

Moral Violations Reduce Oral Consumption

Cindy Chan

University of Pennsylvania

Leaf Van Boven

University of Colorado Boulder

Eduardo B. Andrade

FGV, Rio de Janeiro

Dan Ariely

Duke University

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Cindy Chan, Department of Marketing, the Wharton School, University of Pennsylvania; Leaf Van Boven, Department of Psychology and Neuroscience, University of Colorado Boulder; Eduardo B. Andrade, School of Public and Business Administration, FGV, Rio de Janeiro; and Dan Ariely, Department of Marketing, the Fuqua School of Business, Duke University.

Correspondence concerning this article should be addressed to Cindy Chan, Department of Marketing, the Wharton School, University of Pennsylvania, 700 Jon M. Huntsman Hall, 3730 Walnut Street, Philadelphia, PA 19104. Tel: 215-898-7235. Fax: 215-898-5087. E-mail: cich@wharton.upenn.edu

Abstract

Consumers frequently encounter moral violations in everyday life. They watch movies and television shows about crime and deception, hear news reports of corporate fraud and tax evasion, and hear gossip about cheaters and thieves. How does exposure to moral violations influence consumption? Because moral violations arouse disgust and because disgust is an evolutionarily important signal of contamination that should provoke a multi-modal response, we hypothesize that moral violations affect a key behavioral response to disgust: reduced oral consumption. In three experiments, compared with those in control conditions, people drank less water and chocolate milk while (a) watching a film portraying the moral violations of incest, (b) writing about moral violations of cheating or theft, and (c) listening to a report about fraud and manipulation. These findings imply that “moral disgust” influences consumption in ways similar to core disgust, and thus provide evidence for the associations between moral violations, emotions, and consumer behavior.

Keywords: Emotions, Morality, Disgust, Consumption

Moral violations pervade everyday life. People routinely witness lying, stealing, cheating, and unusual romantic relations through media, product associations, and personal observation. How does exposure to moral violation influence consumption behavior? Recent theorizing about moral disgust implies that exposure to moral violations reduces oral consumption, similar to the influence of core disgust. For example, people may consume less coffee while reading the Sunday paper's exposé of corporate fraud, a violation of ethical business practices. Or people may consume less candy at the theater while watching *Wall Street*, a film that portrays moral violations of crime and greed.

We derive the hypothesis that moral violations reduce oral consumption from the idea that moral violations arouse moral disgust, which is grounded in core disgust. Like other basic emotions, core disgust elicits a distinct, multi-modal profile of cognitive, experiential, expressive, and behavioral responses (Oatley, Keltner, & Jenkins, 2006). Disgust can negatively affect judgments, reducing evaluations, purchase likelihoods, and willingness-to-pay for products (Argo, Dahl, & Morales, 2006; Lerner, Small, & Loewenstein, 2004; Morales & Fitzsimons, 2007). The experiential response to disgust is revulsion, and its expression involves facial activity such as nose wrinkling, upper lip retraction, and gaping (Ekman & Friesen, 1975, 1978; Izard, 1971; Rozin, Haidt, & McCauley, 2008). Finally, disgust produces distinct behavioral tendencies to withdraw from, avoid, and reject consumption objects, a functional behavior that minimizes contamination (Angyal, 1941; Curtis, Aunger, & Rabie, 2004; Curtis & Biran, 2001; Darwin, 1872; Ekman & Friesen, 1975; Frijda, 2006; Izard, 1971; Oatley et al., 2006; Rozin & Fallon, 1987; Tomkins, 1963). For example, people are reluctant to consume chocolate shaped as dog feces (Rozin, Millman, & Nemeroff, 1986), a highly functional behavioral response to disgusting stimuli (insofar as avoiding accidental feces consumption is functional).

Moral offenses are often characterized as “disgusting.” There is some evidence that moral disgust is grounded in core disgust (Inbar, Pizarro, & Bloom, 2009; Rozin et al., 2008). For example, research indicates that core disgust affects moral violation judgments. People who tend to experience more core disgust perceive moral violations as more severe (Inbar et al., 2009, Inbar, Pizarro, Knobe, & Bloom, 2009; Jones & Fitness, 2008), disgusting environments and experiences can increase negative evaluations of morally offensive scenarios (Eskine, Kacirik, & Prinz, 2011; Schnall, Haidt, Clore, & Jordan, 2008; Wheatley & Haidt, 2005), and people who are the target of a facial expression of disgust infer that they have violated a moral norm (Giner-Sorolla & Espinosa, 2011). There is also evidence for the reverse relationship: Moral violations influence responses associated with core disgust. Exposure to moral violations arouses self-reported feelings of disgust (Chapman, Kim, Susskind, & Anderson, 2009; Schnall et al., 2008), self-reported feelings of gustatory discomfort (Royzman, Leeman, & Sabini, 2008), and activates facial expressions of disgust (Chapman et al., 2009).

There is, however, a critical missing piece of evidence for the idea that moral disgust is grounded in core disgust: There is no direct evidence that moral disgust reduces oral consumption. If moral disgust is grounded in core disgust, then moral disgust should elicit a similar multi-modal response profile, including reduced oral consumption. The present experiments seek to provide this important missing evidence.

Although moral violations arouse affective and expressive disgust, it cannot be assumed that moral violations reduce oral consumption. Emotional stimuli can independently influence felt emotion and behavioral responses (Baumeister, Vohs, DeWall, & Zhang, 2007; Frank, 1988; LeDoux, 1996; Loewenstein, 1996; Loewenstein, Weber, Hsee, & Welch, 2001; Van Boven, Loewenstein, Welch, & Dunning, 2012; Winkielman & Berridge, 2004; Winkielman, Berridge,

& Wilbarger, 2005). For example, Winkielman et al. (2005) found that subliminal exposure to happy and angry stimuli influenced beverage consumption and evaluation, yet consumption and evaluation were not correlated with self-reports of mood and arousal. More generally, Baumeister and colleagues (2007) argued that experienced emotion, expressed emotion, and behavioral responses to emotion are not causally related, even if they are positively correlated because they reflect different response modalities to aroused emotion. It may be that moral violations influence self-perceived and expressed disgust without influencing oral consumption.

We tested whether people consumed less than those in control conditions while being exposed to various moral violations: watching a film about incest (Experiment 1), writing a story about theft or cheating (Experiment 2), and listening to an audio clip about fraud and manipulation (Experiment 3). Experiments 1 and 3 also examined associations between behavioral, attitudinal, self-reported, and expressive responses to moral disgust.

Experiment 1

Incest is a powerful and emotionally intense moral violation (Schaich Borg, Lieberman, & Kiehl 2008). We tested whether exposure to incest would reduce oral consumption by asking participants to drink chocolate milk while watching a French film clip. The film was described either as portraying an incestuous relationship or a romantic relationship. Importantly, visual stimuli were held constant across conditions. We predicted that participants in the moral violation condition would drink less than participants in the control condition.

People also reported how disgusted they felt and how much they liked chocolate milk. The multi-modal response to emotional stimuli—which would be found if moral violations influenced feelings, attitudes, and behavior—is a central feature of response profiles to distinct emotions (Oatley et al., 2006). This measure also afforded an exploration of whether the effect of

moral violation on feelings and attitudes mediated the effect of moral violation on oral consumption, or whether feelings, attitudes, and behavior are not causally related.

Method

One-hundred and five non-French speakers (43 females) participated in this and other unrelated studies in exchange for \$10. All participants were told that the researchers were studying people's experiences while watching films. Participants watched the same 2 minute 43 second French film featuring an older woman and younger man embracing romantically and talking.

Participants were randomly assigned to one of two conditions. In the moral violation condition, participants were told that the film was about "an incestuous relationship between a mother and son" (which is what the film actually portrayed and why we excluded French speakers). In the control condition, participants were told that the film was about "a romantic relationship between an older woman and younger man."

Participants were told that they would be given something to drink while watching the film to help simulate a typical film-watching experience; each participant was given a 250 ml carton of room temperature chocolate milk to drink while watching the film. After the film, participants reported how disgusted they currently felt, how interesting they found the film, and how engaged they felt while watching the film (1 = *not at all*, 7 = *very*). Participants also rated how much they liked the chocolate milk (1 = *not at all*, 5 = *very much*). Finally, participants reported how much they agreed with the statements "a romantic relationship between an older woman and younger man is immoral" and "a romantic relationship between a mother and son is immoral" (1 = *strongly disagree*, 7 = *strongly agree*).

Results and Discussion

Participants rated a romantic relationship between a mother and son as more immoral ($M = 6.70$) than one between an older woman and younger man ($M = 2.04$), $t(104) = 34.89$, $p < .001$, as intended. There were no significant differences in interest and engagement between the two conditions, $ps > .173$.

Confirming that exposure to a moral violation reduced oral consumption, participants in the moral violation condition drank less chocolate milk ($M = 110.50$ g) than did those in the control condition ($M = 147.06$ g), $t(103) = 2.14$, $p = .035$. The moral violation manipulation also reduced liking of chocolate milk ($M_{\text{moral_violation}} = 3.48$; $M_{\text{control}} = 4.23$), $t(103) = 2.90$, $p = .005$, and increased self-reported disgust ($M_{\text{moral_violation}} = 4.17$; $M_{\text{control}} = 2.72$), $t(103) = 4.07$, $p < .001$. Because the film was identical across conditions, the effects on liking and disgust can only be attributed to the incest appraisal manipulation. Exposure to a moral violation thus influenced a multi-modal profile consistent with core disgust: behavior (chocolate milk consumption), attitudes (liking of chocolate milk), and feelings (disgust).

The measurement of multiple modes of emotional reaction affords an examination of the relative independence of behavior, attitudes, and feelings. Consistent with the causal independence of these multiple modalities, the correlation between self-reported disgust and consumption was not significant, $r(103) = -.03$, $p = .735$, and self-reported disgust did not mediate the effect of moral violation manipulations on consumption behavior (95% $CI = [-10.42, 19.25]$). When both moral violation condition and self-reported disgust were included a model predicting consumption, the effect of moral violation condition was significant, $F(1,102) = 4.65$, $p = .033$, whereas the effect of self-reported disgust was not, $\beta = 2.28$, $SE = 4.75$, $t(102) = 0.48$, $p = .631$; Although exposure to a moral violation aroused feelings of disgust, the effect of moral violation exposure on oral consumption was independent of those feelings. These findings thus

provide important evidence for the claim that emotional states have independent effects on feelings and behavior.

We did, however, find evidence that behavior and attitudes mutually influenced each other (Bem, 1972). Liking of chocolate milk mediated the effect of moral violation exposure on consumption (95% $CI = [-48.38, -10.18]$, moral violation $p = .56$), and consumption partially mediated the effect of moral violation exposure on liking of chocolate milk (95% $CI = [-.64, -.04]$, moral violation $p = .047$).

One question is whether the results of Experiment 1 were attributable to the particular use of incest, a bodily moral violation, which has been suggested to be independent of other moral violations (Russell & Giner-Sorolla 2013; Schaich Borg et al., 2008). We next addressed this question by using non-bodily moral violations.

Experiment 2

Participants were exposed to two new, non-bodily types of moral violations: theft and cheating. Participants in the moral violation condition were asked to write a story about cheating on an exam or stealing a car; participants in the control condition were asked to write a story about neutral acts of writing with a pen or planning a driving route. All participants were provided with water to consume while writing the stories. We predicted that participants would consume less water while writing about moral violations.

Method

One-hundred and seventeen university students (74 females) participated in this and other unrelated studies in exchange for \$10. Participants were told the researchers were studying “hydration and storytelling,” and were given a 500 ml bottle of water to drink while writing a story.

Participants were randomly assigned to one of four conditions. Participants were shown one of two photographs, of either 15 students in a classroom or a male and female in a car, and asked to write either a moral violation or a control story about the photograph, depending on random assignment. We used two photograph settings and stories to increase the generalizability of our findings. In the moral violation-classroom condition, participants were told, “Sam is writing an exam and sees that another student is cheating.” In the moral violation-car condition, they were told, “Jack and Jill are on a road trip. They discuss how they stole the car they are driving.” In the control-classroom condition, they were told, “Sam is writing an exam and sees that another student is using a pen to write the exam.” Finally, in the control-car condition, they were told, “Jack and Jill are on a road trip. They discuss which route to take.” Therefore, each of the settings (classroom and car) was used in both a moral violation and control condition. Participants were given 3 minutes to write a story based on the idea and image presented. They were asked to include a description of the scene and a dialog between the characters in their story.

Participants were also instructed to drink as much or as little of the water as they would like while writing the story. After 3 minutes, the water was taken away. Participants then rated whether any characters in their story did something *immoral*, *unfair*, and *harmful* (1 = *not at all*, 7 = *a great deal*), which we averaged into an index of moral violation ($\alpha = .89$).

Results and Discussion

Participants in the moral violation conditions reported greater moral violations among their characters ($M = 4.76$) than those in the control conditions ($M = 1.68$), as reflected by a main effect of condition in a $2(\text{condition: moral violation, control}) \times 2(\text{setting: car, classroom})$ ANOVA, $F(1,113) = 134.55, p < .001$; neither the effect of setting nor the interaction was

significant, $ps > .153$. There were no significant effects in similar models predicting engagement, measured by the number of words written by participants, $ps > .365$.

As predicted, participants in the moral violations conditions consumed significantly less water ($M = 89.39$ ml) than did participants in the control conditions ($M = 121.57$ ml). A $2(\text{condition: moral violation, control}) \times 2(\text{setting: car, classroom})$ ANOVA revealed only a main effect of condition, $F(1,113) = 4.37, p = .039$. Neither the main effect of setting nor the interaction was significant, $ps > .381$.

These results conceptually replicate the main finding from Experiment 1, that moral violations reduce oral consumption, but with non-bodily moral violations of theft and cheating.

Experiment 3

Experiment 3 used a context designed to mimic a common consumer experience: listening to the radio while drinking a beverage. We expected that listening to an audio story of a moral violation would reduce oral consumption—our primary dependent variable. We also conceptually replicated prior research and Experiment 1 by testing whether moral violations would decrease liking of the product being consumed and increase self-reports of disgust. Finally, to address concerns about self-report measures, we extended our multi-modal investigation using an indirect measure by examining whether exposure to moral violations would arouse facial expressions of disgust.

Method

Two-hundred and thirty-five university students (142 female) completed this and other unrelated studies in exchange for \$10. Participants were told that the researchers were interested in studying consumers' experiences while engaging in routine morning activities, and they were asked to imagine they were having breakfast while listening to the radio. Participants were given

a 236 ml bottle of chocolate milk to drink and were video-recorded while they listened to a 2 minute 25 second audio clip; participants were asked to remove their eyeglasses, as required by the facial expression coding software (eight participants were excluded for not following these instructions).

Participants were randomly assigned to the moral violation condition or one of two control conditions. In the moral violation news condition, participants were told they would hear a sample morning news story and listened to a recording about the recent London Interbank Offered Rate (LIBOR) scandal, in which banks were described as engaging in fraudulent activities to manipulate interest rates (adapted from Surowiecki, 2012; see Supplemental Materials). In the control news condition, participants listened to a similar recording about LIBOR, however words were changed to portray their actions as unintentional errors. In the control music condition, participants were told they would hear a sample piece of music and listened to a recording of Mazurka No. 10 in B Flat Major Op. 17-1 by Chopin (Marin, Gingras, & Bhattacharya, 2012).

After the audio clip, participants reported how much they had liked and how appetizing they had found the chocolate milk ($1 = \textit{not at all}$, $7 = \textit{very much}$; $r(225) = .88$, $p < .001$). Participants also rated how disgusted they currently felt, and how interesting and engaging they found the audio clip ($1 = \textit{not at all}$, $7 = \textit{very}$; $r(225) = .79$, $p < .001$).

We also analyzed participants' facial expressions as an additional measure of emotional response. Participants' faces were video recorded (captured at 30 frames per second) and analyzed using Noldus FaceReader software (den Uyl & van Kuilenburg, 2005). The software measures seven emotional expressions for every video frame in which it can find and classify a participant's face: disgusted, scared, sad, angry, surprised, happy, and neutral. The classification

system (van Kuilenburg, Wiering, & den Uyl, 2005) has been shown to be highly valid (90% accuracy in classifying images from the Radboud Faces Database and between 70% and 99% agreement with human coders; Bijlstra & Dotsch, 2011; Terzis, Moridis, & Economides, 2010) and was used by Chentsova-Dutton and Tsai (2010) to measure cross-cultural differences in expressive responses to amusing, sad, and disgusting films. For each emotion and frame, FaceReader assigns a value between 0 and 1, with 0 representing no expression of the emotion and 1 representing a maximum measured expression of that emotion. Therefore, higher values indicate greater emotional intensity expressed. We calculated the average expression of each emotion for each participant.

Results and Discussion

Although participants in the moral violation condition were not more interested and engaged ($M = 3.48$) than participants in the news control condition ($M = 2.84$), they were less interested and engaged than participants in the music control condition ($M = 4.10$), $F(2,224) = 10.41$, $p < .001$. Importantly, this pattern of engagement is different from, and therefore cannot explain, the predicted (and observed) patterns of consumption, expression, and self-reported emotion.

To test the effect of moral violation exposure on consumption, we conducted a multiple regression in which we estimated oral consumption from two orthogonal planned contrasts: one comparing the moral violation condition with the two control conditions, the other comparing the two control conditions. As predicted, only a significant effect of the moral violation contrast was obtained. Participants drank less water in the moral violation condition ($M = 100.83$ ml) than in the control conditions ($M = 130.46$ ml), $t(224) = 2.46$, $p = .015$; the two control conditions did not significantly differ from each other ($M_{\text{control_news}} = 120.83$; $M_{\text{music}} = 139.84$), $p = .169$. This

finding replicates our main results, with a different moral violation delivered through a different modality, a mock news radio story.

We conducted analogous multiple regression analyses to estimate liking, self-reported disgust, and facial expressions of disgust. Replicating the results of Experiment 1, participants reported liking chocolate milk less in the moral violation condition ($M = 4.10$) than in the control conditions ($M = 4.72$), $\beta = 0.41$, $t(224) = 2.36$, $p = .019$. (Participants also liked chocolate milk more in the music condition ($M = 5.05$) than the control news condition ($M = 4.38$), $p = .027$.) Participants also felt more disgusted in the moral violation condition ($M = 2.51$) than in the two control conditions ($M = 1.92$), $\beta = -0.39$, $t(224) = -3.03$, $p = .003$, which did not differ significantly from each other ($M_{\text{control_news}} = 2.07$; $M_{\text{music}} = 1.78$), $p = .196$. Finally, participants expressed more disgust while listening to the moral violation news story ($M = 0.103$) than while listening to the two control audio clips ($M = 0.080$), $\beta = -0.02$, $t(224) = -2.10$, $p = .037$, which did not significantly differ from each other ($M_{\text{control_news}} = 0.089$; $M_{\text{music}} = 0.071$), $p = .151$. None of the other six emotional expressions measured showed any significant differences between the moral violation and control conditions, $ps > .135$.

As in Experiment 1, there were bi-directional effects between attitudes and behaviors. Mediation analyses with the moral violation and control contrasts as predictors showed that liking of chocolate milk mediated the effect of moral violation exposure on consumption (95% $CI = [1.39, 23.26]$), and that consumption mediated the effect of moral violation exposure on liking of chocolate milk (95% $CI = [0.06, 0.50]$). In the mediation models, the direct effect of moral violation exposure was not significant, $ps > .23$.

The measurement of multiple modes of emotion reaction allowed an examination of whether the effect of exposure to moral violation on oral consumption was independent of the

effect of exposure to moral violation on disgust, measured in this experiment by expression and self-report. We conducted a mediation analysis in which oral consumption was estimated from the moral violation contrast and the control conditions contrast, with measures of self-reported disgust and expressed disgust as simultaneous mediators. The effect of the contrast between the moral violation and the two control conditions on consumption remained positive when the two measures of disgust were included in the model, $\beta = 15.82$, $t(222) = 1.95$, $p = .053$. There was support for only partial mediation by self-reported disgust (95% $CI = [0.82, 9.40]$), but not for mediation through facial expressions of disgust (95% $CI = [-3.66, 1.67]$); consumption was significantly correlated with self-reported disgust, $r(225) = -.21$, $p = .001$, but not with expressed disgust, $r(225) = -.002$, $p = .98$. These analyses provide additional evidence that the effect of exposure to moral violation on oral consumption is not fully explained by self-perceived and expressed disgust. We also did not observe a significant relationship between the two disgust measures, $r(225) = .02$, $p = .74$, which could be attributed to a weak relationship between the two emotional response measures and/or insensitive measures. Overall, this pattern again provides important evidence suggesting the causal independence of behavioral, felt, and expressed modalities of emotional reactions to disgust.

General Discussion

The present studies demonstrate that exposure to moral violations reduces oral consumption, a behavioral response similar to core disgust. These findings add important evidence to the broad theoretical claim that moral violations are grounded in core disgust, eliciting similar responses across multiple modalities: behavioral, attitudinal, experienced, and expressed. That various types and sources of moral violations influenced oral consumption of various substances highlights the generality of our findings and minimizes concern that the

findings are limited to any particular type of moral violation, medium, or form of oral consumption.

Our findings suggest at least three questions for further research. First, might moral violations reduce oral consumption partly because reduced consumption carries the symbolic meaning of cleansing, such as fasting? This is not strictly the case in our studies given that fasting requires the absence of consumption, whereas we found that that exposure to moral violations did not eliminate oral consumption. Second, might moral violations increase, rather than decrease, some forms of consumption? For example, writing about moral violations increases desires for cleansing products such as antiseptic wipes (Zhong & Liljenquist, 2006).

Finally, might people consume less of products whose brands become associated with moral violations, such as when people consumed less of Martha Stewart products following her convictions of conspiracy, obstruction of justice, and fraud (Hays 2004)? Preliminary evidence supports this hypothesis. We gave participants ($N = 78$; 45 females) a bottle of water to consume while watching a 6-minute documentary clip. Participants randomly received either a water bottle labeled “Wall Street: Water for Powerful People” (which associated the brand with moral violations of greed, abuse of power, and selfishness) or a neutral water bottle labeled “Water: Just H2O.” Participants in the “Wall Street Water” moral violation condition drank less ($M = 149.49$ ml) than did participants in “Water: Just H2O” control condition ($M = 192.23$ ml), $t(76) = 2.01$, $p = .048$, providing evidence that exposure to a brand associated with moral violations reduces oral consumption of the product. These findings hint at a broader marketing implication: If exposure to moral violations reduces consumption behavior and evaluations of consumption objects, food and beverage advertisers may want to carefully consider whether their brand can be contaminated by product placements or media portraying moral violations.

In conclusion, our research demonstrates that common exposures to moral violations reduce consumption behavior. These results provide important evidence that moral disgust is a distinct emotion grounded in core disgust—completing a previous “missing link” in establishing a distinct profile of moral disgust. These results also carry implications for marketers whose brands are associated with moral violations or whose products may be consumed in morally-charged environments. This research highlights a psychological truth in the metaphorical observation that moral violations “leave a bad taste” in one’s mouth.

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Table 1

Participants' consumption of chocolate milk (Experiments 1 and 3) and bottled water (Experiment 2)

	Experimental condition						
	Control			Treatment	Moral violation		
	n	M	SD		n	M	SD
Experiment 1	47	147.06 g	85.40 g	Incest video appraisal	58	110.50 g	88.52 g
Experiment 2	61	121.57 ml	96.56 ml	Theft/cheating story	56	89.39 ml	66.75 ml
Experiment 3	77	139.84 g	84.72 g	LIBOR news story	75	100.83 g	83.25 g
		(Music)					
	75	120.83 g	86.54 g				
		(News)					

Supplemental Material

Experiment 3: Articles adapted from Surowiecki (2012)**Moral Violation Article**

We begin this morning's news hour with a story sent to us by our finance reporter. In order to work well, markets need a basic level of trust. As Alan Greenspan once said, "In virtually all transactions, we rely on the word of those with whom we do business." So what happens to a market in which the most fundamental assumptions turn out to be lies? That is the question in a scandal that has roiled the banking industry all summer. The LIBOR (or the London Inter-bank Offered Rate) is the most important set of numbers in the global financial system. Used as a benchmark for interest rates around the world, it's assembled by asking a panel of big banks to estimate what it would cost them to borrow money today if they had to. Hundreds of trillions of dollars in derivatives, corporate loans, and mortgages are pegged to these rates. Yet we now know that for years LIBOR rates were rigged. Barclays has agreed to pay nearly half a billion dollars to regulators for its manipulations, and a host of other big banks are under investigation for similar misdeeds.

Rigging LIBOR was shockingly easy. The estimates aren't audited. They're not compared with market prices. And LIBOR is put together by a trade group, without any real supervision from government regulators. In other words, manipulating LIBOR didn't require any complicated financial hoodoo. The banks just had to tell some simple lies.

They had plenty of reasons to do so. At Barclays, for instance, traders were making big bets on derivatives whose value depended on LIBOR; changing rates by even a tiny bit could be exceptionally lucrative. In the years leading up to the financial crisis, these manipulations were, in the words of the Commodity Futures Trading Commission, "common and pervasive." The

result was that, instead of reflecting what was real, LIBOR reflected what the banks wanted us to believe was real.

The most striking thing about this scandal is that it was predictable—yet no one did anything to stop it. So how do we rein them in? We could start by making it harder for the banks to game the system—LIBOR, for instance, should be revamped so that it reflects actual market rates, not self-serving guesses. Bankers were asked a simple question, and they lied in response. This new approach would be intrusive and overbearing, and would make it harder for bankers to do what they want. In other words, it's exactly what the financial industry needs.

Control Article

We begin this morning's news hour with a story sent to us by our finance reporter. In order to work well, markets need a basic level of efficiency. As Alan Greenspan once said, "In virtually all transactions we rely on those with whom we do business." So what happens to a market in which the most fundamental assumptions turn out to be flawed? That is the question that has perplexed the financial industry all summer. The LIBOR (or the London Inter-bank Offered Rate) is the most important set of numbers in the global financial system. Used as a benchmark for interest rates around the world, it's assembled by asking a panel of industry analysts to estimate what it would cost them to borrow money today if they had to. Hundreds of trillions of dollars in derivatives, corporate loans, and mortgages are pegged to these rates. Yet we now know that for years LIBOR rates were inaccurate. One group has agreed to spend nearly half a billion dollars to correct for its unintentional errors, and a host of others are being studied for similar mistakes.

Miscalculating LIBOR was surprisingly easy. The estimates aren't verified. They're not compared with market prices. And LIBOR is put together by a trade group, without any real involvement from government. In other words, miscalculating LIBOR didn't require any complicated financial instruments. The group just had to make their best estimates.

They had plenty of reasons to do so. At Barclays, for instance, traders were making big bets on derivatives whose value depended on LIBOR; changing rates by even a tiny bit could be exceptionally important. In the years leading up to the financial crisis, these innocent mistakes were, in the words of the Commodity Futures Trading Commission, "common and pervasive." The result was that, instead of reflecting what was real, LIBOR reflected what the industry believed was real.

The most striking thing about this is that it was unforeseeable—no one could do anything to stop it. So how do we improve this? We could start by making it harder for the the system to go awry—LIBOR, for instance, should be revamped so that it reflects actual market rates, not best guesses. Analysts were asked a question, but they were unable to give precise responses. This new approach would be helpful and effective, and would make it easier for everyone. In other words, it's exactly what the financial industry needs.