

An intervention to improve eating self-regulation in children increases knowledge and energy compensation

Background

- Teaching children to improve energy self-regulation may help to moderate excess energy intake
- We updated an existing intervention¹ to teach children to respond to hunger and fullness signals and tested its effectiveness
- This new intervention incorporated a virtual reality game to teach children eating self-regulation

Objective

To test the effectiveness of a 4-week curriculum designed to improve energy self-regulation in 4-6 year olds on outcomes of knowledge and energy compensation behavior

Participants

Table 1. Participants (N = 25, ages 4-6-years-old)

	BOYS N (%)	GIRLS N (%)
	16(64)	9(36)
	BOYS (Mean ± SD)	GIRLS (Mean ± SD)
Age (years)	5.1 ± 0.8	5.0 ± 0.9
BMI % at baseline (week 1)	69.8 ± 22.9	64.1 ± 23.3
BMI % at follow-up (week 8)	72.9 ± 17.1	63.8 ± 22.8

Study Visits

Table 2. Timeline for study visits. Visits occurred one week apart.

Visit 1	Visit 2	Visit 3	Visits 4-7	Visit 8	Visit 9	Visit 10
Height / Weight	COMPx	COMPx	Intervention	Height / Weight	COMPx	COMPx
Knowledge questionnaire (Box 2 below)	Preload (high or low kcal)	Preload (high or low kcal)	- 4 week laboratory intervention incorporating a virtual reality game	Knowledge questionnaire (Box 2 below)	Preload (high or low kcal)	Preload (high or low kcal)
Ad libitum test meal	Ad libitum test meal	Ad libitum test meal		Ad libitum test meal	Ad libitum test meal	Ad libitum test meal

Compensation Protocol

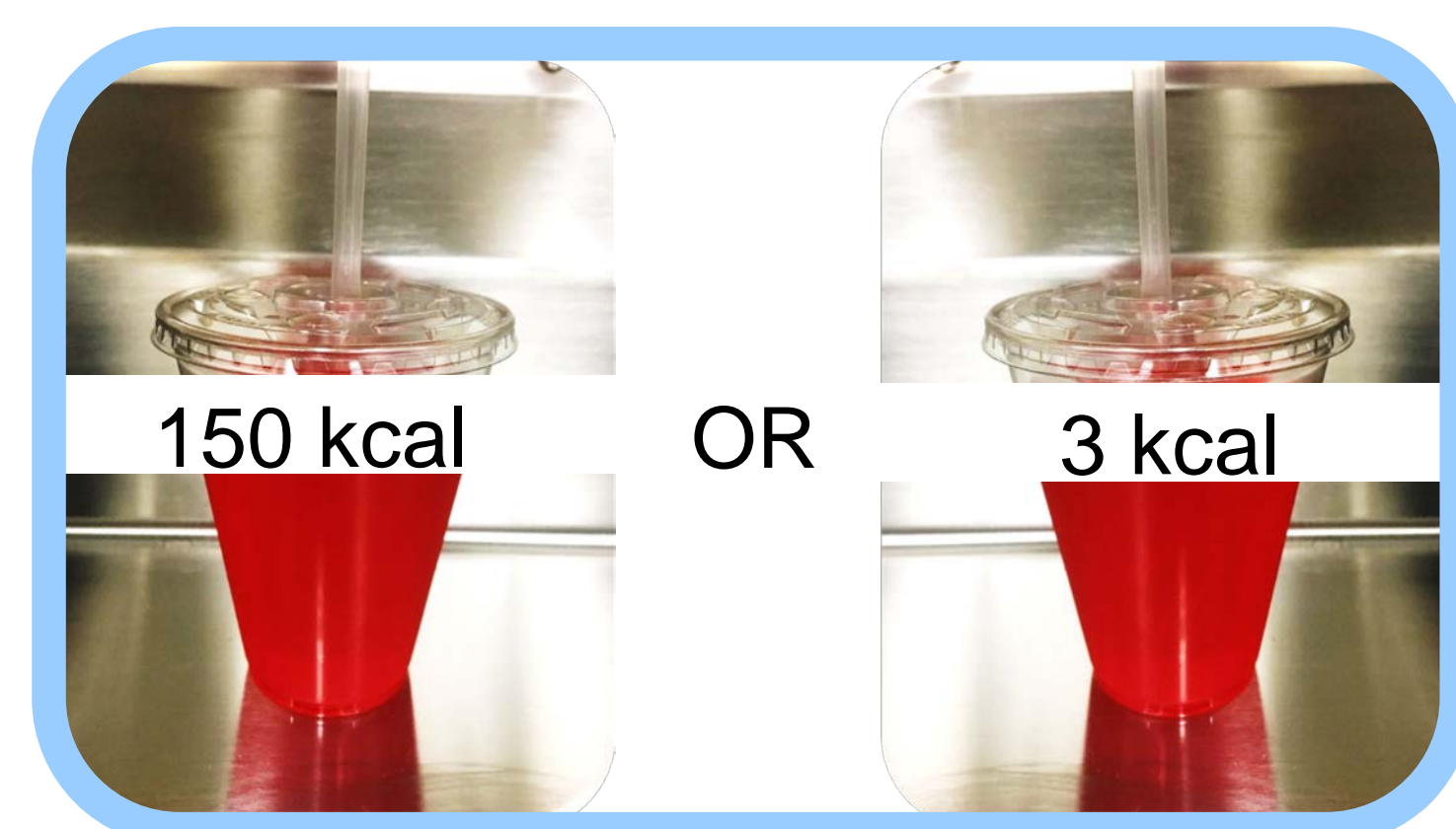


Figure 5. Children received a high-kcal or low-kcal preload 20 min prior to consuming an ad libitum test meal



Figure 6. Foods served at ad libitum meals: macaroni and cheese, broccoli, carrots, grapes, graham crackers, cheese and milk

BOX 1 – Calculating Compensation Index (COMPx)

$$\text{COMPx} = \frac{\text{Meal kcal}_{\text{lowED preload}} - \text{Meal kcal}_{\text{highED preload}}}{\text{Preload kcal}_{\text{highED}} - \text{Preload kcal}_{\text{lowED}}} \times 100\%$$

COMPx Values

100% = perfect compensation
Less than 100% = overeating
More than 100% = undereating

Intervention Images

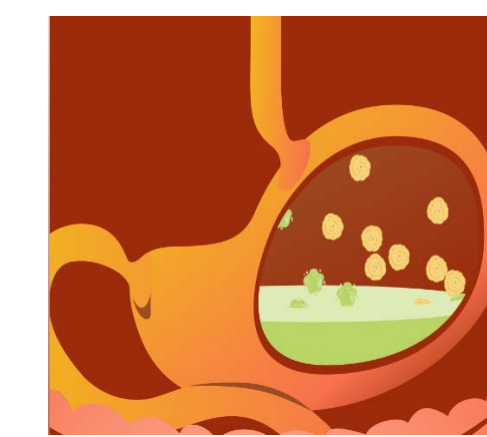


Figure 1. From lesson "What parts of my body help me eat?"

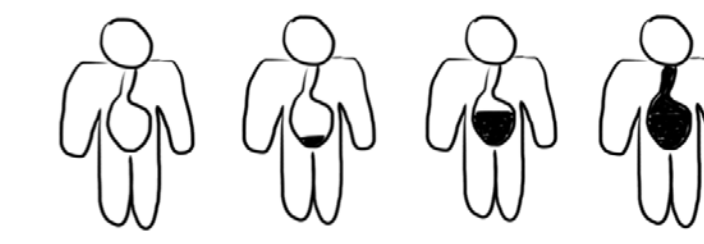


Figure 2. From lesson "What happens if you eat too much?"

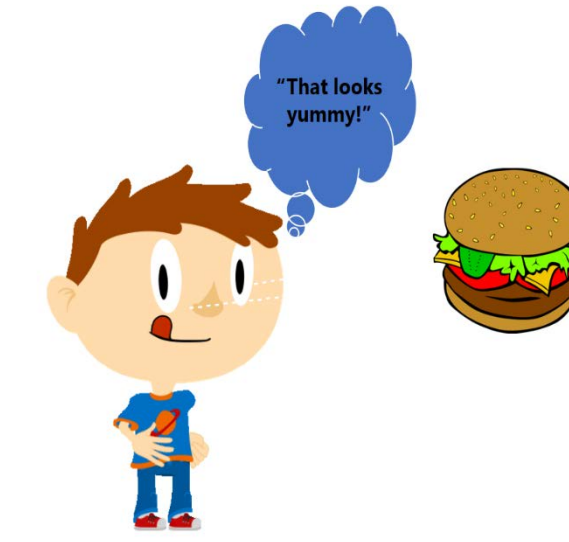


Figure 3. From lesson "Why do you eat?"



Figure 4. From lesson "Why do you stop eating?"

Knowledge Questionnaire

BOX 2 – Examples of 5 out of 10 Knowledge Questions

- Name 2 things your mouth does to help you eat food?
- Name 3 parts of your body that help you digest food?
- Name 2 things your body feels when you are hungry?
- Name 2 things your body feels when you are full?
- What happens to extra food your body doesn't need to use for energy or to grow?

Compensation Results

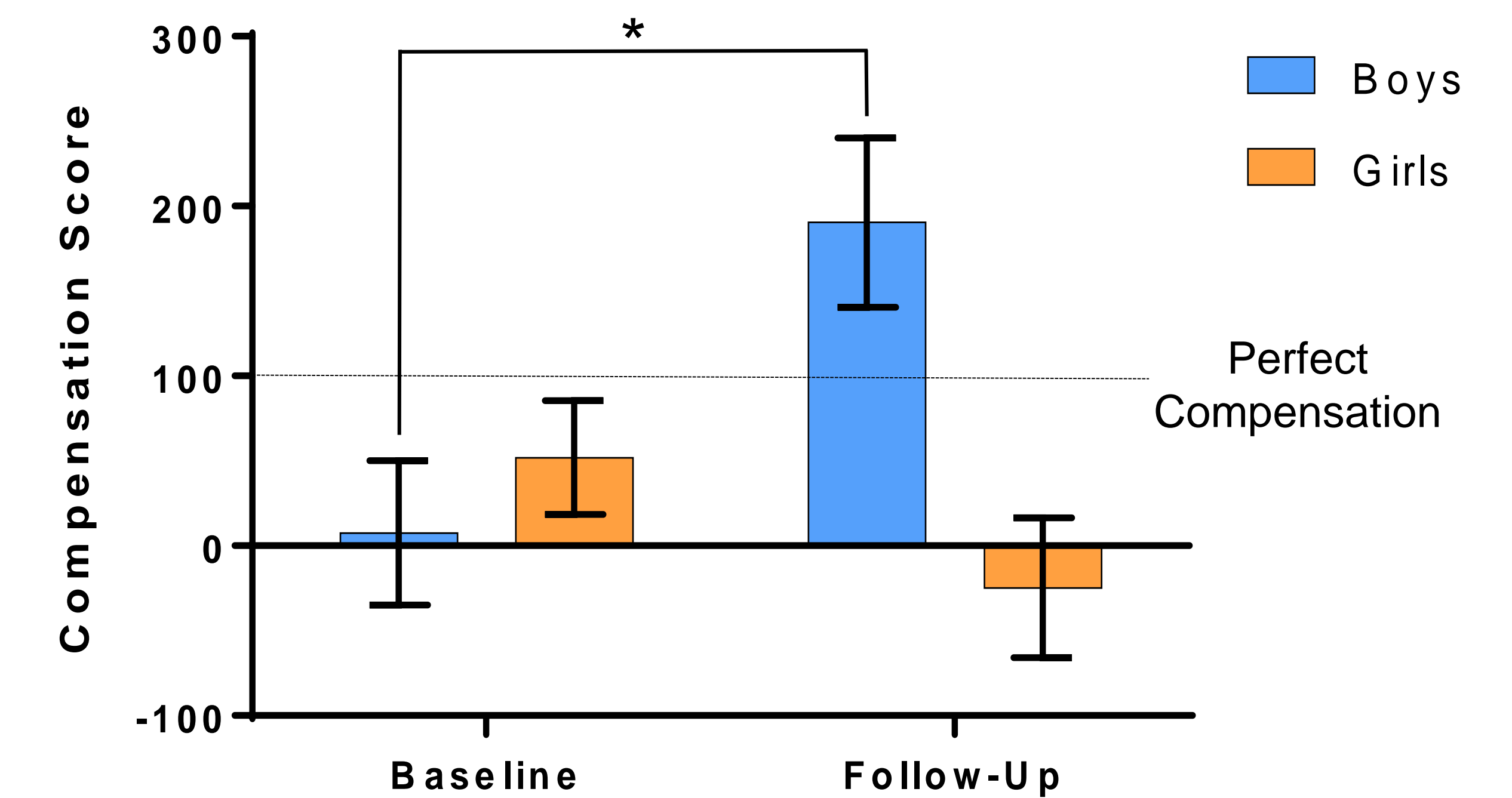


Figure 7. There was a trend for COMPx to increase from baseline (23.5 ± 148.0) to follow-up (113.0 ± 202.6) (p = 0.08). However, repeated measures ANOVA showed a sex * condition interaction (p < 0.01) with boys increasing COMPx from baseline to follow-up.

Knowledge Results

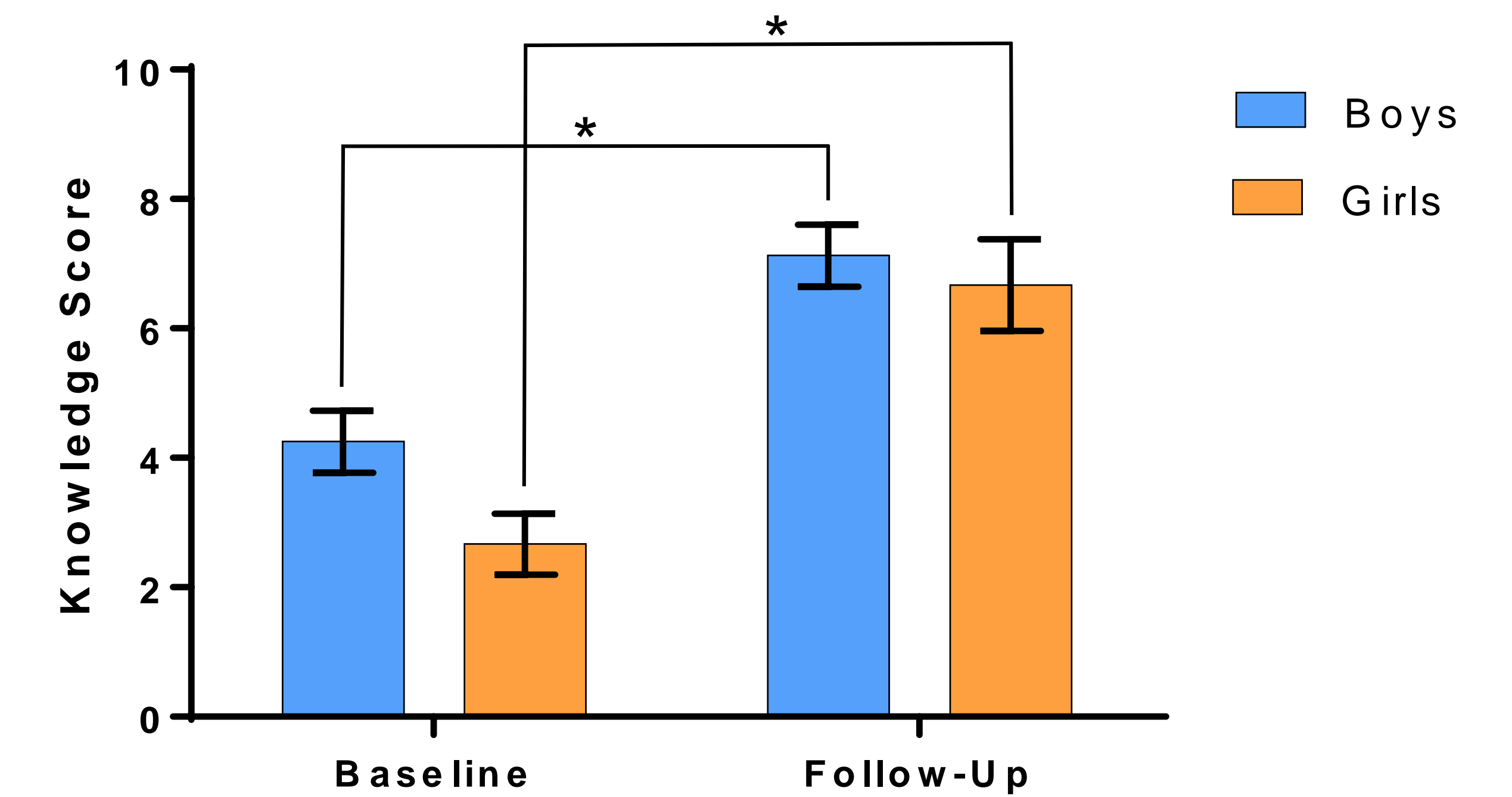


Figure 8. Knowledge scores for boys and girls increased from baseline (3.7 ± 1.9) to follow-up (7.0 ± 2.0) (p < 0.0001)

Conclusions

- Both energy compensation and knowledge improved from baseline to follow-up, although results varied by sex
- Sex differences in intake regulation may occur as early as the preschool years
- Improving energy self-regulation in girls and boys may require different strategies

References

- Johnson SL. Pediatrics 2000;106:1429-35