Use of Fitness and Nutrition Apps: Associations With Body Mass Index, Snacking, and Drinking Habits in Adolescents

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## Authors

De Cock N.;Vangeel J.;Lachat C.;Beullens K.;Vervoort L.;Goossens L.;Maes L.;Deforche B.;De Henauw S.;Braet C.;Eggermont S.;Kolsteren P.;Van Camp J.;Van Lippevelde W.

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## Sample

1210 adolescents from 14- to 16-year-old from 20 schools in Flanders, Belgium

## Implications For Stakeholders About

# Abstract

Background: Efforts to improve snacking and drinking habits are needed to promote a healthy body mass index (BMI) in
adolescents. Although commercial fitness and nutrition mobile phone apps are widely used, little is known regarding their potential
to improve health behaviors, especially in adolescents. In addition, evidence on the mechanisms through which such fitness and
nutrition apps influence behavior is lacking.
Objectives: This study assessed whether the use of commercial fitness or nutrition apps was associated with a lower BMI and
healthier snacking and drinking habits in adolescents. Additionally, it explored if perceived behavioral control to eat healthy;
attitudes to eat healthy for the good taste of healthy foods, for overall health or for appearance; social norm on healthy eating and
social support to eat healthy mediated the associations between the frequency of use of fitness or nutrition apps and BMI, the
healthy snack, and beverage ratio.
Methods: Cross-sectional self-reported data on snack and beverage consumption, healthy eating determinants, and fitness and
nutrition app use of adolescents (N=889; mean age 14.7 years, SD 0.8; 54.8% [481/878] boys; 18.1% [145/803] overweight)
were collected in a representative sample of 20 schools in Flanders, Belgium. Height and weight were measured by the researchers.
The healthy snack ratio and the healthy beverage ratio were calculated as follows: gram healthy snacks or beverages/(gram healthy
snacks or beverages+gram unhealthy snacks or beverages)×100. Multilevel regression and structural equation modeling were
used to analyze the proposed associations and to explore multiple mediation.
Results: A total of 27.6% (245/889) of the adolescents used fitness, nutrition apps or both. Frequency of using nutrition apps
was positively associated with a higher healthy beverage ratio (b=2.96 [1.11], P=.008) and a higher body mass index z-scores
(zBMI; b=0.13 [0.05], P=.008. A significant interaction was found between the frequency of using nutrition and for the zBMI
(b=−0.03 [0.02], P=.04) and the healthy snack ratio (b=−0.84 [0.37], P=.03). Attitude to eat healthy for appearance mediated
both the fitness app use frequency-zBMI (a × b=0.02 [0.01], P=.02) and the nutrition app use frequency-zBMI (a × b=0.04 [0.01],
P=.001) associations. No mediation was observed for the associations between the frequency of use of fitness or nutrition apps
and the healthy snack or beverage ratio.
Conclusions: Commercial fitness and nutrition apps show some association with healthier eating behaviors and BMI in
adolescents. However, effective behavior change techniques should be included to affect key determinants of healthy eating.

# Outcome

"28% of the Flemish adolescents reported to use fitness or nutrition apps in 2013. The mean frequency of using fitness apps was between a few times per month and every week and less than once a month. Possibly, adolescents use health apps less frequently when compared with adults. A higher use of nutrition apps was independently associated with a higher zBMI. Possibly, adolescents using nutrition apps in this study were trying to lose weight. Results confirmed that nutrition app users were indeed more likely to be overweight (36% overweight) in comparison to adolescents who do not use these apps (16% overweight). Using nutrition apps could thus be part of interventions to lose weight. Frequently using both fitness and nutrition apps was associated not only with a lower BMI, but also with a lower healthy snack ratio. The latter finding was unexpected; this could however be a consequence of the perceived higher energy-needs of those adolescents who frequently use fitness apps. These fitness app users might consume more energy-bars that contain large amounts of sugar and/or fat. Higher frequencies of fitness and nutrition apps use were associated with a more positive attitude to eat healthy for appearance, which was in turn associated with a higher zBMI. Adolescents with a higher BMI might thus use fitness or nutrition apps to look good or to lose weight. Thus, apps aimed to change behavior should thus focus more on targeting the key determinants identified in the literature and incorporate the corresponding behavior change techniques in an effective way." (De Cock et al., 2017, pp. 12-13)