Counting Ability in Preschool Children

Numerical Board Games as an Intervention

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Do numerical board games help children learn the English number naming system?

- Unpredictable number names between 11 and 19 in the English language may make it difficult for children to learn the counting sequence.
- In contrast, the simplicity of Asian and Turkish number naming systems may help children to acquire early numeracy skills (Dehaene, 1997; Miller et al., 1995).
- When numbers between 11 and 20 are introduced, Asian children are encouraged to create collections of 10 (Yang & Cobb, 1995).

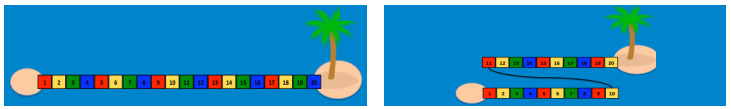
Arabic Number	Chinese	English	Turkish
1	yi	one	bir
2	er	two	iki
3	san	three	üç
…	…	…	…
10	shi	ten	on
11	shi-yi	eleven	on bir
12	shi-er	twelve	on iki
13	shi-san	thirteen	on üç

Linear numerical board games help children learn early numeracy skills (e.g., Ramani & Siegler, 2008). We extended the linear number board game to 20, and created a condition where the base-10 structure of the counting system was more obvious (Compare the row and linear versions in Figure 1).

Method

- **Procedure:** An intervention study consisting of pre-testing, 4 weeks of 15-minutes game intervention, and post-testing.
- **Participants:** 30 preschoolers (M_{age} = 3.5 years); 11 in colour condition; 8 in rows condition; 11 in linear condition (20 children who could count beyond 12 were excluded).

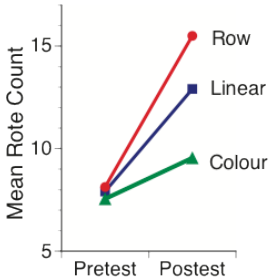
Linear **Row**



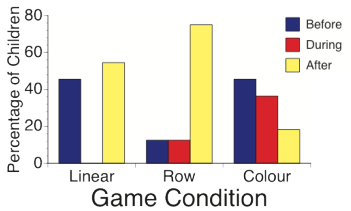
Results

Rote Counting – counting as high as possible without error

Did children show improved counting after the intervention? YES, children in the row and linear conditions counted higher than children in the colour condition.

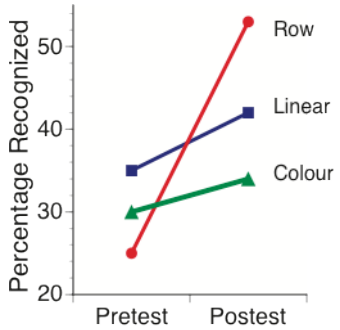


When did children have their BEST count?



Most children in the row condition had their highest count after the intervention; for children in the linear condition, just over half showed improvement; few children in the colour condition improved.

Number Recognition – naming an Arabic number (e.g., **5** or **13**).



- Children in the row condition learned to recognize more numbers.

Discussion

- Consistent with previous research using 1-10 number games, this 1-20 number game helped children acquire early numeracy skills.
- Children in both number game versions improved, but those who played the row game learned more.
- The row game may have helped children learn the underlying base-10 structure of the system.

For children with limited counting knowledge, practice with numbers organized by decade is an effective way to develop numeracy skills.

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