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Effective Occupational Therapy Interventions to Decrease Picky Eating in Children: A Systematic Review

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Background

- Picky eating [1]
- ~50% of children are picky eaters during childhood [2]
  - 27% of toddlers show picky eating behaviors [2]
  - Decreased to 14% by the age of 6 [2]
- Current research

Focused Question

Which intervention within the scope of occupational therapy is effective for increasing food intake and variety in children with picky eating?

Method

Limiters	Inclusion Criteria
Dates of publications	2012-2023
Age Range	9 months - 7 years
Language	English
Demographics	All genders, ethnicities and socioeconomic backgrounds
Text availability	Full text

Flow Diagram

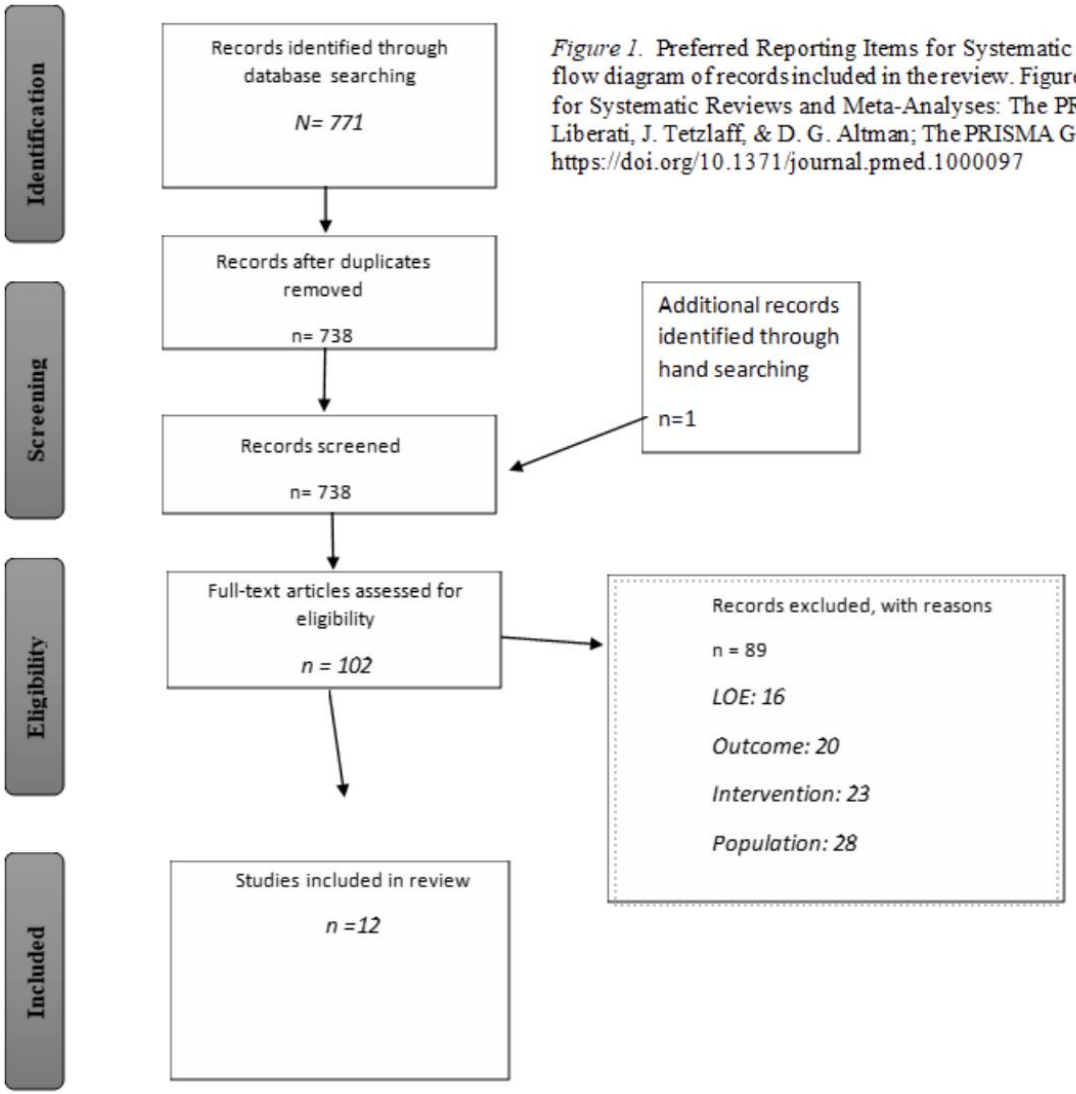

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram of records included in the review. Figure format from "Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement," by D. Moher, A. Liberati, J. Tetzlaff, & D. G. Altman; The PRISMA Group, 2009, PLoS Med, 6(6), e1000097. https://doi.org/10.1371/journal.pmed.1000097

Results

- 12 articles met inclusion criteria
- 3 themes based on the intervention used
  - Taste exposure
  - Nutrition education
  - Flavor change

Results: Taste Exposure

- Strong evidence - 9, level 1 articles [3-11]
- Types of interventions:
  - Screen-based modeling
  - Offering unfamiliar foods at snack time
  - Decreasing the size of the food
  - Reward/praise

Results: Nutrition Education

- Moderate evidence - 5, level 1 articles [6, 7, 10, 12, 13]
- Types of interventions:
  - Picture books
  - School-based nutritional education
  - Baby-led introduction to solids
  - Telephone based nutritional education
  - Nutritional Brochures

Results: Flavor Change

- Moderate evidence - 3, level 1 article [4, 5, 14]
- Types of interventions:
  - Flavor change of vegetables
  - Changing the form of vegetables
  - Pair vegetable with different foods
  - Breastfeeding infants after consuming vegetable juice

Discussion

- **Limitations of articles**
  - Sample size
  - Recall bias
  - Population demographic
  - Dropout rate
  - Maturation

Discussion

- **Limitations of systematic review**
  - Interventions and outcome measures were heterogenous

- **Strength of systematic review**
  - Comprehensive literature search
  - Methodological strengths
  - Within OT scope of practice
  - Generalizability

Implications for OT Practice

Taste Exposure

Nutrition Education & Flavor Change

Further Research

- Refine protocol for taste exposure, nutrition education, and flavor change
  - Intervention activities
  - Frequency
  - Duration

Conclusion

- Taste Exposure
- Nutrition education
- Flavor change

References

1. Wolstenholme, H., Kelly, C., Hennessy, M., & Heary, C. (2020). Childhood fussy/picky eating behaviours: A systematic review and synthesis of qualitative studies. *International Journal of Behavioral Nutrition and Physical Activity, 17*(2), p.1-2. https://doi.org/10.1186/s12966-019-0899-x

2. Cardona Cano, S., Tiemeier, H., Van Hoeken, D., Tharner, A., Jaddoe, V. W., Hofman, A., Verhulst, F. C., & Hoek, H. W. (2015). Trajectories of picky eating during childhood: A general population study. *The International Journal of Eating Disorders*, *48*(6), 570–579. https://doi.org/10.1002/eat.22384

3. Añez, E., Remington, A., Wardle, J., & Cooke, L. (2013). The impact of instrumental feeding on children's responses to taste exposure. *Journal of Human Nutrition & Dietetics*, *26*(5), 415-420. https://doi.org/10.1111/jhn.12028

4. de Wild, V. W. T., de Graaf, C., & Jager, G. (2017). Use of Different Vegetable Products to Increase Preschool-Aged Children's Preference for and Intake of a Target Vegetable: A Randomized Controlled Trial. *Journal of the Academy of Nutrition & Dietetics*, *117*(6), 859-866. https://doi.org/10.1016/j.jand.2016.11.006

5. Mennella, J. A., Daniels, L. M., & Reiter, A. R. (2017). Learning to like vegetables during breastfeeding: a randomized clinical trial of lactating mothers and infants. *American Journal of Clinical Nutrition*, *106*(1), 67-76. https://doi.org/10.3945/ajcn.116.143982

6. Nekitsing, C., Blundell-Birtill, P., Cockroft, J. E., & Hetherington, M. M. (2019). Taste Exposure Increases Intake and Nutrition Education Increases Willingness to Try an Unfamiliar Vegetable in Preschool Children: A Cluster Randomized Trial. *Journal of the Academy of Nutrition & Dietetics*, *119*(12), 2004-2013. https://doi.org/10.1016/j.jand.2019.05.012

7. Owen, L. H., Kennedy, O. B., Hill, C., & Houston-Price, C. (2018). Peas, please! Food familiarization through picture books helps parents introduce vegetables into preschoolers' diets. *Appetite*, *128*, 32-43. https://doi.org/10.1016/j.appet.2018.05.140

References cont.

8. Poelman, A. A. M., Delahunty, C. M., Broch, M., & de Graaf, C. (2019). Multiple vs Single Target Vegetable Exposure to Increase Young Children's Vegetable Intake. *Journal of Nutrition Education & Behavior*, *51*(8), 985-992. https://doi.org/10.1016/j.jneb.2019.06.009

9. Staiano, A. E., Marker, A. M., Frelier, J. M., Hsia, D. S., & Martin, C. K. (2016). Influence of Screen-Based Peer Modeling on Preschool Children's Vegetable Consumption and Preferences. *Journal of Nutrition Education & Behavior*, *48*(5), 331-335.e331. https://doi.org/10.1016/j.jneb.2016.02.005

10. Tournier, C., Bernad, C., Madrelle, J., Delarue, J., Cuvelier, G., Schwartz, C., & Nicklaus, S. (2021). Fostering infant food texture acceptance: A pilot intervention promoting food texture introduction between 8 and 15 months. *Appetite*, *158*, 104989. https://doi.org/10.1016/j.appet.2020.104989

11. Fildes, A., van Jaarsveld, C., Wardle, J., & Cooke, L. (2014). Parent-administered exposure to increase children's vegetable acceptance: a randomized controlled trial. *Journal of the Academy of Nutrition and Dietetics*, *114*(6), 881–888. https://doi.org/10.1016/j.jand.2013.07.040

12. Morison, B. J., Heath, A.-L. M., Haszard, J. J., Hein, K., Fleming, E. A., Daniels, L., Erickson, E. W., Fangupo, L. J., Wheeler, B. J., Taylor, B. J., & Taylor, R. W. (2018). Impact of a Modified Version of Baby-Led Weaning on Dietary Variety and Food Preferences in Infants. *Nutrients*, *10*(8), 1092. https://doi.org/10.3390/nu10081092

13. Wyse, R., Campbell, K. J., Brennan, L., & Wolfenden, L. (2014). A cluster randomised controlled trial of a telephone-based intervention targeting the home food environment of preschoolers (The Healthy Habits Trial): the effect on parent fruit and vegetable consumption. *International Journal of Behavioral Nutrition & Physical Activity*, *11*, 1-15. https://doi.org/10.1186/s12966-014-0144-6

14. Appleton, K., Hemingway, A., Saulais, L., Dinnella, C., Monteleone, E., Depezay, L., Morizet, D., Armando Perez-Cueto, F., Bevan, A., & Hartwell, H. (2016). Increasing vegetable intakes: rationale and systematic review of published interventions. *European Journal of Nutrition*, *55*(3), 869-896. https://doi.org/10.1007/s00394-015-1130-8

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Summary Table

Author/Year	Level of Evidence	Significant Results
Nekitsing et al., 2019	I	**Taste exposure** increased the intake of an unfamiliar vegetable by ~10g. **Nutrition education** of vegetables increased the likelihood of trying the unfamiliar vegetable.
Staiano et al., 2016	I	Screen-based modeling is a promising tool to influence children's vegetable consumption.
Tournier et al., 2021	I	Increase in exposure to a variety of small/soft pieces of food
Añez et al., 2013	I	There was a significant (p= 0.001) increase of children's intake from baseline. Three exposure conditions significantly increased liking of target vegetable.
Appleton et al., 2016	I	The interventions discussed in this systematic review have all shown to be successful, but their long-term follow-ups and cost efficiency/sustainability are very to be determined.
Owen et al., 2018	I	'Vegetable' book group showed a significant increase in intake of the **target vegetable** (Vegetable Book: p = .001) There was an increase in liking of both foods after the taste exposure and remained above baseline at follow-up (all ps <.001)

Summary Table

Author/Year	Level of Evidence	Significant Results
Fildes et al., 2014	I	Intervention group had a significant increase in intake and liking of target vegetable than the control group.
Mennella et al., 2017	I	Infants ate significantly more carrot- flavored cereal than either broccoli-flavored cereal (P = 0.0003) or plain cereal (P = 0.05). Infants whose mothers drank a variety of vegetable juices, including carrot juice, were more accepting of cereal that was flavored with carrot juice than were infants in the control group. Timing of exposure had significant effects on infants' acceptance of the carrot-flavor foods but not of the plain or broccoli-flavored cereals
Morison et al., 2018	I	Baby-led introduction to solids group greater variety in 'core', 'non-core', and 'meat and other protein' food at 7 months and in 'fruit and vegetable' food at 24 months.
Poelman et al., 2019	I	Increase of vegetable acceptance through taste exposure
Wyse et al., 2014	I	Both vegetable (at 2 mo. $p<0.0001$; at 18 mo. $p=0.0067$) and fruit consumption (at 2 mo. $p= 0.0003$; at 18 mo. $p=0.0015$)
de Wild et al., 2017	I	Increase in spinach intake (53g pre and 91g post)- independent of the vegetable product given; repeatedly offering vegetables is effective in increasing vegetable intake