finding

Low voice pitch in orally delivered recommendations can increase compliance with hand sanitizer use among young adults

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Script of Orally Delivered Recommendation in Using Hand Sanitizer

Please also refer to the actual recordings provided as a supplementary audio file. (See note A for a comment relating to the recordings.)

Anyone who has been in a child's play area has witnessed it. As the children come off of the play equipment, the mothers reach into their purse to grab their hand sanitizer. Each child gets a dab of sanitizer to rub into her hands in order to eliminate the germs that have been transferred to her skin. The hope is that this practice will keep the children, and therefore their families, healthier.

But using hand sanitizer isn't beneficial only to children. The use of hand sanitizers is a habit that can help keep us all exposed to fewer germs and therefore will decrease our chance of illness. Whether you are on the playground, using someone else's computer, or visiting a friend in the hospital, take the time to rub some on your hands. It is an easy step toward a healthy winter season.

Alcohol-based hand sanitizers help to deter the spread of germs and illness-causing bacteria, particularly in busy environments like schools and offices. It's important you use hand sanitizer properly to ensure it does the job it's meant to do—get rid of germs before they are able to spread. When combined with other preventative measures (like proper handwashing and thorough touch-point cleaning), using hand sanitizer will help to keep you (and everyone in your household and offices!) protected against the flu and other illnesses.

Results Containing Full Statistical Data Points

Behavioral Compliance

Comparing participants who listened to the low- (n = 236) and high-pitch versions (n = 242) of the public health advisory, I found that those who listened to the low-pitch version were more likely to use the hand sanitizer on the table (83.1%) than were those who listened to the high-pitch one (71.9%), $\chi^2(1) = 8.49$, p = .004, ϕ = .13.

Perceived Behavioral Control Over Health (r = .89)

Those who listened to the low-pitch version of the public health advisory scored higher on perceived behavioral control over their own physical health (M = 5.59, SD = 1.87) than those who listened to the high-pitch one (M = 4.99, SD = 1.91), $F(1, 476) = 12.27$, p = .001, d = 0.32.

Felt Power

Those who listened to the low-pitch version of the public health advisory scored higher on felt power (M = 5.74, SD = 1.92) than those who listened to the high-pitch one (M = 5.23, SD = 2.00), $F(1, 476) = 7.90$, p = .005, d = 0.25.

Mediation Analysis

Using Model 6 of the bootstrapping protocol (Preacher & Hayes, 2008), I tested for the possible serial mediating effect of felt power and perceived behavioral control over health on the influence of low-pitch (versus high-pitch) communication on the likelihood of using hand sanitizer. The total indirect effect was significant (B = .36, SE = .11, 95% CI [.16, .62]). See Figure 1 in the main article for the individual pathways. We also reversed the presumed mediators to examine alternate possible routes, as our variables were self-reported measures, but the total indirect effect was insignificant (B = .11, SE = .12, 95% CI [–.12, .33]).

Perceived Authority

Those who listened to the low-pitch version of the public health advisory scored the perceived authority of the speaker in the audio clip (M = 5.22, SD = 2.06) similarly to how those who listened to the high-pitch version did (M = 5.00, SD = 2.08), $F(1, 476) = 1.34$, p = .24, d = 0.11.

Further Analyses

Battery of Unrelated Questions

After participants had listened to their audio clip but before they completed measures for the current experiment, they completed two questionnaires as pilot testing for another study to examine the potential impact of voice pitch on unrelated contexts. The two questionnaires were the Attitudes to Student Debt (ASD; Davies & Lea, 1995) and the Social and Economic Conservatism Scale (Everett, 2013). Voice pitch did not impact the ASD (M_{low} = 4.25, SD = 2.71, versus M_{high} = 4.19, SD = 2.90) $F(1, 476) = 0.04$, p = .82, d = 0.01, or the economic (M_{low} = 3.95, SD = 2.67, versus M_{high} = 4.28, SD = 2.63), $F(1, 476) = 1.81$, p = .17, d = 0.12, and social (M_{low} = 5.28, SD = 2.25, versus M_{high} = 5.54, SD = 2.04), $F(1, 476) = 1.65$, p = .19, d = 0.11, dimensions of conservatism.

Headphone Control Questions (α = .83)

Those who listened to the low-pitch version of the public health advisory scored the control questions about the headphones (M = 7.14, SD = 1.78) similarly to how those who listened to the high pitch one did (M = 7.31, SD = 1.62), $F(1, 476) = 1.03$, p = .30, d = 0.09.

English Proficiency

Those who listened to the low-pitch version of the public health advisory scored their self-reported English proficiency (M = 8.31, SD = 1.19) similarly to how those who listened to the

high-pitch one did (M = 8.15, SD = 1.06), F(1, 476) = 2.26, p = .13, d = 0.13.

Moderating Role of Authority

Although we found no differences in the perceived authority of the speaker between the low- and high–pitch messages, might authority moderate the effects on power, perceived behavioral control, and hand sanitizer use? To explore this, we used Model 1 of the bootstrapping protocols, which allowed for testing of possible moderating effects (Preacher & Hayes, 2008). Perceived authority did not moderate the impact of voice pitch on power (test of highest order unconditional interaction ΔR^2 = .001), F(1, 474) = 0.57, p = .44; perceived behavioral control (ΔR^2 = .001), F(1, 474) = 0.79, p = .37; or behavioral compliance with using hand sanitizer (likelihood ratio test of highest order unconditional interaction χ^2[1] = .09, p = .75).

Gender Difference Analysis

Because the speaker in the audio clip was a woman, we proceeded to examine possible differences between male and female participants in their responses on the key dependent variables, namely, behavioral compliance with using hand sanitizer, perceived behavioral control, and felt power. This is especially important as voice pitch may act as a cue differently for male and female speakers (Krahé & Papakonstantinou, 2020; Zhang, Reid, Gasiorek, & Palomares, 2019), although prior work also suggests that pitch may be more important than gender of the speaker (Martín-Santana, Reinares-Lara, & Reinares-Lara, 2017).

On behavioral compliance, men were just as likely to use hand sanitizer (74.2%) as women (79.3%), χ^2(1) = 1.71, p = .19, ϕ = .06. Among men, listening to low voice pitch increased hand sanitizer use (79.6%) compared with high pitch (67.5%), although this difference was only marginally significant, χ^2(1) = 3.36, p = .06, ϕ = .13. Among women, listening to low voice pitch also increased hand sanitizer use (85.5%) compared with high pitch (74.1%), and this difference was significant, χ^2(1) = 5.94, p = .01, ϕ = .14. Although the pattern for men only approached significance, we attribute it to an unequal proportion of men (n = 178) and women (n = 300) in this study. Further, coupled with the fact that we were measuring actual behavior on a binary rather than a continuous basis, low statistical power is a concern. Indeed, the sensitivity analysis conducted using G*Power revealed that the sample size of 478 at the α = .05 and power = .80 levels, with a degree of freedom of 1, could only detect an estimated effect size of w = .12. But the patterns were identical, which was most important.

On perceived behavioral control over health, a 2 (gender) × 2 (voice pitch) ANOVA revealed only a main effect of voice pitch, F(1, 474) = 13.28, p < .001, d = 0.33, with low voice pitch increasing perceived behavioral control over health compared with high voice pitch. There was no main effect of gender (M_{men} = 5.34, SD = 1.68, versus M_{women} = 5.26, SD = 2.01), F(1, 474) = .01, p = .91, d = 0.009, and no two-way interaction crossing the two factors, F(1, 474) = 1.24, p = .26, d = 0.10. Indeed, for men, listening to low voice pitch increased perceived behavioral control over health (M = 5.72, SD = 1.72) compared to high pitch (M = 4.87, SD = 1.54), F(1, 176) = 11.68, p = .001, d = 0.51. For women, likewise, listening to low voice pitch also increased perceived behavioral control over health (M = 5.50, SD = 1.91) compared with high pitch (M = 5.05, SD = 2.07), F(1, 298) = 3.79, p = .05, d = 0.22.

Finally, on felt power, a 2 × 2 ANOVA revealed only a main effect of voice pitch, F(1, 474) = 8.27, p = .004, d = 0.26, with low voice pitch increasing felt power compared to a high voice pitch. There was no main effect of gender (M_{men} = 5.48, SD = 1.85, versus M_{women} = 5.48, SD = 2.05), F(1, 474) = 0.06, p = .80, d = 0.02, and no two-way interaction crossing the two factors, F(1, 474) = .35, p = .54, d = 0.05. Indeed, for men, listening to low voice pitch increased felt power (M = 5.78, SD = 1.85) compared with high pitch (M = 5.12, SD = 1.80), F(1, 176) = 5.56, p = .01, d = 0.35. For women, likewise, listening to low voice pitch also increased felt power (M = 5.71, SD = 1.97) compared with high pitch (M = 5.28, SD = 2.10), but this effect only approached significance, F(1, 298) = 3.22, p = .07, d = 0.21.

end note

A. The recordings differed slightly in two spots. In the high-pitch recording, the speaker said "healthier" rather than "healthy" in the sentence "It is an easy step toward a healthy winter season." In the low-pitch recording, the speaker says "to properly ensure" rather than "properly to ensure" in the sentence "It's important you use hand sanitizer properly to ensure it does the job it's meant to do—get rid of germs before they are able to spread."

references

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