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Perceptions of Smoking Prevalence by Youth in Countries With and Without a Tobacco Advertising Ban

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Abstract

This study examined a proposed mechanism by which exposure to cigarette advertising may mediate the subsequent smoking of youth. We hypothesized that children's exposure to cigarette advertising leads them to overestimate the prevalence of smoking, and that these distorted perceptions, in turn, lead to increased intentions to smoke. Children in Finland, where there has been a total tobacco advertising ban since 1978, were compared with children in the United States at a time when tobacco advertising was ubiquitous. Samples of 477 8- to 14-year-old Helsinki students and 453 8- to 14-year-old Los Angeles students whose lifetime cigarette use consisted of no more than a puff of a cigarette were administered questionnaires in their classrooms. The primary hypothesis was confirmed. Los Angeles youth were significantly more likely than Helsinki youth to overestimate the prevalence of adult smoking, in spite of the fact that actual adult smoking prevalence in Helsinki was almost twice that of Los Angeles adults. A similar, significant pattern for perceived peer smoking was obtained, with Los Angeles youth being more likely than Helsinki youth to overestimate prevalence, in spite of the actual greater prevalence of youth smoking in Helsinki.

INTRODUCTION

The World Health Organization in May, 2008 called upon governments worldwide to ban all tobacco advertising, promotion and sponsorship in the interests of protecting the health of the world's 1.8 billion youths (WHO, 2008a). The possibility that tobacco advertising contributes to the initiation of smoking has led to the institution of comprehensive advertising and promotion bans in 39 countries over the last quarter century (WHO, 2008b); partial bans exist

in several additional countries. Nonetheless, only 5% of the world's youths are covered by such bans, according to the recent WHO (2008a) report.

Two categories of processes have been suggested to explain how tobacco advertising may lead children to smoke: The first explanation focuses on the content of the advertisements, and the second focuses on the pervasiveness of the ads (USPHS, 1994). Other research describes similar processes for effects of film imagery on youths (McCool, Cameron & Petrie, 2005; Willis, Sargent, Stoolmiller, Gibbons & Gerrard, 2008). Evidence pointing to an effect of ad content on youth smoking comes from studies about children's self-images and smoking (Chassin, Presson, Sherman, Corty & Olshavsky, 1984; Uutela, Vartiainen, Burton & Johnson, 1991); one model posits that young adolescents respond to cigarette ads with images depicting attributes (e.g., independence, social success, sexual confidence) that the youths aspire to, but do not think they possess, i.e., attributes portraying gaps between ideal self images and self images (Burton, Hansen, Sussman, Johnson & Flay, 1989; USPHS, 1994; Shadel, Tharp-Taylor & Fryer, 2008).

The present paper reports on data pertinent to the second explanation, that the sheer quantity of ads visible in countries with no ad bans exerts a normative influence on children. Specifically, we hypothesized that the pervasiveness of cigarette advertising leads children to over-estimate the actual prevalence of smoking, and that these distorted perceptions in turn increase intentions to smoke.

Studies have been consistent in reporting that children greatly overestimate the prevalence of cigarette smoking (Sherman, Presson, Chassin, Corty & Olshavsky, 1983; Sussman et al, 1988; Reid et al, 2008); this distortion appears to carry over into young adulthood (Cunningham & Selby, 2007). Moreover, adolescent smokers overestimate to an even greater extent than do nonsmokers (e.g., Chassin et al, 1984); smoking prevalence overestimates have been found to predict smoking initiation and acquisition (USPHS, 1994; Reid, Lanske & Leatherdale, 2008). The size of the overestimates can be great: It is common for adolescents to distort actual prevalence by as much as 100%, e.g., believing that 60% of adults smoke, where only 30% actually smoke. It is possible that these gross distortions in perceptions come from the ubiquitousness of cigarette ads showing visual images of people with cigarettes. If this is the case, then youth in countries with limited tobacco advertising should be less likely to overestimate smoking prevalence; similarly, tobacco advertising bans should be followed by reductions in such perceptual distortions--although it might take years for these changes to occur.

A total tobacco advertising ban was enacted in Finland in 1978, meaning that Finnish children now grow up unexposed to pervasive cigarette advertising. In the present study, part of a larger cross-cultural investigation of media influences, we examined smoking prevalence estimates as possible mediators of a relationship between cigarette advertising exposure and smoking intentions for a sample of Finnish children in comparison with a sample of United States children.

METHODS

Subjects

Samples of 660 Helsinki students in school grades 3 through 9 and 562 Los Angeles students in school grades 4 through 10 were administered questionnaires in their classrooms. (Finnish children start school in the first grade at an average age of seven years, whereas United States children begin the first grade at an average age of six years. Thus, a nine-year-old child in Helsinki would typically be in the third grade, whereas a nine-year-old child in Los Angeles would typically be in the fourth grade.) Students in three classes at each grade level in each

city were surveyed during the winter of 1987–88, at a time before there were any limitations on tobacco advertising in the United States, but ten years after the total tobacco advertising ban in Finland. Schools representing lower-middle to middle-class socioeconomic environments were selected for participation. The Helsinki sample was 46% female and 54% male, and the Los Angeles sample was 56% female and 44% male.

Since the present investigation focused on a possible relationship between advertising exposure and intention to initiate smoking in the future, older adolescents and subjects of any age who already smoked were excluded from the sample for data analysis. Thus, the sample was limited to the 477 Helsinki subjects and 453 Los Angeles subjects who were 8 through 14 years old, inclusive, and whose lifetime cigarette use consisted of no more than a puff of a cigarette. Helsinki students were distributed by age as follows: Age 8, 21; 9, 88; 10, 97; 11, 96; 12, 81; 13, 57, and 14, 37. Los Angeles students were distributed as follows: Age 8, 9; 9, 56; 10, 105; 11, 76; 12, 80; 13, 73, and 14, 54.

Procedures & Questionnaires

Questionnaires were administered during regular class periods by health educators working for the research project in Helsinki and Los Angeles, respectively. The questionnaire consisted of 54 items and took approximately 25 minutes to administer. (The Los Angeles questionnaire had one additional question, at the end of the questionnaire, on race/ethnic group status, and the Helsinki questionnaire had four additional questions of special interest to the Finnish investigators.) The questionnaire contained questions on media use, advertising exposure, tobacco behaviors and intentions, smoking prevalence estimates, cigarette ad images, and demographic factors. Questionnaires were created in English, translated into Finnish, and then, as a check, translated back into English by a second translator.

Other results of this study, including findings regarding media use patterns within the two cultures, have been published previously (Burton, Johnson, Uutela & Vartiainen, 1990; Haukkala, Uutela, Burton, Vartiainen & Johnson, 1994).

Measures

The 54 questionnaire items were identical for both sites with the exception of questions involving magazine titles or product brands unique to one culture (e.g., lists of magazines commonly found in households), and a question regarding foreign travel. The three primary advertising exposure variables examined in this study were: whether subject has ever seen a cigarette ad; recency of last time seeing a cigarette ad (with seven alternatives given--today, not today but less than a week ago, a week or more but less than a year ago, one to three years ago, four to nine years ago, more than nine years ago, and never), and whether subject has seen cigarette ads in magazines. Frequency of opportunity to look at magazines or newspapers from other countries was also examined.

Smoking prevalence estimates were assessed by two questions: (1) “Out of every 100 adults, how many do you think smoke cigarettes most days?” and (2) “Out of every 100 students your age, how many do you think smoke cigarettes at least once a week?” For each item subjects were asked to circle one of five alternatives: less than 10, 10 to 29, 30 to 59, 60 to 89 and 90 or more.

Intention to smoke, when assessed with nonsmokers, has been shown to be a strong predictor of future smoking (Stanton, Barnett & Silva, 2005; Sussman, Dent, Flay, Hansen & Johnson, 1987). Intention to smoke was assessed in the present study by the question: “Do you think you will ever smoke cigarettes in the future?,” with subjects asked to circle one of three

alternatives: yes, I'm not sure, or no. We chose not to anchor intention to smoke to a particular time period because of the possibility of differences in perceptions of time in the two cultures.

Hypotheses

Our hypotheses were:

1. Los Angeles subjects would be more likely than Helsinki subjects to overestimate smoking prevalence;
2. Cigarette advertising exposure would be positively related to estimates of smoking prevalence;
3. Overestimates of smoking prevalence would be positively related to intention to smoke, and
4. Overestimates of smoking prevalence would mediate the relationship between cigarette advertising exposure and intention to smoke.

Data Analyses

Chi square analysis was used to examine significance of differences between the Helsinki and Los Angeles samples on the cigarette advertising exposure variables, prevalence estimates and intentions to smoke. We then performed a factor analysis of the media and advertising exposure items. A standard multiple regression path analysis was employed to examine the relationships among advertising exposure, prevalence estimates and intentions to smoke. LISREL version 6 software was used for these analyses.

RESULTS

Ninety percent of the Los Angeles subjects and 60% of the Helsinki subjects answered “yes” to the question, “Have you ever seen an advertisement for cigarettes”? (chi square = 107.7, $p < .001$). However, seventy percent of the Los Angeles subjects compared with only 29% of the Helsinki subjects reported that they had seen a cigarette ad within the past week (chi square = 167.2, $p < .001$). The modal length of time since seeing a cigarette ad fell into the category of “one to three years ago” for Helsinki subjects and into the category of “not today, but less than a week ago” for Los Angeles subjects. Twice as many Los Angeles subjects (80%) as Helsinki subjects (40%) reported that they had seen a cigarette ad in a magazine (chi square = 129.4, $p < .001$).

Eleven variables involving media use and advertising were factor analyzed. Three items (ever seen cigarette ad, recency of seeing cigarette ad and saw cigarette ad in magazine) were found to form a factor: This three-item factor was used as our measure of cigarette advertising exposure. The factor structure was identical for the two samples, but the factor variances were significantly different. Pearson correlation coefficients among the three variables for the Helsinki sample were: ever seen ad with recency, $r = .694$ and with ad in magazine, $r = .470$, and recency with ad in magazine, $r = .496$. For the Los Angeles sample Pearson correlation coefficients were: ever seen ad with recency, $r = .412$ and with ad in magazine, $r = .223$, and recency with ad in magazine, $r = .240$.

Significantly more Los Angeles subjects (65%) than Helsinki subjects (50%) answered that at least 60 out of every 100 adults “smoke cigarettes most days” (chi-square = 35.3, $p < .001$). The extent of overestimation was markedly greater for Los Angeles subjects than for Helsinki subjects: Since actual adult smoking prevalence in Los Angeles was only 21% at the time of the study, “60 out of every 100” represents a 186% overestimate. The same response represents only a 46% overestimate for Helsinki subjects, since actual adult smoking prevalence in

Helsinki was 41%. Subjects in both countries were less likely to overestimate smoking by peers, although the same relationship of prevalence estimates to city of residence was obtained, with Los Angeles subjects being more likely than Helsinki subjects to overestimate. In response to the question, “Out of every 100 students your age, how many do you think smoke cigarettes at least once a week?”, 30% of the Los Angeles subjects and 18% of the Helsinki subjects answered 30% or more (chi-square = 25.7, $p < .001$). As was the case with adults, actual smoking prevalence is also much greater for Helsinki adolescents than for Los Angeles adolescents: 20% of Helsinki junior high school students compared with only 8% of Los Angeles junior high school students reported smoking during the past 24 hours.. A zero-order correlation of .293 ($p < .0001$) between estimates of adult smoking prevalence and estimates of peer smoking prevalence was obtained for the Finnish sample, and a correlation of .390 ($p < .0001$) was obtained for the United States sample.

There were no significant differences in intention to smoke, with 70% of the Helsinki subjects and 71% of the Los Angeles subjects answering “no” to the question, “Do you think you will ever smoke cigarettes in the future?”.

Traditional multiple-regression path analysis was used in two models, for samples from Finland and the United States, respectively. For each model, three simultaneous multiple regressions were conducted with (1) intention to smoke regressed on two measures of estimates of smoking prevalence; (2) estimates of smoking prevalence regressed on the cigarette advertising exposure factor, and (3) intention to smoke regressed on cigarette advertising exposure. Results for the two models, with t values, are shown in Figures 1 and 2.

As seen in Figure 1, among the Los Angeles subjects, significant relationships exist between advertising exposure and perceptions of both adult smoking prevalence ($t=3.582$, $p < .001$) and peer smoking prevalence ($t=2.964$, $p < .01$). Perceived peer smoking prevalence was, in turn, significantly related to intention to smoke for the Los Angeles subjects ($t=2.348$, $p < .05$). Thus, in the Los Angeles sample, there was evidence for significant mediation by the joint significance test (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). For the Helsinki subjects, as shown in Figure 2, only the relationship between advertising exposure and perceived peer smoking prevalence was significant ($t=2.926$, $p < .01$). However, in the Helsinki sample, neither perceived peer nor adult smoking prevalence was significantly related to intention to smoke; thus, in this sample, by the joint significance test, there was no evidence for mediation. Finally, a significant, residual direct effect of cigarette advertising exposure on intention to smoke (after taking the mediators into account) was not found for either group of subjects.

DISCUSSION

Our primary hypothesis was confirmed by the results: Los Angeles youth were significantly more likely than Helsinki youth to overestimate the prevalence of adult smoking, in spite of the fact that actual adult smoking prevalence in Helsinki was almost twice that of Los Angeles adults. A similar, significant pattern for perceived peer smoking was obtained, with Los Angeles youth being more likely than Helsinki youth to overestimate prevalence. Our second hypothesis was also supported: Cigarette advertising exposure was positively related to estimates of both adult and peer smoking prevalence in the Los Angeles sample, and to estimates of peer smoking prevalence in the Helsinki sample. The third hypothesis, that overestimates of smoking prevalence would be positively related to intention to smoke, was supported only in the Los Angeles sample, and only for perceived peer smoking prevalence. Finally, the fourth hypothesis, that the overestimates of smoking prevalence would mediate the relationship between cigarette advertising exposure and intention to smoke, was supported for the Los Angeles sample.

The total tobacco advertising ban in Finland has not eliminated exposure to tobacco advertising by Finnish youth (Burton et al, 1990). However, the nature of exposure to such advertising was drastically different from that for United States youth, as seen in the greater variance of cigarette advertising exposure for the Helsinki sample than for the Los Angeles sample, and, in particular, by the large differences in recency of exposure. Exposure of Helsinki children to cigarette advertising was occasional (coming from travel to a foreign country, seeing foreign magazines, and sponsorship of sports and other events by tobacco manufacturers), whereas exposure of Los Angeles children to these ads was ubiquitous. The underlying assumption of our research hypotheses is that it is the ubiquitous nature of cigarette advertising that leads to distortions in perceptions of smoking prevalence: From this frame of reference, the significant relationship of advertising exposure to estimates of peer smoking prevalence for the Helsinki subjects was unexpected. It seems likely that a certain amount of the relationship between estimates of peer smoking prevalence and advertising exposure is due to self-selected attention to ads by youth who have already noticed their own peers smoking; such self-selection would be expected to be greater among the Helsinki youth where more of the subjects' peers do smoke. This possibility makes even more striking the fact that it was only for the Los Angeles sample, where, while actual peer smoking was low, but subjects were exposed to pervasive cigarette advertising, that the elevated perceptions of peer smoking had enough power to mediate increased intentions to smoke cigarettes. This study needs to be replicated, ideally with other countries before and after advertising bans, to further our understanding of the interrelatedness of these variables.

The results of this study have significance in further delineating one of the mechanisms by which tobacco advertising may contribute to the initiation of smoking among youth: Beyond the appeal of the content of certain cigarette ads portraying attributes desired but not attained by adolescents, the sheer dominance of the environment by images of smoking in countries where there is no regulation appears to contribute to youth tobacco use. The former mechanism specifies that the advertising *content*, by portraying attributes corresponding to the ideal self images of the youths, stimulates them to seek to close a gap between their self image and ideal self image by smoking. The latter mechanism suggests that the advertising *pervasiveness*, by promoting the perception that most people smoke, exerts a normative influence. It is easy to imagine the potential for synergism of these two processes among vulnerable populations, such as youths: ad content communicating that smoking is desirable; ad pervasiveness communicating that it is acceptable to act on those desires.

The total ban on tobacco product advertising, promotion and sponsorship called for by the World Health Organization (2008a) would address effects linked to both of the mechanisms described above, in contrast to the variety of regulations focusing only on advertising content or advertising density and proximity.

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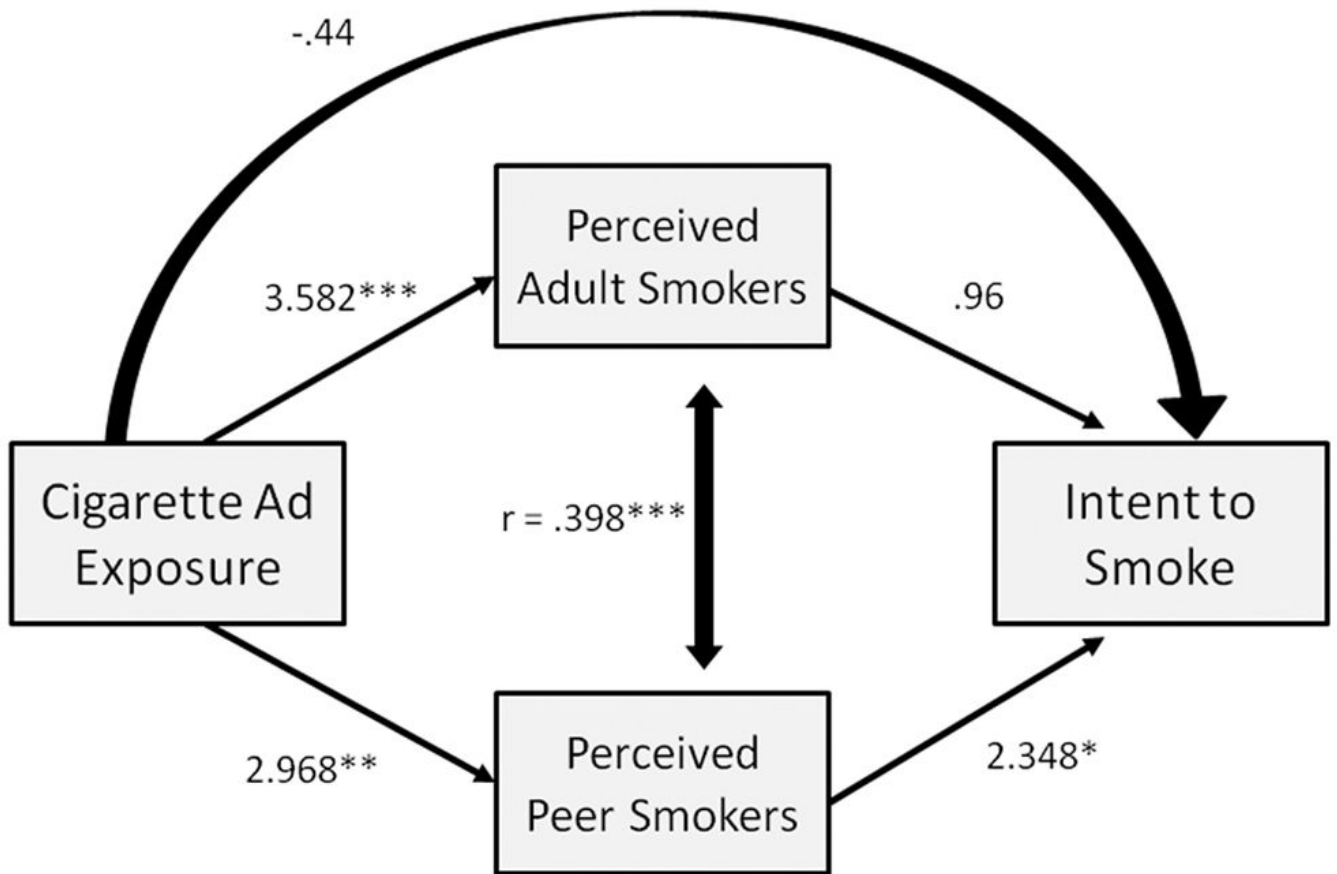


Figure 1. Multiple regression with t values of intention to smoke, perception of adult and peer smoking prevalence, and cigarette advertising exposure for Los Angeles subjects (* $p < .05$; ** $p < .01$; *** $p < .001$).

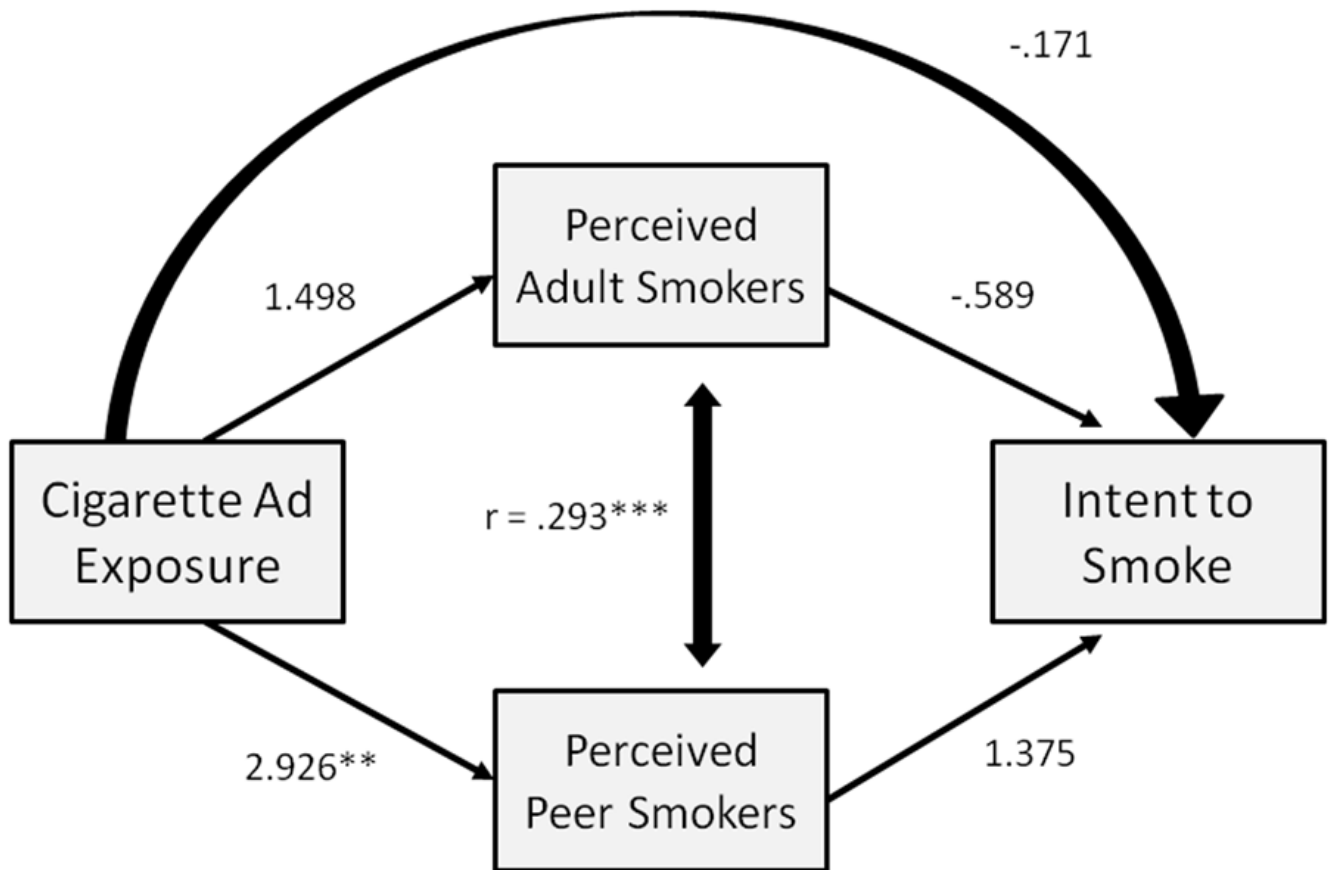


Figure 2. Multiple regression with t values of intention to smoke, perception of adult and peer smoking prevalence, and cigarette advertising exposure for Helsinki subjects (** p < .01; *** p < .001).