

Impact of Behavioral Intention on Effectiveness of Message Features

Evidence From the Family Sun Safety Project

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The effectiveness of messages with different logical styles might change, regardless of factual content, depending on receiver intent to practice prevention. Predictions based on reactance theory, postdecisional regret, and language expectancy theory were tested in a study altering logical style (inductive versus deductive) and language intensity in messages to parents advocating family sun safety. A prediction that deductively formatted messages would be inferior for parents not intending to act was confirmed in analyses of their reported sun protection, supporting a reactance theory explanation. For parents with mixed intentions to increase protection for themselves or their children, deductive messages were most effective, consistent with postdecisional regret processes. High language intensity enhanced both effects. Reactance effects among nonintenders completely disappeared in a follow-up survey, but language intensity effects remained. The influence of message features varies by stage of progression to action, which has practical implications for tailoring health communication to individual needs.

Theories used in health campaigns typically focus on characteristics of individuals and often fail to consider the possibility that message features may detract from program effectiveness, despite evidence that message variables affect persuasion (M. Burgoon,

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1989). The focal point of this article is whether the effects of message features might vary as a function of the stage or decision point where the person is in considering behavior change. From a practical point of view, understanding how to construct persuasive prevention messages is important. With the advent of increasingly sophisticated computer-generated personalized advice protocols in disease prevention projects and the populations' increasing access to interactive multimedia, there is enormous potential to tailor the message features and content of disease prevention messages to increase their effectiveness with different subpopulations.

Message Features and Persuasion

Message features that affect outcomes include characteristics of the message source, how the message is framed (e.g., in terms of potential gains or losses), whether a nondirective inductive or directive deductive style of presentation is used, and how intense the language is. For example, protection motivation theory (R. W. Rogers, 1983) and the extended parallel processing theory (Witte, 1992) propose that the use of fear, or appeals charged with negative emotions, can increase compliance with disease prevention recommendations. Research based on prospect theory (Kahneman & Tversky, 1979) has found that messages that focus on the costs or loss associated with not acting produce increased compliance with screening tests for early detection of disease, whereas messages that discuss the gains from action appear to be more successful for health promoting activities (Rothman & Salovey, 1997).

Language expectancy theory (LET). In our own work, message manipulations based on predictions from LET (M. Burgoon, 1996; M. Burgoon, Jones, & Stewart, 1975; M. Burgoon & Miller, 1985) and research on logical argument style (M. Burgoon, 1989) were used to increase compliance with advice on sun protection in the Family Sun Safety Project (D. B. Buller, Burgoon et al. 1996). LET explains the persuasive impact of various types of instrumental verbal aggression. LET assumes that people develop (a) expectations and preferences concerning language or message strategies based on cultural and sociological norms and (b) informed opinions about what is competent communication. Attitude or behavior change in the direction advocated by a persuasive source happens when these expectations are positively violated either by (a) a positively evaluated source enacting behavior that is better or more preferred than expected or (b) a negatively evaluated source conforming more closely than expected to these expectations. No change in compliance or change to the contrary of the source's intent occurs when negative violations of expect-

tations occur, for example, when language choices or selected message strategies lie outside the bandwidth of socially acceptable behavior in a negative direction. Whether a linguistic choice or message strategy violates expectations is determined in part by who says it. For example, highly credible speakers have "wider bandwidths" of appropriate communication and are more likely to produce positive violations (M. Burgoon, 1996).

From LET, we reasoned that highly intense language is not yet the norm for most health prevention campaigns, so sun safety messages with high linguistic intensity should violate linguistic expectations. Furthermore, because the source—a university cancer center working with schools and pediatricians—was considered a credible source for health information by parents (D. B. Buller, Callister, & Reichert, 1995), these violations should be positively evaluated by parents (because they imply concern and urgency) and yield more compliance with sun safety recommendations than less intense language.¹

We tested these speculations in an experiment within the Family Sun Safety Project, a project aimed at increasing solar protection in families with young children. We found that skin cancer prevention messages containing high language intensity produced the most success (i.e., compliance and plans to comply with sun safety recommendations by parents), and that messages that used high language intensity with deductive (as opposed to inductive) logical argument style yielded the most change in parents' sun safety (D. B. Buller, Burgoon et al., 1996). This article extends that work by asking whether effects of message features vary as a function of where the person is with respect to change (i.e., their baseline or pretest intentions to change).

Stage of preventive behavior change and message effectiveness. The notion that people pass through a number of discrete stages on their way to changing their behavior intentionally has been postulated in a number of theories: diffusion of innovations theory (E. M. Rogers, 1983), the transtheoretical model (TTM) (Prochaska, DiClemente, & Norcross, 1992), and McGuire's (1989) communication/persuasion model. In conceptualizing stages, we agree with McGuire that it is useful to consider the persuasion task. Because our study only asked about plans (intentions) to behave, we have focused on stages that are definable from only asking about intentions. It is possible that communication strategies that maximize development of behavioral intentions may be different from those that facilitate converting intentions into action.

Psychological reactance. One difference between people who do and who do not intend to adopt a behavioral recommendation is that the former

have made a choice congruent with the recommendation, whereas the latter have not yet made a choice and have not accepted either the need or practicality of action. Reactance theory (J. W. Brehm, 1976) suggests that these groups of people will react differently to persuasive messages that promote a particular behavioral option.

Reactance theory holds that people place a premium on their ability to act freely on alternatives. When people perceive that this freedom is threatened, say by persuasive messages that advocate a particular behavior (e.g., sun safety) over others, people experience psychological reactance. Reactance is a psychological state that occurs when people process message information and perceive a threat to their freedom to select from among several attitudinal positions or behaviors. It is aversive and produces an intent to behave opposite to that which is advocated in the message to restore the sense of freedom. Common means of restoration include argument and source derogation (e.g., "Long-sleeved shirts aren't practical when it is extremely hot outside"; "That physician doesn't understand how much my children complain when I apply sunscreen") and increased attractiveness of alternative options (e.g., suntanning).

The feeling of threat does not occur unless people perceive that they have alternatives from which to choose freely and that they are capable of making a decision. Without perceived threat, one cannot experience psychological reactance. Exercising a freedom by making a decision among alternatives reduces reactance to prodecisional messages (Snyder & Wicklund, 1976; Wright, 1986), because those who have formed an intention to act apparently recognize that they, not the message, constrained their choices.²

If reactance to a persuasive message is more likely to occur in people who have not yet made a decision to take preventive action than in those who intend to do so, these two groups of receivers should react differently to inductive and deductive logical appeals to engage in prevention. Messages that avoid directly recommending an action are less likely to create psychological reactance than those that make such direct admonitions (S. S. Brehm & Brehm, 1981). Inductive logical appeals simply provide a list of facts relevant to preventive action without explicit conclusions about what receivers are supposed to think or do. By contrast, deductive appeals provide explicit conclusions. Consequently, we hypothesized that for people who do not yet intend to engage in preventive action, inductive appeals should be less likely to produce reactance and thus be more likely to increase compliance than deductive appeals. By contrast, people who intend to take preventive action should not show this differential reaction to inductive and deductive appeals because reactance is less likely.

Postdecisional regret. Management of postdecisional regret (Landman, 1987; Loomes & Sugden, 1982) may be more relevant to receivers intending to take action than reactance reduction when processing prodecisional messages and thinking about unchosen alternatives. Postdecisional regret is heightened when actual or possible feedback is available that reports negative outcomes of the chosen alternative or presents positive outcomes of an unselected alternative (Kahneman & Tversky, 1982; Landman, 1987; Sugden, 1985). Thus, messages that remind receivers of the positive outcomes of their intentions to take preventive action and negative outcomes of not taking preventive action, but do not stimulate consideration of the converse positions, actually may reduce regret and increase post-message compliance for those who at baseline already intend to adopt preventive strategies. This implies that deductive messages are more effective after people have decided to act than inductive messages, because the explicit conclusions in deductive messages remind them of the positives of action and negatives of inaction and divert their attention away from undesirable consequences, thus minimizing postdecisional regret. However, we were uncertain that the parents in our study would anticipate sufficient negative outcomes to induce postdecisional regret and thus advantage deductive over inductive messages. So, we did not make a strong prediction in this regard.

Language intensity. The linguistic intensity in communication appeals may moderate the hypothesized interaction between language style and intentions. High intensity language is assumed to increase arousal and thus may engage parents more than low language intensity and increase the potential likelihood of any action potential (either reactance or compliance). At the very least, messages that do not produce psychological reactance should be more successful when they contain high rather than low linguistic intensity. High language intensity based on tenets of LET may reduce compliance by exacerbating the psychological reactance produced by deductively formatted persuasive messages sent to those who do not intend to change, by focusing attention on the explicit conclusions in the message, thereby increasing the perceived threat to their freedom to act.

Language intensity also may directly affect the processing of messages. In the original analysis of the Family Sun Safety Project (D. B. Buller, Burgoon et al, 1996), it was shown that under some conditions, the favorable impact of high language intensity was enhanced by deductive logical style. D. B. Buller, Burgoon et al. (1996) speculated that high intensity messages may overarouse receivers (M. Burgoon, 1989) and cause them to "disengage" from the communication if solutions are not offered to minimize or prevent the aversive consequences. Research on

fear appeals shows that when messages arouse fear, people engage in actions that reduce risk (i.e., take precautions) only when efficacious solutions are described to them. When efficacious solutions are unavailable, people make psychological adjustments that minimize the fear rather than taking preventive action (Witte, 1992). Therefore, if high intensity messages are strong enough to induce any disengagement of perception, they should be more effective when deductively formatted, as this focuses attention on appropriate action. By contrast, high intensity language should interfere with the processing of inductive appeals by reducing receivers' abilities to derive conclusions from inductive arguments. We observed that high intensity language was more effective with deductive messages, and low intensity messages were more effective with inductive messages (D. B. Buller, Burgoon et al., 1996). Hence, we predicted in this analysis that strong language would enhance effects of deductive style relative to inductive style. Exacerbating reactance would suggest strong negative effects of intense language on deductive style among those not intending to act. For those close to action, if there were sufficient arousal to induce perceptual narrowing, we would expect a positive effect for deductive over inductive messages. Thus, we have examined the potential mediating role of language intensity in the interaction between behavioral intention and logical argument style.

METHOD

The predictions about the role of baseline behavioral intentions were tested on data collected as part of the Arizona Family Sun Safety Project. Skin cancer is epidemic in the United States and other parts of the world (American Cancer Society, 1996). Coordinated attempts to increase sun safety have made preventive behaviors such as the use of shade, sunscreens, and protective clothing well known but have not always produced regular prevention (D. B. Buller et al., 1995; Hill, White, Marks, & Borland, 1993). Consequently, many parents already were knowledgeable and intended to practice sun protection. Thus, persuasive messages could prompt action as well as produce new behavioral intentions in those not yet convinced.

Language intensity and logical argument style were manipulated in persuasive messages in a between-subjects 2 (language intensity: high vs. low) \times 2 (logical structure: deductive vs. inductive) factorial design.³ A sample of parents in families with elementary-school-age children (age 5 to 11 years) were recruited from a managed-care pediatric clinic and public elementary schools and were pretested by telephone. Each parent was randomly assigned to one of the cells in the factorial design, and the experimental manipulation was conducted entirely by direct mail during

the spring and summer months. Experimental persuasive messages were sent to parents in newsletters and brochures containing information on sun protection. Parents were posttested by telephone in the autumn and again in the following winter.

Recruitment and Samples

Parents with elementary-school-age children were recruited from a managed-care, clinic-based pediatric practice and seven public elementary schools in a metropolitan area in southern Arizona, the region with the highest rates of skin cancer in the United States (R. Harris, personal communication, March 1997; Pathak & Fitzpatrick, 1993). The clinic provided a list of all patients between 5 and 11 years of age ($N = 2,033$ entries), from which 1,459 unique adult names (i.e., parents) were identified. A random sample of 846 parents were selected, and interviewers reached 643 eligible parents. Schools were selected at random from 23 schools with kindergarten through fifth grades that enrolled at least 75% Caucasian students. A sample of 1,129 parents were identified from 42 randomly chosen classes, equally distributed across grades. All parents received letters of invitation by mail; parents from the schools returned consent forms by mail, and parents from the clinic consented orally when contacted by interviewers.

Clinic and school parents did not differ substantially on changes in attitudes and sun protection behavior, so they were combined for this analysis (D. B. Buller, Burgoon et al., 1996). Overall, 841 parents completed the pretest (58% response rate among eligible parents; 71% in the clinic sample, 35% in the school sample), and 804 completed the posttest (96% follow-up rate). Attrition from pretest to posttest had a negligible effect on the equality experimental cell sizes and sample demographics. The analysis was performed only on 768 parents who had complete data on all variables of interest.

Experimental Persuasive Prevention Messages and Health Education Materials

Experimental persuasive prevention messages. Three persuasive prevention messages were created that presented arguments on *health outcomes* of sun protection, *parental values and responsibilities* for own health and child's health, and importance of *physical appearance* of the skin. Topics were based on Nitz's (1995) analysis of attitudinal involvement with sun safety. Four versions of each message were produced by altering language intensity (high vs. low), using adjectives and adverbs and opinionated-rejection statements, and by changing logical argument structure (deduc-

tive vs. inductive), through the presentation of evidence and conclusions (M. Burgoon & Miller, 1971; M. Burgoon & Stewart, 1975; Hamilton, Hunter, & Burgoon, 1990 [see samples of message manipulations in the Appendix]).

Health education materials. A series of 10 printed health education materials encouraging the family to be sun safe were designed to be mailed to parents, 6 of which included the experimental persuasive messages, that is, 3 four-page newsletters and 3 two-fold brochures. Newsletters contained lead articles on a newsworthy sun safety topic (effectiveness of sunscreens, dangers of artificial tanning, and state of the ozone layer) with an attention-getting headline, short articles with practical sun protection advice, and a child's page with games, projects, and suggested readings. Lead articles always continued onto the upper left-hand column of the second page; the persuasive messages were placed next to the last part of the lead articles, in the upper right-hand column of page 2. This placement was designed to capture parents' attention with the lead articles and move it to the persuasive messages.

Each brochure contained one of the persuasive messages. On the inside flap, a list of behavioral recommendations was displayed based on advice from the American Academy of Dermatology, the U. S. Public Health Service, and the American Cancer Society: (a) limit time spent in the sun; (b) avoid the sun's rays between 10:00 a.m. and 3:00 p.m.; (c) apply a sunscreen with a sun protection factor (SPF) of 15 or greater every day of the year; (d) wear clothing that protects the skin—long sleeves and long pants, a wide-brimmed hat, and sunglasses; (e) stay in the shade whenever possible—find shade trees and ramadas or bring an umbrella; (f) avoid artificial tanning from booths, beds, or lamps; (g) be careful not to get a sunburn, (h) examine your skin regularly; and (i) make sun safety a family habit.

In addition, all participants were sent an initial newsletter containing a description of the sun safety program and three magnetic 3" × 5" tip cards (to be hung on a refrigerator door) repeating the behavioral recommendations: sunscreen, protective clothing, and avoidance of intense sunlight. Language intensity and logical structure were not altered on these materials.

Procedure

Letters inviting parents to participate in the study were mailed from October through December. In January and February, parents were contacted by telephone by trained interviewers to complete the pretest survey ($M = 20.6$ minutes per interview, $SD = 5.0$ minutes).

On completion of the pretest, parents were randomly assigned to one of the experimental groups in the factorial design within each sample (parent was the unit of randomization). The experimental intervention was conducted entirely by mail from March to August.⁴ The newsletters, brochures, and tip cards were mailed one at a time to participating parents in rotating order, beginning with the introductory newsletter and followed by a brochure, tip card, another newsletter, and so on. Mailings to parents were equally spaced across the intervention period.⁵

In September and October, interviewers recontacted parents and completed a posttest survey. Posttests also were completed in approximately 6 weeks ($M = 23.1$ minutes per interview, $SD = 4.8$ minutes).⁶ Finally, interviewers recontacted parents in the following February and completed a short posttest containing measures of winter sun protection.

Measures

The 97-item parental pretest survey asked about sources of skin cancer information, knowledge and attitudes about sun exposure and sun safety, practice of sun safe behaviors, skin cancer risk factors, and demographic information. The 103-item posttest also inquired about exposure to prevention messages and additional demographic characteristics. Both contained knowledge and attitude measures not relevant to the present article; details of scale content and reliabilities can be found in D. B. Buller, Burgoon et al. (1996).

Baseline behavioral intentions. Behavioral intentions were measured at pretest by asking parents whether they planned to protect (a) themselves and (b) their children more in the upcoming summer. Responses to these two items were *yes*, *no*, and *don't know*, with *yes* responses indicating that parents had a behavioral intention to increase sun safety and *no* and *don't know* indicating that they did not have a behavioral intention. These questions are similar to ones used by Prochaska et al. (1992) to distinguish between people in a "preparation" stage who have formed intentions to act from those in the "contemplation" stage with no intentions. A single composite pretest intention variable was created from these two questions: intentions to increase sun protection for both self and child, for either, or for neither. This was done because we thought those answering inconsistently probably had levels of intent between the two consistent groups (our interventions were recommending sun safe behavior for the whole family). At pretest, 71% of parents intended to protect both themselves and their children; 19% intended to protect self or child (16% child only, 4% parent only, with rounding errors); and 10% intended to protect neither.

Sun protection outcomes. Parents described sun protection using 5-point frequency scales (*never, rarely, sometimes, often, always*). For themselves, parents reported on frequency of using sunscreen and sunscreen with SPF of 15 or more, wearing protective clothing and hats, avoiding the sun at midday, and staying in the shade. For children, parents reported on the frequency of these six behaviors plus application of sunscreen before school (D. B. Buller, Burgoon et al., 1996). Parents were asked if they had explained to their children that they should protect their skin from the sun and taught them how to apply sunscreen. They reported the SPF of the sunscreen used most often and the amount of time children spent outside on the preceding day.

Sun protection was measured for both parents and children at each assessment. Summed scales were generated for parent summer protection, parent winter protection, child summer protection, and child winter protection. Reliabilities ranged from .56 to .93, but as some represented alternate ways of achieving the same end, high reliability was not a precondition of validity. Parent- and child-reported winter behavior was collected at follow-up (see D. B. Buller et al., 1997). At pretest, parents reported on protection during the previous summer and in the current winter; at posttest, parents described protection during the current summer and plans for the upcoming winter. In the final posttest in February, parents only provided ratings of the frequency of protection behaviors during the current winter.

Exposure to prevention messages. At posttest, parents' exposure to the prevention messages was assessed by asking how many newsletters, brochures, and tip cards they had received and read and whether anyone else in the family had read them. Exposure measures were modeled after measures of print media use that asked people to recall the number of issues of newspapers and/or magazines received and read in a defined period of time (e.g., last week; last 4 weeks) (J. K. Burgoon, Burgoon, & Buller, 1987).

Statistical Analysis

Pre-post change scores were calculated for parents' self and child protection behavior. The test of the hypothesized interaction between argument style and behavioral intention was initially performed using a 3 (behavioral intention) \times 2 (argument style) \times 2 (person) \times 2 (outcome type) mixed-model ANOVA. Intention (to increase protection for both parent and child/either/neither) and argument style (inductive/deductive) were between-subjects factors, and person (parent/child) and outcome type (change in actual summer protection behavior/change in

plans for winter protection behavior) were within-subjects factors. A third between-subjects variable—language intensity (high/low)—was then added to test the speculations about the moderating role of language intensity. Two-tailed tests were used, with alpha set at $p < .05$.

RESULTS

Hypothesis Test

It was hypothesized that deductively formatted persuasive prevention messages would produce less compliance than inductively formatted messages by parents who did not intend to increase sun safety. This predicted two-way interaction was apparent in the $3 \times 2 \times 2 \times 2$ ANOVA, $F(2, 762) = 4.22, p < .05$, but not quite as was expected (Table 1). As predicted, inductively formatted arguments produced more compliance with recommendations to practice sun safety than deductively formatted messages on all outcome measures with nonintenders (those who did not intend to increase protection for both parent and child). Consistent with ideas about postdecisional regret management, inductive messages produced less compliance than deductive messages on all outcome measures with the mixed intent group (those who intended to increase protection for either parent or child). However, deductive messages produced marginally worse compliance on all outcome measures among consistent intenders (those who intended to increase protection for both parent and child) rather than more compliance, as was predicted (Table 1).

Language Intensity Analysis

Language intensity effects were initially explored in the $3 \times 2 \times 2 \times 2 \times 2$ ANOVA (see Table 2). It revealed that parents reported greater changes in sun protection for their children than for themselves, $F(1, 756) = 51.95, p < .0001$, greater plans for protection in the upcoming winter than in actual protection during the summer, $F(1, 756) = 182.84, p < .0001$, and greater change with increasing levels of intention, $F(2, 756) = 9.95, p < .001$. There was also an interaction between person and outcome, $F(1, 756) = 36.25, p < .0001$. The difference between the two child sun protection measures was greater than that for the parents. There were other interactions, including several involving intention. As our hypothesis related to the differential effects of message factors by level of intention, and the sample sizes of the three intention categories varied greatly, separate 2 (argument style) $\times 2$ (intensity) $\times 2$ (person) $\times 2$ (outcome type) analyses were performed at each level of intention. To simplify the presentation, main

TABLE 1
 Mean Change in Parent and Child Sun Protection in Summer and Winter, for Interaction Between Baseline
 Combined Parent and Child Intention to Increase Protection^a and Logical Argument Style in Prevention Messages

	Intend Neither Parent Nor Child		Intend Parent or Child		Intend Parent and Child	
	Inductive	Deductive	Inductive	Deductive	Inductive	Deductive
<i>N</i>	38	35	67	82	277	269
Parent protection in summer	0.97	0.03	0.57	1.13	1.76	1.63
Parent plans next winter	4.74	3.51	2.25	5.74	6.77	6.44
Child protection in summer	1.47	1.29	1.06	1.28	2.02	1.37
Child plans next winter	6.32	6.23	6.63	9.54	10.83	9.14

a. Behavioral intention variable indicates whether parent intended to increase protection for *neither* self nor child, for *self or* child, or for *self and* child.

TABLE 2
Mean Change in Parent and Child Sun Protection in Summer and Winter, for Interaction
Between Baseline Combined Parent and Child Intention to Increase Protection^a and
Logical Argument Style and Language Intensity in Prevention Messages

	<i>Intend Neither Parent Nor Child</i>				<i>Intend Parent or Child</i>				<i>Intend Parent and Child</i>			
	<i>Inductive</i>		<i>Deductive</i>		<i>Inductive</i>		<i>Deductive</i>		<i>Inductive</i>		<i>Deductive</i>	
	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>High</i>
<i>N</i>	18	20	20	15	36	31	46	36	138	139	133	136
Parent protection in summer	1.22	0.75	0.00	0.07	0.47	0.68	0.78	1.58	1.57	1.95	1.29	1.96
Parent plans next winter	3.67	5.70	4.65	1.88	2.33	2.16	4.96	7.10	7.44	6.10	5.02	7.92
Child protection in summer	1.11	1.80	1.75	0.67	0.86	1.29	1.46	1.06	2.04	2.01	0.97	1.76
Child plans next winter	5.17	7.35	9.45	1.93	6.89	6.32	8.04	11.44	9.71	11.94	7.84	10.41

a. Behavioral intention variable indicates whether parent intended to increase protection for *neither* self nor child, for *self or* child, or for *self and* child.

effects of person (parent/child), outcome (summer/winter protection), and their interaction are ignored.

For parents with no intentions of changing their sun protection either for themselves or their children, there was a significant interaction between argument style and message intensity, $F(1, 69) = 4.40, p < .05$, with the highly intense deductive message producing the least change (see means in the first four columns in Table 2 for this and the next three tests). This is consistent with our hypothesis that language intensity would enhance reactance to deductive messages. There was also a significant three-way interaction with these two variables and type of outcome, $F(1, 69) = 4.29, p < .05$, with the above mentioned interaction strongest for winter protection plans (Table 2) and a trend that deductive style was inferior for changing summer behavior, regardless of intensity (Table 2). The three-way interaction of language intensity, argument style, and person was not significant, but a trend, $F(1, 69) = 3.36, p < .10$, suggested that the argument style by language intensity interaction may be strongest for child protection behavior (Table 2). Thus, the suggestion that highly intense deductive messages would be inferior when directed at parents not intending to change was essentially supported, although the effect was stronger for plans for next winter than for change reported during the summer months.

For parents with mixed intentions (i.e., intended to increase protection for either self or child), the pattern of results was quite different (see means in columns 5 through 8, Table 2, for these tests). Deductively formatted messages were superior overall, $F(1, 145) = 6.57, p < .05$. There was a significant interaction between argument style and outcome type, $F(1, 145) = 5.89, p < .05$, with the superiority of deductive style greater for winter plans (but deductive messages seemed to be superior for summer behavior too; see rows 2 and 4, Table 2).

For those with consistent intentions, the pattern was more complex (see means in columns 9 through 12, Table 2). There was a four-way interaction among all independent variables, $F(1, 542) = 7.70, p < .01$; three-way interactions between language intensity, person, and outcome, $F(1, 542) = 5.34, p < .05$, and argument style, language intensity, and person, $F(1, 542) = 4.00, p < .05$; a two-way interaction between argument style and person, $F(1, 542) = 5.18, p < .05$; and a main effect of language intensity, $F(1, 542) = 6.14, p < .05$. There were also some trends, but as the sample size is large in this group, they are not considered. Taken together, the pattern suggests some superiority of high intensity over low intensity language for deductive messages but mixed patterns for inductive messages. Low intensity deductive messages were the least effective. Inductive style may be superior for influencing changes in what parents did with their children, largely due to the greater inferiority of weak deductive messages.

Follow-Up Posttest on Change in Winter Sun Protection

Similar analyses were conducted for the follow-up data on actual winter sun protection for the winter following the intervention (see D. B. Buller et al., 1997, for results of analysis ignoring intention). Initially, a 3 (intention) \times 2 (argument style) \times 2 (language intensity) \times 2 (person) ANOVA was performed. There was a person main effect, $F(1, 549) = 21.77$, $p < .0001$, with greater change for children than for parents. There was a trend for a language style by intensity interaction identical to the original hypothesis that high intensity deductive messages produced the most compliance regardless of baseline behavior intention ($p < .10$; see D. B. Buller et al., 1997) and no evidence of any other interactions. Even so, to provide comparability with the earlier analyses, the three-way analyses (person by argument style by language intensity) were conducted at each level of intention. There were no significant effects involving the between-subject variables for the no-intent group ($p > .10$). The mixed-intent group had a significant interaction between argument style and language intensity, $F(1, 118) = 4.97$, $p < .05$, with highly intense deductive messages being superior to all other message forms. The consistent intender group had a significant interaction between language intensity and person ($p < .05$; see D. B. Buller et al., 1997). Given the lack of any evidence of differential effects by level of intention, these small differences should be interpreted cautiously. The predicted inferiority of strong deductive messages among the nonintenders was not found. In terms of the central hypothesis, the results from the follow-up suggested that the reactance effect had completely disappeared.

DISCUSSION

These results provide support for the general notion that message factors vary in utility as a function of stage of behavior change, although our specific predictions were not completely supported. The evidence for reactive effects from deductive messages sent to parents who had no intention of increasing sun protection is clear, and this reactance was increased by intense language. Care should be taken when using strong directive messages with people who have not made a decision to act. Among those with consistent intentions to act (i.e., who intend to increase protection of both self and child), communication style factors made less difference. Intense language may improve deductive communications (and less intense language may harm them), whereas it has no effect on inductive messages. For a relatively nonconflictual behavior like sun protection, once people are convinced to act, all communication may be

processed through that intention, and the potential for message factors to influence outcomes is reduced.

The positive effect of deductive messages for parents with mixed intentions (i.e., to protect either self or child) is interesting, even though the evidence of a facilitating effect was stronger here than among consistent intenders, where we initially postulated it might be found. Interpretation of this effect on mixed intenders hinges on the meaning of this intent category. This group arguably is convinced of the value of action but may not be fully persuaded to take action. This group may be loosely thought of as analogous to contemplators in Prochaska et al.'s (1992) TTM—those with some intention of acting but no plans to do so immediately. Deductive messages may be useful for these people because they focus thoughts on action. The problem with this explanation is that reactance theory predicts that messages with strong admonitions to act in a certain way should produce reactance to change up until a clear decision to act is made. Whether this is a problem for the application of reactance theory hinges on whether the less clear intentions in this group have sufficiently reduced perceived choice to eliminate the likelihood of reactive effects. Perhaps they have, but whether this would generalize to similar weak intentions for other health behaviors is not certain. It may be that mixed intentions carry with them an openness to being pushed into action. Another possibility is that the group had a strong intention to act for one person and no intention to act for the other. In that case, however, we would expect this group to have results intermediate to those of consistent intenders, because reactance should occur with recommendations to change the behavior for whom one has no intention to act. This did not happen, and when we did separate analyses using parent intent for parent outcomes and child intent for child outcomes, the pattern of results became less clear.

It would be useful to employ a more sophisticated breakdown of stages of change to see if deductive styles are more effective for those merely considering action—thinking they should act (intention in principle) without deciding to do so—or whether the effect only occurs once people have decided to act but before a decision as to when. It also would be useful to improve the measurement of behavioral intentions and explore whether it is related to concepts such as openness to being persuaded. Finally, effects of behavioral intention on message processing might vary by behavior: Behaviors that are internally conflicted might be more likely to induce reactance than those that are not. Sun protection is probably not very conflicted, as people can quite rapidly adopt protective measures in response to mass campaigns (Hill et al., 1993), so reactance effects might be restricted to receivers not yet convinced of the need for any action. It would be interesting to explore the predictions with a behavior like smoking cessation that is highly conflictual due to the strong immediate

negative consequences of quitting. Here, we might expect that close to action, deductive messages would be superior, because inductive messages may allow too much undirected thought, consideration of negative consequences of quitting, increased postdecisional regret, and a reversal of intentions to quit.

It should be noted that the study had low power to find effects within the two lower intention categories whose numbers were small, so the fact that the patterns were only marginally significant should not be taken as evidence that the effects are weak. Better designed tests of these propositions are needed. Additionally, it is possible that in the pretest-posttest design, the improvements in reported sun protection behavior were affected by the pretest measure. We think this is unlikely, because D. B. Buller, Buller, Beach, and Ertl (1996) showed that pretesting only improved recall of terms used in sun safety instruction, not self-reported knowledge, attitudes, or sun protection. Furthermore, it is difficult to conceive of how a pretest could have contributed to the complex interactions we observed.

The finding that the reactance effects did not persist by affecting behavior during the following winter is reassuring. Reactance effects may be more temporary than other content- and context-based effects of message features such as language intensity (D. B. Buller et al., 1997). Both effects might be considered a product of "peripheral cues" in the elaboration likelihood model of persuasion (Petty & Cacioppo, 1986), yet only the reactance effect was short-lived. Language intensity may communicate urgency and importance about an issue that makes recommendations to act more emotionally salient and memorable than perceptions of threat to behavioral freedom. In line with the "sleeping effect" (Hovland, Janis, & Kelley, 1953), message content becomes more effective over time in generating convictions to act as the reactance is forgotten. Language intensity effects also may persist, because they arise from the verbal message content that may be encoded better into memory than situational by-products of messages like reactance.

To the extent that our results are generalizable, they have implications for health communication. For mass-disseminated campaigns, where most of the population is not convinced of the need for action, intense deductive strategies clearly should be avoided. However, where most of the population intends to act and positive effects of deductive strategies are likely, it might be acceptable to risk reactance effects among those not yet convinced if the principal negative effect of intense deductive messages is only to delay moving the minority of nonintenders to accept the need for action. In situations in which messages can be tailored, we can choose the communication style that maximizes compliance: inductive messages for those still deciding whether action is appropriate and intense deductive messages for those considering action but not yet com-

mitted. The choice of communication factors for those poised to act is less clearly revealed in our analysis; more thought and research is needed here. Obviously, these suggestions are tentative and may apply only for sun protection. Research is needed on the appropriateness of these recommendations for other disease prevention behaviors.

Finally, this analysis suggests that we should reconsider what it is about stages that might be relevant and what it is that determines stage. Stage might be best conceptualized around the persuasion task, such as convincing people to consider the possibility that a behavior has unwanted effects, that these negative effects are less than the perceived benefits, and that they should change their behavior. Subsequent tasks might include encouraging people to set a timetable, to develop a plan of action, to enact the plan, and to persist with the action through short-term problems. Knowing stage of change alone, though, is insufficient. Explanations for stage-related changes in information processing must be developed to specify how to communicate effectively and maximize intervention success at various points in the progress toward action.

APPENDIX

Samples of Language Intensity and Logical Style Manipulations in Persuasive Messages

Statements with high intensity language:

Skin cancer is a grotesque growth of skin cells.
Treatment of skin cancer involves cutting or burning tumors from the skin.
Tragically, about 7,200 Americans will die from melanoma, a very serious type of skin cancer, this year alone.

Statements with low intensity language:

Skin cancer is an unusual growth of skin cells.
Treatment of skin cancer involves removing tumors from the skin.
Sadly, about 7,200 Americans will die from melanoma, a very serious type of skin cancer, this year alone.

Message formatted in inductive logical style:

Here are the facts:

- The effects of years of not protecting your skin against sun exposure are ugly, permanent, and hazardous to your health.
- Sun overexposure can result in more serious effects like scaly skin growths and sores that bleed into the skin like bruises.
- 95% of all skin cancers in the United States can be attributed to sun exposure.

Message formatted in deductive logical style:

We Arizonans spend too much of our time outdoors exposed to the sun's rays. Although small amounts of sun exposure are not harmful, overexposure is dangerous and will result in skin damage or even cancer.

The effects of many years of not protecting your skin against harmful sun exposure are ugly, permanent, and hazardous to your health. Overexposure will result in more wrinkled and leathery skin. Other more serious effects include scaly skin growths and sores that bleed into the skin like bruises. The most dangerous effect of too much sun exposure is skin cancer: 95% of all skin cancers in the United States are attributed to sun exposure.

NOTES

1. Because few medical organizations have low credibility, negative violations and subsequently negative evaluations of messages are likely to be uncommon.

2. It may be possible to induce reactance in individuals who have an intent to act with messages that claim responsibility for the behavioral choice and invalidate the person's decision or that advocate acting in a manner that precludes behavioral options on which the person has not yet decided.

3. The design also included a campaign duration factor. Prevention messages were sent over either 6 months (March to August) or 3 months (June to August). There was no effect of duration on study outcomes, so it is not discussed here.

4. Children in the selected elementary school classes were taught the *Sunny Days, Healthy Ways* sun safety curriculum by their teachers in March and April. The children learned about protecting their skin from the sun's harmful rays in three age-appropriate versions for Grades K through 1, 2 through 3, and 4 through 5 (D. B. Buller, Buller, Beach & Ertl, 1996; M. K. Buller, Loescher, & Buller, 1994). The school districts agreed to participate in the Family Sun Safety Project in part because this curriculum was provided to students. Parental materials were designed to be effective independent of this curriculum, but they did contain graphics and characters used in the curriculum. At posttest, 88% of parents recruited from these classes were aware that their child had received instruction in sun safety, 93% reported that their child brought home information, 87% read these materials, and 79% talked with their children about them. However, parents from the schools did not report higher sun protection than parents from the clinic, so it does not appear that the sun safety instruction for children affected parental behavior, nor did it confound the results.

5. Parents in the March to August duration condition were sent a mailing every 2.5 weeks, and those in the June to August condition were sent a mailing every 1.25 weeks.

6. As a quality control, 5% of interviewed parents (42 at pretest and 40 at posttest) were randomly selected, recontacted by a supervisor, and confirmed that they had been interviewed.

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