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Social Marketing Risk-Framing Approaches for Dental Sealants in Rural American Indian Children

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Objective: To compare three variants of a culturally relevant and theoretically based message to determine the most influential risk-framing approach for improving intention to place dental sealants for preschool children.

Design and Sample: A convenience sample of adult, American Indian participants (n = 89) attending a community health fair were assigned to view a gain-framed, loss-framed, or mix-framed dental sealant message.

Measures: We compared participants' scores on a 46-item survey to determine the relative effect of the frame assignment on seven indices of behavior change.

Results: The mean difference in participants' stage-of-change scores (x = 1.17, n = 89, SD = 1.90) demonstrated a significant improvement for all groups after watching the dental sealant message t88 = 5.81, p < .0001, 95% CI [0.77â€“1.57]. Self-efficacy was the only construct for which we detected a statistically significant difference as a function of frame assignment. Overall, the mix-framed message resulted in the highest scores. The gain-framed message was the least influential on four constructs. This finding is in contrast to findings that gain-framed oral health messages are most influential (Gallagher & Updegraff, 2012; O'Keefe & Jensen, 2007).

Conclusions: Community advisory board members determined to use the mix-framed approach in an oral health social marketing campaign with a rural, American Indian audience.

Described as the most common disease of childhood, tooth decay or early childhood caries is a major public health concern affecting 60–90% of low-income and minority children (Phipps, Ricks, Manz, & Blahut, 2012). American Indian (AI) children have been found to have the highest rate of early childhood caries when compared to any other population in the United States (Phipps et al., 2012) and to have four times the risk for unmet dental needs than any other minority group (Flores & Lin, 2013). Reducing the early childhood caries rate is important because primary teeth are needed to speak, eat, and smile and because pain related to untreated decay is among the most common reasons for school absenteeism (U.S. Department of Health and Human Services [USDHHS], 2000).

The most important public health intervention to prevent dental caries is fluoridated municipal water (USDHHS, 2012), but the municipal water available to many residents (U.S. Census Bureau, 2012) in AI communities is not fluoridated. In the

absence of fluoridated water, school-based dental sealant programs are highly recommended to limit dental caries in children (Centers for Disease Control and Prevention [CDC], 2011). Dental sealants use a thin layer of plastic to fill in the pits and fissures present in the chewing surface of molars. This sealant then prevents exposure to sugar and harmful acids, effectively preventing up to 60% of decay in treated teeth (CDC, 2011). Dental sealants are available through the Indian Health Service (IHS) Dental Program and school-based programs. Unfortunately, AI third-graders in Montana did not meet the 50% dental sealant goal set by Healthy People. Only 29% of AI third-graders had dental sealants applied (Montana Department of Public Health and Human Services, 2010).

While the adoption of fluoridated water and improving the rates of applied dental sealants in school-aged children are necessary public health initiatives—alone they are insufficient to address the problem in preschool-aged children. Early childhood caries are on the rise in children aged 2–5 years; thus, the current priority population must be reached before elementary school.

Rural, AI community stakeholders identified a social marketing strategy as a way to promote the use of dental sealants for school- and preschool-aged children. An AI community advisory board (CAB) was convened to create a culturally relevant campaign. Designing a message in culturally relevant terms is supported in the literature documenting the effectiveness of social marketing interventions with AI audiences (Bowen, Henderson, Harvill, & Buchwald, 2012; Montgomery, Manuelito, Nass, Chock, & Buchwald, 2012; Perdue et al., 2011; Sprague et al., 2011) because it includes the affective domain (e.g., attitudes and emotions) as well as the cognitive domain.

While the key concepts of social marketing are well-documented (Andreasen, 1995; CDC, 2014), it was unknown which approach to presenting risk information, known as the risk-framing effect (gain, loss or mixed), would be most effective for increasing adult intention to acquire dental sealants for preschool children in a rural, AI community. The primary purpose of this research was to compare the influence of three dental sealant message framing approaches on seven indices of behavior change to learn which of three framing approaches to use with a rural, AI audience.

Background

Behavior change is the outcome of interest in many health promotion and disease prevention initiatives. Educational interventions are the hallmark of many of these efforts. The authors of the Precaution Adoption Process Model (PAPM) found that individuals needed knowledge, risk perception, and self-efficacy information to advance through the stages of change and adopt the desired behavior (Weinstein, Rothman, & Sutton, 1998). While the importance of these three constructs in behavior change is well-established, the best mechanism for presenting the risk-perception information is not.

Whether the risk-perception information should be presented in terms of the advantages or the disadvantages of adopting the health behavior has been studied extensively. Experts analyzed 35 published reports on the influence of message framing and concluded that the answer differs by topic and audience (Akl et al., 2011). O'Keefe and Jensen (2007) reported that gain-framed messages advocating dental hygiene behaviors resulted in statistically and clinically significant improvements when compared to loss-framed messages, but none of the nine studies included in their meta-analysis were specific to the use of dental sealants or an adult, AI audience. In another study of message framing advocating the use of dental floss to undergraduate students, the authors reported that individuals could be classified as either approach- or avoidance-oriented and that the appeal of either gain- or loss-framed messages varied according to this individual attribute (Sherman et al., 2006). These results imply that a mix-framed message would have the required elements to appeal to both audience subgroups and be the most useful in a diverse setting such as a clinic waiting-room. As there was no definitive evidence whether gain-, loss-, or mix-framed messages were more effective in promoting adoption of dental sealants with an AI audience (Akl et al., 2011), the aims of this research project were to (1) construct and test the subscales, (2) determine whether there are associations between framing approach and higher knowledge, risk perception, self-efficacy, intention, inclination, social norms, and stage-of-change scores in a predominantly AI population, and (3) document perceived barriers to oral health care in anticipation of later stages of a social marketing campaign for acquiring dental sealants.

Methods

Design and sample

We enrolled a convenience sample of 89 age-eligible participants (see Table 1) who were attending a community college health fair on April 10, 2013. The principal investigator and one research assistant made a short presentation about the research project and invited attendees to participate by filing into one of three classrooms where they viewed only one of the three versions of the dental sealant message. Participants answered one pretest question and then watched their assigned message before completing the rest of the questionnaire. As participants completed their questionnaires, they were each issued a $15 grocery-store gift card. The research protocol was approved by the Local Institutional Review Board (13-305) and oversight was provided from the Local Tribal Business Council (Resolution 208-2012).

Dental sealant messages. Andreasen (1995) six benchmark criteria for social marketing research were met in the design of all three messages. For example, the intervention attended to behavioral determinants such as costs associated with accepting or rejecting the action and alignment of the action with internal and external values (Gainforth, Cao, & Latimer-Cheung, 2012). Among Andreasen's six benchmark criteria is the requirement that the intervention be based on formative consumer research. In this study, formative consumer research was operationalized in two phases. First, this was a community-engaged research project. Specifically, identification of the problem of reducing early childhood caries through the design and implementation of a social marketing campaign came from CAB members.

In collaboration with the principal investigator and graphic designer, CAB members drafted the prototype message which was 2 min and 18 s long and featured 14 frames (see Table 2). The message was silent and required the viewer to read the text. Silent messages are preferred over audio messages to avoid disturbing clinic patients or staff (Loeb, 2008). The animated message included a banner of photos across the top that spanned several frames, while the text and design animations appeared midway through each frame. Word choices and graphic elements were the focus of seven rounds of drafts and revisions with the DST vendor, Vericom Spectrio Corporation (see Fig. 1). As examples of how

TABLE 1. *Results of Nonparametric Chi-Square (χ^2) and ANOVA (F)* Analyses for Differences by Group Assignment of Participants in Dental Sealant Message Framing Experiment (n = 89)

		Message assignment					
	Total *N* (%)	Mix (n = 23) *N* (%)	Gain (n = 34) *N* (%)	Loss (n = 32) *N* (%)	*df*	χ^2	*p*
American Indian	85 (97.7)	23 (100)	31 (96.9)	31 (96.9)	4,87	3.45	.48
Female	60 (68.2)	13 (56.5)	25 (75.8)	22 (68.8)	2,88	2.32	.31
Parents/Caregivers	37 (41.6)	12 (52.2)	13 (38.2)	12 (37.5)	2,89	1.44	.49
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*df*	*F*	*p*
Participant age	33.1 (14.4)	33.3 (13.5)	35.4 (16.8)	30.6 (12.2)	2,85	0.92	.40
No. of children 2–5 years	.99 (1.5)	1.56 (2.02)	0.74 (1.21)	0.84 (1.39)	2,86	2.28	.11
Knowledge	68.2 (19.8)	75.4 (11.6)	65.4 (24.7)	66.3 (17.7)	2,89	2.05	.13
Intention	4.46 (.64)	4.51 (0.67)	4.29 (0.61)	4.60 (0.61)	2,85	2.07	.13
Self-efficacy	3.89 (0.59)	4.09 (0.62)	3.64 (0.54)	3.99 (0.52)	2,85	5.34*	.007
Risk perception	4.08 (0.46)	4.18 (0.39)	4.01 (0.45)	4.07 (0.52)	2,84	0.88	.42
Social norms	3.44 (0.43)	3.39 (0.37)	3.46 (0.51)	3.46 (0.40)	2,86	0.23	.80
Change in PAPM	1.17 (1.9)	1.30 (2.58)	1.35 (1.70)	0.88 (1.50)	2,86	0.60	.55
Inclination	4.27 (0.61)	4.40 (0.49)	4.22 (0.66)	4.22 (0.65)	2,86	0.75	.47
Emphasis	2.50 (2.04)	2.56 (2.06)	2.48 (2.02)	2.47 (2.13)	2,83	.016	.98

Note. Interesting, Informative, Believable, Tone, and Emphasis were each assessed on a 0–5 Scale. PAPM was measured on a 0–7 Scale. Knowledge items were scaled to a percentage.
*$p < .05$.

TABLE 2. *Comparison of the Frame by Frame Content Included in Each of the Three Dental Sealants Messages*

Frame number and text	SMP[a]	PAPM[b]	Frame
We all Want to protect our children and see them smile	Value		M, G, L
Did you know that dental sealants can help them do both	Barrier	KN	M, G, L
In treated teeth dental sealants can prevent up to 60% of tooth decay	Barrier	KN	M, G, L
Go to the dentist to apply sealants as soon as your child's first back tooth comes in	Barrier	KN	M, G, L
Sealants protect teeth from cavities	Barrier	KN	M, G, L
Sealants are invisible and pain free		RP	M, G
Most local families do not get fluoride in their water	Barrier	KN	M, G, L
Sealants protect teeth like an umbrella or helmet		RP	M, G
Tooth decay in young children is on the rise		RP	M, L
Sealants can help prevent a painful trip to the dentist		RP	M, L
Left untreated, tooth decay can lead to poor health and small smiles		RP	M, L
IHS Insurance pays for dental sealants and it takes less than 1 hr		SE	M, G, L
Call 338-6180 or 338-2044 [Heart Butte] to schedule your appointment today	Ask	SE	M, G, L
Help Our Kids to Smile Indian Style	Vision		M, G, L

Note. M = Mix-Framed; G = Gain-Framed; L = Loss-Framed; RP = Risk Perception; KN = Knowledge; SE = Self-Efficacy.

[a]Social Marketing Principles (SMP) require that message elements (1) address a value commonly held by members of the audience, (2) address the likely barrier(s) to action, (3) ask the viewer to perform a specific action, and (4) identify the shared vision that will result from the behavior change.

[b]Precaution Adoption Process Model (PAPM) theory suggests three antecedents to behavior change: knowledge, risk perception, and self-efficacy.

the message was created in a culturally relevant way, the term "molar" was changed to "back tooth," and clock hands were converted to feathers in a clock-face illustration of the quantity "60%."

The second phase of "formative consumer research" was creating three versions of the message to determine which framing approach was associated with increased community member's scores on the dependent variables the most. The three versions of the message only differed in the presentation of risk-communication items (see Table 2). Gain-framed messages identified the benefits of children getting dental sealants, loss-framed messages identified the risks of children not getting dental sealants, and the mix-framed message conveyed both the benefits and risks. For example, the mix-framed approach communicated both the benefits of sealed teeth (i.e., sealants are invisible and pain free) and the costs of unsealed teeth (i.e., painful and expensive trips to the dentist to have a cavity filled). Each message was directed at parents and caregivers in the viewing audience and concluded with a call to action.

Measures

The questionnaire used to assess participants on the seven indices of behavior change was largely adapted from the instruments developed by Ajzen (2002) and Latimer et al. (2008) with 18 of the 46 items developed specifically for this study. The 46 items assessed knowledge (nine items), risk perception (11 items), self-efficacy (six items), social norms (10 items), intention (three items), inclination (four items), stage-of-change (one item), and perceptions of the message (two items).

Each of these constructs has been established in the psychology literature as important for influencing human behavior change. Knowledge was defined for this study as a cognitive process where information about dental sealants (CDC, 2013) is evaluated and from which factual awareness results. Knowledge was operationalized as a multi-item index to gage how much participants learned from the intervention message. Risk perception was defined as the subjective assessment people make about the danger of leaving their children's teeth unprotected. Self-efficacy was defined from the Theory of Planned Behavior as the confidence the individual has in his/her ability to successfully perform the behavior required to produce the desired outcomes (Bandura, 1977). Social norms were defined for this study as the belief that others expect the positive behavior from the individual (Ajzen, 2002). Stage-of-change was defined

Figure 1. Stillshot of Frame 8 illustrating that the sealant provides an invisible layer of protection over the tooth surface

from the Transtheoretical Model as an individual's readiness to act on a new health behavior (Prochaska & DiClemente, 1983; Weinstein & Sandman, 2002).

While there are important differences between the Theory of Planned Behavior and stage theory, both theories have an intermediate outcome measure between the influential variables (i.e., knowledge, risk perception) and the adoption of the healthy behavior. In the Theory of Planned Behavior, the intermediate outcome measure is intention and in stage theory the intermediate outcome is stage-of-change. Higgins (2000) proposed that inclination is another important mediating variable in behavior change. Stage-of-change was assessed using one Likert-style item both before and after viewing the message. The participants scored themselves on a 7-point continuum ranging from "never heard of sealants" to "will continue to have my children treated with sealants." Intention was measured using three items and inclination (informative, interesting, believable, and tone) was measured using four items all measured on a 5-point scale. Items were shuffled to avoid consecutive questions on the same construct. Six items were reverse-coded to deter serial responses from participants. Multiple-choice and Likert-style scales were used to avoid monotony in the questionnaire. A copy of the instrument is available by written request of the primary author.

Analytic strategy

We performed descriptive and inferential analyses using the Statistical Package for the Social Sciences 21.0 after the database was created (IBM Corporation, 2012). A random selection of 10% of the data was back-checked with the original survey. After data cleaning, the 10 social norms items were reduced to seven because more than half of participants recorded "don't know" responses to three items. The remaining items were then scored and averaged. We used chi-square tests to compare categorical demographic variables, one-way analysis of variance for all comparisons between groups on age, knowledge, the scales, and the change scores. We used a paired samples *t* test to compare participant's scores on the PAPM before and after watching the message.

Results

Health Fair participants ($n = 89$) who reported their age ($n = 88$, $M = 33.1$, $SD = 14.4$) ranged in age from 18 to 79 years [18–20 ($n = 12$), 21–30 ($n = 39$), 31–40 ($n = 12$), 41–50 ($n = 14$), 51–60 ($n = 7$), 61–70 ($n = 2$), and 71–80 ($n = 2$]. Most participants who reported gender ($n = 88$) were female ($n = 60$, 68.2%). Nearly all participants self-identified as AI ($n = 85$, 97.7%) with one each identified as Caucasian (1.1%) or other (1.1%). About half of participants ($n = 50$, 52.4%) had children

between the ages of 2–5 years in their care [1 (n = 14), 2 (n = 12), 3 (n = 2), 4 (n = 1), 5 or more (n = 8)].

Psychological variables

Participants were assessed on readiness to acquire dental sealants using the PAPM. The mean difference in participant's stage-of-change scores was 1.17 (n = 89, SD = 1.90) demonstrated a significant improvement for all groups after watching any variant of the dental sealant message $t_{88} = 5.81$, $p < .0001$, 95% CI [0.77–1.57].

One-way analysis of variance was used to compare participants' pre-postscores on the PAPM ($F_{2,86} = 0.60$, $p = .55$). One-way analysis of variance was also used to evaluate the effect of frame assignment on the following scales: risk perception ($F_{2,84} = 0.60$, $p = .55$), intention ($F_{2,85} = 2.07$, $p = .13$), inclination ($F_{2,86} = 0.76$, $p = .47$), knowledge ($F_{2,71} = 1.3$, $p = .28$), and self-efficacy ($F_{2,85} = 5.34$, $p = .007$). Self-efficacy was the only construct for which we found a statistically significant difference as a function of frame assignment. Bonferroni post hoc comparisons of the three groups indicated that the mix-framed message (M = 4.09, 95% CI [.081, .824], $p = .011$]) and the loss-framed message (M = 3.99, 95% CI [0.014, 0.69], $p = .038$) produced significantly higher self-efficacy scores than the gain-framed message (M = 3.64). The mean difference between the self-efficacy scores of participants assigned to mix-framed and loss-framed messages was not statistically significant (mean difference = .099, $p = 1.0$, 95% CI [−.27, 0.47]).

Reliability statistic

The internal reliability of the items measuring each construct was calculated using Cronbach's alpha (Vogt, 2005): risk perception (alpha = .68, n = 87), self-efficacy (alpha = .55, n = 88), intention (alpha = .75, n = 88), inclination (alpha = .78, n = 87), and social norms (alpha = .31, n = 87). As knowledge is an index rather than a scale, a reliability coefficient was not calculated.

Barriers to care

Participants (n = 69, 77.5%) provided 85 responses to the open-ended question, "What barriers do you think prevent families from getting dental sealants for their children?" Participant responses ranged from explanations at the individual level to the community and structural level consistent with Fisher-Owens et al. (2007) theoretical framework. The primary system-level barrier identified by participants (n = 18, 26.1%) was access to services with comments about the scarcity of initial and follow-up appointments, the lack of extended hours for working families, and the practice of having people line up before business hours for walk-in appointments. The lack of convenient transportation can be thought of at either the individual or system level but is suggested here as a system-level barrier. The line for walk-in appointments starts as early as 6:00 a.m., but appointments with the ride service do not begin until 8 a.m. when the appointment slots for the day have already been assigned. Financial barriers to seeking oral health care and lack of trust in the system were also mentioned (n = 8, 11.6%).

Individuals-level barriers to seeking dental sealants were identified as lack of information and lack of effort. Many participants (n = 20) thought that families lacked information on the benefits and drawbacks of dental sealants in particular and oral health care in general. Nearly an equal number (n = 18) noted that apathy, laziness, poor time management, and busy lives of parents resulted in an overall lack of effort to take their children to the dentist for sealants. Additional responses included a lack of awareness of opportunities with IHS, financial assistance, and the Ride Service. Drug and alcohol dependence (n = 2), fear of the dentist (n = 1), and school absenteeism (n = 2) were other suggestions. Dental and screening services through the Head Start, Early Head Start, and public school systems are provided by IHS outreach to supplement the dental care families arrange at the dental clinic independently. Low enrollment in preschool programs and chronic absenteeism can be understood as barriers to dental care in this context.

Discussion

Message

The most important finding of this study was that viewing any message on dental sealants improved intention and PAPM scores without regard to framing approach. This finding underscores the fundamental role of raising awareness in any health promotion campaign.

Self-efficacy was the only dependent variable that differed significantly as a function of frame assignment where the mix- and loss-framed messages yielded superior results to the gain-framed message. The gain-framed message was the least influential on the measured constructs of knowledge, intention, self-efficacy, and risk perception. This finding is in contrast to the predominant conclusions in the literature that gain-framed dental hygiene messages and prevention messages in general are most influential (Gallagher & Updegraff, 2012; O'Keefe & Jensen, 2007). This finding does support the conclusions of Sherman et al. (2006) who concluded that in a diverse audience the message framing should appeal to both approach and avoidance personality styles.

It is important to note that participants in this study were not able to discern which message frame they had been assigned to watch and rated all three versions as having a positive tone and focusing on the benefits of dental sealants for children (see Table 3). This is also an important finding to discuss in terms of the existing literature. One hypothesis O'Keefe and Jensen (2007) considered as an explanation for why gain-framed messages were significantly better than loss-framed messages on the issue of dental sealants was related to the "dose" of positive or negative information. In this study where the supremacy of gain-framed messaging for dental health messaging was not supported, the "dose" may be the explanation. Perhaps, the positive and negative features of the three different framing assignments were not extreme enough to evoke similar findings to other published studies.

TABLE 3. *American Indian Health Fair Participants Perception of Message Tone* (n = 86) and Emphasis (n = 88) Compared with Assignment to Mix-Framed, Gain-Framed, or Loss-Framed Message Design

	Mixed *N* (%)	Gain *N* (%)	Loss *N* (%)
The overall tone of the message was?			
Mixed	0	3 (8.8)	1 (3.2)
Positive	23 (100)	31 (91.2)	30 (96.8)
Negative	0	0	0
Would you say the message focused on?			
Both risks and benefits	6 (26.1)	11 (33.3)	7 (23.3)
Benefits	14 (60.9)	21 (63.6)	22 (73.3)
Risks	3 (13.0)	1 (3.0)	1 (3.3)

Questionnaire

The reliability statistic indicated that the items measuring intention, inclination and risk perception cohered well and precisely measured participants' responses on these constructs. The scales were less reliable for self-efficacy and social norms. The low reliability results for self-efficacy also provided a learning opportunity for the research team. The dental sealant message informed the audience that IHS insurance pays for children's dental sealants but participant's agreement varied broadly with the item, "How certain are you that insurance will pay for children's dental sealants?" This self-efficacy item may not have been a good measure of self-efficacy as clients may have had a bad experience or no experience with IHS Insurance. There was also a broad variation in response to the self-efficacy item, "How confident are you that an appointment would be available if you called to have dental sealants applied?" From the comments participants recorded about the barriers to dental care, many identified the scarcity of appointments and inconsistencies experienced with IHS insurance making these imperfect assessment items for self-efficacy. In future work, the construct of control beliefs may be a better variable than self-efficacy. From the Theory of Planned Behavior, control beliefs are defined as beliefs about the facilitators and barriers to action (Ajzen, 2002)—a more appropriate theoretical construct in this application. In future work, we will redesign the items to improve the internal consistency reliability to an alpha at or above 0.7.

Participants shared their opinions on the barriers that prevented families from getting dental sealants. The responses provided a broad framework for community-based interventions to improve access to oral health care—a focus area of the Healthy People 2020 Oral Health Objectives (USDHHS Healthy People 2020, 2011a,b). In response to the opinions that lack of parental knowledge was an important barrier, the CAB members developed a set of five digital signage messages addressing common dental myths and six messages addressing age-specific dental guidelines for parents to follow from pregnancy through age 5 years (e.g., Take your child for a chair ride at the dentist for his/her first birthday).

"Fear of the dentist" was another barrier identified by a study participant that the CAB members wanted to address immediately. Members reflected on this barrier and concluded that shame because of the condition of their teeth and inadequate pain management in past dental encounters were the likely root causes. A new digital signage message was created that included playful poses with the dentists and hygienists with the text, "We all love to laugh and smile and eat good food, but fear of pain and shame may keep us from seeing the dentist. The shame and pain is old news! Trust our friendly, caring staff to keep you smiling." This message is currently displayed as part of the content loops displayed at a rural IHS clinic and the Women, Infant, and Children Clinic.

Efforts to educate parents about dental sealants and "customer-service" initiatives to improve their experience in accessing dental care are important individual- and family-level actions to take. Social marketing proponents suggest that where the audience-identified factors converge is the best place to direct social marketing efforts (CDC, 2014). Therefore, the issues of how to allocate dental services and how to integrate the transportation services with dental services are rich areas for discussion and future intervention.

One limitation of this study was the approach to convenience sampling, whereby groups were enrolled consecutively rather than simultaneously. A second weakness in this study was the inclusion of social norms items on the survey when only about one quarter of third-graders have had sealants applied rather than more than 50% that would be required when using social norms theory. Finally, the authors recognize that intention to adopt a behavior is a different thing than adopting it. The research team is planning follow-up studies to evaluate the utility of the dental sealant message for increasing the percentage of children who actually have dental sealants applied.

A community-based experiment was conducted to determine which of three framing approaches to a dental sealant message was the most influential among adult viewers. Participants' scores demonstrated improvements in stage-of-change across all three assignments, supporting the utility of a social marketing campaign to increase the use of dental sealants without regard to a framing effect. The mix-framed message yielded the greatest advancements in stage-of-change and the highest scores for other indices of intention to acquire dental sealants. While authors (O'Keefe & Jensen, 2007; Rothman & Salovey, 1997) of the prevailing literature on message framing have reported that gain-framed messages should be the most influential for a minimally risky behavior such as getting dental sealants, the findings of this study found only one significant difference by framing approach. Self-efficacy scores for getting dental sealants were significantly higher for participants who viewed the mix-framed message.

The CAB members evaluated the results of this study and decided that the mix-framed message was the best of the three messages. They determined that it was the version to be displayed on the digital signage monitors in their IHS and Women, Infant, and Children Clinics. In response to barriers to acquiring dental sealants shared by study participants, the team created additional static messages to address commonly identified barriers to oral health care including those at the individual and the system levels.

Digital signage technology has the potential for being a valuable health promotion tool with the capacity to display a variety of culturally relevant messages to priority subgroups within the viewing audience. In a community-engaged project, the flexibility to draft and refine messages until the right balance of theory and appeal is achieved is a valuable tool. Digital signage technology is a contemporary approach for displaying community-designed messages that may help increase awareness of and access to pediatric dental sealants in a rural, tribal community.

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