



The effect of three learning techniques on Dutch children's vegetable consumption

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Background

Dutch young children consume about 45 grams of vegetables a day, whereas 100-150 grams is recommended. In the Netherlands, vegetables are mainly consumed during dinner. New strategies are needed to encourage children's vegetable consumption, also during other moments of the day.

Objectives

The objective was to test the effect of three different learning techniques on children's vegetable consumption:

- 1) Repeated exposure to two vegetable shapes (MEX-study)
- 2) Imitation of an idol or teacher
- 3) Participation in vegetable preparation (VIK-study)

General methods

- Children aged 4 to 6 years
- Between-subject design with inclusion of control group
- Real-life settings
- Main outcome: vegetable intake
- Long-term measures included

MEX-study (N=79)

- Two primary schools, regular morning snack moment
- Raw carrots cut into slices (50 grams) and sticks (50 grams)
- Intervention group (I): exposure 10 times
- Control group (C): exposure 3 times (1st, 5th & 10th session)



Plate offered during MEX-study



Carrot cooking session during VIK-study

RESULTS MEX

Average intake session 1, 5&10	I: 32 ± 26 grams; C: 47 ± 34 grams (p=0.10)
Intake over time	One intervention class decreased intake (p=0.008; Beta slope = -1.9), whereas the other intervention class showed a small but non-significant increase in intake
Shape	Slices were preferred over sticks for six out of ten sessions
Follow-up at two & nine months	Intake seemed to increase at follow-up, but intake changes were not significantly different between the intervention and control group

Imitation of an idol (N=101) or teacher (N=103)

- Primary school, regular morning snack moment
- Raw carrots cut into sticks (100 grams)
- PR group: 5x positive restriction + 8x convivial eating
- CE group: 8x convivial eating, no positive restriction
- Control group: offered carrots 2x, no idol present
- Preference measured by a choice test with four vegetables

	Idol	Teacher
Average intake 8 sessions	22 ± 24 grams	34 ± 28 grams
Intake over time	Remained stable	Remained stable
Average vegetable intake over three choice tests	67 ± 32 grams	83 ± 25 grams
Carrot preference	Decreased over time	Increase in choice test 2, highest in PR group
Follow-up at nine months (carrot intake)	46 ± 38 grams Intake increased in PR and CE group (p<0.05)	To be analysed
Follow-up intake choice test	78 ± 35 grams	To be analysed

VIK-study (N=101)

- Restaurant of the Future
- Complete dinner with boiled carrots or French beans (130 grams)
- One parent present per child
- Intervention group (I): participation in carrot cooking session
- Control group (C): children were read a book
- Vegetable choice as indicator of preference

RESULTS VIK

Intake session 1	I: 52 ± 50 grams; C: 59 ± 43 grams (p=0.49)
Post-test intake (=session 2)	I: 46 ± 42 grams; C: 38 ± 48 grams (p=0.63)
Carrot preference	Trend indicating that children in intervention group were more likely to choose carrots in session 2 (p=0.08)
Follow-up at one & three months	Intake remained stable in I and C (50 - 57 grams)

Conclusions

- Although we did not see an increase in vegetable intake during the school-based interventions, offering children vegetables as a snack during the school day may be a valuable addition to their current vegetable intake.
- The positive effect of imitation within school-based interventions may appear on the long-term.
- Participation in vegetable cooking may increase interest in the prepared vegetable, but did not increase intake after one session.
- Offering children a choice of vegetables may support their intake.

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