Effects of Anti-Smoking Advertising on Youth Smoking: A Review

MELANIE WAKEFIELD, PhD
Centre for Behavioural Research in Cancer,
Cancer Control Research Institute,
The Cancer Council Victoria,
Carlton, Victoria, Australia

BRIAN FLAY, DPhil
Health Research and Policy Centers,
University of Illinois at Chicago,
Chicago, Illinois, USA

MARK NICHTER, PhD
Department of Anthropology,
University of Arizona,
Tucson, Arizona, USA

GARY GIOVINO, PhD
Department of Cancer Control,
Epidemiology, and Biostatistics,
Roswell Park Cancer Institute,
Buffalo, New York, USA

This paper reviews empirical studies, encompassing community trials and field experiments, and evaluates government-funded anti-smoking campaigns, ecologic studies of population impact of anti-smoking advertising, and qualitative studies that have examined the effects of anti-smoking advertising on teenagers. We conclude that anti-smoking advertising appears to have more reliable positive effects on those in pre-adolescence or early adolescence by preventing commencement of smoking. It is unclear whether this is due to developmental differences, or is a reflection of smoking experience, or a combination of the two. In addition, it is evident that social group interactions, through family, peer and cultural contexts, can play an important role in

This paper was supported by funding from the Robert Wood Johnson Foundation through the Tobacco Etiology Research Network and the State and Community Intervention program of the National Cancer Institute through Grant # 1 R01 CA86273-01 “Youth Smoking and the Media”.

Address correspondence to Melanie Wakefield, Centre for Behavioural Research in Cancer, Cancer Control Research Institute, The Cancer Council Victoria, 1 Rathdowne Street, Carlton, Victoria, Australia, 3053. E-mail: Melanie.Wakefield@cancervic.org.au

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reinforcing, denying, or neutralizing potential effects of anti-smoking advertising. Although there is some research to suggest that advertising genres that graphically depict the health effects of smoking, emphasize social norms against smoking, and portray the tobacco industry as manipulative can positively influence teenagers, these findings are far from consistent. Finally, the effects of anti-smoking advertising on youth smoking can be enhanced by the use of other tobacco control strategies, and may be dampened by tobacco advertising and marketing. Overall, the findings of this review indicate that there is no single "recipe" for anti-smoking advertising that leads to reductions in youth smoking. Anti-smoking advertising can influence youth smoking, but whether it does in the context of individual anti-smoking campaigns needs to be the subject of careful evaluation.

Introduction

Since the last major review of the use of mass media to reduce smoking (Flay, 1987), anti-smoking advertising has become more common as part of efforts to reduce smoking prevalence in the United States and other countries. Debate about the required extent of funding and the efficacy of different anti-smoking advertising themes has been intense. In the United States, it has been further fueled by states who are finding themselves in receipt of substantial tobacco control funding from the Master Settlement Agreement, and searching for "the best buy" for media campaigns (Centers for Disease Control, 1999). In addition, several tobacco companies have begun to use advertising strategies to promote a message to youth not to smoke. These developments raise questions about the circumstances under which anti-smoking advertising may have greater or lesser effects on youth smoking.

Although there is evidence that anti-smoking advertising can influence tobacco use, not all campaigns report these effects for youth. There is much to be learned about the optimum amount and configuration of exposure, type of messages, and execution of messages, as well as how anti-smoking advertising messages are mediated by the personal characteristics and social environments of teenagers. In most cases, anti-smoking advertising is not broadcast in a vacuum; rather, it is one of a range of strategies that ultimately aim to influence smoking behavior. Thus, it is important to understand how anti-smoking advertising may operate in conjunction with other tobacco control strategies. Finally, anti-smoking advertising usually co-occurs with messages that aim to promote smoking and it seems likely that tobacco industry marketing practices could undermine anti-smoking efforts. This paper aims to review the empirical literature pertaining to anti-smoking advertising in order to draw some conclusions about what is known and what priorities exist for further research.

Research concerned with the effects of anti-smoking advertising on teenagers has spanned a number of disciplines and methodologies. These include controlled field experiments of persuasive mass-media interventions, some of which have occurred in concert with school-based prevention programs; population-based studies as part of the evaluation of government funded anti-smoking campaigns; ecologic studies using aggregate data on anti-smoking advertising and/or youth smoking; and qualitative studies of youth appraisal of anti-smoking ads. In this review, we present and discuss studies that are field experiments, evaluations of government-funded campaigns, those that examine the comparative effectiveness of different anti-smoking themes, and research pertaining to the relationship between anti-smoking advertising and cigarette advertising.

Method

We sought to locate all published reports of the effects of anti-smoking advertising on youth by using PubMed and Psychlit searches which included the terms "advertising",
"counteradvertising", "anti-smoking advertising", "mass media", "television" and "adolescence", "adolescent", "youth", "teen", "teenager", or "child". We additionally undertook internet searches up to November 2000, including all United States state tobacco control program sites, to locate unpublished reports of relevance.

Field Experiments

There have been a series of controlled experimental studies whereby youth have been exposed to persuasive anti-smoking mass media messages, sometimes in combination with school-based smoking prevention programs, and followed over time to compare differences in smoking. Some of these have been large community trials, whereas others have been focused on school-based prevention programs, where media is used as one component of intervention. Some of the field experiments have specifically focused on changing youth smoking, while others describe a community-wide intervention which was aimed at the wider community, but also measured effects on youth (e.g., Fortmann, Taylor, Flora, and Jatusis, 1993; Perry, Kelder, Murray, and Klepp, 1992). The level of detail provided by authors as to the anti-smoking advertising (e.g., main messages, mode of delivery, intensity, and duration) used in these studies varies, as do the measures of exposure, but where the advertising and level of exposure was described, we have summarized the information for the reader. Table 1 gives an overview of these trials.

In the first of these studies in Finland, 7th grade students (aged 12 to 13 years) from four intervention schools in North Karelia and two control schools in another province were involved. In 1978, all schools in North Karelia received a program based on the social influences approach, whereby students were taught about social pressures to smoking exerted by peers, adults, and the mass media and were given refusal skills training. One pair of schools received the program through a teacher-led curriculum of 5 sessions during the 8th grade, and another pair of schools received the program through health educators and peers, with between 2–5 sessions in each of 7th, 8th, and 9th grades. Students in all schools in North Karelia were additionally exposed to an intense program of mass media and community activities to promote smoking cessation among adults. Matched control schools in another province received neither mass media nor any school program. Four years after project commencement, despite being similar at baseline, smoking prevalence was significantly lower among students in the cohorts of schools in North Karelia, irrespective of method of school program delivery, compared with students in the control school cohort (Vartiainen et al., 1996). At an eight-year follow-up, benefit was evident only among those who were nonsmokers at baseline, leading to the conclusion that the combination of the school program and media campaign reduced smoking initiation, but did not increase cessation among existing young smokers (Vartiainen et al., 1990). More recently, a fifteen year follow-up (to average age 28) of the original student cohorts was reported. In this study, baseline nonsmokers in the intervention groups again showed the most benefit in being significantly less likely to have taken up smoking, but there were no enduring protective effects for baseline smokers (Vartiainen et al., 1998). With the exception of baseline smoking status, further subgroup analyses were not undertaken. These results suggest that the combination of media and school programs may have most favorable impact if commenced before youth are likely to take up smoking. However, the study design did not allow apportioning of differential effects to the school program or media campaign.

A second trial was conducted in the United States (Perry et al., 1992). This study examined the effect of a school-based intervention beginning in 1983 in grade 6 which had 6–10 lessons per year addressing educational and cigarette refusal skills. The program was
<table>
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<tr>
<th>Name of project</th>
<th>Nature of intervention</th>
<th>Target group</th>
<th>Study design</th>
<th>Main outcomes</th>
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<tr>
<td>North Karelia, Finland (Vartiainen, Pallonen, McAlister, Koskala, &amp; Puska, 1986; Vartiainen, Pallonen, McAlister, &amp; Puska, 1990; Vartiainen, Paavola, McAlister, &amp; Puska, 1998)</td>
<td>C = No intervention; I1 = peer-led social influence school program + adult-focused mass media campaign + community activities; I2 = teacher-led social influence school program + adult-focused mass media campaign + community activities.</td>
<td>7th graders aged 12–13 years</td>
<td>Quasi-experimental design with matched schools in two counties, starting 1978</td>
<td>4 yr f.u: Smoking prevalence sig. lower in I groups; 8 yr f.u: Smoking initiation lower in I group for baseline nonsmokers, no difference in quit rates for baseline smokers; 15 yr f.u: as above.</td>
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<td>Minnesota Health Health Program (Perry et al., 1992)</td>
<td>C = multicomponent school program I = as above, plus mass media on heart health, including smoking cessation</td>
<td>6th graders</td>
<td>Quasi-experimental design with matched schools in another state</td>
<td>3 yr f.u: I students had sig. lower smoking prevalence, but unable to separate effects of school program and media.</td>
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<td>Stanford Five City Project (Fortmann et al., 1993; Winkelby, Fortmann, &amp; Rockhill, 1993)</td>
<td>C = No intervention I = media advocacy and some anti-smoking advertising aimed mainly at adults during 1980–1985</td>
<td>12–14 year olds</td>
<td>Quasi-experimental design with matched communities, cross sectional surveys</td>
<td>From 1979 to 1990, prevalence of daily smoking for 12–24 year olds did not differ in I and C communities</td>
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<td>Vermont Study (Flynn, Worden, Secker-Walker, Badger, &amp; Costanza, 1992; Flynn, Worden, Secker-Walker, Pirie, Badger, Carpenter, &amp; Geller, 1994; Flynn, Worden, Secker-</td>
<td>C = school program only I = school program + TV and radio anti-smoking ads broadcast for 5 months in year 1 and for one month in years 2–4, more messages targeted at high risk girls</td>
<td>5th–7th graders</td>
<td>Quasi-experimental design with two matched pairs of school communities</td>
<td>4 yr and 6 yr f.u: I students had sig. lower smoking status, past week smoking and daily smoking; Sig. relative reduction in outcomes for high risk teens, especially girls</td>
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<td>Southeastern US (Bauman, Brown, Bryan et al., 1988;</td>
<td>I1 = radio anti-smoking ads</td>
<td>12-14 year olds</td>
<td>Households surveys of teens in 3 non-overlapping media markets in SE USA, followed up at 2 years</td>
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<td>Bauman, LaPrelle, Brown, Kock, &amp; Padgett, 1991)</td>
<td>I2 = as above, plus ad to encourage participation in non-smoking sweepstakes</td>
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<td>No differences in smoking behavior at follow-up</td>
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<td>Southern California (Flay et al., 1988, 1995)</td>
<td>I3 = as above, plus TV ad to encourage participation in sweepstakes</td>
<td>7th graders</td>
<td>Quasi-experimental design with student follow-up twice during 7th grade and once during each of 8th, 9th, and 10th grade</td>
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<td>C1 = no intervention</td>
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<td>Strong immediate positive effects on mediator variables such as knowledge of smoking consequences, perceived smoking prevalence and efforts to resist trying cigarettes, partial decay at 2 yr f.u. but still sig. different;</td>
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<td>C2 = health information only control</td>
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<td>No sig. effects on smoking behavior</td>
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<td>I = social influences school program + television intervention</td>
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<td>At completion of I and at 1 yr f.u: I students had sig. lower rates of past week smoking</td>
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<td>Project Sixteen (Biglan, Ary, Smolkowski, Duncan,</td>
<td>C = school intervention</td>
<td>7th and 9th graders</td>
<td>Matched pairs of schools assigned to the 2 conditions and followed up 5 times until one year after intervention</td>
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<td>&amp; Black, 2000)</td>
<td>I = school + community intervention, including paid anti-smoking ads on radio, newspaper articles and posters</td>
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<td>Norway (Hafstad, Aaro, &amp; Langmark, 1996, 1997; Hafstad &amp; Aaro, 1997)</td>
<td>C = no intervention in county, I = county has anti-smoking TV ad, cinema ad, newspaper ads and posters mailed to schools. Campaign aimed mainly at girls, emphasizing mismatch between being a smoker and independence, appearance, and concern for environment</td>
<td>14–15 year olds</td>
<td>Two matched counties, using cohort of teenagers sampled from household survey, followed up at 6–12 months, 3 years</td>
<td>3 yr f.u: Sig. reduction in odds of being a smoker for I group comp with C group for boys and girls; Reduction in odds of smoking for baseline smokers applied equally to males and females; Reduction in odds of smoking for baseline nonsmokers applied only to girls</td>
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C = Control; I = Intervention
conducted as part of the Minnesota Heart Health Program, so that students in Minnesota were additionally exposed to primarily adult-directed mass media advertising promoting aspects of heart health, including smoking cessation, as well as health screening and other community education strategies and services. Compared with a matched control group in a different state, students in Minnesota at a three year follow-up were significantly less likely to be smokers (Perry et al., 1992). However, it is not possible to apportion the effects of the mass media campaign from the school-based intervention.

A third community trial was implemented in California from 1980 through 1985. The Stanford Five City project, a cardiovascular disease prevention trial, incorporated media advocacy and selected persuasive media messages encouraging people to quit smoking, as well as attend to other cardiovascular risk factors. In cohort and cross-sectional studies of adults aged 25 to 74 years, being in the intervention communities was associated with lower smoking prevalence and a greater likelihood of smoking cessation for baseline smokers than being in control communities (Fortmann et al., 1993). However, in cross-sectional surveys of youth aged 12–24 from 1979 through 1990, trends in the prevalence of daily smoking did not differ between control and intervention communities (Winkelby et al., 1993).

Four experimental studies were undertaken in different parts of the United States during the mid-1980’s. Flynn and colleagues (Flynn et al., 1992, 1994, 1997; Worden, Flynn, Geller et al., 1988; Worden et al., 1996) studied children in two matched pairs of communities (one pair in Vermont and one in Montana) who received a combination of media and school interventions over a 4 year period, commencing in grades 5 to 7. The mass media intervention consisted of 36 brief television spots and 17 radio spots, which were broadcast on television and radio each year for four years in media programs popular with the target group. In the first year, the media campaign lasted 5 months, and in each subsequent year, one month. The school intervention consisted of 3–4 lessons per year delivered by classroom teachers over the same period. The common education objectives of the media and school interventions were to encourage young people to have a positive view of nonsmoking; to have a negative view of smoking; to have skills for refusing cigarettes; and to have the perception that most people their own age do not smoke. Messages were especially targeted to those at higher risk for smoking. Since the period of most rapid pubertal change is about 12 years for girls and 14 years for boys, it was considered likely that girls would be more mature during the earlier stages of the campaign (Worden et al., 1996). For this reason, more of the messages were oriented to appeal to the interests of higher risk girls.

Within each matched pair, one community was assigned to a media + school condition and the other to a school only condition. The students who had baseline assessment in grades 4–6 were followed annually over a 4-year period as part of the initial study and then a further follow-up was conducted at 6 years. In addition, students were classified at baseline into being at high or low risk for smoking, with those at high risk reporting a history of smoking or two or more smoking influences in their immediate environment.

Smoking in the past week, self-reported smoking status, and daily smoking were significantly lower among students in the media + school condition at a four and six year follow-up, compared with the school only condition (Flynn et al., 1992, 1994). These results were more pronounced for adolescents at high risk, whereas those at low risk achieved only marginally significant change in smoking at the 6 year follow-up (Flynn et al., 1997). There was a greater relative benefit offered by the media + school intervention at follow-up for high risk girls than was observed for high risk boys.

The authors suggest that the higher risk sample were faced with making decisive choices about smoking earlier in life because of the strong smoking models in their
environment and that the media messages supporting nonsmoking decisions may have provided protective effects at this critical juncture. By contrast, lower risk students may not have faced these decisive choices until later in adolescence, after the intervention period had ended. The implication of this pattern of findings is that there may be differential effects of anti-smoking advertising on children and adolescents, which are mediated by their previous experience with smoking and the immediate social influences to which they are exposed.

In addition, since smoking among high risk girls relatively was more greatly reduced than among high risk boys, gender may be an additional important moderator of the effect of media messages. Three potential explanations have been offered to account for these findings. First, girls may have seen more ads than boys, since more of them were broadcast in programs frequently watched or listened to by girls. Second, the message content of the ads may have been of greater utility to girls than boys. During formative research conducted to assess ad creation and selection, for example, it was found that girls were more concerned than boys with the ability to manage social relationships without being a smoker, and this theme characterized several of the ads shown. Finally, because girls age into puberty earlier than boys, these effects could have been largely due to timing—namely, that the ads portrayed information during a critical period of their adolescent development, which was experienced by boys at a time when the intervention was coming to completion.

The findings of this controlled trial provide solid evidence that anti-smoking advertising can influence teenage smoking and further suggest that effects may be moderated by specific characteristics of the target group and by amount, content, and/or timing of message exposure.

Another controlled study was undertaken in the Southeastern United States and involved media only, without linkage to school interventions (Bauman et al., 1988, 1991). This intervention study assigned metropolitan statistical areas in non-overlapping media markets to receive three different types of media campaigns. The first was a radio campaign using eight 30-second messages focusing on the expected consequences of smoking. The second condition involved a radio campaign using these same ads and an additional 60-second ad, inviting 12–15 year olds to enter a “non-smoking sweepstakes”. Entrants to the sweepstakes received a mailed brochure that asked them to talk to their friends about not smoking and to have their friends enter the sweepstakes. A $20 incentive was offered for recruiting five or more friends to enter. A final media condition was similar to the second but included a television broadcast of the sweepstakes offer and only three of the radio messages. The media messages were broadcast for three months within a six month period and the brochures to encourage peer contact and sweepstakes entry persisted for a further nine months.

Baseline data were collected through household surveys for 12–14 year olds. These respondents were followed up at two years. Although there was evidence that the radio conditions had a modest influence on the perceived utility of smoking and approval of friend’s smoking, there were no changes in smoking behavior observed between media conditions (Bauman et al., 1991). Reflecting on these findings, it is possible that the campaign exposure was inadequate, and campaign messages may have been superficial (Bauman et al., 1991; Pechmann, 1997). In addition, there were no complementary strategies used to reinforce nonsmoking messages, such as through school programs and other community activities. Finally, youth who were the subject of the campaigns were already aged an average of 13 years at the time of exposure, in contrast to previously described interventions which commenced in pre-adolescence and persisted over a longer time period.
Another controlled experimental study undertaken in the 1980’s involving media was undertaken in Southern California (Flay et al., 1988, 1995). Students in grade 7 were randomly assigned by school to investigate the relative effectiveness of a school-based social resistance training classroom curriculum, a television intervention, and a school-based classroom curriculum plus television intervention. In this experiment two control groups were used, a no-treatment control group and a health information only control group. The televised messages sought to encourage discussion between students and parents about prevention and cessation in the home, and between adults in the home and workplace for cessation.

Follow-up of students occurred twice during 7th grade and once during grades 8, 9, and 12. There were strong positive effects observed on mediating variables, including knowledge and consequences of smoking and aspects of social resistance, perceived prevalence of smoking, and efforts to resist trying cigarettes (Flay et al., 1995). Although there was partial decay at the two year follow-up, differences remained statistically significant for the first two measures. However, there were no significant effects observed in early or later follow-ups for smoking intentions or behavior. The lack of behavioral effects may have been due to poor execution of the television programming (Flay et al., 1988) or to observed variability in the application of classroom program delivery (Sobol et al., 1989). Another factor considered a possible explanation was that the high rate of attrition (47% of the original sample completed follow-up), especially among youth at higher risk (dropouts were more likely to have lower school grades at baseline), may have attenuated any beneficial effects among those students for whom the program could have had greatest impact.

Another community trial, called Project Sixteen, compared a 3-year multicomponent community-based intervention with a school based curriculum only, in 16 communities in Oregon (Biglan et al., 2000) from 1991. The school curriculum implemented a social influences program for grades 6–12 that had previously been found to be effective in reducing smoking consumption among baseline smokers (Ary et al., 1990). The community program consisted of youth anti-smoking activities, family communication about smoking, reducing sales of cigarettes to youth, a policy on minor’s possession of tobacco, and media advocacy efforts. The media intervention involved paid advertisements and radio public service announcements, newspaper articles, presentations to local civic groups, and the printing of messages on posters and sports programs. Communities were assigned to the two conditions from matched pairs and students from grades 7 and 9 were followed-up five times until one year after the end of the intervention. The school + community intervention was associated with a significant reduction in smoking in the one year of intervention and one year after the intervention was completed, compared with the school only condition (Biglan et al., 2000). It is not possible to determine the relative contribution of the media from this design since it occurred in concert with other community intervention efforts.

A series of studies from Norway examined the effects of a media campaign directed to teenagers, principally girls (Hafstad, Aaro, & Langmark, 1996, 1997; Hafstad & Aaro, 1997). The campaign emphasized the mismatch between concerns for independence, appearance, and environment on the one hand and being a smoker on the other. Media for the three-week campaign aired only in Buskerud county, and included television ads, cinema ads, newspaper ads, and posters mailed to schools. A cohort of adolescents aged 14–15 years at baseline identified through a household survey were followed-up 6–12 months later. Short-term effects were observed significantly more frequently among girls than boys, in terms of discussing the campaign with peers, in class, and with parents. Nonsmoking girls were also more likely than boys to respond at follow-up that they had
cigarette tax, leading to an increase in the price of cigarettes and a necessity to interpret changes accordingly.

To the end of 1999, there were five major statewide comprehensive tobacco control programs in the United States: California, Massachusetts, Arizona, Oregon, and Florida. Recent reviews of these programs have concluded that they do reduce adult and youth smoking (Institute of Medicine, 2000; Wakefield & Chaloupka, 2000). Ecologic studies are consistent in suggesting that aggregate per capita consumption declines in response to the onset of campaign activities and does so in a magnitude greater than that expected on the basis of a price increase alone (Biener, Harris, & Hamilton, 2000; Glantz, 1993; Harris, Connolly, Brooks, & Davis, 1996; Hu, Sung, & Keller, 1995a, 1995b; Pizicani et al., 1999; ). Since adolescent smoking comprises only a small percentage of overall aggregate consumption, these results are generally interpreted as being mainly indicative of adult smoking changes. However, cross-sectional and longitudinal population survey research adds additional evidence that these types of campaigns can have enduring effects on reducing teenage smoking (Briton et al., 1997; Centers for Disease Control, 1999; Johnson, 1997; Massachusetts Department of Education, 1998; Soldz, Kreiner, Clark, & Krakow, 2000; Unger et al., 1998). Importantly, a salient finding from this literature is that campaigns seem to have more influence on younger, than older, teens.

Since these reviews, several other important peer-reviewed studies have been published which pertain to youth. A recent study used data from a cohort of Massachusetts youth commencing in 1993 to specifically examine the impact of anti-smoking advertising on smoking behavior (Siegel & Biener, 2000). Among younger adolescents (aged 12–13 at baseline), recall of anti-smoking advertising on television in the past 30 days was significantly associated with a lower rate of progression to established smoking (self-report of smoking 100 cigarettes) at a four year follow-up. However, exposure to television anti-smoking advertisements had no effect on progression to established smoking among older adolescents (aged 14–15 at baseline).

Youths exposed to anti-smoking advertising were 2.3 times more likely to report at follow-up that less than half the kids at their high school were smokers. In this cohort study, the relationship between exposure to anti-smoking advertising and this variable, denoting an accurate as opposed to inflated perception of youth smoking prevalence, was stronger for those aged 12–13 at baseline than for older adolescents (Siegel & Biener, 2000). This pattern of results suggests that the protective effect of anti-smoking advertising may in part be mediated by reducing perceived youth smoking prevalence, which itself is known to have a strong influence on youth smoking initiation (Chassin, Presson, Sherman, Cotty, & Olshavsky, 1984; Sussman et al., 1988; United States Department of Health and Human Services, 1994). At least two of the advertisements aimed to show that smoking among peers their age was not the norm in Massachusetts. As the authors suggest, it may be that the specific messages used in the advertising may have been more salient to younger, rather than older, teens. Alternatively, these results are consistent with indications from earlier research that anti-smoking advertising may have more demonstrable impact on younger than older teens.

As part of the evaluation of the Florida Tobacco Pilot Program, media tracking surveys of teenagers demonstrated high rates of campaign awareness, and specific ad awareness in the first six weeks of the campaign, which persisted to one year (Sly, Heald, & Ray, 2001). Over the first year of the campaign, there was change in attitudes consistent with the intention of campaign messages, decreases in adolescent intentions to smoke and decreases in smoking behavior among Florida youth, compared with youth in other states with low levels of anti-smoking activity (Sly, Heald, & Ray, 2001). Ultimately, youth scoring at intermediate and high levels on a media effect index were less likely to initiate
smoking than youths who could not confirm awareness of television advertisements. Adjusted odds ratios between the media index and measures of initiation were similar within categories of age, sex, susceptibility, and whether a parent smoked (Sly, Hopkins, Trapido, & Ray, 2001). In school-based surveys undertaken by the Florida Department of Health, the prevalence of past 30-day cigarette use declined from pre-campaign in 1998 to post-campaign in 1999 in Florida (Bauer et al., 1999). The decline continued in 2000, with this follow-up study additionally reporting that the percentage of committed nonsmokers was significantly increased compared with 1998 figures (Bauer, Johnson, Hopkins, & Brooks, 2000), although no control states were available for comparison.

With few exceptions, this body of research has been concerned with determining whether statewide comprehensive tobacco control programs are associated with reduced cigarette consumption and lower smoking prevalence among adults and teenagers. To a great extent, the overriding aim of determining the impact of the overall program on population smoking has been pursued at the expense of more fine-grained research which might have been focused on the advertising itself, and upon individual differences in responsiveness to advertising messages. The study by Siegel and Biener (2000) is one of the few to have gone beyond these overarching aims and take a closer look at individual differences.

**Comparative Effectiveness of Anti-Smoking Themes**

Plainly, not all anti-smoking advertising is equal. A growing body of research has begun to explore the types of anti-smoking message themes that might best resonate with youth (Balch & Rudman, 1998; Goldman & Glantz, 1998; Harrison Health Research, 1998; Hill, Chapman, & Donovan, 1999; Pechman & Goldberg, 1998; Perrachio & Luna, 1998; Teenage Research Unlimited, 1999; Wakefield, Miller, & Roberts, 1999; Worden et al., 1998). This research has produced mixed findings, probably due to the different methodologies involved, but some consistencies emerge. One study used focus group methods where youth discussed opinions after viewing advertisements (Teenage Research Unlimited, 1999) and another summarized information from focus group reports (Goldman and Glantz, 1998). Others have used questionnaires to seek responses from youth on ratings of ads they recall (Harrison Health Research, 1998; Wakefield et al., 1999) or have used such measures immediately after youth have viewed ads (Pechmann and Goldberg, 1998).

Advertisements which elicit strong emotional arousal, typically those that graphically portray the adverse consequences of smoking, often rate highly among teens and adults, and are associated with increased intention not to smoke (Harrison Health Research, 1998; Hill et al., 1999; Teenage Research Unlimited, 1999; Wakefield et al., 1999). Ads which present normative information about teen smoking have been associated with reduced intention to smoke in copy-testing conditions (Pechmann & Goldberg, 1998). Ads highlighting the deceptive and misleading conduct of the tobacco industry typically require a more “sophisticated” target audience with additional experience in understanding these messages (Teenage Research Unlimited, 1999; Pechmann & Goldberg, 1998). Ads with a theme emphasizing that teens need to make a choice about whether or not to smoke generally have lowest ratings among youth (Teenage Research Unlimited, 1999). Thus, the Philip Morris “youth smoking prevention campaign”, which exclusively uses these types of ads, is probably ineffective in motivating youth to “stop and think” about smoking.

One likely reason for inconsistent research findings is that advertising effectiveness is also influenced by the way in which the message is executed—for example, factors such
as casting, lighting, sound, voiceovers, the number of frames, setting, and wardrobe may all influence the "take home" message of the advertisement, its memorability, personal relevance, and persuasiveness (Pechmann & Reibling, 2000). Furthermore, in the real world setting, ads are viewed in the context of television or radio programs, and this can influence how they are perceived (Aylesworth & MacKenzie, 1998). Also, advertising is received and interpreted in a context and this will differ according to the novelty of the message. Newly commenced anti-smoking advertising campaigns may have relatively high salience in some states investing for the first time in anti-smoking ads, but for states that have had anti-smoking advertising for years, rotation and careful scheduling of messages may be necessary to maintain message salience and avoid advertising "wear out". In addition, some messages may be more complex than others and may require a longer duration or higher frequency of exposure to engage the target audience as intended. Finally, a mix of messages may work better than a single message. For example, a recent review of fear based messages concluded that they can be highly effective in motivating change, especially when accompanied by messages that promote self-efficacy (Witte & Allen, 2000). Thus, research on the effectiveness of different message themes is attempting to partition out one aspect of advertising as if all other factors that may influence impact are constant, which is clearly not the case. Further research is this field is needed.

**Comparative Analyses of Anti-smoking Advertising and Cigarette Advertising**

From 1967 to 1970, prior to the ban on broadcast tobacco advertising in the United States, television networks were required by the Federal Communication Commission's Fairness Doctrine to broadcast one anti-smoking advertisement for approximately every three tobacco advertisements, and an exposure of one anti-smoking ad to every four tobacco ads was achieved. Over this period, nearly $200 million in commercial advertising time (in 1970 dollars) was donated for this purpose (Warner, 1979), equivalent to approximately $292 million per annum in 2000 dollars. Several empirical studies have found that, over the period these anti-smoking ads were broadcast, per capita cigarette consumption declined by over 10%, a trend that had occurred only once before in the century, when the health hazards of smoking were first publicized by the Surgeon-General in 1964 (Baltagi & Levin, 1986; Schneider, Klein, & Murphy, 1981; Warner, 1979, 1986). Furthermore, analysis showed that these changes involved teenagers (Lewit, Coate, & Grossman, 1981). When cigarette advertising was removed in 1971 and the anti-smoking ads were removed with them, consumption resumed an upward trend.

Apart from this "natural experiment", few studies have empirically sought to evaluate the comparative effects of different levels of exposure to anti-smoking advertising and cigarette advertising. Pechmann and Rameshwar (1994) exposed 7th graders in California to anti-smoking advertising, cigarette advertising, or control advertising embedded in a magazine for adolescents. Later, they participated in an ostensibly unrelated study in which they read trait information about a peer who was either identified or not identified as a smoker. Youth's evaluative judgements of the peer and their thoughts and inferences about the person were then assessed. Anti-smoking ads were found to lower perceptions of a teenage smoker's common sense, personal appeal, maturity, and glamor. In contrast, exposure to cigarette ads resulted in more favorable thoughts about the teenage smoker. Pechmann & Knight (cited in Pechmann, 2000) found that just one anti-smoking advertisement was able to offset the impact of three cigarette advertisements, which would otherwise have enhanced perceptions of a teenage smoker's social stature, poise, popularity, and vitality.
It seems conceptually plausible that anti-smoking advertising and cigarette advertising might compete with one another for the attention of potential and existing smokers. Saffer and Chaloupka (1999) and Levy and Friend (2000) discuss advertising response functions in attempting to portray the critical points where advertising is most effective, where additional exposures are subject to diminishing marginal returns, and how these thresholds might be modified by other influences. Advertising response functions suggest that advertising has very little effect until it reaches a certain critical level of exposure, or threshold, after which there are large pay-offs for increasing investment in the campaign (Ackoff & Emshoff, 1975; Rao & Miller, 1975; Simon & Arndt, 1980). As pointed out by Levy and Friend (2000), this may be due to the fact that larger campaigns can make appropriate use of more media channels with a consequent potential for reaching a larger audience, and/or that ads require multiple exposures to optimize impact. As Pechmann explains, anti-smoking ads must have “adequate ‘share of voice’ to break through ad clutter, attract attention and persuade” (1997, p. 195).

Saffer and Chaloupka (1999) and Levy and Friend (2000) posit that the ratio of cigarette advertising to anti-smoking advertising changes the relative effectiveness of each. Thus, cigarette advertising may increase the threshold of anti-smoking messages required to effectively influence smoking behavior. There is some evidence that tobacco companies increase their marketing efforts, at least at the point of purchase, in states where comprehensive tobacco control programs exist (Slater, Chaloupka, & Wakefield, 2001), perhaps in an attempt to offset the effects of the anti-smoking campaign. Thus, the two may be in a dynamic relationship, and not independent from each other.

Conclusions and Issues for Further Research

This review has found a considerable number of studies with potential to add to our knowledge of the effects of anti-smoking advertising. As previously indicated, many of the studies have methodological limitations, in using nonrandomized designs, using a weak dose of intervention, having problems with follow-up, or occurring in the context of other tobacco control strategies which themselves have potential to influence youth smoking. In isolation, each study might be considered imperfect. Yet, when considered together, there is a high degree of consistency in findings, which provide good support for the notion that anti-smoking advertising can influence youth smoking.

Anti-smoking advertising appears to have more reliable positive effects on those in pre-adolescence or early adolescence by preventing commencement of smoking (e.g., Flynn et al., 1997; Siegel and Biener, 2000; Vartiainen, Paavola et al., 1998). It is unclear whether this is due to developmental stage differences (and so is related to gender for this reason), or is a reflection of smoking experience, or a combination of the two; further research to explore this would be useful. In addition, it is evident that social group interactions, through family, peer, and cultural contexts, can play an important role in reinforcing or neutralizing potential effects of anti-smoking advertising (Hafstad and Aaro, 1997). Further research is required to examine the effect of competing exposures of anti-smoking advertising and tobacco advertising and marketing on youth smoking uptake, and to determine under what circumstances and for which individuals anti-smoking advertising may be most effective in preventing uptake.

Although there is some research to suggest that graphic advertising about health effects, social normative advertising, and tobacco industry manipulation messages can positively influence teenagers, these findings are far from consistent, and additional research is needed to assess what characteristics of anti-smoking advertisements most
lead teenagers to seriously stop and think about or engage in discussions about smoking. The extent to which teenagers from broadly similar cultural backgrounds might respond in similar ways to anti-smoking advertising messages is also unknown. For example, would teenagers in tobacco-growing states or countries be more resistant to notions of the tobacco industry as manipulative? Might teenagers in states with a long history of anti-smoking advertising require more graphic and/or complex messages to engage their attention and make them stop and think? Additional audience studies that test a wide range of advertising themes, as well as executional styles, are required.

On a broader level, it is important to determine whether teen-directed anti-smoking advertising has an impact on youth smoking in the absence of broader efforts to change the normative environment for smoking through advertising and other policies aimed at reducing smoking among the population in general. Finally, it is important to assess teenage appraisal of youth smoking prevention and public relations efforts presently being undertaken by tobacco companies. Monitoring of youth awareness and appraisal of such advertising and other efforts could be informative in this regard.

The opportunity for using randomized designs to evaluate anti-smoking advertising effects in the field has all but passed in high-income countries like the United States and Australia, where advertising campaigns have both national and state activity. The best that can be achieved might be staggered commencement and/or different doses of advertising buy in media markets, although effects are still difficult to disentangle from the background of other influences that may influence teenage smoking. More proximal effects on youth attitudes and beliefs may be possible to discern, especially if messages are specific and innovative. In seeking to apportion influence of different types of tobacco control "inputs" (Wakefield & Chaloupka, 1999) and in minimizing problems introduced by unit of analysis, there is an opportunity for multi-level analytic approaches (Palmer, Graham, White, & Hansen, 1998; Diez-Roux, 1998, 2000) to be used to examine the combined impact of anti-smoking advertising, tobacco marketing, and other tobacco control policies.

Overall, the findings of this review indicate that there is no single "recipe" for anti-smoking advertising that leads to reductions in youth smoking. Anti-smoking advertising can influence youth smoking, but whether it does in the context of individual anti-smoking campaigns needs to be the subject of careful evaluation. Anti-smoking advertising occurs, and must be evaluated, in the context in which it is used, along with all the other factors that may reduce or promote smoking (cf. Flay, 1987).

References


