

'Just a pinch of salt'. An experimental comparison of the effect of repeated exposure and flavor-flavor learning with salt or spice on vegetable acceptance in toddlers

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ABSTRACT

Children's vegetable intake is far below the recommended amounts. No studies to date have tested the relevance of using salt or spices to increase children's vegetable acceptance. The objective of this study was to compare the effect of repeated exposure to that of flavor-flavor learning, on the acceptance of a non-familiar vegetable in toddlers. Two unconditioned stimuli were used for the flavor-flavor learning: salt and a salt-associated spice. Toddlers attending six nurseries were assigned to 3 groups in a between-subject design. A repeated exposure group (RE; n = 47) was exposed 8 times to a basic salsify puree prepared with 0.2% w/w of salt. A first flavor-flavor learning group (FFL-Salt; n = 54) was exposed 8 times to a salty salsify puree prepared with 0.5% w/w salt and a second one (FFL-Nutmeg; n = 50) was exposed 8 times to a spiced salsify puree prepared with 0.2% w/w salt and 0.02% w/w nutmeg. Toddlers' acceptance in terms of intake (g) (jars of puree weighed before and after consumption) and liking (5-pt scale) of the target vegetable (basic salsify puree) was evaluated at pre-exposure, at each of the 8 exposures of the learning period, at post-exposure, and at one, three and six months after exposure. Acceptance of a control vegetable (carrot puree) was evaluated at pre-exposure, post-exposure, and three and six months after exposure. In all groups, intake of the target vegetable increased from pre- to post-exposure. This increase was significantly higher in the RE group (64 +/- 11 g) than in the FFL-Salt group (23 +/- 11 g) and marginally higher than in the FFL-Nutmeg group (36 +/- 11 g). During the exposure period, intake increased linearly in the RE group; it followed an inverted U-shape for the FFL-Salt group and a U-shape for the FFL-Nutmeg group. No difference between groups was observed on the increase in liking of the target vegetable from pre- to post-exposure; nevertheless, the increase was significantly different from zero in the RE and FFL-Salt groups but not in the FFL-Nutmeg group. During the exposure period, liking increased linearly and similarly in all groups. The increase of target vegetable intake was still observed for all groups, after 6 months. These findings suggest that flavor-flavor learning with salt or a salt-associated spice was not more effective than repeated exposure in increasing the acceptance of a non-familiar vegetable. Thus, repeated exposure appears to be the simplest choice to increase vegetable intake on the short and long term in toddlers.

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