

Persuasive Oral Hygiene Communications in Uruguay and Spain

LA COMMUNICATIONS D'HYGIENE BUCCO-DENTAIRE PERSUASIVES EN URUGUAY ET L'ESPAGNE

Yvonne A.B. Buunk-Werkhoven^{1,*}

Arie Dijkstra¹

María Eugenia Jaso²

Sebastián Acevedo²

Gustavo Parodi Estellano²

José Manuel Almerich Silla³

Abstract: This experimental intervention study examined the extent to which the persuasive effects of positively and negatively framed messages designed to promote oral hygiene behavior, were moderated by individual differences. Firstly, two measures of regulatory focus (i.e., promotion and prevention focus) were tested as moderators. Secondly, two contextual individual differences (i.e., level of education and country) were tested as moderators. One hundred and fifty five dental patients who visited a dental faculty in Montevideo (Uruguay) and a dental faculty in Valencia (Spain) participated in this study. They were at each faculty randomly assigned to the positive or the negative frame condition and completed a multiple culturally adapted questionnaire. The results showed that regulatory focus and level of education moderated the persuasive effects of both message frames, but that the direction of the moderation depended on country. This study illustrates that message framing effects in a naturalistic setting, just before the examination or treatment started, can have differential effects depending on the individual's regulatory focus, education level and the country in which it is applied. Although not all results patterns could be explained satisfactorily, the patterns strongly suggest that messages tailored to individual differences may be more effective than a so called 'one-size fits all' approach.

¹ Dept. of Social Psychology, University of Groningen, The Netherlands.

*Corresponding author: Yvonne A.B. Buunk-Werkhoven, RDH, PhD, ^{P/A} Dept. of Social Psychology, University of Groningen, Grote Kruisstraat 2/1, 9721 TS Groningen, The Netherlands.

E-mail: yvonne@apbuunk.com

² Facultad de Odontología, Universidad Católica del Uruguay

³ Universitat de València, España.

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Resumé: Cette intervention expérimentale a examiné la mesure à lequel les effets persuasifs positif et négatifs encadrés des messages conçus pour promouvoir le comportement d'hygiène bucco-dentaire, ont été modéré par des différences individuelles. Premièrement, deux mesure de centre réglementaire (c'est-à-dire, la promotion et le centre de prévention) a été évaluée comme des modérateurs. Deuxièmement, deux différentes individuelles contextuelles (soit, le niveau d'éducation et le pays) ont été évaluées comme des modérateurs. Cent cinquante-cinq patients dentaires qui ont visité une faculté dentaire à Montevideo (l'Uruguay) et une faculté dentaire à Valence (l'Espagne) ont participé à cette étude. Dans chaque faculté leur ont été assignée aléatoirement au positif ou négatif de la condition de cadre et ont complété un questionnaire de culture multiple adapté. Les résultats ont montré que le centre réglementaire et le niveau d'éducation ont modéré les effets persuasifs des messages des cadres, mais que la direction de la modulation dépend du pays.

Cette étude illustre ce message en encadrant des effets dans un cadre naturaliste, juste avant l'examen ou le traitement commencé, peut avoir des effets différentiels selon le centre réglementaire de l'individu, le niveau d'éducation et le pays dans lequel il est appliqué. Bien que ce n'est pas tous les résultats de modèles peuvent être expliqués d'une manière satisfaisante, les modèles suggèrent fortement que les messages façonnés aux différences individuelles puissent être plus efficaces qu'une approche appelé 'une taille convient à tout'.

Mots-clés: Centre réglementaire; Cadrage de message; Communication persuasive; Hygiène bucco-dentaire; Différences contextuelles

INTRODUCTION

Although adequate daily home oral care and regular visits to a dental hygienist or dentist are the best guarantee for maintaining oral health, many people fail to adequately take care of their teeth (Syrjälä, Knuuttila, and Syrjälä, 1992a, b): Non-compliance with oral self-care recommendations is a major problem in preventive dentistry (Sniehotta, Araújo Soares, and Dombrowski, 2007). One of the first steps in the promotion of oral health is the use of oral health messages aiming to persuade individuals to change their unhealthy oral habits or their inadequate oral hygiene behavior.

Persuasive messages mostly include outcomes of adequate oral self-care, and overall, these outcomes can be presented in two distinct ways. They may either emphasize the negative consequences of poor oral self-care, or emphasize the positive consequences of adequate oral self-care. A *positively* framed message emphasizes the benefits of engaging in a specific behavior, whereas a *negatively* framed message emphasizes the costs of failing to engage in a specific behavior. For example, individuals with adequate oral hygiene self-care have a better oral health, which means healthy gum, a fresh breath odor et cetera, and whereas individuals with inadequate oral hygiene self-care have a poor oral health, which means unhealthy gum, a bad breath odor et cetera. (Donovan and Jalleh, 2000; Dijkstra, Schakenraad, Menninga, Buunk, and Siero, 2009; Mann, Sherman, and Updegraff, 2004; O'Keefe and Jensen, 2007; Rothmann and Salovey, 1997). There is evidence that, in general, positively framed messages are, more so than negatively framed messages, effective in promoting oral hygiene prevention behaviors, such as using mouth rinse or floss (Mann et al., 2004; Rothmann, Martino, Bedell, Detweiler, and Salovey, 1999; Sherman, Updegraff, and Mann, 2008; Uskul and Oysermann, 2009). However, recent developments in the field of message framing

show that framing effects may depend on individual differences (Dijkstra, et al., 2009; Mann et al, 2004; Sherman et al., 2008; Updegraff et al., 2007; Uskul and Oysermann, 2009; Uskul et al., 2009). The goal of the present experiment is to explore the persuasive effect of positively and negatively framed messages in changing oral hygiene behavior, with the focus on the moderating effects of individual differences.

Regulatory Focus in the domain of health

One individual difference that is conceptually related to positive and negative framing is the person's regulatory focus. Based on the motivational principle that individuals generally approach pleasure and avoid pain, Regulatory Focus Theory (Higgins, 1997, 1998) distinguishes between two distinct personal goal orientations, i.e., a focus on aspirations and accomplishment (i.e., promotion focus) and a focus on responsibilities and safety (i.e., prevention focus). A person who is basically *promotion* focused is more interested in obtaining positive outcomes, for instance a bright smile and white teeth. A person who is basically *prevention* focused is more inclined to avoid negative outcomes, for instance cavities and bad smell (Higgins and Spiegel, 2004; Lee and Aaker, 2004).

Extending the idea that individuals can pursue these two different kinds of regulatory goals, Lockwood, Jordan, and Kunda (2002) demonstrated that individuals are motivated by role models who encourage strategies that fit their regulatory concerns. Promotion focused individuals are most inspired by positive role models or positive outcomes. That is, they are focused on strategies for achieving success, promotion strategies. In contrast, prevention focused individuals are most motivated by negative role models or negative outcomes. That is, they are focused on strategies for avoiding failure, prevention strategies. In sum, individuals are sensitive for information that fits their dominant regulatory focus (i.e., promotion or prevention), and they show enhanced motivation and performance when they are encouraged to pursue strategies that match their regulatory concerns (Higgins, 2000).

With regard to persuasion, it can be expected that because promotion focused individuals are more sensitive to positive outcomes as these positive outcome more strongly fulfil their need (to approach these outcomes), they will be more persuaded by a message in which the outcomes are framed positively. Similarly, because prevention focused individuals are more sensitive to negative outcomes as these negative outcome more strongly fulfil their need (to avoid these outcomes), they will be more persuaded by a message in which the outcomes are framed negatively. Thus, a match between the person's goals orientation or focus and the message frame is thought to lead to more persuasion. Such a match may be due to the experience of "feeling right" while processing the message. "Feeling right" is a non-affective subjective experience caused by reading a message that fits one's regulatory focus. This experience can be a source of information in the process of evaluation of a message. When a person experiences such a regulatory fit, the goal pursuit activity (the reading) 'feels right', and in turn, this feeling could positively inform the evaluation process, thereby increasing persuasion (Cesario, Grant, and Higgins, 2004; Cesario, Higgins, and Scholer, 2008).

Contextual differences

The same mechanism of "feeling right" might be involved when a message matches cultural or socio-economic individual differences. A match between message content and such salient contextual themes may also lead to a subjective experience of "feeling right," thereby influencing the evaluation process and persuasion. Relevant cultural or socio-economic difference might be related to regions, countries, and ethnic groups.

There are profound differences in oral health behavior across regions, countries, and ethnic groups (Schou, 2000; Sakki, Knuuttila, and Antilla, 1998; Davidson, Rams, and Andersen, 1997; Ronis, Antonakos, and Lang, 1996). Such differences may influence the relationship between psychological factors on the one hand and oral health behavior on the other hand. For example, Buunk-Werkhoven, Dijkstra, Bink, van Zanten, and van der Schans (2011) show that predictors of oral health behavior differed

for people in Nepal compared to people in the Caribbean (Aruba and Bonaire). To the extent that different factors are associated with oral health behavior in diverse contexts, the persuasive effectiveness of oral health messages in promoting oral hygiene behavior may also differ between these contexts. Indeed, according to Uskul et al. (2009), white British individuals with a strong promotion focus were more persuaded (i.e., had more positive attitudes and stronger intention to floss) when given the gain-framed message, whereas East-Asian individuals with a stronger prevention focus were more persuaded (i.e., had more positive attitudes and stronger intention to floss) when given the loss-framed message. Moreover, in another study of Uskul and Oysermann (2009) about cultural context on persuasive communication, there is evidence that health messages matched to salient cultural frames increase the persuasiveness. For instance, culturally relevant messages are more persuasive when the participants were reminded of their chronically relevant cultural-orientation. In the present study we use country, Uruguay versus Spain, as indicator of an individual cultural and socio-economic state.

Education

Not only regulatory focus and the cultural context, but also the educational level of people may affect the persuasiveness of oral health related messages. Results from earlier reports have shown that oral hygiene habits are related to the level of education (Lin, Wong, Wang, and Lo, 2001; Syrjälä et al., 1992a, b). Partly as a result of this, the recipient's level of education may influence the information processing of messages on oral hygiene. Based on the Elaboration Likelihood Model of persuasion, individual's beliefs or attitudes are formed or changed by a persuasive message through either a central or peripheral route (ELM; Petty and Cacioppo, 1986). The route depends upon the degree to which the person is both motivated and able to think about, consider or elaborate on the message. Level of education may be related to both determinants of message processing, to the motivation and to the ability to process and elaborate on the information. Lower educated people can be expected to be less motivated and less capable to process health messages (Jones, Lee, and Rozier, 2007; Rudd and Horowitz, 2005). The low motivation and the low ability represent low involvement in the topic of the message, thereby leading to more peripheral and less central processing. Thus, lower level of education might be related to more peripheral and less central processing. At least three studies show that low involvement was related to stronger persuasive effects of positive compared to negative outcome frames (Maheswaran & Meyers-Levy, 1990; Martin & Marshall, 1997; Donovan and Jalleh, 2000). Therefore, low educated recipients may be more persuaded by the positive frame. When we assume that higher educated people are more motivated and more capable to process messages, they may be expected to be more involved. Two studies show that higher involvement is related to stronger persuasive effects of a negative frame (Maheswaran & Meyers-Levy, 1990; Martin & Marshall, 1999). Although the above reasoning provides some directions for expectations on the relation between level of education and framing effects, the theory is weak and indirect (as level of education can only be a rough indicator of involvement) and we do not know any studies that already tested the relation. Therefore, we present the present analyses concerning framing and level of education as exploratory.

The current study

While prior research, for example Uskul et al. (2009ab), has examined effects of matching messages to individuals within different backgrounds of culture, we examined if the messages had similar or different effects in two different cultural and socioeconomic populations, i.e., Uruguay and Spain. These countries with predominantly Caucasian populations are both Spanish speaking, using high context messages in routine communication (Hall and Reed Hall, 1990). The countries could be categorized as non-Western and Western, respectively, and they differ in their historical background, in population (about 3.5 million in Uruguay versus about 45 million in Spain), and in the gross national income per capita (PPP international \$ about 9,940 versus about 28,200, respectively). The general life expectancy at birth is 72/79 years (M/F) in Uruguay, and 78/84 years (M/F) in Spain, whereas in 2003 the healthy life expectancy at birth was 63/69 years (M/F) and 70/75 years (M/F), respectively. The total expenditure on health per capita in 2006 was \$989 in Uruguay and \$2,388 in Spain (WHO, 2009). Here again, we did not have specific hypotheses for a

moderating effect of country; however, as most research on health messages is conducted in affluent Western countries, we felt it was important to examine if the messages were as effective in both countries, with more focus on generalization aspects than on cultural differences.

Finally, according to a meta-analytic review of O'Keefe and Jensen (2007) a limitation of most extant studies on persuasive communication with respect to oral hygiene behavior is that, according to professional oral hygiene standards, the recommended oral hygiene behavior is usually too simple or quite incomplete (e.g., only mouth rinse, brushing or flossing). In line with *evidence-based dentistry*, optimal self-care oral hygiene behavior is not simply a matter of daily removal of dental plaque by 'just tooth brushing and flossing' (Tedesco, Keffer, and Fleck-Kandath, 1991). Although the notion that flossing results in the detection and prevention of gum diseases is not supported by scientific evidence, interdental cleaning is an important complementary aspect of oral self-care (Berchier, Slot, Haps, and van der Weijden, 2008; Galgut, 1991; Hoenderdos, Slot, Paraskevas, and van der Weijden, 2008; Slot, Dörfer, and van der Weijden, 2008). Therefore, in our message an elaborate set of oral hygiene behaviors was recommended.

METHOD

Recruitment, Procedure, and design

The 155 participants in this experimental study were dental patients who visited a dental faculty, 'La facultad de Odontología de la Universidad Católica del Uruguay' in Montevideo (Uruguay sample), and patients who visited a dental faculty, 'La Universitat de València' in Spain (Spain sample). Ethical approval for this study was obtained from the ethics committee of the two departments. The dental patients were invited to take part in this international study on oral hygiene behavior, and after providing informed consent they answered voluntarily a multiple culturally adapted paper-and-pencil-questionnaire in the dental chair in the clinic just before the screening/dental examination or dental treatment. Participants were randomly assigned to complete either the questionnaire, in which the positively framed or the negatively framed oral health message was presented. The persuasive oral health message focused on the positive or negative effects on the Intention to perform Oral Hygiene Behavior (OHB). Before all participants read the oral health message, they filled out the self-regulatory health specific focus (promotion/ prevention) measure, and a measure of the extent to which they engaged in optimal oral care, as defined by professional standards (Buunk-Werkhoven, Dijkstra, and van der Schans, 2010, 2009). After reading the oral health message, all participants completed a set of evaluation questions concerning the message framing; the positive or negative arguments and their opinion. In addition, they filled out a measure assessing their intentions to perform the recommended OHB. Finally, the screening or dental treatment was conducted by dental students.

For the translation of measures in the questionnaire from Dutch into the national language Spanish as its mother tongue, the procedure of Geisinger (1994) was partly used. The measures were first translated into Spanish by three native Spanish speakers of Uruguayan decent (two dental students and a psychologist). Then, each member, working separately, carefully reviewed their three versions of the Spanish translations, and compared it against the English version. In a group meeting the members discussed discrepancies and reconciled all differences and concerns with the translation, until they reached agreement that the language was clear and understandable for the Uruguayan dental patients, and that the instruments tapped the intended construct in this Latino-American subgroup. In the end of the translation process, a formal Uruguayan translator checked the final questionnaire. For the sample in Valencia, the Uruguayan version of the questionnaire was checked and translated into Spanish as its mother tongue by a native Spanish speaker of Spanish decent (a dentist in the dental faculty).

Oral Health Message

The present study employed an oral health message which focused exclusively on intention to perform oral hygiene behavior (OHB). The oral health message included facts about oral health and outlined physical,

psychological and social consequences of performing (or not performing) OHB. The outcomes of the message were framed in two mirrored versions, each of about 400 words, including 25 examples of outcomes. Both versions (i.e., completed texts with mirrored arguments) were educational in tone, and the information about the impact of self-care oral hygiene on oral health differed in how it was presented. The *positively* framed message emphasized the benefits of engaging in an adequate OHB. For example, individuals with an optimal OHB have a better oral health, which means healthy gum, a fresh breath, younger appearance, more self-esteem, more positive reactions in interpersonal relationships, and they have a lower chance of undesirable outcomes, such as cavities or pain, feelings of shame or rejection, stress and disappointment by others. The *negatively* framed message emphasized the costs of failing to engage in an adequate OHB. For example, individuals without optimal OHB have a bad oral health, which means bad and unhealthy teeth, being viewed as less intelligent, weaker, and they have lower chance of desirable outcomes, such as healthy gum, no pain, et cetera. At the end of both messages, the description of an adequate OHB was presented: “brushing your teeth twice a day (once after breakfast and once before going to sleep), using a soft-bristled toothbrush and fluoride containing toothpaste; brushing softly/ without pressure for at least two minutes; brushing stepwise by making small strokes –sort of massage– near the gum, along the inside and the outside, and on the jackdaw areas. In addition to the tooth brushing, daily interdental cleaning (i.e., use of floss, tooth sticks, or interdental brushes) and tongue cleaning was also recommended” (American Dental Associations, 2010; Buunk-Werkhoven et al., 2010, 2009).

Measures

The questionnaire was divided into several parts, and a few demographic questions. Level of education was categorized as low, medium or high. In both countries, a low educational level refers to vocational training, medium level to advanced vocational training, and high level to college/university training.

Regulatory Focus in the domain of health was measured by using 8 items. The *promotion focus* scale consisted of 4 items (example item: “In general, I am focused on promoting a good general health”) (Cronbach’s $\alpha = 0.69$ in Uruguay, and $\alpha = 0.67$ in Spain). The *prevention focus* scale also consisted of 4 items (example item: “In general, I am focused on preventing a bad general health”) (Cronbach’s $\alpha = 0.68$ in Uruguay, and $\alpha = 0.78$ in Spain). Participants rated on 5-point-Likert scale their agreement to the items (1 = *strongly disagree* to 5 = *strongly agree*), and a sum score was computed by summing up scores on the 4 items per scale (ranging from 4 to 20). The higher the score per scale, the more promotion-focused or prevention-focused the individuals tend to be.

Oral Hygiene Behavior is a measure of the extent to which people engage in optimal oral care, as defined by professional standards (Buunk-Werkhoven et al., 2010, 2009). A culturally adapted version of this OHB index, including 8 items with respect to tooth brushing, interdental cleaning and tongue cleaning. For example, the item “I brush my teeth as follows” was supported by pictures showing different brushing methods. The OHB sum score on this index could range from 0 to 16. A higher sum score indicates a higher level of oral self-care.

Text evaluation was assessed by asking participants for their opinion of the oral health message. Participants were asked “To what extent do you think this message was reporting positive arguments on the consequences of OHB?”, “To what extent do you think this message was reporting negative arguments on the consequences of OHB?”, and “To what extent do you think that the text gave you a negative or positive feeling on the consequences of OHB?” These three items were to be answered on 7-points bi-polar adjective rating scales. After recoding the second item, an index for the perceived positive versus negative message framing was constructed by adding these three items. The text evaluation sum score could range from 3 to 21. A higher sum score indicates a more positive and a less negative reception of the message.

Intention to perform adequate oral hygiene behavior was measured using a sum score constructed from 3 items (Uruguay: $\alpha = 0.96$; Spain: $\alpha = 0.94$), e.g., “Do you intend to perform optimal oral hygiene behavior as described, within one year?”, and “Do you intend to ..., within the next six months?” which were answered with endpoints 1 = *absolutely not* to 7 = *absolutely yes*, and “Is it likely that you will start to perform optimal oral hygiene behavior as described, within the next six months?” with the endpoints 1 =

totally unlikely to 7 = *totally likely*. The intention sum score could range from 3 to 21. A higher sum score indicates a higher intention to perform oral hygiene self-care.

RESULTS

Characteristics of participants

In total 80 Uruguayan participants (67.5 % female) were exposed to the framed messages and completed our measures. Their mean age was 35 (14) years (range 18-68). In Valencia the number of participants was 75 (77.3 % female). Their age was 43 (10) years (range 18-74), and they were around eight years older than the participants in the Uruguayan sample, $F(1,154) = 14.44, p < .001$. Less than a half of the participants in Uruguay (44%) and 79% of the participants in Spain were married, $F(1,150) = 3.51, p = .06$. In Uruguay, only 6.3% of the participants had a low level of education, 43% had a medium level, and 50% had a high level of education, whereas the level of education in the Spanish sample varied from low (40%), medium (40%) to a high level (20%), $F(1,153) = 33.82, p < .001$.

In general, in Uruguay as well as in Spain patients reported a reasonably high level of OHB ($M = 11.41, SD = 2.55$ and $M = 11.29, SD = 1.96$, respectively). For instance, the findings of the OHB index showed that 79% of the Uruguayan participants and 88% of the Spanish participants brushed their teeth as recommended, twice a day. In addition, three-quarter of the Uruguayan participants, and 60% of the Spanish participants brushed their teeth in the morning and before they go to sleep for two minutes each time. In Uruguay, 44% of the participants cleaned their tongue daily and 41% sometimes, and in Spain 55% of the participants cleaned their tongue daily and just 13% sometimes. None of the Spanish participants and 14% of the Uruguayan participants reported to not use interdental cleaning methods. In both countries, 88% used fluoride containing toothpaste.

In the following set of analyses (ANOVA), main effects and interactions between the independent variable (Message Framing) and the moderators (Promotion focus, Prevention focus and Education) on Intention to perform Oral Hygiene Behavior are reported. To examine the direction of the differences in the effects of Message Framing related to Promotion-/ Prevention focus, and Level of Education, the contrasts and simple slopes were tested separately in the Uruguayan and Spanish samples.

Manipulation checks

To check if the manipulation of the message framing was perceived as intended in both countries, an ANOVA on the total scores of the three text evaluation items was performed, with Country (Uruguay/ Spain), Message Framing (Positive/ Negative), and Country X Message Framing interaction as factors. The analysis revealed the expected main effect of message framing, $F(1,151) = 4.21, p = .042$, indicating that the positive message was perceived as more positive ($M = 6.16, SD = .85$), than the negative message ($M = 5.85, SD = 1.06$). The ANOVA did neither show a main effect of country, $F(1,151) = .526, p = .469$ nor was the interaction between country and message framing, $F(1,151) = .063, p = .802$ significant. To conclude, these data indicate that the positive and negative message perceptions differed not by country.

The omnibus moderation test

To examine the role of the three moderators (Promotion focus, Prevention focus and Education), in a first analysis a saturated model (using ANOVA) was tested with three 3-way interactions as highest order independent variables and intention to perform OHB as the dependent variable. The three 3-way interactions were:

- a) 2 (Country) X 2 (Message Framing) X Promotion focus,
- b) 2 (Country) X 2 (Message Framing) X Prevention focus,

c) 2 (Country) X 2 (Message Framing) X (Education).

Interestingly, this saturated model showed that of the three 3-way interactions, two were significant and one approached significance. With regard to self-regulatory focus moderation, there was a significant Country by Message Framing by Promotion focus interaction, $F(1,137) = 3.94, p = .049$, and a marginally significant Country by Message Framing by Prevention focus interaction, $F(1,137) = 2.85, p = .093$. This suggests that the effect of message framing on intention to perform OHB depends on regulatory focus (uniquely for promotion focus and for prevention focus) in Uruguay and Spain (Figure 1 and 2). In addition, with regard to education as a moderator, this saturated model revealed a strongly significant Country by Message Framing by Education interaction, $F(1,137) = 9.99, p = .002$. This indicates that the effect of message framing depends on the level of education, and that this relation depended on country (Figure 3).

In order to explore the 3-way interaction effects further, the effects of Message Framing, the three moderators (Promotion focus, Prevention focus and Education), and their interactions were performed for Uruguay and Spain separately. To find the meaning of the above-mentioned significant interactions, a “low” and a “high” group regarding the three moderators were computed. For the moderators promotion focus and prevention focus the complete data set was used to model participants scoring low or high on the specific moderator by respectively subtracting one standard deviation (1 SD below the mean) from the standardized scores, and adding one standard deviation to the standardized scores (1 SD above the mean), using the procedure outlined by Cohen, Cohen, West, and Aiken (2003). Thus a *low promotion (or prevention) focus* represents the participants who relatively less strongly endorse a promotion (or prevention) focus, and a *high promotion (or prevention) focus* represents the participants who relatively more strongly endorse a promotion (or prevention) focus. To test the moderating effects of level of education, this variable was recoded because in the Uruguayan sample only 6.3% reported to have low education: This variable was dichotomized into “low” or “high”. Thus a *low* level of education represent the participants who has a secondary school to advanced vocational training level of education, and a *high* level of education represent the participants who has a college/university level of education.

Promotion focus as moderator

Uruguay

Within the Uruguayan sample, a 2 (Message Framing) X 2 (Promotion-focus) ANOVA on intention to perform OHB neither showed a main effect of Message Framing [$F(1, 75) = 1.70, p = .20, ns$] nor of Promotion-focus [$F(1, 75) = .27, p = .61, ns$] nor was the interaction between Message Framing and Promotion focus significant [$F(1, 75) = 2.29, p = .13, ns$]. Although there was no significant Message Framing by Promotion focus interaction; the planned contrast was conducted to find the meaning of the 3-way interaction in the saturated model. Therefore, a “low” and a “high” promotion focus group were modeled by using the procedure outlined above. As shown in Figure 1, Uruguayan participants with a *high promotion focus* were significantly more persuaded when given the positively framed message ($M = 6.65$) than when given the negative framed message ($M = 6.35$), $F(1, 75) = 4.00, p = .049$.

Spain

Within the Spanish sample, a 2 (Message Framing) X (Promotion focus) ANOVA on intention to perform OHB showed a significant Message Framing by Promotion focus interaction [$F(1, 71) = 5.86, p = .018$]. This model neither revealed a main effect of Message Framing [$F(1, 71) = .59, p = .45, ns$] nor of Promotion focus [$F(1, 71) = 2.25, p = .14, ns$]. Using the same procedure outlined above, Figure 1 showed that Spanish participants with a *low promotion focus* were significantly more persuaded when given the positively framed message ($M = 7.33$) than when given the negative framed message ($M = 6.12$), $F(1, 71) = 5.25, p = .025$. We also examined if the effects remained the same when controlling for education and prevention focus, and that appeared indeed to be the case.

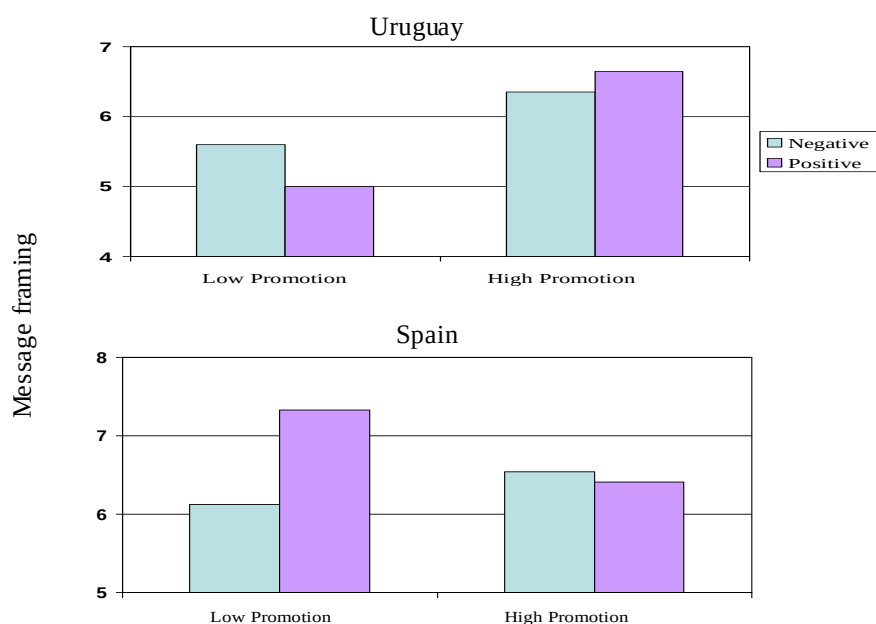


Figure1: The effect of Message Framing and Promotion on Intention to perform OHB

Prevention focus as moderator

Uruguay

Within the Uruguayan sample, a 2 (Message Framing) X 2 (Prevention focus) ANOVA on intention to perform OHB revealed a marginally significant main effect of Prevention focus [$F(1, 75) = 3.44, p = .067$], indicating that the participants who were higher prevention focused tend to have significantly higher intention to perform oral hygiene self practices. This model failed to demonstrate a main effect of Message Framing [$F(1, 75) = 1.77, p = .19, ns$], nor was there an interaction between Message Framing and Prevention focus [$F(1, 75) = .01, p = .93, ns$]. After a “low” and a “high” prevention focus groups were modeled by using the procedure outlined earlier, Figure 2 showed that none of the contrasts were significant.

Spain

Within the Spanish sample, a 2 (Message Framing) X (Prevention-focus) ANOVA on intention to perform OHB revealed a strongly significant Message Framing by Prevention-focus interaction [$F(1, 71) = 9.12, p = .004$]. This model failed to demonstrate a main effect of Message Framing [$F(1, 71) = 1.10, p = .30, ns$] or Prevention [$F(1, 71) = 2.69, p = .11, ns$]. Using the procedure outlined earlier, Figure 2 showed that Spanish participants with a *low prevention focus* were significantly more persuaded when given the positively message ($M = 7.28$) than when given the negative message ($M = 5.94$), $F(1, 71) = 8.49, p = .005$. For participants with a *high prevention focus* there was no significant difference in message framing on intention to perform OHB [$F(1, 71) = 1.68, p = .20, ns$]. Again, we also examined if the effects remained the same when controlling for education and prevention focus, and that appeared indeed to be the case.

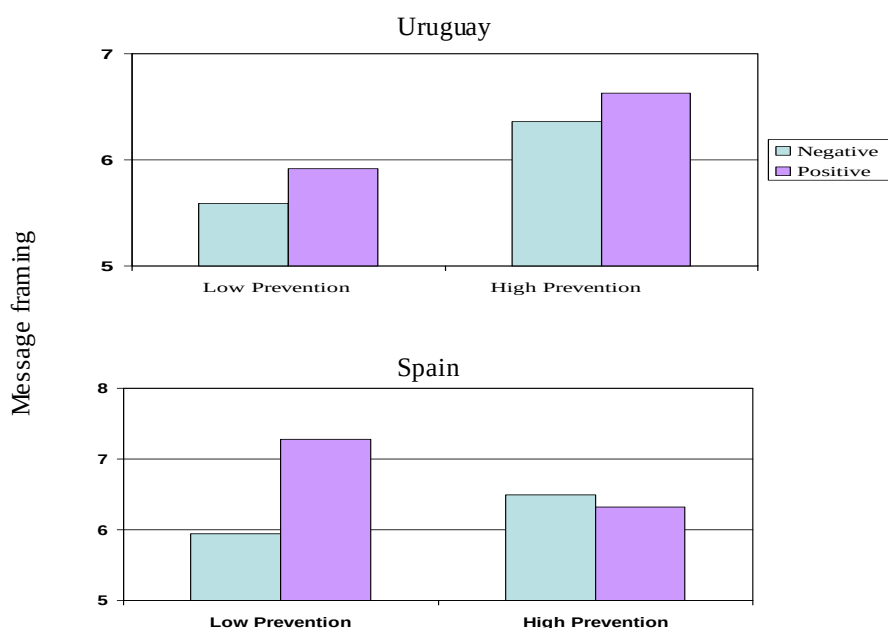


Figure 2: The effect of Message Framing and Prevention on Intention to perform OHB

Education as moderator

Uruguay

Within the Uruguayan sample, a 2 (Message Framing) X (Education) ANOVA on intention to perform OHB revealed a strongly significant Message Framing by Education interaction [$F(1, 74) = 8.19, p = .005$]. This model neither showed a main effect of Message Framing [$F(1, 74) = 1.33, p = .25$ ns] nor of Education [$F(1, 74) = .37, p = .55$, ns]. Again, the planned contrast was conducted to find the meaning of the 3-way interaction in the saturated model. Therefore, a measure of education was created. As shown in Figure 3, T-tests revealed that Uruguayan participants with a *high level of education* were significantly more persuaded when given the positively message ($M = 6.71, SD = .73$) than when given the negative message [$(M = 5.57, SD = 1.92); t = 2.44, p = .02$]. For participants with a *low level of education* there was no contrast of message framing on intention to perform OHB [$(M = 6.08, SD = 1.16$ vs. $M = 6.54, SD = .61); t = -1.51, p = .14$, ns].

Spain

Within the Spanish sample, a 2 (Message Framing) X (Education) ANOVA on intention to perform OHB revealed a marginally significantly main effect of Message Framing [$F(1, 71) = 3.59, p = .06$]. The main effect of Message Framing was qualified by a significant Message Framing by Education interaction [$F(1, 71) = 3.99, p = .05$]. There was no main effect of Education [$F(1, 71) = .52, p = .47$, ns].

As shown in Figure 3, T-tests revealed that Spanish participants with a *low level of education* were significantly more persuaded when given the positively message ($M = 6.71, SD = .49$) than when given the negative message ($M = 6.14, SD = 1.38$); $t = 2.12, p = .04$. For the participants with a *high level of education* ($N = 15$) there was no contrast of message framing on intention to perform OHB [$(M = 5.79, SD = 2.04$ vs. $M = 6.57, SD = .88$); $t = -.94, p = .37$, ns].

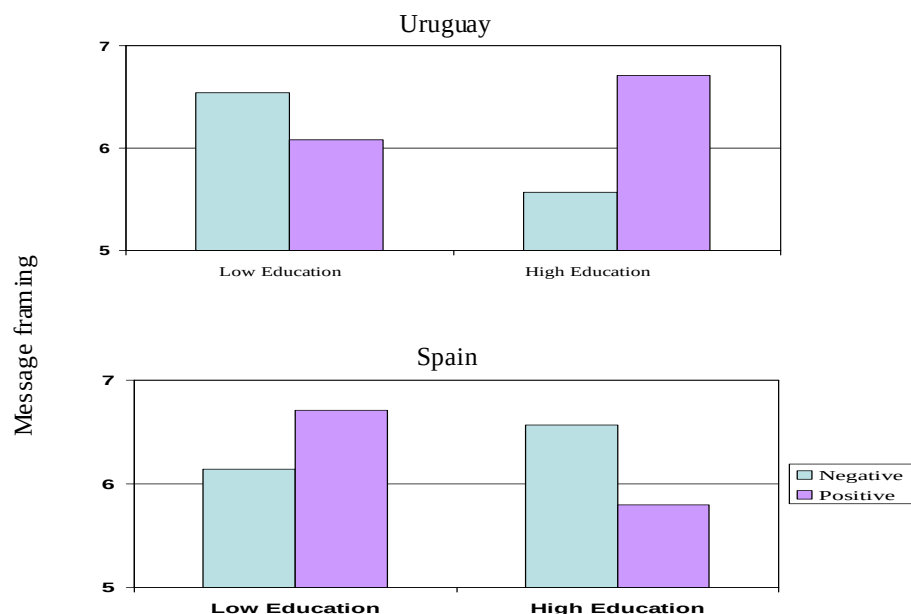


Figure 3: The effect of Message Framing and Education on Intention to perform OHB

DISCUSSION

The present study aimed to explore the persuasive effects of positively and negatively framed messages in promoting OHB, taking into account possible moderators: promotion focus and prevention focus, level of education and country (Uruguay and in Spain).

The manipulation check revealed that the positively framed message and the negatively framed message were successfully formulated: The positive message was perceived as more positive than the negative message, and these message perceptions differed not by country. Thus, there was a basic agreement between participants in both countries about the valence of the messages.

With regard to persuasion, the expected matching effects related to regulatory focus were only found in Uruguay with regard to promotion focus. In Spain and with regard to prevention focus no matching effects could be detected. With regard to level of education, only the finding that low educated (supposedly low involved) participants in Spain were most persuaded by the positive frame was in line with our theorizing on level of processing. In addition, country showed to be a relevant moderator of framing effects: There were significant differences in message framing effects between the Uruguayan and Spanish samples. First, the positively framed message was more effective among Uruguayan participants with a *high* promotion focus, but among Spanish participants with a *low* promotion focus. Second, while in both countries the effect of message framing on intention to perform OHB depended on promotion focus, only in Spain the effect also depended on prevention focus in that among participants *low* in prevention focus, the positively framed message was more effective. Third, Uruguayan participants with a *high level of education*, and in contrast, Spanish participants with a *low level of education* were more persuaded by the oral health message, when given the positively framed message than when given the negatively framed message.

One relevant observation is that in Uruguay, neither promotion or prevention focus significantly moderated the effects of framing. In contrast, in Spain both regulatory focus dimensions did significantly

moderate the framing effects. With regard to level of education, the two-way interaction in both countries was significant. Thus, the state of mind of promotion or prevention seemed to have more complex effects in Spain.

The results also show that for Spanish participants with a strong focus on either promotion or prevention, the type of framing of the message did not matter. It seems that these participants, who are already oriented towards taking care of their oral health, one way or another, do not need a particular message to convince them of the importance of oral hygiene self-care practice. Only Spanish participants who were low in either a promotion or prevention focus seemed to be sensitive to the type of framing in persuasive messages. They responded less favourably to the negatively framed message than to the positively framed message. A possible explanation is that both health-specific measures of regulatory focus are parameters of involvement in health issues. Thus, these Spanish participants may have been less involved in oral health and have fewer goals to attain or maintain a good oral health. This could explain why they were more persuaded by a positively framed text: These Spanish participants might have engaged in more peripheral processing of the persuasive messages (Petty and Cacioppo, 1986) and the positivity of the message may have worked as a peripheral cue (Dijkstra et al., 2009; Maheswaran & Meyers-Levy, 1990; Martin & Marshall, 1999). The finding that, only in Spain, low educated participants were also more persuaded by the positive frame might be explained in a similar way, by assuming that they were low involved and, therefore, processed the messages peripherally.

All taken together, the findings cannot easily be explained and several assumption must be made about the level of processing and to the extent that our measures of regulatory focus and level of education are indices of the level of processing. However, at the least it is safe to conclude that both measures of regulatory focus, level of education, and country are involved in determining what message frame is the most effective.

Because oral health behavior is a so called “preventive behavior” (Rothman & Salovey, 1997), on the basis of Prospect Theory it might be expected that, overall, the positive framing would be more effective. However, the overall main effect of framing was not significant. But *when* a significant difference between the positively and the negatively framed message was present, in all cases the positively framed message was more effective in changing the intention to perform OHB than the negatively framed message. Thus, the underlying idea that when people are exposed to a promise of positive outcomes, they will “play on safe” was only true under certain conditions.

One particular feature of the present study was that, unlike most research in the oral health area (Mann et al., 2004; Rothmann et al., 1999; Sherman et al., Uskul and Oysermann, 2009), a message promoting an extensive set of OHB as recommended by dental professionals was used (Buunk-Werkhoven, Dijkstra, van der Schans, Jaso, Acevedo, and Parodi Estellano, 2008). Such behavior includes tooth brushing (with respect to details like frequency, time of brushing, measures of force, duration in minutes, method, and use of fluoride toothpaste), interdental cleaning (the use of floss, tooth sticks, interdental brushes), and tongue cleaning. Because this behavior is more difficult to practice than the isolated oral behaviors that mostly have been studied (e.g., only flossing), the effects may differ. For example, with regard to the effects of negatively framed outcomes, stronger resistance to the message might be expected when the task is perceived as more difficult (Van’t Riet, Ruiter, Werrij and De Vries, in press).

This study has some limitations. An important theoretical framework was the Regulatory Focus Theory (Higgins, 1997, 1998). However, the positively framed message contained gains as well as non-losses, while the negatively framed message contained losses as well as non-gains. Thus, similar to Uskul et al., (2009a), our messages were especially framed according to the valence of the outcomes (positive versus negative) and not so much according to the type of the outcome (gain versus loss). This operationalization is not entirely in line with Regulatory Focus Theory. However, because of this way of framing, the messages were highly naturalistic, presenting actual outcomes in a natural way.

Another limitation is related to country as a moderator. In the context of this study on persuasion it is not clear how country (Uruguay and Spain) would moderate effects of framing. Country must have been a rough indicator of some psychological state or mechanisms that had moderating power with regard to

framing. The differences between Uruguay and Spain are probably related to the differences in national income, expenditure on health and dental health. These contextual differences are mainly related to poverty and richness, indicating that a low income may be related to less health care facilities, which occurred in Uruguay more than in Spain (WHO, 2009). In addition, these structural environments may shape different cultures that should explain psychological differences in the processing of framed messages.

To conclude, although the precise reasons for the differences between Uruguay and Spain and the other moderators need further investigation, the findings of the present study highlight the fact that the effect of message framing may strongly depend in contextual characteristics. This was illustrated in a naturalistic setting. The current findings not only pose a theoretical challenge, but also support the well-established fact that tailored oral hygiene self-care intervention including exhaustive framed messages may be more effective than a so called ‘one-size fits all’ approach.

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REFERENCES

- American Dental Associations. Cleaning your teeth and gums (oral hygiene). Available at: <http://www.ada.org/3072.aspx?currentTab=1#faq> {last accessed 2010}.
- Berchier, C.E., Slot, D.E., Haps, S. and Weijden, G.A. van der. (2008). The efficacy of dental floss in addition to toothbrush on plaque and parameters of gingival inflammation: a systematic review. *International Journal of Dental Hygiene*, 6, 265-279.
- Buunk, A.P., and Vugt, M. van. (2008). *Applying Social Psychology, From Problem to Solutions*. London: Sage Publications Ltd.
- Buunk-Werkhoven, Y.A.B., Dijkstra, A., Bink, P. Zanten, S. van, and Schans, C.P. vander. (2011). Determinants and promotion of oral hygiene behavior in the Caribbean and Nepal. (*Manuscript submitted for publication.*)
- Buunk-Werkhoven Y.A.B, Dijkstra, A., and Schans, C.P. van der (2010). Determinants of oral hygiene behavior: A study based on the theory of planned behavior. *Community Dentistry and Oral Epidemiology*. DOI: 10.1111/j.1600-0528.2010.00589.x
- Buunk-Werkhoven, Y.A.B., Dijkstra A., and Schans, C.P. van der (2009). Oral health-quality of life predictors depend on population. *Applied Research Quality of Life*, 4, 283-293.
- Buunk-Werkhoven, Y.A.B., Dijkstra, A., Schans C.P. van der, Jaso, M.E., Acevedo, S., Parodi Estellano, G. (2008). Evaluación y promoción de la actitud hacia la higiene oral en pacientes de la Facultad de Odontología de la Universidad Católica del Uruguay [Evaluation and promotion of patients’ oral hygiene behavior in the faculty of Odontology of the Catholic University in Uruguay]. *Actas Odontológicas*, 2, 13-20.

- Cesario, J. Grant, H., and Higgins, E.T. (2004). Regulatory fit and persuasion: transfer from “feeling right.” *Journal of Personality and Social Psychology*, 86, 388-404.
- Cesario, J., Higgins, E. T., and Scholer, A. A. (2008). Regulatory fit and persuasion: Basic principles and remaining questions. *The Social and Personality Psychology Compass*, 2, 444-463.
- Cohen, J., Cohen, P., West, S.G., and Aiken, L.S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences*. Mahwah, NJ: Lawrence Erlbaum Associate Publishers.
- Davidson, P.L., Rams, T.E., Andersen, R.M. (1997). Socio-behavioral determinants of oral hygiene practices among USA ethnic and age groups. *Advanced Dental Research*, 11, 245-53.
- Donovan, R.J., and Jalleh, G. (2000). Positive and negative framing of hypothetical infant immunization: The influence of involvement. *Health Education & Behavior*, 27, 82-96
- Dijkstra, A., Schakenraad, R., Menninga, K., Buunk, A.P., and Siero, F. (2009). Self-discrepancies and involvement moderate the effects of positive and negative message framing in persuasive communication. *Basic and Applied Social Psychology*. DOI: 10.1080/01973530903058441.
- Geisinger, K.F. (1994). Cross-cultural normative assessment: translation and adaptation issues influencing the normative interpretation of assessment instruments. *Psychological Assessment*, 6, 304-312.
- Hall, E. and Reed Hall, M. (1990). *Understanding Cultural Differences*, Yarmouth: Intercultural Press.
- Higgins, E.T. (1997). Beyond pleasure and pain. *American Psychologist*, 52, 1280-1300.
- Higgins, E.T. (1998). Promotion and prevention: Regulatory focus as motivational principle. *Advances in Experimental Social Psychology*, 30, 1-46.
- Higgins, E.T. (2000). Making a good decision: Value and fit. *American Psychologist*, 55, 1217-1230.
- Higgins, E.T. and Spiegel, S. (2004). Promotion and prevention strategies for self-regulation: A motivated cognition perspective. In R.F. Baumeister & C. Vohs (Eds.), *Handbook of self-regulation* (pp. 171-187). New York: Guilford.
- Hoenderdos, N.L., Slot, D.E., Paraskevas, S., and van der Weijden, G.A. (2008). The efficacy of woodsticks on plaque and parameters of gingival inflammation: a systematic review. *International Journal of Dental Hygiene*, 6, 280-289.
- Idson, L.C., Liberman, N., and Higgins, E.T. (2000). Distinguishing gains from nonlosses and losses from nongains: A regulatory focus perspective on hedonic intensity. *Journal of Experimental Social Psychology*, 36, 252-274.
- Jones, M., Lee, J.Y. and Rozier, R.G. (2007). Oral health literacy among adult patients seeking dental care. *Journal of the American Dental Association*, 138, 1199-1208.
- Lee, A.Y. and Aaker, J.L. (2004). Bringing the frame into focus: The influence of regulatory fit on processing fluency and persuasion. *Journal of Personality and Social Psychology*, 86, 205-218.
- Lin, H.C., Wong, M.C.M., Wang, Z.J., and Lo, E.C.M. (2001). Oral health knowledge, attitudes and practices of Chinese adults. *Journal of Dental Research*, 80, 1466-1470.
- Lockwood, P. Jordan, C.H., and Kunda, Z. (2002). Motivation by positive or negative role models: Regulatory focus determines who will best inspire us. *Journal of Personality and Social Psychology*, 17, 91-103.
- Maheswaran, D. and Meyers-Levy, J. (1990). The Influence of Message Framing and Issue Involvement. *Journal of Marketing Research*, 27, 361-367.

- Mann, T.L., Sherman, D.K., and Updegraff, J.A. (2004). Dispositional motivations and message framing: A test of the congruency hypothesis in college students. *Health Psychology*, 3, 330-334.
- Martin, B.A.S. and Marshall, R. (1999). The Interaction of Message Framing and Felt Involvement in the Context of Cell Phone Commercials. *European Journal of Marketing*, 33, 206-218.
- O'Keefe, D.J. and Jensen, J.D. (2007). The relative persuasive of gain-framed loss-framed messages for encouraging disease prevention behaviors: a meta-analytic review. *Journal of Health Communication*, 12, 623-644.
- Petty, R.E. and Cacioppo, J.T. (1986). *The elaboration likelihood model of persuasion*. New York: Academic Press.
- Riet, J. van 't, Ruiter, R.A.C., Werrij, M.Q., and Vries, H. de. (in press). Self-efficacy moderates message framing-framing effects: The case of skin cancer detection. *Psychology & Health*.
- Ronis, D.L., Antonakos, C.L., and Lang, P.W. (1996). Usefulness of multiple equations for predicting preventive oral health behaviors. *Health Education Quarterly*, 23, 512-27.
- Rothmann, A.J. and Salovey, P (1997). Shaping perceptions to motivate healthy behavior: The role of message framing. *Psychological Bulletin*, 121, 3-19.
- Rudd, R.E. and Horowitz, A.M. (2005). Health and literacy: supporting the oral health research agenda. *Journal of Public Health Dentistry*, 65, 131-132.
- Sakki, T.K., Knuuttila, M.L., and Antilla, S.S. (1998). Lifestyle, gender and occupational status as determinants of dental health behavior. *Journal of Clinical Periodontology*, 25, 566-70.
- Schou, L. (2000). The relevance of behavioural sciences in dental practice. *International Dental Journal*, 50, 324-332.
- Sherman, D.K., Updegraff, J.A., and Mann, T.L. (2008). Improving oral health behavior: A social psychological approach. *Journal of the American Dental Association*, 139, 1382-1387.
- Sniehotta, F.F., Araújo Soares, V., and Dombrowski, S.U. (2007). Randomized controlled trial of a one-minute intervention changing oral self-care behavior. *Journal of Dental Research*, 86, 641-645.
- Slot, D.E., Dörfer, C.E., and van der Weijden, G.A. (2008). The efficacy of interdental brushes on plaque and parameters of periodontal inflammation: a systematic review. *International Journal of Dental Hygiene*, 6, 253-264.
- Syrjälä, A-M. H., Knuuttila M.L.E., and Syrjälä, L.K. (1992a). Reasons preventing regular dental care. *Community Dentistry and Oral Epidemiology*, 20, 10-14.
- Syrjälä, A-M. H., Knuuttila M.L.E., and Syrjälä, L.K. (1992b). Intrinsic motivation in dental care. *Community Dentistry and Oral Epidemiology*, 20, 333-7.
- Tedesco, L.A., Keffer, M.A., and Fleck-Kandath, C. (1991). Self-efficacy, reasoned action, and oral health behavior reports: A social cognitive approach to compliance. *Journal of Behavioral Medicine*, 14, 341-355.
- Updegraff, J.A., Sherman, D.K., Luyster, F.S., and Mann, T.L. (2007). Understanding how tailored communications work: The effects of message quality and congruency on perceptions of health messages. *Journal of Experimental Social Psychology*, 43, 249-257.
- Uskul, A. K. and Oysermann, D. (2009a). When message-frame fits salient cultural-frame, messages feel more persuasive. *Psychology & Health*. DOI: 10.1080/08870440902759156.

- Uskul, A. K., Sherman, D., and Fitzgibbon, J. (2009b). The cultural congruency effect: Culture, regulatory focus, and the effectiveness of gain- vs. loss-framed health messages. *Journal of Experimental Social Psychology*, 45, 535-541.
- World Health Organization. 2008. Primary Health Care – Now More Than Ever. The World Health Report 2008. Introduction and Overview. Available from: http://www.who.int/whr/2008/08_overview_en.pdf [internet site]. Assessed 5 April 2009.
- World Health Organization. 2009. The objectives of the WHO Global Oral Health Programme (ORH). http://www.who.int/oral_health/objectives/en/index.html [internet site]. Assessed 5 April 2009.
- World Health Organization. 2009. <http://www.who.int/countries/ury/en/> [1], and <http://www.who.int/countries/esp/en/> [3] Assessed 10 November 2009.