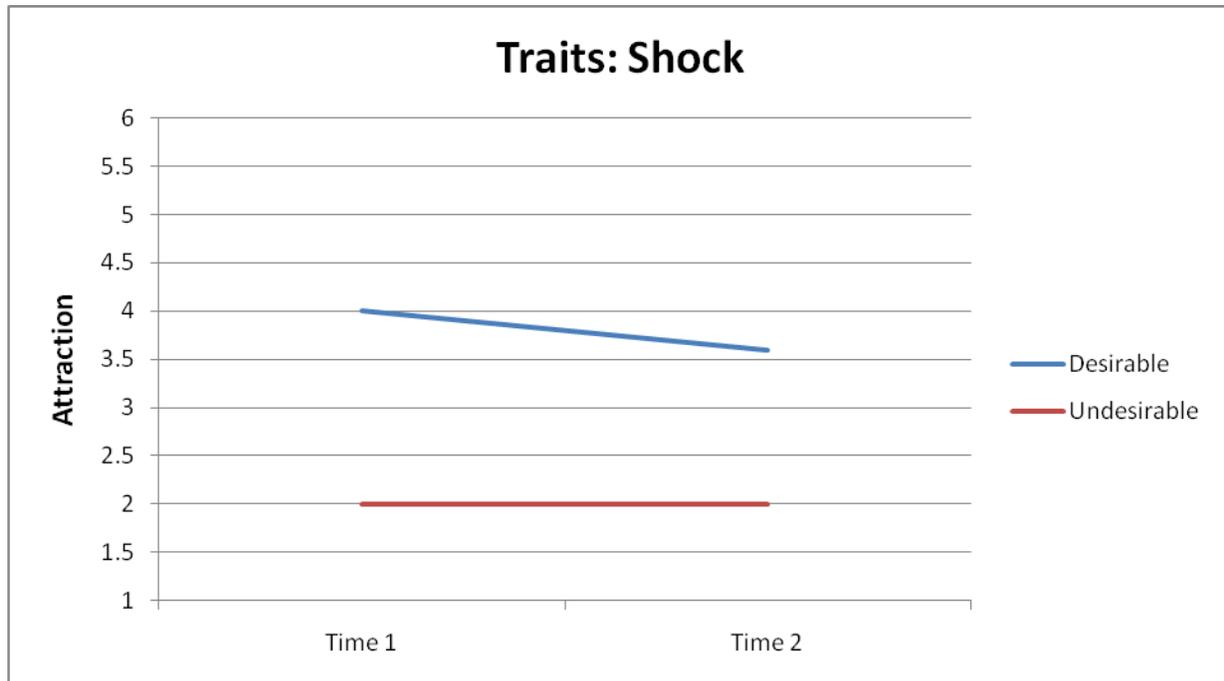


Figure 3. Graph of significant interaction between time and traits for the shock condition.

Discussion

The response facilitation hypothesis predicts that while aroused in either the shock or exercise condition, participants would find attractive faces more attractive in their post-test than control condition participants, and they would find unattractive faces less attractive. This hypothesis was not supported by an interaction between condition, attractiveness of face, and time. However, there was some support for the arousal-neglect hypothesis: a significant interaction between condition, desirability of traits, and time. This interaction indicates that while being aroused by electric shock, participants were likely to neglect positive traits and rate attractive and unattractive faces lower during their post-test than during their pre-test,. This suggests that in these circumstances, neglect of mitigating information was more powerful than

the polarization effect we expected, which was not present in any condition. Again, the effect was only present in the shock condition.

The difference between the shock condition and exercise condition is interesting because the conditions include different types of arousal: aversive and non-aversive. According to Response-Facilitation theory, this difference should not dictate the presence of a polarization effect. However, we have no previous research that indicates whether type of arousal should have an effect on neglecting information. Further research on neglect of information under different types of arousal may yield interesting results, but we are wary of looking too far into this interaction as it was much stronger when participants were neglecting desirable traits, not undesirable traits.

We suspect we may not have found the polarization effect in this study for a few reasons. First, in previous studies on misattribution of arousal, most researchers have used confederates as stimuli to elicit attraction or non-attraction. We used pictures of faces as stimuli, which may have been much less salient. Additionally, the pictures had some limitations. We were unable to find very many faces that were rated as very attractive in our pilot surveys, so some of the “attractive” pictures included in our survey were rated as only moderately attractive (most were between 5.5 and 7 on a scale from 1 to 10 with 10 being the most attractive). Because we wanted to avoid a floor effect, we used faces rated from about 3.5 to 4.5 as our “unattractive” stimuli based on pilot testing. Thus, the gap between our attractive and unattractive faces was small. There was still a significant main effect for attractiveness of faces ($F(1, 51) = 151.05, p < .001$), but it’s possible that a larger number of faces would have increased statistical power (our choice of 4 attractive and 4 unattractive faces was based mostly on the number of attractive faces we had available).

A second important limitation was our manipulation of arousal. In the exercise condition, participants performed a stair-stepper for 2 minutes. Though this sufficiently raised their heart rate, it may not have been enough time to sufficiently keep them physiologically aroused for the remaining part of the experiment. White et al. (1981) had participants run in place for 120 seconds in their high arousal condition, which was sufficient arousal, but running in place is perhaps more strenuous than stepping up and down. In the shock condition, we had no good way of measuring participants' arousal. Heart rate was not significantly altered by electric shock, but we still believed participants were aroused. They were visibly anxious and apprehensive, and reported fear and anxiety during pilot testing.

Further research on different types of arousal may yield interesting results. Our study used two different classifications of arousal, aversive (shock), and non-aversive (exercise). Though not in all the ways we predicted, the two seemed to have different effects on our participants. They neglected certain information more in the shock condition than the exercise condition. Research including even more types of arousal, such as anger or excitement, may show differences in the way people perceive mitigating information.

Additionally, we believe further research on the neglect of mitigating information as applied to attraction would be valuable and interesting. Our data indicate that neglect of information may be more influential to ratings than the misattribution effect (though the design of our study may not have lent itself to the misattribution effect very well). Neglecting information that influences attraction while under a state of arousal could have many implications, such as the reason people neglect information while under the influence of the passionate type of love.

While the misattribution effect is a well known phenomenon, our study did not support it. Instead, we found evidence that neglect of information may be important to perceived attraction. Further research exploring the connection between mitigating information and attraction while under a state of arousal may help explain our results, and give interesting insight into different types of relationships.

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