

# **CONSISTENT SECOND-ORDER MOTOR PLANNING BY COTTON-TOP TAMARINS**

## **(*SAGUINUS OEDIPUS*): EVIDENCE FROM A DOWEL TASK**

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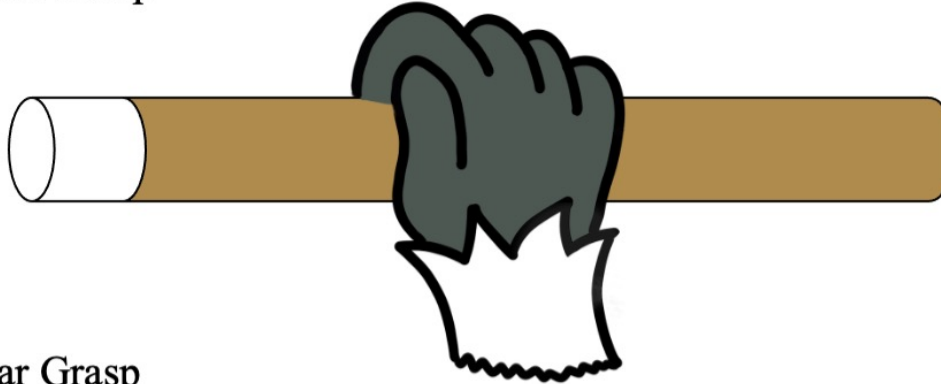
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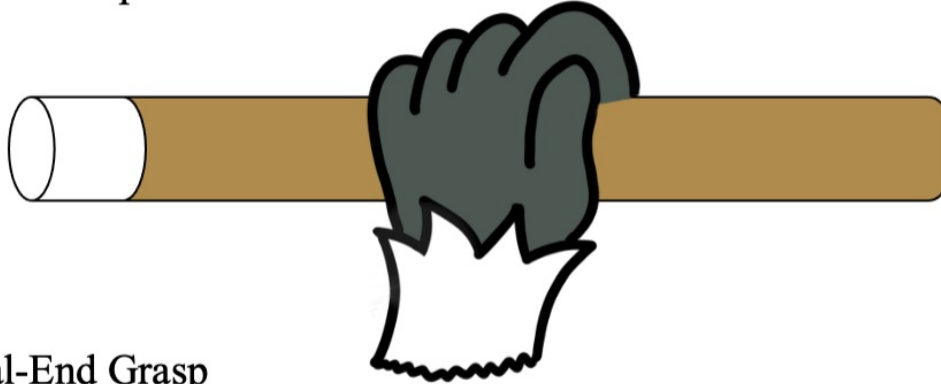
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- Raw data is located at: [https://github.com/ngschwob/Tamarin\\_DOGR](https://github.com/ngschwob/Tamarin_DOGR)
- Questions to be directed to: [ngschwob@gmail.com](mailto:ngschwob@gmail.com)
- Videos available upon request
  - Example videos of each grip type are located at:  
<https://www.dropbox.com/sh/5daryrcopq2phkl/AADiyMkifJfSEB8dvGBhsT5va?dl=0>

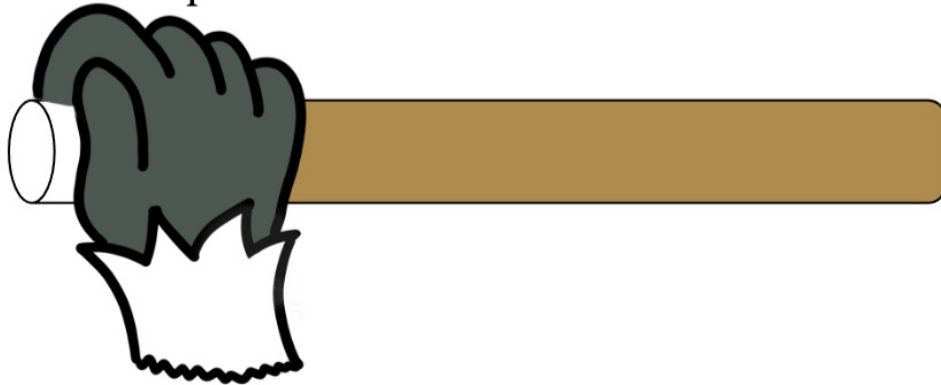
Radial Grasp



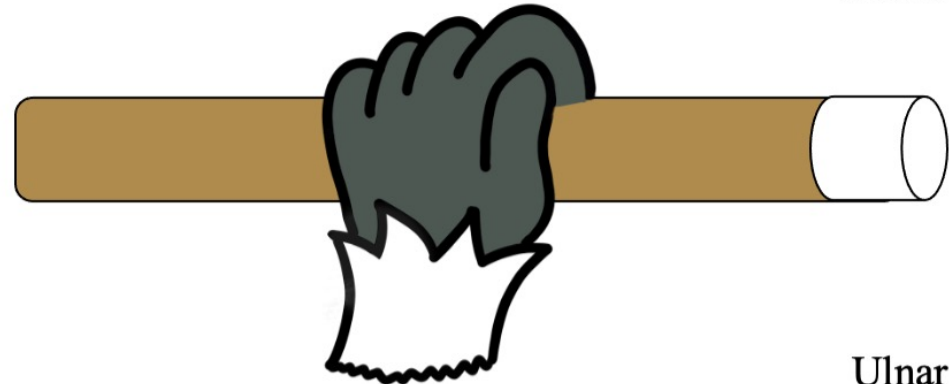
Ulnar Grasp



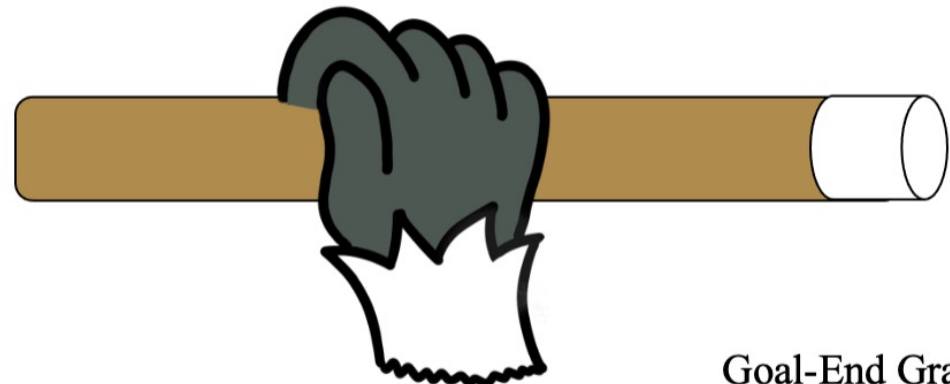
Goal-End Grasp



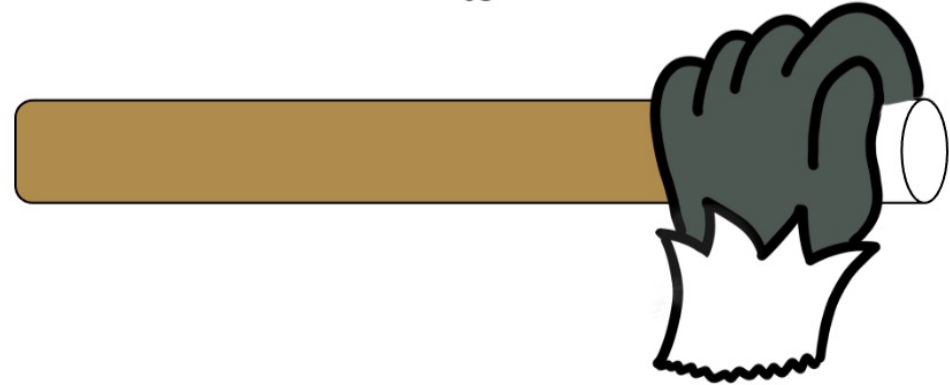
Radial Grasp



Ulnar Grasp



Goal-End Grasp



# **Sample Information**

Sample Data		
Tamarin	DOB	Sex
Bart	October 19, 2003	Male
Dolores	May 30, 2002	Female
Elaine	March 16, 2003	Female
Homer	March 12, 2004	Male
Lisa	March 16, 2003	Female
Magie	April 25, 2003	Female
Mulva	~ 2003	Female

N Trials for each Side Baited by Tamarin w/o Mouth First trials

	Side Baited				N Sessions	Avg # Trials per session
	Left	Control	Right	N Trials		
Bart	0	2	2	4	2	2
Dolores	1	1	1	3	1	3
Elaine	14	15	15	44	10	4.4
Homer	2	3	2	7	4	1.75
Lisa	16	15	14	45	10	4.5
Magie	6	7	10	23	5	4.6
Mulva	13	12	13	38	9	4.22
Sum	52	55	57	164	41	/
Average	7.428571429	7.857142857	8.142857143	23.42857143	5.857142857	5.204082

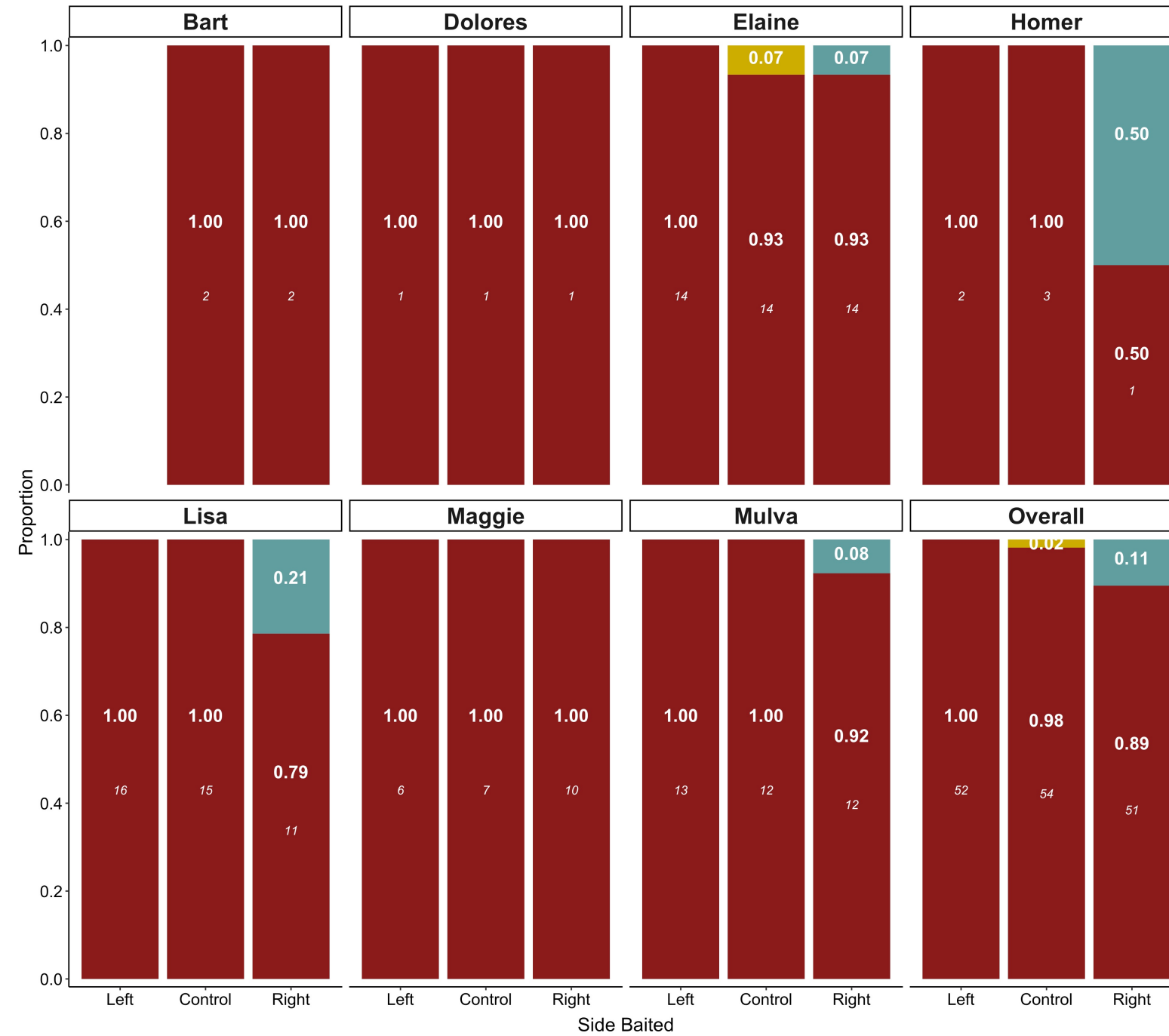
## Trial Information Includes Control Trials and does not include Mouth First trials

Range	3, 45
Average Number of trials per Tamarin	23.42857
Range of Sessions	1, 10
Average Number of Sessions	5.857143
Range # Trials per Session	1, 6
Avg # trials per session	4

# Grip Type



Grasp Type Ulnar Goal-End Radial



- Proportion of grip type by left side baited, both sides baited (control) and right side baited

# Grip Type by Side Baited by Tamarin

	Left Side Baited			Both Sides Baited			Right Side Baited			N Trials
	Ulnar	Goal-End	Radial	Ulnar	Goal-End	Radial	Ulnar	Goal-End	Radial	
Bart	0	0	0	0	0	2	0	0	2	4
Dolores	0	0	1	0	0	1	0	0	1	3
Elaine	0	0	14	0	1	14	1	0	14	44
Homer	0	0	2	0	0	3	1	0	1	7
Lisa	0	0	16	0	0	15	3	0	11	45
Maggie	0	0	6	0	0	7	0	0	10	23
Mulva	0	0	13	0	0	12	1	0	12	38
Sum	0	0	52	0	1	54	6	0	51	164
Average	0	0	7.428571429	0	0.142857143	7.714285714	0.857142857	0	7.285714286	23.42857143

Grip Type per Tamarin and Binomial Analysis Results

	Grip Type				Binomial			
	Ulnar	Goal-End	Radial	Sum	Prop Radial	p value	95% Lower	95% Upper
Bart	0	0	2	2	1	0.5	0.1581139	1
Dolores	0	0	2	2	1	0.5	0.1581139	1
Elaine	1	0	28	29	0.965517241	1.12E-07	0.8223557	0.9991274
Homer	1	0	3	4	0.75	0.625	0.1941204	0.9936905
Lisa	3	0	27	30	0.9	4.65E-06	0.7424609	0.9795801
Magie	0	0	16	16	1	8.43E-06	0.7347115	0.9788829
Mulva	1	0	25	26	0.961538462	8.05E-07	0.8036304	0.9990267
Sum	6	0	103	109	0.946428571			
Average	0.857142857	0	14.71428571	15.57142857	0.939579386			
SD	1.069044968	0	12.21630448	12.90810008	0.090933856			

Grip Type by Side Baited Overall

		Side Baited			
		Left	Control	Right	Sum
Grip Type	Ulnar	0	0	6	6
	Goal-End	0	1	0	1
	Radial	52	54	51	157
	Sum	52	55	57	164
	Average	17.33333333	18.33333333	19	54.66666667

# Proportion of trials where a Radial Grasp was used by Tamarin on Testing Trials

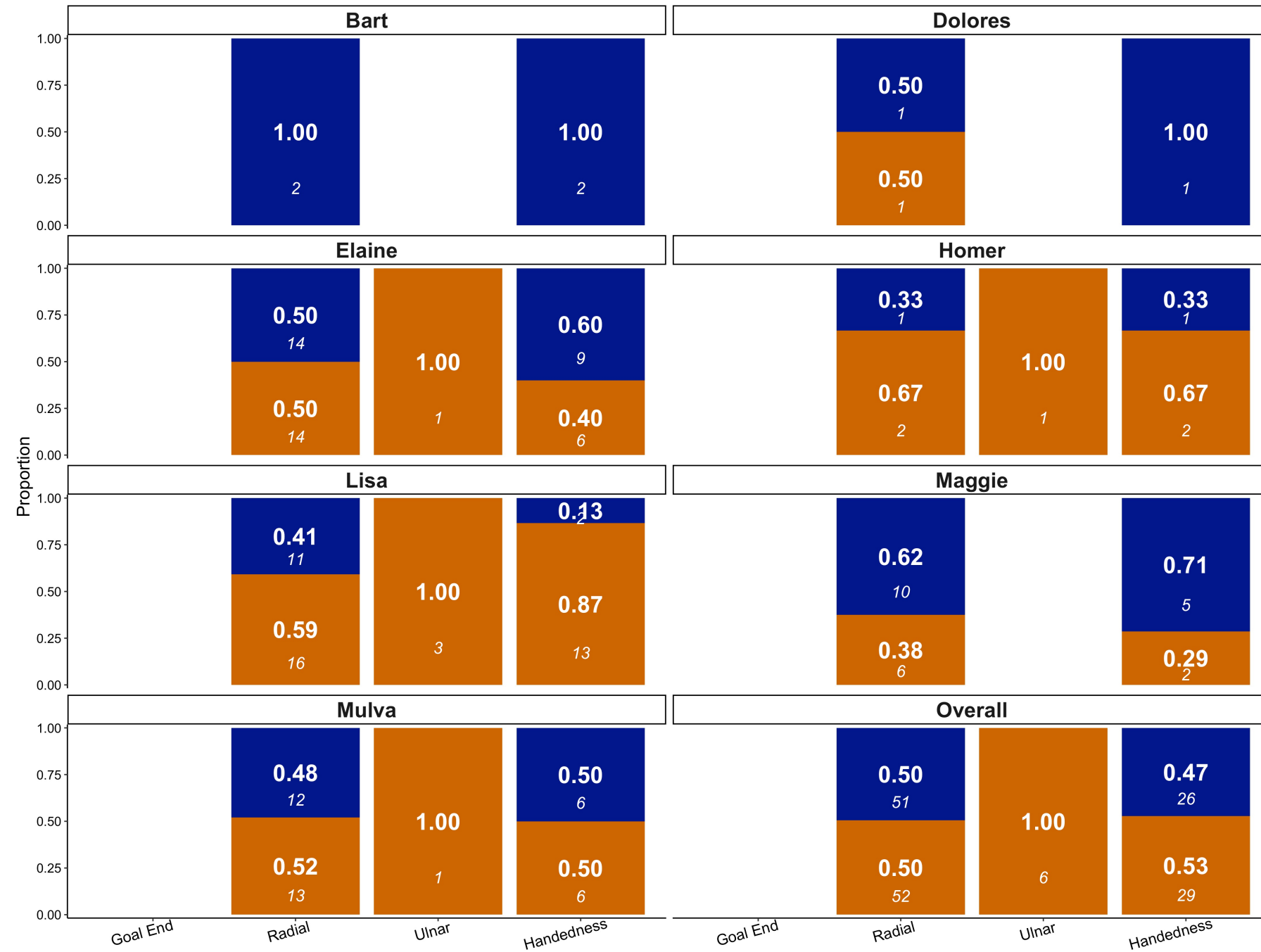
	N Radial Trials	N Trials	Prop. Radial
Bart	2	2	1
Dolores	2	2	1
Elaine	28	29	0.9655172
Homer	3	4	0.75
Lisa	27	30	0.9
Maggie	16	16	1
Mulva	25	26	0.961538
Sum	103	109	0.944954128
Average	14.71428571	15.57142857	0.939579314
SD	12.21630448	12.90810008	0.090933835

# Hand Use

# Hand Use by Grip Type and Side Baited by Tamarin

		Left Baited			Control Baited			Right Baited			N Trials
		Ulnar Grasp	Goal-End Grasp	Radial Grasp	Ulnar Grasp	Goal-End Grasp	Radial Grasp	Ulnar Grasp	Goal-End Grasp	Radial Grasp	
Bart	BothHands	0	0	0	0	0	0	0	0	0	4
	LeftHand	0	0	0	0	0	2	0	0	2	
	RightHand	0	0	0	0	0	0	0	0	0	
Dolores	BothHands	0	0	0	0	0	0	0	0	0	3
	LeftHand	0	0	0	0	0	1	0	0	1	
	RightHand	0	0	1	0	0	0	0	0	0	
Elaine	BothHands	0	0	1	0	0	0	0	0	0	44
	LeftHand	0	0	0	0	0	9	0	0	14	
	RightHand	0	0	13	0	1	5	1	0	0	
Homer	BothHands	0	0	0	0	0	0	0	0	0	7
	LeftHand	0	0	0	0	0	1	0	0	1	
	RightHand	0	0	2	0	0	2	1	0	0	
Lisa	BothHands	0	0	0	0	0	0	0	0	0	45
	LeftHand	0	0	0	0	0	2	0	0	11	
	RightHand	0	0	16	0	0	13	3	0	0	
Maggie	BothHands	0	0	0	0	0	0	0	0	0	23
	LeftHand	0	0	0	0	0	5	0	0	10	
	RightHand	0	0	6	0	0	2	0	0	0	
Mulva	BothHands	0	0	0	0	0	0	0	0	0	38
	LeftHand	0	0	0	0	0	6	0	0	12	
	RightHand	0	0	13	0	0	6	1	0	0	
Overall	BothHands	0	0	1	0	0	0	0	0	0	164
	LeftHand	0	0	0	0	0	26	0	0	51	
	RightHand	0	0	51	0	1	28	6	0	0	
N Trials		52			55			57			164

Hand Used ■ Left ■ Right



- Proportion of hand use by grip type on testing trials
  - Left or Right Baited
- Handedness is hand use on control trials
  - Both sides baited
- Number in italics represents number of trials



# **Across Testing Sessions**

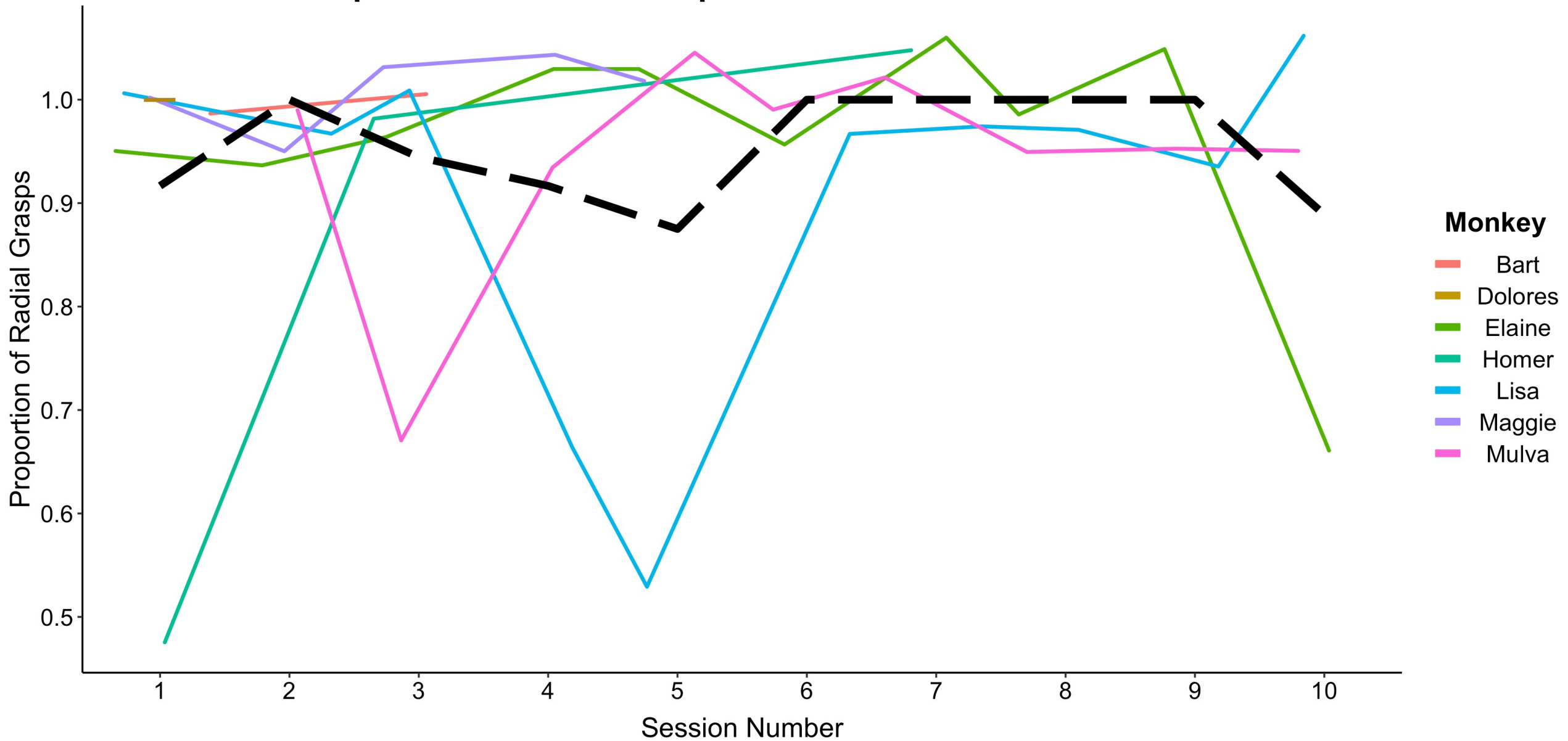
Number of Trials per Session excluding Mouth First Trials

		Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Session 7	Session 8	Session 9	Session 10	Sums	N Trials
Bart	Left	0	0	0								0	4
	Center	1	0	1								2	
	Right	1	0	1								2	
Dolores	Left	1										1	3
	Center	1										1	
	Right	1										1	
Elaine	Left	1	2	1	2	1	1	2	2	1	1	14	44
	Center	1	2	0	1	1	2	2	2	2	2	15	
	Right	2	1	0	2	1	2	1	2	2	2	15	
Homer	Left	1	0	1	0							2	7
	Center	2	1	0	0							3	
	Right	1	0	0	1							2	
Lisa	Left	1	1	0	2	2	2	2	2	2	2	16	45
	Center	0	1	1	2	2	1	2	2	2	2	15	
	Right	2	0	1	1	2	0	2	2	2	2	14	
Maggie	Left	0	1	2	2	1						6	23
	Center	1	1	2	2	1						7	
	Right	2	2	2	2	2						10	
Mulva	Left	0	1	1	2	1	1	1	2	2	2	13	38
	Center	0	0	1	2	2	1	2	1	2	1	12	
	Right	0	1	2	2	1	1	1	2	2	1	13	

Proportion of Radial Grasps on Testing Trials per session

	Bart			Dolores			Elaine			Homer			Lisa			Maggie			Mulva		
	N Radial	N Trial	Prop Radial	N Radial	N Trial	Prop Radial	N Radial	N Trial	Prop Radial	N Radial	N Trial	Prop Radial	N Radial	N Trial	Prop Radial	N Radial	N Trial	Prop Radial	N Radial	N Trial	Prop Radial
Session 1	1	1	1	2	2	1	3	3	1	1	2	0.5	3	3	1	2	2	1	2	2	1
Session 2	1	1	1				3	3	1	1	1	1	1	1	1	3	3	1	2	3	0.666667
Session 3							1	1	1	1	1	1	1	1	1	4	4	1	4	4	1
Session 4							4	4	1				2	3	0.666667	4	4	1	2	2	1
Session 5							2	2	1				2	4	0.5	3	3	1	2	2	1
Session 6							3	3	1				2	2	1				2	2	1
Session 7							3	3	1				4	4	1				4	4	1
Session 8							4	4	1				4	4	1				4	4	1
Session 9							3	3	1				4	4	1				3	3	1
Session 10							2	3	0.666667				4	4	1						
Sums																					
N Trials	2			2			29			4			30			16			26		

Proportion of Radial Grasps Over Sessions



# **Data across studies**

Dexterity High Low

