Influence of Habitual Water Intake on Energy Intake in Emerging Adults

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Objectives: Acute water ingestion before a meal is suggested to reduce energy intake (EI) by promoting satiety; however, the influence of daily fluid intake on associated EI has yet to be extensively explored. This study determined the relationship between habitual total fluid intake and EI in emerging adults.

Methods: 54 free-living college students (45% female; age, 23 $\pm$ 4 years; height, 173.5 $\pm$ 12.2 cm; body mass, 75.8 $\pm$ 17.6 kg; body fat (BF), 19.0 $\pm$ 8.7%) provided a 24 h urine sample across 7 consecutive days and recorded their daily food and fluid intake. Daily perceptual measures of thirst were assessed in a subset of participants (n $=$ 34) using separate 100mm visual analog scales to assess perceived thirstiness, pleasantness (mouth), dryness (mouth), taste (mouth), fullness (gastrointestinal tract), and sickness (gastrointestinal tract). Linear mixed effect models with random intercepts assessed the associations of between and within-person changes in daily fluid intake (total fluid (TF), plain water intake (PW), and total water intake from food and fluids (TWI)), BF, and thirst ratings on EI via person-mean centering.

Results: On average, participants consumed 2626 $\pm$ 1357 ml TF, 1812 $\pm$ 1276 ml PW, 3049 $\pm$ 1441 ml TWI, and 1950 $\pm$ 717 kcals across all observations. Participants that consumed more PW than the group mean had greater total EI above the group mean ($\beta = 0.156$ [0.03, 0.28], p $=$ 0.015). However, when participants consumed more PW than is typical, they reported a lower total EI compared to their individual mean ($\beta = -0.15$, [-4.7e-3, -0.29], p $=$ 0.0468). Between participants, greater ratings of thirst were associated with lower EI ($\beta = -9.22$, [$-17.26, -1.20$], p $=$ 0.032), however, within-person increases in thirst were associated with greater EI ($\beta = 11.14$, [2.01, 20.27], p $=$ 0.021). When covarying for TWI, individuals with higher BF reported lower total EI ($\beta = -17.48$ [$-31.87, -3.12$], p $=$ 0.022).

Conclusions: Increasing PW intake above one's typical volume can potentially reduce EI, perhaps through mechanisms or perceptions of increased satiety. Disparate findings for between and within-person effects of PW on EI warrant further investigation into other variables influencing EI and PW intake such as physical activity and food preferences.