Published in final edited form as:
Addict Behav. 2009 November ; 34(11): 932–937. doi:10.1016/j.addbeh.2009.05.014.

How Does Exposure to Cigarette Advertising Contribute to Smoking in Adolescents? The Role of the Developing Self-Concept and Identification with Advertising Models

William G. Shadel, PhD and **Shannah Tharp-Taylor, PhD**
RAND Corporation

Craig S. Fryer, DrPH, MPH
University of Pittsburgh

Abstract

Increased exposure to cigarette advertisements is associated with increases in adolescent smoking but the reasons for this association are not well established. This study evaluated whether self-concept development (operationalized as level of self-conflict) and identifying with the models used in cigarette print advertising contributed to smoking intentions among adolescents. Ninety-five adolescents (ages 11-17) participated in this two session study. In session 1, they rated the extent to which they identified with the models used in 10 current cigarette print ads (the models were isolated digitally from the cigarette advertisements) and their level of self-conflict was assessed. In session 2, participants viewed each of the 10 cigarette advertisements from which the models were drawn and rated their intentions to smoke following exposure to each ad. Model identification was associated with similar levels of post ad exposure smoking intentions for both younger and older adolescents when they also exhibited no self-conflict. A contrasting set of findings emerged for younger and older adolescents when they exhibited high levels of self-conflict: Young adolescents who strongly identified with the models used in cigarette advertisements had higher post ad exposure smoking intentions compared to younger adolescents who weakly identified with the models used in the advertisements; in contrast, older adolescents who weakly identified with the models used in cigarette advertisements had stronger post ad exposure smoking intentions compared to older adolescents who strongly identified with the models used in the advertisements. These results point to the importance of examining developmentally-relevant moderators for the effects of cigarette advertising exposure.

Keywords

tobacco; smoking; advertising; marketing

Increases in adolescent smoking are strongly associated with increased levels of exposure to cigarette advertising (DiFranza et al., 2006; Wakefield, Flay, Nichter, & Giovino, 2003; Wellman, Sugarman, DiFranza, & Winkoff, 2006). Despite restrictions on youth-focused

Corresponding author: William G. Shadel, PhD RAND Corporation 4570 Fifth Avenue, Suite 600 Pittsburgh, PA 15213 phone: 412-683-2300, ext. 4489 fax: 412-683-2800 shadel@rand.org.

tobacco advertising and significant restrictions on how the tobacco industry can advertise and market cigarettes brought about by the Master Settlement Agreement in 1998, tobacco industry advertising budgets have nearly doubled in the last 10 years (FTC, 2007) and adolescents continue to be exposed to cigarette advertising and marketing (King & Siegel, 2001; Lancaster & Lancaster, 2003; Lee, Taylor, & McGetrick, 2004; Pollack & Jacobson, 2003). Moreover, the field of tobacco control continues to struggle with understanding *who* is most vulnerable to the effects of cigarette advertising. A better understanding of moderators of cigarette advertising's effects could lead to improved smoking prevention and media literacy programs that target particularly vulnerable individuals with more aggressive interventions (see Kazdin & Nock, 2003).

Cigarette advertising is particularly influential for adolescents who have never smoked or who have minimal levels of experience with smoking. Data from a recent meta-analysis suggest that exposure to cigarette adverting increases the odds of moving from never smoking to initiation by 79-91%; exposure increases the odds of progressing from experimental smoking to more regular smoking around 12%. The effects of exposure on initiation were significantly larger than the effects of exposure on progression to regular smoking in this meta-analysis (Wellman et al., 2006). These findings are consistent with stage-based theoretical perspectives on the development of adolescent smoking which suggest that transitions to smoking among earlier stages of smoking (e.g., never smoking to preparing to smoke to engaging in initial trials) are governed more by factors such as tobacco-related media, improving the self-image, peer norms, and mood, whereas later transitions (e.g., experimental to regular to dependent use) are theorized to be governed more by physiological cues and reactions to smoking, and to processes relating to nicotine dependence (e.g., craving, withdrawal) (Flay & Petraitis, 1994; Leventhal & Cleary, 1980; see also Shadel, Shiffman, Niaura, Nichter, & Abrams, 2000; USDHHS, 1994).

Early perspectives from the tobacco control literature speculated that never smoking adolescents' developing self-concept is a psychological construct through which cigarette advertising may exert its effects on adolescent smoking (e.g., Chapman & Fitzgerald, 1982; Krugman, Quinn, Sung, & Morrison, 2005; Pierce, DiStafan, Jackson, & White, 2002; Pollay et al., 1996; USDHHS, 1994). Certainly, the self-concept undergoes significant change during adolescence and this change may explain some of the vulnerability to engaging in high risk behavior that individuals experience during this developmental period (see Arnett, 1999; see also Steinberg, 2008). Social-cognitive perspectives on self-concept development operationalize these changes as *conflicts* among the various descriptive self-attributes that an individual adolescent uses to define him or her self. In general, these conflicts are relatively fewer in number during early adolescence (e.g., ages 11-13), increase during middle adolescence (ages 14-17), and decline in late adolescence (ages 18–22) and beyond (Harter & Monsour, 1992; Harter, 1999a, 1999b). Conflicts among self-attributes arise due to adolescents' increasing awareness that new and different self-attributes can be used to describe them, and a lack of the cognitive facilities necessary to resolve the contradictions that may arise between opposing self-attributes. The cognitive capacity to resolve self-conflicts develops during middle and late adolescence. Adolescents who possess a high number of self-conflicts and are not capable of resolving those conflicts (i.e., young adolescents due to their relative lack of cognitive maturity) look to external contexts to help them decide which attributes are most important and which one(s) they should adopt as part of their self-concept (see Harter, 1999a). High levels of self-conflict are more normative for middle, versus early, adolescents (Harter, 1999a).

Shadel and colleagues (2001) proposed that the potent images displayed by cigarette advertisements represent one environmental context that adolescents who have higher levels of unresolvable self-conflict (i.e., early adolescents) may look to for help in defining

themselves. In a sample of never smokers, a previous study (Shadel, Niaura, & Abrams, 2004) found that young adolescents (i.e., middle school) with a greater number of self-conflicts reported that cigarette advertising imagery was more relevant to them compared to young adolescents with lower numbers of self-conflicts and older adolescents (regardless of self-conflict). A follow-up study (Shadel, Tharp-Taylor, & Fryer, 2008) found that younger adolescents who exhibited a high number of self-conflicts and who also said that cigarette advertisements were more relevant to their self-concept had stronger intentions to smoke following exposure to cigarette advertisements compared to all other groups of younger adolescents. Taken together, the results of these studies provide the first formal evidence that the developing self-concept coupled with level of advertising relevance moderates adolescents' smoking intentions following exposure to cigarette advertisements.

In order to gain a more detailed understanding of the effects of cigarette advertising on adolescent smoking, important, more nuanced questions should continue to be asked in this domain. The experimental stimuli used in Shadel et al. (2004) consisted of cigarette advertisements that were stripped of all references to cigarettes and smoking. As such, adolescents responded to the relevance of *all* of the imagery contained in the advertisement (e.g., the models used in the advertising and the context or apparent situation the individual models in the advertisements were in), without reference to the product (i.e., cigarettes) being advertised. Personal relevance of the cigarette advertising imagery was the dependent variable in this study; smoking intentions were not an outcome. The experimental stimuli in Shadel et al. (2008) consisted of intact, unedited cigarette advertisements. That is, adolescents responded to the personal relevance of the *entire* advertisement and then rated their intentions to smoke. Although both studies suggest that the personal relevance of the advertisement and its imagery are important in thinking about the role that self-conflict plays in moderating adolescents' responses to cigarette advertisements, these studies do not isolate the role of the models used in the cigarette advertisements. This distinction is important because if adolescents who exhibit maladaptive levels of self-conflict look to outside sources for help with resolving these conflicts, it is likely that they look to other people and social resources (Harter, 1999a). Indeed, consumer identification with the models used in advertising media is thought to predict their level of involvement with those media messages and hence influence their susceptibility to persuasion (Messaris, 1997). Research on adolescent susceptibility to alcohol ads has found that increasing levels of identification with the models in alcohol advertising was associated with expectancies for use which in turn were associated with increased alcohol use (Austin, Chen, & Grube, 2006). As such, level of identification with cigarette advertising models may be a key moderating variable when considered in combination with self-conflict.

The purpose of the current study was to expand upon the findings of Shadel et al. (2004) and Shadel et al. (2008) by evaluating how the number of self-conflicts interacts with age and identification with the models used in cigarette advertising to predict adolescent never smokers' intentions to smoke following exposure to cigarette advertising. Intentions continue to be a robust predictor of progression to regular smoking in adolescence (Choi, Gilpin, Farkas, & Pierce, 2001; Wakefield et al., 2004) and as such, are an important and reasonable theoretically-driven outcome for laboratory-based work with adolescent never smokers. Based upon theory (Shadel et al., 2001) and prior work (Shadel et al., 2004; Shadel et al., 2008), it was hypothesized that young adolescents who have higher numbers of self-conflicts and who have greater levels of identification with cigarette advertising models would have the strongest intentions to smoke following exposure to cigarette advertising compared to young adolescents with lower numbers of self-conflicts. Self-conflict was not expected to play as strong a role with middle adolescents.

Methods

Participants

This study was approved by the Institutional Review Board at the RAND Corporation. Adolescents were recruited using a variety of print media advertising that contained no information about cigarettes or cigarette advertising. The study parameters and requirements were explained to potential participants during brief phone screenings (i.e., that it was a study of advertising, and that potential participants would be exposed to several kinds of advertising that included cigarettes). Inclusion criteria were: ages between 11 and 17; no physical or psychiatric problem that would interfere with completing the study (based on parent report); never smoked a cigarette, even a puff (based on adolescent self-report); and parental written consent and adolescent written assent to participate. A total of 95 never smoking adolescents participated, though missing data from the first to second session (see procedures below) reduced the evaluable cases available for this study to n=85. The sample was 55% female; 40% Caucasian; 52% African-American; 5% Multi-ethnic; 2% Asian; 1% American Indian) with a M age of 13.8 (SD = 1.8).

Procedures

Participants completed two sessions in a small group setting; each session was separated by about one week. Group sessions were held in conference rooms that were arranged like a classroom with participants facing a projection screen. They were shown all study stimuli (model photographs and intact cigarette advertisements) as PowerPoint slides. During session 1, participants completed the informed consent procedures, completed a battery of baseline measures (see measures below), and rated the models selected from each of ten cigarette advertisements on their attractiveness and likeability, and on the extent to which the model was “like them” (see measures); the models' photographs were digitally extracted from the advertisements. During session 2, participants were exposed to each of the ten intact cigarette advertisements (i.e., from which the models were drawn), in rotation in popular magazines (e.g., *Glamour*, Rolling Stone, Newsweek, People, Sports Illustrated) from 2004-2005. The advertisements were for brands that have been historically popular with adolescents (American Legacy Foundation, 2007; Johnston, O'Malley, Bachman, & Schulenberg, 1999): Camel (4 ads), Kool (3 ads), and Newport (3 ads). After exposure to each advertisement, participants rated how much each ad made them want to smoke (see measures). After completing all study procedures, participants were debriefed, compensated with a $30 gift certificate to a local shopping mall for completing these two sessions, and provided with written smoking prevention materials (National Institute on Drug Abuse, 2000).

Advertising Stimuli and Ratings

Ten cigarette advertisements were selected from popular magazines and used as the stimulus materials for the study. Each of the advertisements was digitized and the model(s) used in each advertisement were digitally extracted from the advertisements so that they could be rated independent of the cigarette advertisements themselves. There were 13 models in total who were rated (one model from each Camel advertisement; one model from each Kool advertisement; two models from each Newport advertisement). Participants were not told that the models were taken from cigarette advertisements. Each of the models was rated on the following characteristics: *model appeal* and *model identification*. A description of each of these the measures and how they were used appears below.

Covariates

The following measures were included in the analyses as covariates. [1]

Baseline smoking intentions—Smoking intentions at baseline were assessed using a 3-item scale adapted from items used by Choi et al. (2001), and shown to predict smoking initiation: "Do you think you will try a cigarette anytime soon?"; "Do you think you will smoke a cigarette anytime in the next year?"; and "If one of your best friends offered you a cigarette, would you smoke it?". Responses were made on a 1 (Definitely Not) to 10 (Definitely Yes) scale and summed to produce a baseline smoking intention scale score (possible range of 3 – 30); higher scores indicated stronger intentions to smoke. The alpha coefficient was .87 and the *M* score was 4.5 (*SD* = 4.3). Intentions were included as a covariate to gauge the degree to which smoking intentions post ad exposure are independent of pre-existing smoking intentions.

Model appeal—Participants rated the cigarette advertising models on their level of *attractiveness* (*1 = not at all attractive; 10= very attractive*) and *likeability* (*1 = not at all likeable; 10 = very likeable*). The attractiveness and likeability items were highly correlated within each model image (all *r*'s > .64, *p*'s < .0001) and as such, were summed to form a single item for each model image, termed *model appeal*. Model appeal ratings were averaged across brand to form a mean model appeal rating (see *M* = 11.1, *SD* = 3.7). Because likeability and attractiveness of sources in persuasive communications predicts the extent to which those communications are effective (see Petty & Wegener, 1999), the mean model appeal variable was used as a covariate in the analyses.

Independent Measures

The following variables were the central independent variables. In the regression analyses, the variables were centered (see Aiken & West, 1991) and the 2- and 3-way multiplicative interaction of each (centered) variable with the other was included.

Age—Participant's age was treated as a continuous variable.

Model identification—Model identification was assessed by asking participants how much they were "like" a given model (*1 = not like me at all; 10 = a lot like me*). A mean model identification variable was calculated across models across the three brands (*M* = 4.0, *SD* = 1.7). Model identification was used as a central predictor in the analyses.

Self-Conflict—Number of self-conflicts experienced by the adolescents in this sample was derived from the "What I am Like with Other People" task, a researcher-administered assessment developed by Harter and colleagues (for a review, see Harter, 1999a; for use in studies of cigarette advertising, see Shadel et al., 2004, 2008). First, adolescents generated, in a free response manner, all of the attributes that described them in each of six domains of life, all relevant for adolescents (i.e., self with friends, with mother, with father, with best friend, with romantic interest, in the classroom). Second, participants identified those attributes (that they had just generated) which were opposites of one another; the research assistant then drew a line between pairs of words identified as opposites. Finally, participants identified which opposing word pairs (that they had just identified) were in conflict, in disagreement, fighting, or clashing with one another. These multiple synonyms of conflict are used in order to accurately convey to adolescents the definition of conflict (Harter & Monsour, 1992). Opposite word pairs identified as in conflict with one another were then identified by drawing arrows on either side of the line connecting them. Total numbers of conflicts that the adolescent identified were counted for a total self-conflict score. Increasing numbers of self-conflicts are associated with increasingly negative self-evaluations and lower levels of self-worth (self-

[1]A number of other variables were examined as potential convariates, but were unrelated to post ad exposure smoking intentions: gender, ethnicity, mood, previous exposure to smoking in the media and cigarette advertising, and smoking attitudes. As such, they are not considered further in this paper.

esteem), both of which, in turn, are associated with negative affective reactions (as discussed in Harter, 1999b). Previous work has shown that number of self-conflicts moderated young adolescents' responses to cigarette advertisements (Shadel et al., 2004, Shadel et al., 2008). This sample reported an *M* of 1.5 conflicts (*SD* = 2.1; *median* = 1.0; *range* = 0.0 – 10.0).

Dependent Measure

Post ad exposure smoking intentions—Smoking intentions were assessed after exposure to each ad with the following question, "This ad makes me think that I should smoke" (1 = *definitely disagree*; 10 = *definitely agree*). Smoking intention scores for each ad were averaged across brand (*M* = 3.5, *SD* = 2.2).

Results

Table 1 presents zero order correlations among all covariates and individual independent variables (i.e., not interactions) used in the analyses reported below. Stronger post ad exposure smoking intentions were significantly associated with greater levels of model appeal and stronger levels of model identification. Greater levels of model identification were significantly associated with greater levels of model appeal and stronger levels of baseline smoking intentions. Finally, increasing age was significantly associated with stronger baseline smoking intentions.

A linear regression analysis was used to predict post ad exposure smoking intentions. All variables were centered prior to entering them into the regression equation. The final model F (10, 75) was equal to 35.368 ($p < .0001$) and accounted for 80.2% of the variance in post ad exposure smoking intentions. Table 2 presents the unstandardized coefficients, betas, t-values, and significance levels of each variable, and the two and three way interactions appearing in the final regression model. As hypothesized, the 3-way interaction between age, model identification, and self-conflict predicted post ad exposure smoking intentions. In order to determine the direction of this significant three way interaction, a simple slopes analysis was conducted (Aiken & West, 1991;Holmbeck, 2002;Preacher, Curran, & Bauer, 2006). We defined younger adolescents as those adolescents one standard deviation (*SD*) below the mean (*M*) age and older adolescents as those one standard deviation above the mean age. Lower levels of model identification were defined as one *SD* below the *M* model identification score while higher levels of model identification were defined as one *SD* beyond the *M* model identification score. Finally, lower levels of self-conflict were defined as having zero conflicts and higher levels of self-conflict were defined as having self-conflicts one *SD* beyond the *M* self-conflict score. [2] These results are presented in Figure 1; the top panel of Figure 1 plots the values for younger adolescents and bottom panel plots the values for older adolescents. As can be seen from the figure, for younger adolescents, higher levels of self-conflict were significantly associated with stronger post ad exposure smoking intentions as their identification with the models in those ads increased (smoking intentions $(y) = 3.979 + .625x$; slope $t = 2.903$, $p = .0049$); lower levels of self-conflict were associated with similar levels of smoking intentions, regardless of their level model identification (smoking intentions $(y) = 4.139 + .089x$; slope $t = .291$, $p = .772$). For older adolescents with lower levels of self-conflict, increasing levels of model identification were associated with similar levels of smoking intentions (smoking intentions $(y) = 3.295 + .187x$; slope $t = .480$, $p = .633$); however, higher levels of self-conflict were significantly associated with *weaker* post ad exposure smoking intentions as older adolescents' identification with the models in those ads increased (smoking intentions $(y) = 3.836 - .805x$; slope $t = 2.506$, $p = .014$).

[2]One *SD* below the *M* of self-conflict would yield a theoretically out of range value for this measure (e.g., a −.679). As such, we used the absolute minimum lowest possible value on this measure – a zero - to conduct the simple slopes analysis.

Discussion

Advertising by the tobacco industry contributes to adolescent smoking initiation (DiFranza et al., 2006; Wakefield et al., 2003). Despite this robust association, the field still struggles with answering questions about who is most vulnerable to the effects of cigarette advertising. Previous research has focused on identifying individual differences in the developing self-concept to answer these questions. These studies found that younger adolescents (i.e., middle school aged) with a greater number of self-conflicts report that cigarette advertising imagery is more relevant to them compared to young adolescents with lower numbers of self-conflicts and older adolescents (regardless of self-conflict) (Shadel et al., 2004) and found that younger adolescents who exhibited a high number of self-conflicts and who also said that cigarette advertisements were more relevant to their self-concept had stronger intentions to smoke following exposure to cigarette advertisements compared to all other groups of younger adolescents (Shadel et al., 2008). The results of these studies provided the first evidence that the developing self-concept coupled with level of advertising relevance moderates adolescents' smoking intentions following exposure to cigarette advertisements.

However, these previous studies examined the self-relevance of the cigarette advertisements in general without specific reference to the models used in those advertisements. Consumer identification with the models used in advertising media predicts their level of involvement with those media messages and hence influences their persuasion (Austin et al., 2006; see Messaris, 1997). The results from the current study are consistent with this perspective and largely replicate and extend the findings of Shadel et al.(2004; 2008) by showing that level of identification with the models used in cigarette advertising is an important additional moderator. Young adolescents who exhibited high levels of self-conflict and also said that they identified more with the models used in cigarette advertisements had stronger levels of smoking intentions following exposure to cigarette advertising compared to young adolescents with higher levels of self-conflict who did not identify with cigarette advertising models and young adolescents with low levels of self-conflict (regardless of level of model identification). This finding is consistent with the perspective that younger adolescents who are having the most difficulty defining themselves are especially susceptible to the effects of cigarette advertising.

An interesting pattern of results emerged from investigating the effects of self-conflict and model self-identification in middle adolescents, however. For older adolescents with lower levels of self-conflict, increasing levels of model identification were associated with similar levels of smoking intentions; this finding replicates and extends the findings in previous studies (Shadel et al., 2004; Shadel et al., 2008). However, higher levels of self-conflict were significantly associated with *weaker* post ad exposure smoking intentions as older adolescents' identification with the models in those ads increased. This finding contrasts with findings from previous research in that no significant effects were found for middle adolescents with higher levels of self-conflict (Shadel et al., 2004b; Shadel et al., 2008). While the differences between studies in what aspect of cigarette advertising participants identified with could explain the differences between studies (e.g., identifying with all of the non-cigarette related imagery from the advertisement versus identifying with the entire advertisement versus identifying with only the models), conceptually driven explanations for this finding are possible. For example, due to their age middle adolescents are likely exposed to greater levels of cigarette advertising and also, to greater levels of anti-smoking information (i.e., programs in school, public service announcements on television; anti-smoking media literacy; see Wakefield et al., 2003). In addition, middle adolescents with higher levels of self-conflict are more in tune with their developing self-concept and may be better equipped to manage any self-conflict they experience. As such, they may have been better able to recognize cigarette advertising models due to increased exposure to cigarette advertising, understand the models in cigarette advertisements are intended to convey positive messages about smoking due to increased

exposed to anti-smoking information, and as a result were able to separate their identification with the models from cigarette smoking. In other words, they could disentangle their identification with the positive features of the models from the known negative features of smoking which consequently was associated with weaker smoking intentions. Future research should focus on developmental considerations for middle adolescents in more detail.

Limitations to this study should be noted. First, strong causal inferences cannot be drawn in this study due to the essentially correlational design. Fully controlled, randomized experimental studies would help to advance an understanding of how change in smoking intentions is affected by exposure to cigarette advertising. Second, actual adolescent smoking behavior was not an outcome in this study; rather this study used as the dependent variable intentions to smoke, a strong predictor of current and future smoking behavior in adolescents (Wakefield et al., 2004). Third, despite having adolescents respond to 10 cigarette advertisements for brands popular with adolescents (e.g., Camel, Kool, Newport), this sample of advertisements was, by necessity, selective and restricted. Therefore, these results may not generalize to other cigarette brands or even to other advertisements within these brands; these results also do not speak to how self-conflict or model identification may or may not moderate adolescents' responses to exposure to other forms of cigarette advertising (e.g., point of sale) and “soft” marketing (e.g., in the movies; see Sargent, 2005). Fourth, the sample employed was a low risk group of reactively recruited, adolescents who have never smoked. Therefore, our findings may not generalize to adolescents in the population at large, to those who have had some experimental exposure to cigarettes or to smoking, or to adolescents who are more regular smokers. Finally, it is not clear whether identification with the models, as in the current study, identification with the entire advertisement (as in Shadel et al., 2008), or identification with non-product related information in each advertisement (cf., Shadel et al., 2004) is the more important moderator; the design of the current study did not permit a direct comparison. As such, future research should seek to disentangle which facet of this moderator is most important. Nevertheless, the results of this study, taken together with the results of previous empirical efforts (Shadel et al., 2004; Shadel et al., 2008) provide additional support for the idea that the developing self-concept plays a role in moderating who responds to cigarette advertising and why. Downstream individual-level and policy-level interventions might therefore focus efforts on particularly susceptible groups of adolescents in order to more fully inoculate them against the effects of continued cigarette advertising exposure.

Acknowledgements

William G. Shadel and Shannah Tharp-Taylor, RAND Corporation; Craig S. Fryer, Center for Minority Health, Graduate School of Public Health, University of Pittsburgh.

This research was supported by R21 CA 100549.

Special thanks are due to Brian Carroll, Preethi Saama, and Michelle Horner for their invaluable assistance in executing the procedures of this research. The authors are also grateful to the staff and students of the Centers for Healthy Hearts and Souls for their assistance in conducting this research.

References

Aiken, LS.; West, SG. Multiple regression: Testing and interpreting interactions. Sage; Thousand Oaks: 1991.

American Legacy Foundation. Cigarette preferences among youth – Results from the Legacy Media Tracking Online. American Legacy Foundation [On-Line]. 2007. Available http://www.americanlegacy.org/PDFPublications/fl_17.pdf. Accessed: 11/25/08.

Arnett J. Adolescent storm and stress, reconsidered. American Psychologist 1999;54:317–326. [PubMed: 10354802]

Austin Weintraub E, Chen M, Grube J. How does alcohol advertising influence underage drinking? The role of desirability, identification and skepticism. Journal of Adolescent Health 2006;38:376–384. [PubMed: 16549298]

Chapman S, Fitsgerald B. Brand preference and advertising recall in adolescent smokers: Some implications for health promotion. American Journal of Public Health 1982;72:491–494. [PubMed: 7065340]

Choi W, Gilpin E, Farkas A, Pierce J. Determining the probability of future smoking among adolescents. Addiction 2001;96:313–323. [PubMed: 11182877]

DiFranza JR, Wellman RJ, Sargent JD, Weitzman MJ, Hipple BJ, Winickoff JP. Tobacco promotion and the initiation of tobacco use: Assessing the evidence for causality. Pediatrics 2006;117:e1237–e1248. [PubMed: 16740823]

Federal Trade Commission. Cigarette report for 2004 and 2005. Washington, DC: 2007.

Flay, B.; Petraitis, J. The theory of triadic influence: A new theory of health behavior with implications for preventive interventions. In: Albrecht, GL., editor. Advances in medical sociology, Vol 4: A reconsideration of models of health behavior change. JAI; Greenwich, CT: 1994. p. 19-44.

Harter, S. The construction of the self: A developmental perspective. Guilford Press; New York: 1999a.

Harter S. Symbolic interactionism revisited: Potential liabilities for the self constructed in the crucible of interpersonal relationships. Merrill-Palmer Quarterly 1999b;45:677–703.

Harter S, Monsour A. Developmental analysis of conflict caused by opposing attributes in the adolescent self-portrait. Developmental Psychology 1992;28:251–260.

Holmbeck G. Post-hoc probing of significant moderational and mediational effects in studies of pediatric populations. Journal of Pediatric Psychology 2002;27:87–96. [PubMed: 11726683]

Johnston, L.; O'Malley, PM.; Bachman, JM.; Schulenberg, JE. Cigarette brands smoked by American teens: One brand predominates; three account for nearly all of teen smoking. University of Michigan News and Information Services; Ann Arbor, MI.: Apr.. 1999 [On-line]. Available: www.isr.umich.edu/src/mtf; accessed 11/25/08

King C, Siegel M. The Master Settlement Agreement with the tobacco industry and cigarette advertising in magazines. New England Journal of Medicine 2001;345:535–537. [PubMed: 11519510]

Kazdin AE, Nock MK. Delineating mechanisms of change in child and adolescent therapy: Methodological issues and research recommendations. Journal of Child Psychology and Psychiatry 2003;44:1116–1129. [PubMed: 14626454]

Krugman M, Quinn WH, Sung Y, Morrison M. Understanding the role of cigarette promotion and youth smoking in a changing marketing environment. Journal of Health Communication 2005;10:261–278. [PubMed: 16036733]

Lancaster AR, Lancaster KM. Teenage exposure to cigarette advertising in popular magazines: vehicle versus message reach and frequency. Journal of Advertising 2003;32:69–76.

Lee RG, Taylor VA, McGetrick R. Toward reducing youth exposure to tobacco messages: Examining the breadth of brand and nonbrand communications. Journal of Health Communication 2004;9:461–479. [PubMed: 15513792]

Levanthal H, Cleary PD. The smoking problem: A review of research and theory in behavioral risk modification. Psychological Bulletin 1980;88:370–405. [PubMed: 7422752]

Messaris, P. Visual persuasion: The role of images in advertising. Sage; London: 1997.

National Institute on Drug Abuse. Mind over matter: The brain's response to nicotine. Rockville, MD: 2000. NIH Publication:00-4248

Petty, RE.; Wegener, DT. The elaboration likelihood model: Current status and controversies. In: Chaikin, S.; Trope, Y., editors. Dual process theories in social psychology. Guilford; New York: 1999. p. 41-72.

Pierce J, DiStafan J, Jackson C, White M. Does tobacco marketing undermine the influence of recommended parenting in discouraging adolescents from smoking? American Journal of Preventive Medicine 2002;23:73–81. [PubMed: 12121794]

Pollack HA, Jacobson PD. Political economy of youth smoking regulation. Addiction 2003;98(Suppl1): 123–138. [PubMed: 12752365]

Pollay RW, Siddarth S, Siegal M, Haddix A, Merritt G, Giovino G, Erikson MP. The last straw? Cigarette advertising and realized market shares among youths and adults, 1979 – 1993. Journal of Marketing 1996;60:1–16.

Preacher KJ, Curran PJ, Bauer DJ. Computational tools for probing interaction effects in multiple linear regression, multilevel modeling, and latent curve analysis. Journal of Educational and Behavioral Statistics 2006;31:437–448.

Sargent JD. Smoking in movies: Impact on adolescent smoking. Adolescent Medicine 2005;16:345–370.

Shadel WG, Niaura R, Abrams DB. How do adolescents process smoking and anti-smoking advertising? A social-cognitive analysis with implications for smoking initiation. Review of General Psychology 2001;5:429–444.

Shadel WG, Niaura R, Abrams DB. Who Am I? The role of self-conflict in adolescents' responses to cigarette advertising imagery. Journal of Behavioral Medicine 2004;27:463–475. [PubMed: 15675635]

Shadel WG, Shiffman S, Niaura R, Nichter M, Abrams DB. Current models of nicotine dependence: What is known and what is needed to advance understanding of tobacco etiology among youth. Drug and Alcohol Dependence 2000;59:9–22.

Shadel WG, Tharp-Taylor S, Fryer CS. Exposure to cigarette advertising and adolescents' intentions to smoke: The moderating role of the developing self-concept. Journal of Pediatric Psychology 2008;33:751–760. [PubMed: 18356185]

Steinberg L. A social neuroscience perspective on adolescent risk taking. Developmental Review 2008;28:78–106. [PubMed: 18509515]

United States Department of Health and Human Services (USDHHS). Preventing Tobacco Use Among Young People: A Report of the Surgeon General. USDHHS; Washington, DC: 1994.

Wakefield M, Kloska DD, O'Malley PM, Johnston LD, Chaloupka F, Pierce J, G. et al. The role of smoking intentions in predicting future smoking among youth: findings from Monitoring the Future data. Addiction 2004;99:914–922. [PubMed: 15200587]

Wakefield M, Flay B, Nichter M, Giovino G. The role of the media in influencing trajectories of youth smoking. Addiction 2003;98(Suppl1):79–103. [PubMed: 12752363]

Wellman RJ, Sugarman DB, DiFranza JR, Winkoff JP. The extent to which tobacco marketing and tobacco use in films contribute to children's use of tobacco: A meta-analysis. Archives of Pediatric and Adolescent Medicine 2006;160:1285–1296.

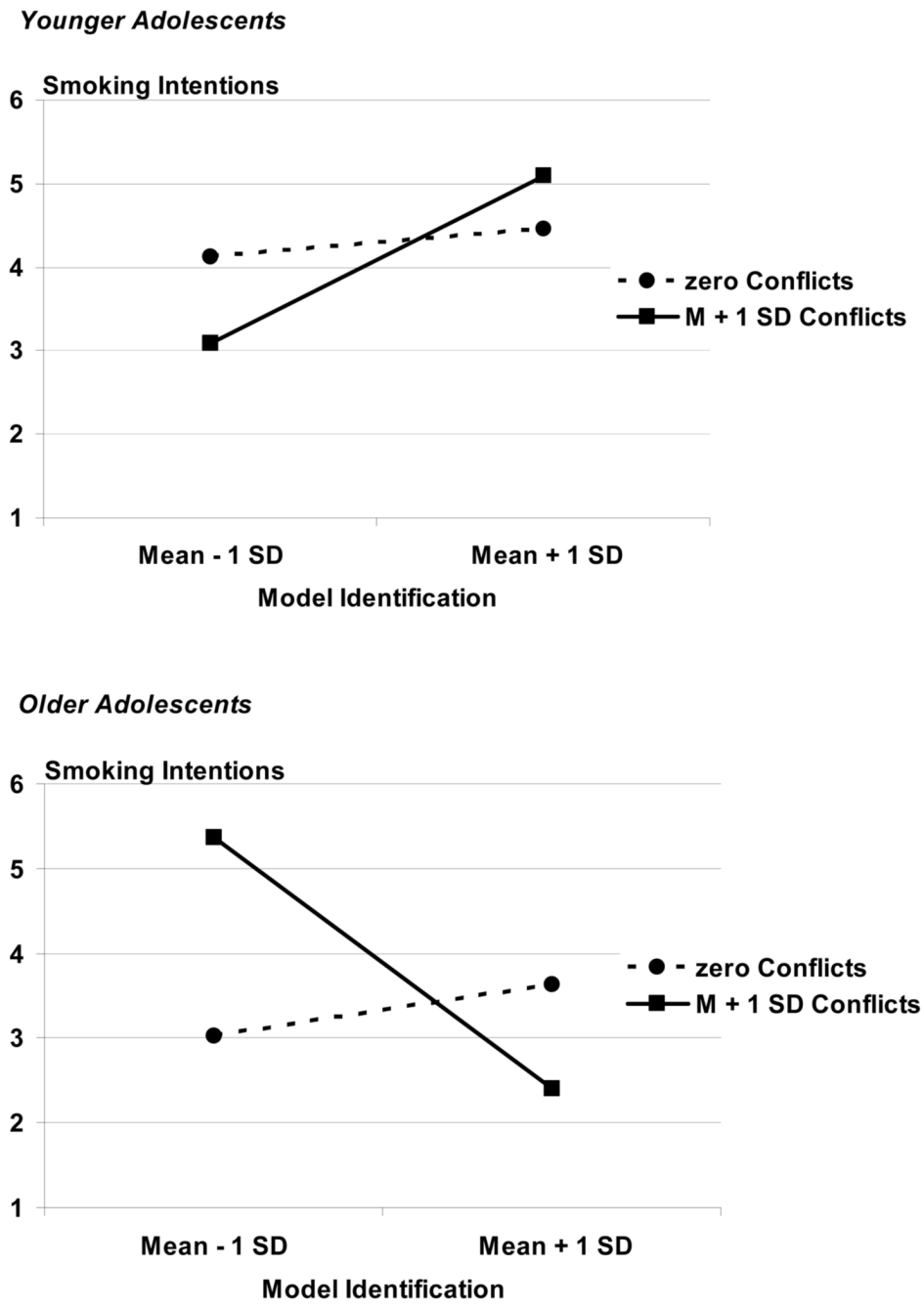

Figure 1.
Simple slopes analysis for younger and older adolescents.

Table 1

Correlations among the covariates, independent variables, and the dependent variables

	1. Baseline smoking intentions	2. Model appeal	3. Age	4. Model identification	5. Self-conflict	6. Post ad exposure smoking intentions
1.		.197	.205*	.278**	.029	.080
2.			.071	.398***	.033	.464***
3.				.252**	−.001	−.033
4.					.133	.250*
5.						.024
6.						

* $p < .05$

** $p < .01$

*** $p < .001$

Table 2

Final model results predicting post ad exposure smoking intentions.

Variable	Unstandardized Coefficient	*Beta*	*t*	*p*
Constant	3.789	.897	16.437	< .0001
Baseline smoking intentions	.108	.073	1.206	= .232
Model appeal	.295	.242	4.282	<.0001
Age	−.177	−.074	−1.205	= .232
Model identification	.082	.030	.418	= .677
Self-conflict	.049	.026	.454	= .651
Age × Model identification	−.093	−.060	−.895	= .374
Age × Self-conflict	.055	.057	.826	= .411
Model identification × Self-conflict	−.053	−.051	−.757	= .451
Age × Model identification × Self-conflict	−.119	−.155	−2.306	= .024