



2009

## Effect of Exposure to Small Pharmaceutical Promotional Items on Treatment Preferences

David Grande  
*University of Pennsylvania*

Dominick L. Frosch

Andrew W. Perkins

Barbara Kahn  
*University of Pennsylvania*

Follow this and additional works at: [https://repository.upenn.edu/marketing\\_papers](https://repository.upenn.edu/marketing_papers)



Part of the [Advertising and Promotion Management Commons](#), [Behavioral Economics Commons](#), [Cognition and Perception Commons](#), [Cognitive Psychology Commons](#), [Health and Medical Administration Commons](#), and the [Marketing Commons](#)

---

### Recommended Citation

Grande, D., Frosch, D. L., Perkins, A. W., & Kahn, B. (2009). Effect of Exposure to Small Pharmaceutical Promotional Items on Treatment Preferences. *JAMA Internal*, 169 (9), 887-893. <http://dx.doi.org/10.1001/archinternmed.2009.64>

This paper is posted at ScholarlyCommons. [https://repository.upenn.edu/marketing\\_papers/415](https://repository.upenn.edu/marketing_papers/415)  
For more information, please contact [repository@pobox.upenn.edu](mailto:repository@pobox.upenn.edu).

---

# Effect of Exposure to Small Pharmaceutical Promotional Items on Treatment Preferences

## Abstract

**Background:** Policy discussions concerning pharmaceutical promotion often assume that small promotional items are unlikely to influence prescribing behavior. Our experiment measures whether exposure to these items results in more favorable attitudes toward marketed products and whether policies that restrict pharmaceutical marketing mitigate this effect.

**Methods:** This is a randomized controlled experiment of 352 third- and fourth-year medical students at two US medical schools with differing policies toward pharmaceutical marketing. Participants assigned to treatment were exposed to small branded promotional items for Lipitor (atorvastatin) without knowledge that the exposure was part of the study. We measured differences in implicit (ie, unconscious) attitudes toward Lipitor and Zocor (simvastatin) in exposed and control groups with the Implicit Association Test (IAT). Self-reported attitudes were also measured, and a follow-up survey was administered measuring attitudes toward marketing.

**Results:** Fourth-year students at the University of Miami Miller School of Medicine exposed to Lipitor promotional items had more favorable implicit attitudes about that brand-name drug compared to the control group (IAT effect: 0.66 vs 0.47;  $P = .05$ ), while the effect was reversed at the University of Pennsylvania School of Medicine (IAT effect: 0.22 vs 0.52;  $P = .002$ ) where restrictive policies are in place limiting pharmaceutical marketing (interaction effect:  $P = .003$ ). No significant effect was observed among third-year students. On a “skepticism” scale, University of Miami students held more favorable attitudes toward pharmaceutical marketing compared to University of Pennsylvania students (0.55 vs 0.42;  $P$

**Conclusions:** Subtle exposure to small pharmaceutical promotional items influences implicit attitudes toward marketed products among medical students. We observed a reversal of this effect in the setting of restrictive policies and more negative school-level attitudes toward marketing.

## Disciplines

Advertising and Promotion Management | Behavioral Economics | Business | Cognition and Perception | Cognitive Psychology | Health and Medical Administration | Marketing

# Effect of Exposure to Small Pharmaceutical Promotional Items on Treatment Preferences

David Grande, MD, MPA; Dominick L. Frosch, PhD; Andrew W. Perkins, PhD; Barbara E. Kahn, PhD

**Background:** Policy discussions concerning pharmaceutical promotion often assume that small promotional items are unlikely to influence prescribing behavior. Our experiment measures whether exposure to these items results in more favorable attitudes toward marketed products and whether policies that restrict pharmaceutical marketing mitigate this effect.

**Methods:** This is a randomized controlled experiment of 352 third- and fourth-year medical students at two US medical schools with differing policies toward pharmaceutical marketing. Participants assigned to treatment were exposed to small branded promotional items for Lipitor (atorvastatin) without knowledge that the exposure was part of the study. We measured differences in implicit (ie, unconscious) attitudes toward Lipitor and Zocor (simvastatin) in exposed and control groups with the Implicit Association Test (IAT). Self-reported attitudes were also measured, and a follow-up survey was administered measuring attitudes toward marketing.

**Results:** Fourth-year students at the University of Miami Miller School of Medicine exposed to Lipitor pro-

motional items had more favorable implicit attitudes about that brand-name drug compared to the control group (IAT effect: 0.66 vs 0.47;  $P=.05$ ), while the effect was reversed at the University of Pennsylvania School of Medicine (IAT effect: 0.22 vs 0.52;  $P=.002$ ) where restrictive policies are in place limiting pharmaceutical marketing (interaction effect:  $P=.003$ ). No significant effect was observed among third-year students. On a “skepticism” scale, University of Miami students held more favorable attitudes toward pharmaceutical marketing compared to University of Pennsylvania students (0.55 vs 0.42;  $P<.001$ ) but the results were similar to those of a previously published national study (0.42 vs 0.43;  $P=.53$ ).

**Conclusions:** Subtle exposure to small pharmaceutical promotional items influences implicit attitudes toward marketed products among medical students. We observed a reversal of this effect in the setting of restrictive policies and more negative school-level attitudes toward marketing.

*Arch Intern Med.* 2009;169(9):887-893

**Author Affiliations:**  
Department of Medicine  
(Dr Grande) and Leonard Davis  
Institute of Health Economics  
(Drs Grande and Frosch),  
University of Pennsylvania,  
Philadelphia; Department of  
Medicine, University of  
California, Los Angeles  
(Dr Frosch); Jesse H. Jones  
Graduate School of  
Management, Rice University  
(Dr Perkins); School of  
Business Administration,  
University of Miami (Dr Kahn).

**D**ISCUSSIONS ABOUT THE INFLUENCE of pharmaceutical promotion on physicians often focus on gifts and payments of relatively large economic value. This focus is also evident in ethics guidelines addressing pharmaceutical promotion among many professional medical societies.<sup>1</sup> The underlying assumption is that smaller gifts are unlikely to exert influence on prescribing decisions.

## *For editorial comment see page 829*

In contrast, a substantial body of marketing and psychology literature suggests that even trivial items can exert influence irrespective of economic value. For example, adding a small gift such as personalized mailing labels to a solicitation for donations has been shown to significantly increase contributions.<sup>2</sup> In phar-

maceutical promotion, small gifts are often tethered to branding efforts, as items such as pens and coffee mugs display logos. Aside from the intrinsic value of promotional items, branded materials strengthen brand awareness and build brand equity through a variety of largely unconscious but powerful mechanisms.<sup>3</sup> Nonverbal information about the brand, such as symbols or logos, is often more influential than verbal cues.<sup>4</sup> Stronger brands have a memory encoding and storage advantage over unknown brands,<sup>5</sup> which facilitates the formation of strong positive associations with the brand. Strong branded products are more often in a “top-of-mind” set of alternatives for consumers to consider.<sup>6</sup> Strong brand awareness provides a justifiable reason for choosing a particular brand.<sup>7,8</sup> This research suggests that small branded promotional items should increase favorable attitudes for the brand being promoted. We are unaware of studies that test these effects in a clinical con-

text with health professionals, but many physicians, because they are medical experts, believe they are not susceptible to these influences.<sup>5,9,10</sup> In one survey, just 8% of physicians believed they were susceptible to influence by marketing items such as branded pens, whereas 31% of patients felt these items could influence physicians.<sup>9</sup> The guidelines of the American Medical Association regarding gifts to physicians from industry reflect this belief of lack of susceptibility by permitting “gifts of minimal value.”<sup>11</sup>

We used the Implicit Association Test (IAT)<sup>11</sup> to measure the effect of simple exposure to small, branded promotional items in the environment on treatment preferences of medical students. The IAT, described in greater detail below, is an experimental approach designed to uncover otherwise unconscious or hidden attitudes. We studied medical students from 2 schools with differing policies toward pharmaceutical marketing (more restrictive vs less restrictive) to test possible effect modification. We hypothesized that medical students exposed to branded promotional items would have more favorable attitudes toward the branded product through the priming of positive associations. However, we hypothesized that the presence of a university policy restricting pharmaceutical marketing would mitigate the positive associations with the branded product due to the increased awareness of persuasive marketing tactics that such a policy may evoke.

## METHODS

### SETTING AND PARTICIPANTS

The study used a randomized experimental design. Participants were third- and fourth-year medical students at the University of Pennsylvania School of Medicine (Penn) and the University of Miami Miller School of Medicine (Miami). We selected these institutions because of their differing policies regarding interactions between trainees and pharmaceutical company representatives. The University of Pennsylvania has restrictive policies in place that prohibit most gifts, meals, and samples while Miami continues to permit such marketing practices.

Subjects were recruited by e-mail and flyers and were paid \$25 per person to participate in the study. Enrollment took place between August 24, 2007, and April 4, 2008. The study was approved by the Institutional Review Boards at the University of Pennsylvania and the University of Miami.

### EXPERIMENTAL PROCEDURE

Study participants were assigned to a control or primed condition based on their day of enrollment. Participants assigned to the “primed” condition were exposed to Lipitor (atorvastatin) branded promotional items immediately prior to completing a computer-based study instrument. These exposures included Lipitor logos on a clipboard (used when signing in to the study room) and notepaper (used to provide participants with their study identification number). Participants assigned to the control condition completed the same procedures but with a plain (non-branded) clipboard and notepaper. Randomization was conducted by day in order to avoid contamination of conditions.

We did not reveal the specific focus of the study to the participants until the entire study was complete. Participants were told they were enrolling in a study about clinical decision making under varying conditions. Participants were asked not to discuss the

experiment with others until they were notified that the study was complete. At that time, participants were debriefed by e-mail with an explanation of the specific aims of the experiment.

## OUTCOME MEASURES

Our study was designed to measure the influence of exposure to branded promotional items on relative attitudes toward 2 lipid-lowering statins. We examined differences in attitudes toward Lipitor and Zocor (simvastatin) in our exposed (Lipitor promotional items) and control groups. Lipitor is among the most promoted brand-name statins in the United States while simvastatin is available generically and considered to be nearly equally effective. The study outcomes included measures of implicit and self-reported (ie, explicit) attitudes.

Implicit attitudes were evaluated with the Implicit Association Test,<sup>11-15</sup> a widely used tool in marketing and psychology research that is thought to be resistant to social desirability bias among research participants. Initial applications of the IAT, for example, demonstrated the persistence of racial and gender stereotypes and prejudices, even in the face of strong conscious beliefs that such attitudes do not exist and strong social norms that dictate they should not exist.<sup>16,17</sup> Results from the IAT are a better predictor of intergroup discrimination (eg, biased behavior against people of other races/ethnicities, gender, and sexual orientation based on existing attitudes and stereotypes) compared with ostensibly similar self-report measures.<sup>13</sup> In recent years, the use of the IAT has been expanded to research focused on branding and marketing.<sup>18,19</sup> Further details regarding application and validity of the IAT have been published elsewhere<sup>13-15</sup>; a demonstration can be found at the Project Implicit Web site (<https://implicit.harvard.edu/implicit>).

Conceptually, the IAT pairs targets (eg, *Lipitor* and *Zocor*) with attributes (eg, *pleasant* or *unpleasant*) and requires subjects to sort corresponding images and words. Differences in reaction times when pairing targets and attributes are a clue to implicit attitudes. For example, greater speed when *Lipitor* and *pleasant* are paired or when *Zocor* and *unpleasant* are paired reflects a more favorable attitude toward Lipitor than Zocor. The IAT in this study comprised 5 related categorization tasks performed on a computer. In tasks 1 and 2, study participants learn the appropriate behavioral response (usually a key press) for each of 4 categories: 2 categories that represent the target objects (*Lipitor* and *Zocor*) and two categories that represent the attributes (*pleasant* and *unpleasant*). In these initial tasks, words or images representing the target objects and attributes were presented, and participants were prompted to quickly and accurately assign each word or image to the appropriate category using assigned computer keys. Following those tasks, the participants completed an initial combined task in which 1 attribute and 1 target object category (eg, *pleasant* and *Lipitor*) are assigned to 1 response button, while the other attribute and target object categories (eg, *unpleasant* and *Zocor*) are assigned to the other. Study participants were again instructed to quickly and accurately assign the items to the appropriate response key. Following a fourth categorization that reverses the key assignments for the target categories, study participants then complete a final reversed combined task requiring the categorization of *pleasant* and *Zocor* on the same key, and *unpleasant* and *Lipitor* on the other key. During each task, response times were recorded.

Explicit attitudes were assessed by self-report. Following the IAT, participants were asked to compare Lipitor and Zocor in 5 dimensions (superiority, preference, efficacy, safety, and convenience) using an 11-point scale (Lipitor Strongly Preferred = +5, Zocor Strongly Preferred = -5).

Study participants were contacted by e-mail after completion of the first phase of the study with a follow-up anonymous

**Table 1. Demographic Characteristics of Study Participants**

Characteristics	No. (%) of Subjects		P Value <sup>a</sup>
	Control	Exposed	
Sex			
Female	91 (46.2)	88 (53.8)	.39
Male	80 (50.8)	93 (49.2)	
Age, y (SD)	25.8 (3.0)	25.5 (2.4)	.31
School			
University of Pennsylvania (n=154)	78 (50.7)	76 (49.3)	.49
University of Miami (n=198)	93 (47.0)	105 (53.0)	
Training year			
Third-year medical student (n=191)	69 (36.1)	122 (63.9)	<.001
Fourth-year medical student (n=161)	102 (63.4)	59 (36.7)	

<sup>a</sup>P value from a  $\chi^2$  test for dichotomous variables and *t* test for continuous variables.

mous Internet-based survey that assessed their attitudes toward pharmaceutical marketing. The purpose was to measure differences in attitudes among students at the 2 schools given the differing institutional policies as a possible explanatory factor. Participants completed a 9-item previously published instrument with a 4-point scale that assessed their level of agreement with statements measuring their acceptance of and skepticism regarding pharmaceutical marketing.<sup>20</sup>

### STATISTICAL ANALYSIS

The primary outcome measure, the mean IAT effect, was calculated by dividing differences in average response times when the 2 drugs are paired with different attributes by the pooled standard deviation as described in previously published research.<sup>21</sup> Comparisons of the IAT effect across exposed and control groups were performed using independent-sample *t* tests. Results were stratified by school and class year to account for institutional and training-year effects. Analysis of variance (ANOVA) was used to calculate the interaction effect for school, class year, and experimental exposure. Explicit attitude measures that compared Lipitor and Zocor were combined into a Lipitor preference scale with a range of -5 to +5, with positive values reflecting a Lipitor preference. Nonparametric tests (Mann-Whitney tests) were used to compare means from the Lipitor preference scale across groups. Chi-squared statistics were used to compare proportions of subjects in agreement with attitude statements in our follow-up pharmaceutical marketing survey. We collapsed the 9 items from the survey into a 6-item scale (range, 0-1) as a measure of skepticism toward pharmaceutical marketing. The items (1, 5-9) were selected based on the previously published 8-school survey to allow for a direct comparison with our results.<sup>20</sup> All *P* values computed were 2-sided. All analyses were performed using the Stata software program, version 9.2 (StataCorp LP; College Station, Texas).

### RESULTS

A total of 352 third- (n=191) and fourth-year (n=161) medical students participated in our study. The demographic characteristics of the participants are summarized in **Table 1**. At Miami, 198 students were enrolled from a potential pool of 324 third- and fourth-year stu-

dents. At Penn, 154 students were enrolled from a potential pool of 410 third- and fourth-year students. The average age of participants was 25.7, with similar numbers of men and women. There were no significant differences in demographic characteristics by experimental group except for training year. Fourth-year students were represented in greater numbers in the control group, as were third-year students in the exposed group.

### IMPLICIT ATTITUDES

The results from the IAT are presented in **Table 2** stratified by school and class year. Overall, students in both class years at both schools demonstrated implicit attitudes favoring Lipitor over Zocor as reflected by the positive values even among control students. However, there were significant differences between the exposed and control groups among fourth-year medical students at Penn and Miami. At Miami, fourth-year students exposed to Lipitor promotional items demonstrated stronger preferences toward Lipitor compared to the control group (*P*=.05), a finding that supports our first hypothesis. In contrast, Penn fourth-year students exposed to Lipitor-branded items exhibited the opposite response, demonstrating weaker preferences toward Lipitor compared to the control group (*P*=.002). There were no significant experimental effects noted among third-year medical students at either Penn or Miami (*P*=.87 and *P*=.44, respectively). This interaction effect of our marketing exposure with school and class year is depicted in the **Figure** (*P*=.003).

### EXPLICIT ATTITUDES

The explicit attitude Lipitor preference scale that compares Lipitor with Zocor had high internal reliability (Cronbach  $\alpha$ =0.80). Subjects demonstrated a preference toward Lipitor compared to Zocor independent of our intervention (**Table 3**). We did not observe a significant experimental effect across the 2 groups overall or within school-class-year strata. These results suggest that, when students self-report their explicit preferences, they have a slight preference for Lipitor but reveal no effects from a brief exposure to branded promotional items.



**Table 3. Self-Reported (Explicit) Attitudes—Lipitor Preference Scale<sup>a</sup>**

	Mean Scaled Responses			
	Control	Exposed	Difference	P Value
University of Pennsylvania medical students	0.47	0.37	0.10	.10
Third-year students	0.49	0.43	0.06	.44
Fourth-year students	0.45	0.31	0.14	.12
University of Miami medical students	0.79	0.67	0.12	.37
Third-year students	0.79	0.63	0.16	.57
Fourth-year students	0.79	0.80	-0.01	.95
All study participants	0.64	0.55	0.10	.13

<sup>a</sup>Scale with a range of -5 to +5, with positive numbers indicating Lipitor preference and negative numbers indicating Zocor preference.

**Table 4. Attitudes About Pharmaceutical Marketing by Medical School**

	Penn (n=90)	Miami (n=97)	2005 National Survey <sup>a</sup>	P Value (Penn vs Miami)	P Value (Penn vs National Survey)	P Value (Miami vs National Survey)
<b>% in Agreement</b>						
Most grand rounds sponsored by drug companies are helpful and educational	52.2	85.6	89.0	<.001 <sup>c</sup>	<.001 <sup>c</sup>	.32
It is sometimes okay for students to accept gifts and lunches from drug companies because most students have considerable debts and minimal income	52.2	74.2	80.3	.002 <sup>c</sup>	<.001 <sup>c</sup>	.16
Drug company materials are a useful way to learn about new drugs	53.3	65.0	71.3	.11	<.001 <sup>c</sup>	.20
It is sometimes okay for students to accept gifts and lunches from drug companies because drug companies have minimal influence on students	30.0	60.8	71.1	<.001 <sup>c</sup>	<.001 <sup>c</sup>	.04 <sup>a</sup>
Funds to medical schools from drug companies are a helpful way to lower tuition	44.4	54.6	53.8	.16	.09	.88
My school should exclude pharmaceutical representatives from meeting with students and residents	66.7	17.5	17.3	<.001 <sup>c</sup>	<.001 <sup>c</sup>	.96
Receiving gifts or food from pharmaceutical representatives increases the chance that I will eventually prescribe the drug company's products	63.3	29.4	31.2	<.001 <sup>c</sup>	<.001 <sup>c</sup>	.71
Receiving gifts or food from pharmaceutical representatives increases the chances that my fellow students will eventually prescribe the drug company's products	68.9	38.2	42.3	<.001 <sup>c</sup>	<.001 <sup>c</sup>	.44
Drug company-sponsored grand rounds are often biased in favor of the company's products	92.2	67.7	67.4	<.001 <sup>c</sup>	<.001 <sup>c</sup>	.95
<b>Mean Scaled Score</b>						
Summary pharmaceutical marketing skepticism scale <sup>b</sup>	0.55	0.42	0.43	<.001 <sup>c</sup>	<.001 <sup>c</sup>	.53

Abbreviations: Penn, University of Pennsylvania School of Medicine; Miami, University of Miami Miller School of Medicine.

<sup>a</sup>Sample size varied by item from 663 to 808.

<sup>b</sup>Higher numbers reflect increased skepticism about pharmaceutical marketing.

<sup>c</sup> $P \leq .01$ .

perience and greater exposure to their clinical teachers and prevailing institutional practices.

The divergent effects at our 2 study schools are an interesting finding. At Penn, exposure to the branded items produced less favorable implicit attitudes. One potential explanation for this effect is that the strong school policy provided an external warning about specific persuasion tactics underlying pharmaceutical marketing. This information may have motivated some form of resistance by the audience<sup>23</sup> that could have taken the form of simple message rejection or active counterarguing or careful message scrutiny.<sup>24</sup> The policy therefore may have heightened the

ability of the Penn students to exercise what has been termed "persuasion coping effectiveness",<sup>25</sup> which produces a goal within oneself to achieve one's own current learning or attitudinal goal independently of what the marketer seems to be trying to accomplish. The differential attitudes observed in the marketing survey, with the Penn students exhibiting significantly more negative attitudes than those in the national sample or for the Miami students where no policy exists, support this explanation. At Miami, where students had more positive attitudes toward marketing, exposure to a branded promotional item likely primed more positive implicit associations.

While the presence or absence of a school policy is a reasonable explanation for our findings, we cannot prove causality nor can we exclude other school-level characteristics as alternative explanations. Nonetheless, it is notable that the attitudes of Miami students regarding pharmaceutical marketing are remarkably similar to those outlined in the 8-school survey<sup>20</sup> published in 2005, while the Penn students hold considerably less favorable attitudes in the context of restrictive policies toward pharmaceutical marketing.

The lack of significant findings in our explicit attitude measures raises several interesting conclusions and questions. First, self-reported attitudes are vulnerable to social desirability bias. If the hypothesized effect of a marketing exposure were positive toward a brand, then we would expect social desirability to operate in the opposite direction as the experimental effect. This may account for our null findings among fourth-year students at Miami on explicit attitude measures in contrast to our IAT findings. Second, the IAT is likely to be a much more sensitive measure than explicit attitude measures. Studies that simply rely on self-reported attitudes may miss important effects. Novel methods that provide indirect measures of attitudes are an important addition to the methods used to study the effects of marketing.

There are some limitations to our experiment. Most importantly, our findings are focused on attitudes as opposed to behaviors. However, effects on attitudes are notable given that our exposure was brief and subtle, and attitudes are known to be a significant predictor of behaviors.<sup>26</sup> The simulation in the experimental setting of repeated exposure to promotional items that occurs in clinical practice would be challenging. However, implicit attitudes have been shown to more directly translate into behaviors under conditions of high cognitive load such as time pressure, a situation common in clinical practice.<sup>27</sup> Another limitation is that the training year differences we observed may reflect a cohort effect. Our randomization procedures also did not produce balanced groups with respect to training year. This is likely due to the fact it was necessary to randomize by day to avoid contamination of experimental groups and that class training schedules may have facilitated participation on certain days. However, we addressed this imbalance by stratifying our analysis by class year. Another possible limitation to our study is that study subjects could have been aware of the study hypothesis despite the fact that we did not directly reveal it. Only our self-reported explicit attitude measures would be vulnerable in this circumstance. One of the advantages of the IAT is its resistance to such demand characteristics, which lends strength to our findings. Finally, we are unable to draw specific conclusions regarding practicing physicians. Our study was focused on medical students in their third and fourth years of training, and the generalizability of our findings to practicing physicians is unknown. These limitations are balanced by significant strengths, including the randomized experimental design and novel outcome measures that are less susceptible to bias.

In conclusion, our study is the first of which we are aware to experimentally measure the effect of exposure to small branded pharmaceutical promotional items on

brand preferences among medical students. Our results provide evidence that subtle branding exposures are important and influential, as the psychology and marketing literature would suggest. Our findings are particularly notable because they are attributable to simple exposure to promotional items independent of other effects attributable to the social relationships associated with gifts. Our study also suggests that institutional policies, by way of their influence on student attitudes toward marketing, could lead to different responses to branded promotional items.

**Accepted for Publication:** January 2, 2009.

**Correspondence:** David Grande, MD, MPA, 3641 Locust Walk, Room 407, Philadelphia, PA 19104-6218 (dgrande@wharton.upenn.edu).

**Author Contributions:** Dr Grande had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Grande, Kahn, Frosch, and Perkins. *Acquisition of data:* Grande, Kahn, and Perkins. *Analysis and interpretation of data:* Grande, Kahn, Frosch, and Perkins. *Drafting of the manuscript:* Grande and Perkins. *Critical revision of the manuscript for important intellectual content:* Grande, Kahn, Frosch, and Perkins. *Statistical analysis:* Grande, Frosch, Kahn, and Perkins. *Obtained funding:* Kahn. *Administrative, technical, and material support:* Grande, Kahn, and Frosch. *Study supervision:* Grande and Kahn.

**Financial Disclosure:** Dr Grande was compensated as an expert witness on behalf of the State of Vermont Attorney General's Office in a case concerning regulation of pharmaceutical marketing activities. From January 1, 2006, to June 30, 2007, Dr Frosch served as the project director for a clinical trial of medications to treat methamphetamine dependence sponsored by Hythiam Inc. Dr Kahn was compensated as an instructor in courses sponsored by Johnson & Johnson, Wyeth Pharmaceuticals, Medtronic, GlaxoSmithKline, Sanofi-aventis, Janssen, Astra Zeneca, UnitedHealth Group, and Cooper University Hospital.

**Funding/Support:** Dr Grande was supported by the Robert Wood Johnson Foundation Health & Society Scholars program at the time of this research. Dr Frosch is supported by a Robert Wood Johnson Foundation Investigator Award in Health Policy Research.

**Role of the Sponsors:** The funding organizations had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; or preparation, review, or approval of the manuscript.

**Additional Contributions:** Dr Kahn thanks the Leonard Davis Institute of Health Economics and the Behavior Laboratory at the Wharton School at the University of Pennsylvania for support of this research. We thank Mark O'Connell, MD, Tess Stebbins, BS, and Alberto Lam, BS, from the University of Miami Miller School of Medicine and Judy Shea, PhD, and Helene Weinberg, MBA, from the University of Pennsylvania School of Medicine for their assistance and David Asch, MD, MBA, and Katrina Armstrong, MD, MSCE, for reviewing an earlier draft of this manuscript.



## REFERENCES

1. American Medical Association. Opinion of the Council on Ethical and Judicial Affairs E-8.061: gifts to physicians from industry. <http://www.ama-assn.org/ama/pub/education-careers/continuing-medical-education/cme-credit-offerings/ama-cme-courses/ethical-guidelines-gifts-physicians-industry/ethical-opinions-guidelines/opinion-e8061-clarifying.shtml>. Accessed January 30, 2009.
2. Cialdini R. *Influence: Science and Practice*. Boston, MA: Allyn & Bacon; 2001.
3. Hasher L, Zacks RT. Automatic and effortful processes in memory. *J Exp Psychol Gen*. 1979;108:356-388.
4. Reddy AC. *The role of "Self-concept" in Industrial Buying: An Empirical Investigation in the Purchasing of Office Machines* [dissertation]. University of North Carolina at Chapel Hill; 1972.
5. Alba JW, Hutchinson JW. Dimensions of consumer expertise. *J Consum Res*. 1987;13:411-455.
6. Simonson I, Huber J, Payne J. The relationship between prior brand knowledge and information acquisition order. *J Consum Res*. 1988;14:566-578.
7. Hoeffler S, Keller KL. The marketing advantages of strong brands. *J Brand Management*. 2003;10:421-445.
8. Hoyer WD, Brown SP. Effects of brand awareness on choice for a common, repeat-purchased product. *J Consum Res*. 1990;17:141-148.
9. Gibbons RV, Landry F, Blouch D, et al. A comparison of physicians' and patients' attitudes toward pharmaceutical industry gifts. *J Gen Intern Med*. 1998;13(3):151-154.
10. Steinman MA, Shilipak M, McPhee S. Of principles and pens: attitudes and practices of medicine housestaff toward pharmaceutical industry promotions. *Am J Med*. 2001;110(7):551-557.
11. Greenwald AG, McGhee DE, Schwartz JLK. Measuring individual differences in Implicit cognition: the Implicit Association Test. *J Pers Soc Psychol*. 1998;74(6):1464-1480.
12. Greenwald AG, Nosek BA. Health of the Implicit Association Test at age 3. *J Exp Psychol*. 2001;48(2):85-93.
13. Greenwald A, Poehlman T, Uhlmann E, Banaji M. Understanding and using the Implicit Association Test, III: meta-analysis of predictive validity. *J Pers Soc Psychol*. In press.
14. Nosek BA, Greenwald AG, Banaji MR. Understanding and using the Implicit Association Test, II: method variables and construct validity. *Pers Soc Psychol Bull*. 2005;31(2):166-180.
15. Nosek BA, Greenwald AG, Banaji MR. The Implicit Association Test at age 7: a methodological and conceptual review. In: Bargh JA, ed. *Social Psychology and the Unconscious: The Automaticity of Higher Mental Processes*. New York, NY: Psychology Press; 2005.
16. Greenwald AG, Banaji MR, Rudman LA, Farnham SD, Nosek BA, Mellott DS. A unified theory of implicit attitudes, stereotypes, self-esteem, and self-concept. *Psychol Rev*. 2002;109(1):3-25.
17. Farnham SD, Greenwald AG, Banaji MR. Implicit self-esteem. In: Abrams D, Hogg MA, eds. *Social Identity and Social Cognition*. Vol 17. Malden, MA: Blackwell Publishers Inc; 1999:230-248.
18. Forehand MR, Perkins AW. Implicit assimilation and explicit contrast: a set/reset model of response to celebrity voice-overs. *J Consum Res*. 2005;32:435-441.
19. Brunel FF, Tietje BC, Greenwald AG. Is the Implicit Association Test a valid and valuable measure of implicit consumer social cognition? *J Consum Psychol*. 2004;14:385-404.
20. Sierles FS, Brodkey A, Cleary L, et al. Medical students' exposure to and attitudes about drug company interactions—a national survey. *JAMA*. 2005;294(9):1034-1042.
21. Greenwald AG, Nosek B, Banaji M. Understanding and using the Implicit Association Test, I: an improved scoring algorithm. *J Pers Soc Psychol*. 2003;85(2):197-216.
22. Ringold D. Boomerang effects in response to public health interventions: some unintended consequences in the alcoholic beverage market. *J Consum Policy*. 2002;25:27-63.
23. Brehm J. *Responses to the Loss of Freedom: A Theory of Psychological Reactance*. Morristown, NJ: General Learning; 1972.
24. Petty R, Cacioppo J. Forewarning, cognitive responding, and resistance to persuasion. *J Pers Soc Psychol*. 1977;35:645-655.
25. Friestad M, Wright P. The persuasion knowledge model: how people cope with persuasion attempts. *J Consum Res*. 1994;21:1-31.
26. Kim M, Hunter J. Attitude behavior relations—a metaanalysis of attitudinal relevance and topic. *J Commun*. 1993;43:101-142.
27. Gibson B. Can evaluative conditioning change attitudes toward mature brands? new evidence from the Implicit Association Test. *J Consum Res*. 2008;35:178-188.