

Foraging Strategies in Preschoolers

Ideal Free Distribution (IDF) theory predicts that foragers will divide between foraging zones in proportion to the amount of food available in each zone (Fretwell & Lucas, 1970). In a free-operant procedure, IDF characterizes foraging behavior in mallard ducks (Harper, 1982) and human adults (Madden et al., 2002). More recently, vanMarle, Seok, and Billingsly (2018) showed that IDF also characterizes foraging behavior in children: Sixteen 2.5-5-year-olds foraged in two reward zones. Pennies were distributed on a variable interval schedule in each zone and divided evenly between children within the zone at the time of the reward. Zones provided rewards in a ratio of 1:1, 2:1 or 5:1. As predicted, children divided between the zones to closely match the reward proportions. We reanalyzed the same dataset to ask what individual behavior/strategies may have produced group-level matching. Specifically, we investigated (1) what types of foraging strategies were evident, and (2) how strategies related to reward obtainment.

As predicted by IDF, individual children reaped equivalent rewards. For both total number of rewards and total number of times rewarded, rewards were equivalent across individuals (4/6 and 5/6 sessions had non-significant chi-squares ($p > .05$), respectively; Figure 1). One way to achieve group-level matching is if individuals exhibit matching behavior. This was not a predominant strategy. Instead, children could be categorized as “stayers” (0-1 switches/session, $n=9$) or “switchers” (2+ switches/session, $n=6$), if they stayed or switched in more than half of their sessions. Strategy was not related to total rewards ($r(15) = -.09$, $p > .05$) (Figure 2).

In sum, group-level matching did not result from individual matching. Instead, children achieved equivalent rewards by dividing between rich and poor zones early in the session. Future studies will test individual children in both group and individual foraging tasks to explore similarities between individual and group-level decision making.

References

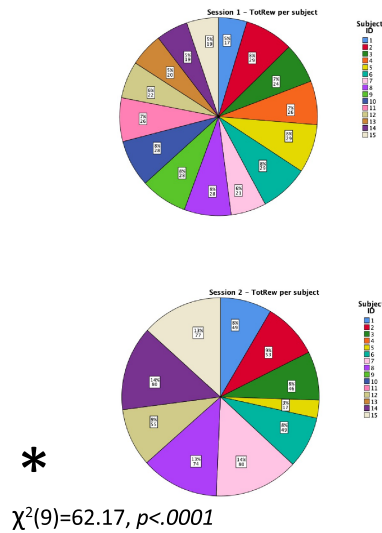
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Figure 1. Reward distribution Across Subjects. Reward distrubtion was remarkably even across children for the majority of the sessions.

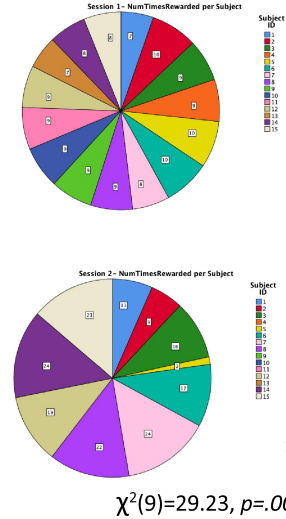
Reward Distribution Across Subjects

Total Number of Rewards

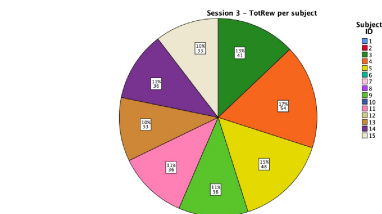
Total Number of Times Rewarded



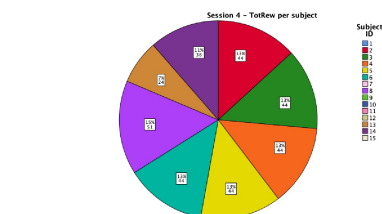
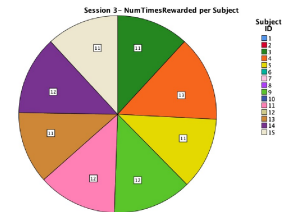
Session 1
1:1



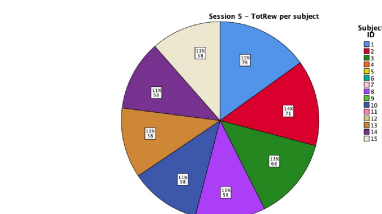
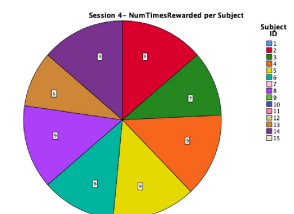
Session 2
1:5



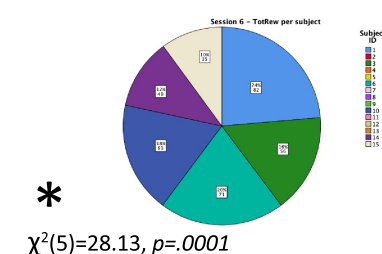
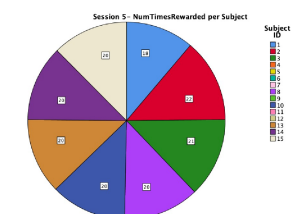
Session 3
2:1



Session 4
1:1



Session 5
5:1



Session 6
1:2

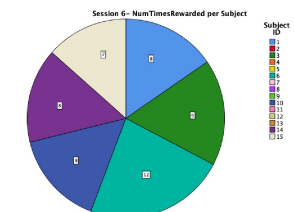


Figure 2. Number of rewards by strategy group. Independent samples t-tests were significant in only two sessions, with “stayers” reaping significantly more rewards than “switchers”. Rewards were equivalent in all other sessions.

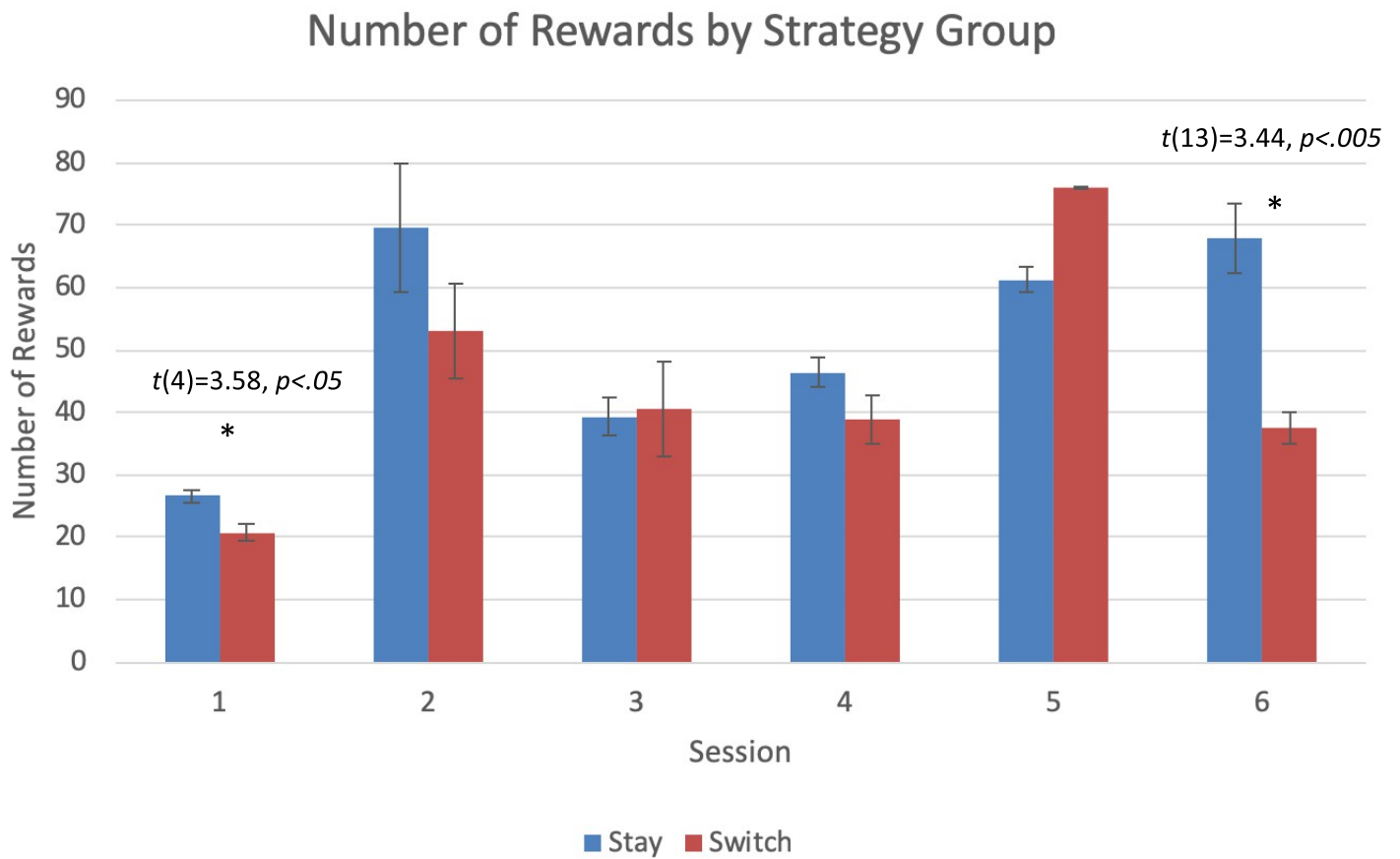


Table 1. Switch or stay by subject by session. Red cells indicate a child “staying” (0/1 switches) in that session, green cells indicate a child “switching” (2+ switches) in that session.

Switch or Stay by Subject by Session						
Subject	Session					
	1	2	3	4	5	6
1	1	1			1	0
2	0	1		1	0	
3	1	1	0	0	0	0
4	0	0	0	0		
5	0	1	1	1	1	0
6	0	0		1		0
7	0	0				
8	0	1	0	0	0	
9	0	1	0			0
10	0				0	0
11	1		0			
12	0	1	1			
13	1		0	1	0	0
14	1	0	0	1	0	1
15	1	1	1		0	1

Stay

Switch

Grey cells indicate child did not participate in session.