Individual Differences in Marketing Placebo Effects: Evidence From Brain Imaging and Behavioral Experiments

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We used a novel automated structural brain imaging approach to determine individual differences of Marketing-Placebo-Effects (MPE) and combined this approach with behavioral experiments. We found that consumers high in reward-seeking, high in need for cognition, and low in somatosensory awareness are more responsive to MPE.

[to cite]:

[url]:
http://www.acrwebsite.org/volumes/1019497/volumes/v43/NA-43

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Expectancy and Placebo Effects of Marketing Actions
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Paper #1: How Counterfeiting Contaminates the Efficacy of Authentic Products
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Paper #2: Expectancy Effects of Alcohol-Energy Drink Cocktail Labeling on Subjective Intoxication, Risk-Taking, and Sexual Self-Confidence and Aggressiveness
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Paper #3: The Taste of a Bad Deal: The Effect of Transactional Utility on Experiential Utility
Jayson S. Jia, The University of Hong Kong
Taly Reich, Yale University, USA
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Paper #4: Individual Differences in Marketing Placebo Effects: Evidence from Brain Imaging and Behavioral Experiments
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SESSION OVERVIEW
Expectancies are beliefs about future feelings, events or outcomes. A large body of literature in consumer research has shown that expectancies, shaped by marketing actions such as branding, labeling or pricing, influence consumers’ sensory perception and enjoyment of products independently of their physical properties (e.g., Allison and Uhl 1964, McClure et al. 2004, Lee, Frederick and Ariely 2006). More recently, consumer research has shown that marketing-based expectancy effects operate as “placebo” effects and modify neural representations of experiences (Plassmann et al. 2008). Marketing placebo effects influence not only sensory perception, but also the actual efficacy of products claimed to trigger a specific behavioral response: the pricing of energy drinks influence drinkers’ mental acuity (Shiv, Carmon and Ariely 2005), or the pricing of pills influence patients’ resistance to pain (Weber, Shiv and Carmon 2008).

The four papers in this session—all in advanced stages of completion—aim to present novel findings on the psychological and neurological underpinnings of marketing placebo effects. These papers also present a large scope of marketing placebo effects in domains with high relevance for consumers, firms, policymakers and health authorities. Amar, Ariely, Carmon and Yang demonstrate how expectancies make counterfeiting particularly harmful from consumers’ perspective: labeling products as fakes (counterfeit) decreases their actual efficacy. For instance golf players perform worse when playing with a club labeled as counterfeit.

Cornil, Chandon and Krishna contribute to the debate on Alcohol Mixed with Energy Drinks by showing the critical role of expectancies: consuming a cocktail labeled as “Vodka Red Bull” (rather than “Vodka” or “Exotic Fruits”) influences perceived intoxication and may trigger harmful behavioral responses such as sexual aggressiveness. Whereas most previous research on marketing placebo effects has examined how quality signals (such as price) can influence expectancies, Jia, Reich and Shiv show that transaction utility (for instance, the feeling of making a good or bad deal) can also shape consumers’ expectancy and enjoyment of purchased products, independently of quality signals. Finally, Plassmann and Weber use a novel automated structural brain imaging approach to better understand individual differences in marketing placebo effects on a behavioral and neural level, and show that people high in reward-seeking, high in need for cognition, and low in somatosensory awareness are more responsive to such effects.

This session brings together leading scholars and uses diverse methods (field experiments, lab experiments, neuroimaging trials) to address important theoretical questions about marketing placebo effects such as the role of involvement and awareness, and the identification of personality traits and neural circuits involved in these effects. They also provide evidence of domain-specific placebo effects with substantive implications for business, consumer satisfaction and public health. We expect this session to have a broad appeal among consumer researchers interested in the psychology of expectancies, branding and labeling, public and health policy, and neurosciences.

How Counterfeiting Contaminates the Efficacy of Authentic Products

EXTENDED ABSTRACT
Counterfeiting is a rampant global phenomenon. The value of counterfeit and pirated products globally is estimated to be up to $1.77 trillion in 2015 (ICC, 2015). Sales of counterfeit products have grown by 1700% in the past decade (Economist, 2010), affecting a remarkably broad range of industries (e.g., apparel, consumer electronics, beverage, food, pharmaceutical, tobacco, and even cars and heavy machinery) in both developing and developed countries around the world. While a number of studies have shed light on how counterfeits affect consumers’ preference for authentic products (e.g., Gino, Norton, & Ariely, 2010; Grossman & Shapiro, 1988; Wilcox, Kim, & Sen, 2009), how counterfeiting may impact the consumption experience is not well understood. For example, might knowing that the Nike’s golf clubs they have may be counterfeit impair expert golfers’ game performance? Might knowing that there are counterfeit Parker ink pens on the market reduce how well one can write when she is using an authentic (non-counterfeit) Parker mechanical pencil?

This research aims to fill this gap in the literature. We argue and show in the lab and the field that counterfeiting can engender moral disgust—in a manner similar to the disgust aroused by exposure to physical contaminants (cf. Chapman, Kim, Susskind, & Anderson, 2009). Because moral disgust triggers repulsion and rejection responses (Chapman & Anderson, 2012), it can contaminate the consumption experience, dampening perception and even actual product efficacy. We further argue and demonstrate that, just like that disgusting substance can transfer infectious essence to another object (Rozin, Millman, & Nemeroff, 1986), moral disgust experienced towards a counterfeited product can contaminate the counterfeited brand in general, and thus harming the efficacy of authentic products in other categories of the brand.

In Study 1, we investigated whether perceiving that the golf club they used is a counterfeit could impair the performance of expert golfers, even though that club was an authentic product and those golfers were certified experts in the sport. Consistent with our proposition, the golfers were more successful at driving the balls into the holes when they thought they were using the authentic putter than the supposedly counterfeit one; even when they missed, they drove the balls closer to the holes. That these results emerged in the field,
with expert golfers, and manifested in objective performance differences, demonstrated the external validity of the effect.

In Study 2, we sought evidence of the psychological mechanism we proposed—whether moral disgust towards counterfeiting mediates the negative effect of counterfeiting on product efficacy, and whether exposure to a counterfeit can contaminate the efficacy of authentic products in other categories of the target brand. They were randomly assigned to one of two conditions. Those who in the authentic condition, were provided an authentic Parker pen. Those who in the counterfeit condition were given the same pen but were told that the product was a counterfeit. Participants were instructed to draw a line connecting the entrance and the exit of a small maze printed on paper, without touching the “walls” of the maze. Next, participants completed a word fragment task that unobtrusively assessed the level of moral disgust participants experienced (adapted from Jones & Fitness, 2008). After a short break, participants were asked to complete a second task that examined the infectious effect of counterfeiting on other product of the target brand. Participants were given an authentic Parker branded mechanical pencil and asked to work on the same maze task as they did with the pen. Consistent with our propositions, even though participants in both conditions used an identical pen, those in the counterfeit condition made significantly more errors on the maze task than those in the authentic condition. A mediation analysis established that the moral disgust participants experienced mediated the effect of counterfeiting on product efficacy. Further, consistent with the notion of contamination we proposed, prior exposure to the counterfeit pen significantly impacted participants’ performance when they switched to the pencil to work on the maze task; those in the counterfeit condition made significantly more mistakes on the maze task. A mediation analysis also established that the moral disgust participants experienced towards the first, counterfeit product (i.e., the pen) mediated the effect of counterfeiting on the efficacy of the second product (i.e., the mechanical pencil).

In Study 3, we directly probed whether counterfeits illicit physical repulsion, probing whether the effect we found could not be simply explained by the alternative account that consumers have lower quality expectation about counterfeited products. Participants were randomly assigned to one of two conditions: Whereas those in the authentic condition were asked to complete the session using the club they identified as authentic, those in the counterfeit condition, the one they thought was the counterfeit. The rest of the procedure was identical in both conditions. A laser pointer was attached to the handle end of the club. Participants were asked to hold the club head and point the laser beam (emitting from the pointer attached to the handle) at the bull’s eye of a round target with ten rings. The target was pinned to a vertical wall. Participants were asked to keep the laser beam on the bull’s eye as much as possible for 30 seconds. A high-resolution video camera was discretely set up in the lab room, recording the movements of the laser beam on the target area. The overall distance the laser point ‘traveled’ on the target area—a measure of the extent to which participants were willing to firmly grip and control the club head—was used as the dependent measure. Supporting our proposition that counterfeiting triggers moral disgust and hence physical repulsion, participants in the authentic condition exhibited behavior consistent with tighter grip than those in the counterfeit condition—the former group’s laser beam traveled a shorter distance than did that of the latter group. Further, when we used the total distance the laser point traveled below the center line as the dependent measure, a significant difference was found. However, when we used the total distance the laser point traveled above the center line as the dependent measure, no significant difference was found, indicating that the downward movements, which reflect the frequency at which participants loosened their grip, drove the effect we obtained with the total-distance-travelled measure. These findings thus suggest that the counterfeit effect we observed in this research cannot be simply explained by consumers’ lower expectation about a counterfeit’s product quality—this alternative account would not predict the difference in downward movements of the laser beam.

Taken together, the findings of the three studies provide converging support for our proposition that the notion of counterfeit engenders moral disgust towards the victimized brands, which, in turn, can result in reduced product efficacy of authentic products.

**Expectancy Effects of Alcohol-Energy Drink Cocktail Labeling on Subjective Intoxication, Risk-Taking, and Sexual Self-Confidence and Aggressiveness**

**EXTENDED ABSTRACT**

More than 50% of American and European college students report consuming alcohol mixed with energy drinks (AMED), raising major public health and safety concerns. The US Food and Drug Administration has argued that mixing energy drinks with alcohol has a causal effect on risky behaviors because the caffeine in these drinks masks the effects of alcohol, decreasing perceived intoxication without actually reducing the effects of intoxication (Ferreira et al. 2006). This concern has prompted the FDA to ban premixed AMEDs in supermarkets in 2010.

In the last years however, new evidence has emerged refuting the masking hypothesis, the central argument used by the FDA. As summarized in review papers, “there is no consistent evidence that energy drinks alter the perceived level of intoxication” (Verster et al. 2012), and “the underlying mechanisms of action of alcohol–caffeine co-administration remain unknown” (Benson and Scholey 2014). We argue that the current research on AMED, which has only investigated pharmacological effects in blind experiments, has overlooked psychological effects created by cocktail labeling. Research in consumer behavior has shown that brands or categorization labels can influence perceptions and actual behavior through expectancy (or placebo) effects (Ariely and Norton 2009; Irmak et al. 2011; Plassmann et al. 2008). Two studies have focused on the expectancy effects of energy drinks. Shiv et al. (2005) have shown that people solve more puzzles after drinking energy drinks believed to increase mental alertness. Brasel and Gips (2011) have shown that mere exposure to the Red Bull brand increased aggressive driving in video games. However, no research has, to date, examined whether AMED consumption can influence perceived intoxication and harmful behavioral responses through expectancy effects shaped by cocktail labeling.

We hypothesize that highlighting that a cocktail contains vodka and Red Bull (vs. vodka alone and vs. soft drinks) increases perceived intoxication through expectancy effects. This sharply contrasts with the FDA’s masking hypothesis that energy drinks decrease perceived intoxication through pharmacological effects. We argue that this happens because people generally believe that AMED consumption is more (rather than less) intoxicating than alcohol consumption alone (Marczinski et al. 2011; Peacock et al. 2013). We also hypothesize that higher perceived intoxication increases behaviors which are culturally associated with alcohol intoxication (MacAndrew and Edgerton 1969), such as sexual self-confidence and aggressiveness and general risk-taking. Conversely, we hypothesize that it also makes people compensate for the anticipated decrease in motor or cognitive capacities associated with alcohol intoxication.
(Testa et al. 2006) and makes them take less risks in domains where risk-taking can be dangerous, such as driving. Finally, we hypothesize that these effects should be stronger among people who are less experienced with alcohol intoxication, because experienced drinkers are better able to estimate their actual level of intoxication (Monk and Heim 2013).

After prescreening heterosexual men with no alcohol disorders and at least some experience of social drinking (measured with the AUDIT test), we recruited 154 participants in Paris, France (Mean age = 22.3). All participants were asked to drink the same cocktail containing 6cl of 40% Vodka (two standard drinks), 8cl of Red Bull and 16cl of a mix of exotic fruits for a target blood alcohol concentration (BAC) of 0.045 g/dL. Depending on the experimental condition, participants were told it was a “vodka-Red Bull cocktail,” (high level of transparency) a “vodka cocktail,” (medium level of transparency) or an “exotic fruit cocktail” (low level of transparency).

We administered the Balloon Analogue Risk Task (BART) (Lejuez et al. 2002), a measure of general risk taking in which participants pump a virtual balloon to earn money while increasing the risk of losing money if the balloon explodes. We next measured sexual self-confidence by showing photos of attractive women and asking participants how likely they would chat these women up, and how likely it was that women would accept their advances. Then, we measured sexual aggressiveness with a validated scale (Ariely and Loewenstein 2006). We also asked participants how long they would wait before driving across different scenarios. Then, we measured perceived intoxication with a questionnaire, and actual intoxication with an electronic Breathalyzer. Before releasing participants (when their actual intoxication reached a low point), we measured participants’ beliefs that energy drinks increase or decrease alcohol intoxication.

As predicted, the level of manipulated transparency linearly increased perceived intoxication (p<.01), general risk-taking (p=.02), sexual self-confidence (p=.01) and sexual aggressiveness (p=.04); all these measures were highest when the cocktail was labeled “Vodka Red Bull”, lowest when labeled “Exotic fruits”, and in-between when labeled simply “Vodka”. Conversely, transparency increased linearly intentions to wait before driving (p=.005), with participants in the “Vodka-Red Bull” condition willing to wait the longest time.

To rule out mere priming effects of exposure to the Red Bull brand or Vodka label (Bresal and Gips 2011), we tested a moderated mediation model, which showed that perceived intoxication fully mediated the effect of “vodka-Red Bull” label on behavioral responses, and that this mediation was conditional upon people’s beliefs in the intoxicating effect of AMED consumption (i.e. the mediating effect of perceived intoxication significantly increased when participants more strongly believed that AMEDs increase intoxication compared with alcohol only). Another moderated mediation model showed that the mediation was stronger among participants with lower AUDIT score, that is, people with less drinking experience.

To conclude, while past research has investigated the non-pharmacological effects of energy drinks consumption (Shiv et al. 2005) or of alcohol consumption (Hull and Bond 1986), our research is the first to examine whether and how AMED consumption influences perceived intoxication and harmful behavior through expectancy. Our findings also suggest that it is important to distinguish between different risky behaviors, such as driving risk and sexual aggressiveness—which have often been bundled together. From a policy perspective, this research contributes to the current debate about the public health impact of mixing alcohol with energy drinks. Our results support the need for public authorities to regulate the branding and advertising of AMED drinks, based on psychological rather than pharmacological mechanisms.

**The Taste of a Bad Deal: The Effect of Transactional Utility on Experiential Utility**

**EXTENDED ABSTRACT**

Can getting a bad deal on a bar of chocolate make the chocolate taste worse? Can accidentally paying twice when buying music online make a song sound worse? Our findings suggest “yes” on both accounts. This paper explores the notion that transactional utility, or enjoyment derived from the transaction or acquisition phase prior to actual consumption, can directly affect how much hedonic utility is derived from the consumption experience itself. This phenomenon is intuitive by research from the past decade showing that pre-experiential factors (i.e., factors that affect consumers before consumption occurs) such as price cues can change experiences’ hedonic and neurological reward values (e.g., Plassmann et al. 2007; McClure et al. 2004; Shiv, Carmon, & Ariely 2005; Tsai & Lee 2013). For example, wines with a higher price tag can trigger greater activation of reward centers of the brain (Plassmann et al. 2007); the same energy drink with a higher price tag can also improve cognitive performance in puzzle solving tasks (Shiv et al. 2005). The cognitive science behind such ‘mind over body’ effects stems from variations of the placebo effect, which relates to how our biology responds to cognitive expectations which go on to distort experiences (Shiv et al. 2005).

Whereas most previous research on marketing placebo effects has examined how factors such as price can influence expectations (e.g., price signals quality), which then affects the reward value of experiences, we explored the pure carry-over impact of transaction utility independent of such factors. In a similar vein, Tsai and Lee (2013) have shown that price promotions and getting a discount can influence post-purchase hedonic consumption experience via the improvement of mood, reduction of pain of payment, and change in consumption approach. Although price-discounts are one possible means of increasing transaction utility, the full extent of transaction utility’s relationship with experiential utility remains relatively unexplored. This paper, which tests the impact of decreased transaction utility, investigates the general effect of transaction utility on experiential utility by exploring how perceived goodness-of-deal affects motivational factors such as wanting which then affect the liking of consumer experiences (Berridge and Robinson 1998).

The challenge of this research and our experimental design was to find ways of manipulating transactional utility while keeping final price and perceived value of the products constant. Experiment 1 served as an initial exploration of the basic effect and explored how an incidental decrease in transactional utility that was independent of the product itself could affect experiential utility. In an online shopping simulation, participants (N = 90) were double-charged for the purchase of a music video in the treatment condition (and charged once in the control condition). These participants felt that the song’s listed price ($2.99 in both conditions) was more expensive and reported lower transactional utility from their purchase, p’s < .05. They subsequently reported (marginally) lower wanting and motivation to listen to the song, p = .07 and less enjoyment during the actual listening experience p = .09.

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1 Experiential utility should not be confused with overall satisfaction; it is not surprising that lower transactional utility can decrease overall satisfaction from the purchase, but traditional economic models do not consider that satisfaction from a purchase can change experiential factors such as enjoyment or taste perception.
Experiment 2 extended the findings to a wider range of products (chocolate chip cookies, dessert biscuits, and orange juice) in an in-lab shopping simulation that involved physical transactions (paying with tokens). All participants (N = 130) were endowed with both high quality tokens and low quality tokens which were ostensibly worth $1 (participants were endowed with both to induce relative value for the money). By random assignment, participants were asked to spend either the high quality or low quality chips. Although the monetary values of the chips were equal (prices and other quality cues were also the same), the apparent disparity in quality of chips made it more painful to give up the higher quality tokens (higher quality tokens were more valued, p < .05, and spending them reduced transactional utility p < .05, although perceived objective costliness was no different, p > .1). This manipulation was akin to asking participants to spend an old, crumpled bill or a new, crisp bill. When tasting foods, participants who gave up the nicer token (lower transaction utility) reported reduced relative desire (wanting) for the foods, lower experiential utility, and less desire for repeat consumption or future purchases (p < .05). Furthermore, we found that the overall relationship between transaction utility and experiential utility for all three products was mediated by wanting for the products (Sobel = 5.55, p < .01). In other words, lower transaction utility reduced the relative desire for the products, which then reduced how much they were enjoyed.

Experiment 3 explored the mechanism of reduced wanting and tested a latitude of acceptance model of utility whereby lower transaction utility increased the ‘standards’ of taste (captured by a disjointed, piecewise utility function) – consumption experiences that were above that standard were unaffected by the increased scrutiny, while consumption experiences that were below the standard were negatively affected. Employing the same basic experimental paradigm as Experiment 2, we also randomized low (Hershey’s) versus high quality (Ghiradelli’s) branded chocolate. In the low transaction utility condition, participants liked the Hershey’s chocolate less, were less interested in eating more, and less interested in future purchases (p < .05). However, there were no differences in ratings of liking, desire, or future interest for the Ghiradelli chocolate. The results supported a latitude of acceptance model (driven by differences in scrutiny at different thresholds) that is consistent with both the product quality moderation found in Plassman et al. (2007) and involvement mechanism intuited by Tsai and Lee (2013). Overall, our findings not only contribute to the understanding of how placebo effects operate in marketing and the downstream effects of pricing on consumer behavior, but also reveal intuitions on the basic understanding of reward and how cognitive and affective motivational forces can interact to change the processing of reward value.

Individual Differences in Marketing Placebo Effects: Evidence from Brain Imaging and Behavioral Experiments

EXTENDED ABSTRACT

Recent research has studied whether marketing-based expectancies such as price quality beliefs influence the consumption experience and subsequent behavior, but almost no research has examined individual differences in “marketing placebo effects” (MPE, see Plassman & Wager 2014 for a review). In this paper, we suggest three moderators of MPE based on previous findings from the neuroscientific literature investigating traditional pain placebo effects. These are (1) dopaminergic processing linked to reward-seeking, (2) prefrontal activity linked to cognitive regulation and appraisal of emotional states and experiences (i.e., a top-down cognitive process), and (3) attention to or away from somatosensory experiences encoded in somatosensory brain areas (i.e., a bottom-up somatosensory processing linked to processing in the posterior insula and somatosensory cortices).

We tested in this paper whether individual differences in these three processes moderated MPE with a variety of different MPEs (price, brand labels, health claims) and sensory experiences (food and aesthetic consumption) following a two-step procedure: In the first step, we tested the neural predictions of our model using a structural imaging approach from neuroscience to study individual trait-related differences (study 1).

More specifically, we used automated structural Magnetic Resonance Imaging analysis to detect whether differences in gray matter volume (GMV, Ashburner & Friston 2000) can be linked to individual differences in MPE (N = 90). We found that the size of GMV in the ventral and dorsal striatum (b_{striatum} = 2.38, SE_{striatum} = 0.9, p < .01), the dorsal medial prefrontal cortex (dmPFC, b_{dmPFC} = 5.35, SE_{dmPFC} = 1.55, p < .001) and the posterior insula (b_{insula} = 10.55, SE_{insula} = 3.58, p < .005) moderated the expectancy effects of price (high vs. low) and health claims (healthy vs. regular) on the experienced taste pleasantness for wine and milkshakes.

In a second step, we relied on existing evidence linking each of these brain areas with personality traits (i.e., the striatum with reward-seeking, the posterior insula with somatosensory awareness, and the dorsal medial prefrontal cortex with need for cognition) to further test the implications of our model for how personality traits moderate the placebo effects of price in behavioral experiments of wine tasting (studies 2a, 2b, and 2c) applying a similar design as done by Plassmann et al. 2008.

In study 2a (N = 88), we investigated whether reward sensitivity, measured using the reward-seeking subscale of the behavioral activation scale (BAS), predicts MPE and found that the BAS subscale scores amplified the effect of price on experienced utility ratings (T(1, 87) = 2.98, p = .004). In study 2b (N = 85), we investigated whether somatosensory awareness, measured using the private body consciousness subscale of the Body Consciousness Questionnaire (Miller, Murphy, and Buss 1981), predicts MPE and indeed found that somatosensory awareness moderated MPE (T(1, 84) = −2.83, p = .006). In study 2c (N = 78), we investigated whether a consumer’s need to focus on cognitive cues might play an important role for MPE using the Need for Cognition Scale (Cacioppo, Petty, and Kao 1984). We found that the NFC scores in line with our hypothesis amplified the effect of price on experienced utility ratings (T(1, 78) = 2.40, p = .019).

Taken together, studies 2a, 2b, and 2c provided further evidence that participants high in reward-seeking and high in need for cognitive processing were more responsive to MPE, whereas subjects high in somatosensory awareness were less responsive to MPE.

In the last study, we tested the robustness and generalizability of our effects by studying whether reward responsiveness, somatosensory awareness, and need for cognition also jointly moderate the effects of the perceived expertise of artists (known artist vs. the experimenter, taken from Kirk et al. 2008) on subjective aesthetic experiences (study 3, N = 492). We found that the BAS (T(1, 491) = 6.53, p < .001) and NFC (T(1, 491) = 2.44, p = .015) scores indeed amplified expectancy effects on experienced utility ratings, whereas PBC moderated expectancy effects on experienced utility ratings (T(1, 491) = −2.75, p = .006).

To conclude, in this paper we investigated individual differences in MPE. We found converging evidence using different methodologies (brain imaging and behavioral experiments) that for a variety of marketing-based expectancies (process, brand labels, and
health claims) and different sensory consumption experiences (food and art) consumers high in reward-seeking and high in need for cognitive processing were more responsive to MPE, whereas subjects high in somatosensory awareness were less responsive to MPE. Understanding individual differences of marketing placebo effects is important for marketing researchers, public policy makers, and practitioners alike.

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