

Summary of Results

In the first part of the project, dataset of scores on 5 subscales of the Strengths and Difficulties Questionnaire was analyzed by SAS. The subset which was used in this project was obtained by filtering the master dataset according to unique number (=17). To obtain the completeness for each assessment point, the number of percentage of each assessment point as well of the total number of all assessment points were computed. The results indicate that everyone completed the Baseline assessment (100%), and that the percentage of completeness decreased though following four assessments. As shown in Table 1, among 189 children, there were 80.42% of Exit, 60.32% of FollowUp1 and only 51.32% of FollowUp2. In Table 2, 11.1% of children only did one assessment; 23.81%, 26.98%, 38.10% of children did 2, 3, and 4 assessments, respectively. According to the frequencies and percentages for each ‘combination’ of completed assessments in Table 3, most children did baseline and exit (80.42%) as well as baseline and followup1 (60.32%). Furthermore, the mean and standard deviation for each SDQ subscale for total, female, and male children were obtained separately in Table 4. Overall, SDQ of ESS, CPS, IHA, PPS decreased but PSB increased as along as assessment points. To evaluate whether statistically significant improvement was observed from baseline to last available assessment time point, paired t-test of each subscale score was done to get the p-value in Table 5. Null hypothesis in this case is “subscale scores of the baseline are same as subscale scores of the last assessment”. Each p-value was compared to 0.05 to get if the null hypothesis is rejected. At 5% of significant level ($\alpha = 0.05$), p-values of ESS, IHA and PSB were small enough to reject null hypothesis, which mean there were statistically significant improvement for those scores. However, p-values of CPS and PPS were not smaller than 0.05, so there is no evidence to reject null hypothesis.

In the third part of the project, a R function `oneRoundTest (sampleSize, probMissingOne, probMissingTwo)` was created to simulate the single round of process described in Part 2. The variables in this function corresponded to sample size, proportion corresponding to the percentage in the first missing data mechanism as well as vector corresponding to the proportions specified for the second missing data mechanism, respectively. The output of `oneRoundTest` is the p-value for this single round of test. To compute the rejection percentage of 500 rounds on different sample size and the proportion for the first missing data mechanism, a second R function `manyRoundTest`

(sampleSize, probMissingOne, probMissingTwo) was created to call oneRoundTest by 500 times. It then collects the rejections and output the rejection rate. Note it is possible to get NAN p-value from oneRoundTest when probMissingOne is too high and that there were too many missing values. These NAN p-value tests were excluded from denominator when computing rejection ratio in manyRoundTest function.

Rejection rate of Emotional Symptoms Subscale (ESS) score according to different sample size was computed by using manyRoundTest with different sampleSize (from 10 to 200 with step of 5) and shown as Figure 1. According to Figure 1, rejection rate increased as the sample size got larger, and it reached about 100% when sample size was larger than 150. This is expected as larger sample size will yield more statistical difference, resulting in larger rejection rate until reaching to 100%. Figure 2 shows the rejection rate of ESS score according to different proportion of first missing data mechanism. According to Figure 2, the rejection rate decreased as the missing proportion get larger, and it reached to 0% when the missing proportion is 98%. This is expected as the more the missing data, the less the difference of two assessment points.

Rejection rate of Prosocial Behavior Subscale (PBS) score on different sample size and missing probability were included in Fig. 3 and Fig. 4, respectively. The rejection rate for PBS have the similar trend with ESS. However, it reached to 100% when sample size is larger than 60.

Part 1 result:

- (1) Table 1. What number and percentage of children completed assessments at each of the 4 assessment time points (BASELINE, EXIT, FOLLOWUP1, and FOLLOWUP2)?

	BASELINE	EXIT	FOLLOWUP1	FOLLOWUP2
Number	189	152	114	97
Percentage	100%	80.42%	60.32%	51.32%

- (2) Table 2. How many children completed only one assessment? How many children completed 2 assessments? 3? 4?

	1	2	3	4
Number	21	45	51	72
Percentage	11.11%	23.81%	26.98%	38.10%

- (3) Table 3. What were the frequencies and percentages for each ‘combination’ of completed assessments present in the data?

	BL&EXIT	BL&FU1	BL&FU2	EXIT&FU1	EXIT&FU2
Number	152	114	97	100	86
percentage	80.42%	60.32%	51.32%	52.91%	45.50%
	FU1&FU2	BL&EXIT&FU1	BL&EXIT&FU2	BL&FU1&FU2	EXIT&FU1&FU2
Number	81	100	86	81	72
percentage	42.86%	52.91%	45.50%	42.86%	38.10%

- (4) Table 4. Calculate the mean and standard deviation for each SDQ subscale separately for each assessment time point.

For the Total Sample of Children					
	Baseline_ESS	Baseline_CPS	Baseline_IHA	Baseline_PPS	Baseline_PSB
Mean	3.6561	2.3492	4.6614	2.3175	6.7566
STD	2.2081	1.8115	2.6741	1.7427	1.9877
	EXIT_ESS	EXIT_CPS	EXIT_IHA	EXIT_PPS	EXIT_PSB
Mean	2.5066	1.9342	3.2434	1.7763	8.0592
STD	2.2960	1.7928	3.0231	1.8168	2.1166

	FU1_ESS	FU1_CPS	FU1_IHA	FU1_PPS	FU1_PSB
Mean	2.4211	1.5877	3.1667	1.6754	8.5000
STD	2.4419	1.9992	2.9084	1.9800	2.3771
	FU2_ESS	FU2_CPS	FU2_IHA	FU2_PPS	FU2_PSB
Mean	2.4433	2.3608	3.3608	2.1134	8.0000
STD	2.9225	2.3944	3.4677	2.5490	2.8431
For the Total Sample of Male					
	Baseline_ESS	Baseline_CPS	Baseline_IHA	Baseline_PPS	Baseline_PSB
Mean	3.2105	2.5263	5.0947	2.2526	6.4737
STD	2.1826	1.8728	2.7447	1.7982	1.9066
	EXIT_ESS	EXIT_CPS	EXIT_IHA	EXIT_PPS	EXIT_PSB
Mean	2.1579	2.1316	3.8553	1.5789	7.7237
STD	2.3892	1.6358	3.1904	1.7225	2.2006
	FU1_ESS	FU1_CPS	FU1_IHA	FU1_PPS	FU1_PSB
Mean	2.2203	1.6780	3.3898	1.5763	8.3390
STD	2.3124	2.1208	3.0287	1.6938	2.4887
	FU2_ESS	FU2_CPS	FU2_IHA	FU2_PPS	FU2_PSB
Mean	2.1346	2.5000	3.5192	2.2885	7.7500
STD	2.8147	2.6159	3.6380	2.6222	2.9497
For the Total Sample of Female					
	Baseline_ESS	Baseline_CPS	Baseline_IHA	Baseline_PPS	Baseline_PSB
Mean	4.1064	2.1702	4.2234	2.3830	7.0426
STD	2.1526	1.7391	2.5407	1.6919	2.0368
	EXIT_ESS	EXIT_CPS	EXIT_IHA	EXIT_PPS	EXIT_PSB
Mean	2.8553	1.7368	2.6316	1.9737	8.3947
STD	2.1584	1.9278	2.7317	1.8972	1.9872
	FU1_ESS	FU1_CPS	FU1_IHA	FU1_PPS	FU1_PSB
Mean	2.6364	1.4909	2.9273	1.7818	8.6727
STD	2.5774	1.8745	2.7813	2.2582	2.2612
	FU2_ESS	FU2_CPS	FU2_IHA	FU2_PPS	FU2_PSB
Mean	2.8000	2.2000	3.1778	1.9111	8.2889
STD	3.0346	2.1277	3.2911	2.4755	2.7188

(5) Table 5. Using scores from this last available time point, calculate a t-test to determine if statistically significant improvement was observed from baseline to last available assessment time point. (Use 5% significant level)

Subscale	SDQ_ESS	SDQ_CPS	SDQ_IHA	SDQ_PPS	SDQ_PSB
P-value	<.0001	0.1002	<.0001	0.3288	<.0001
Conclusion	Reject	Not reject	Reject	Not reject	Reject

Part 3 Result:

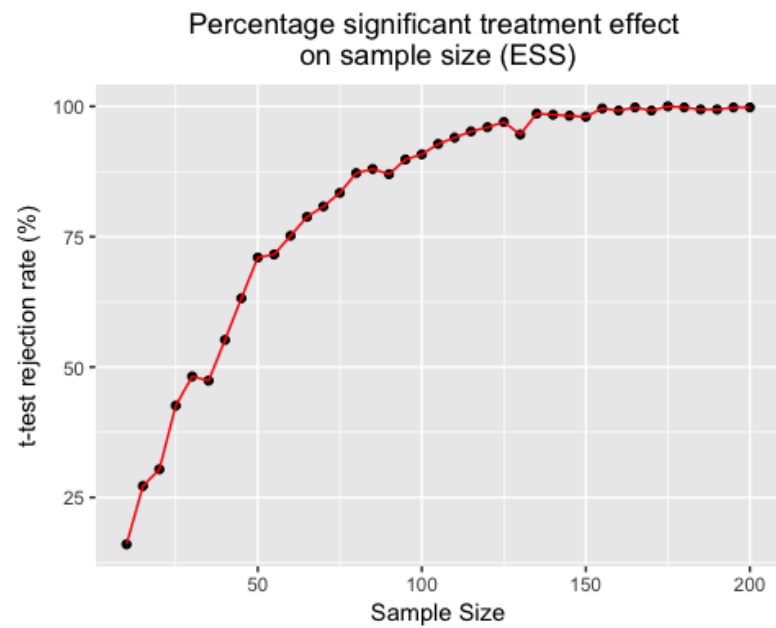


Fig. 1 Percentage significant treatment effect on sample size for ESS

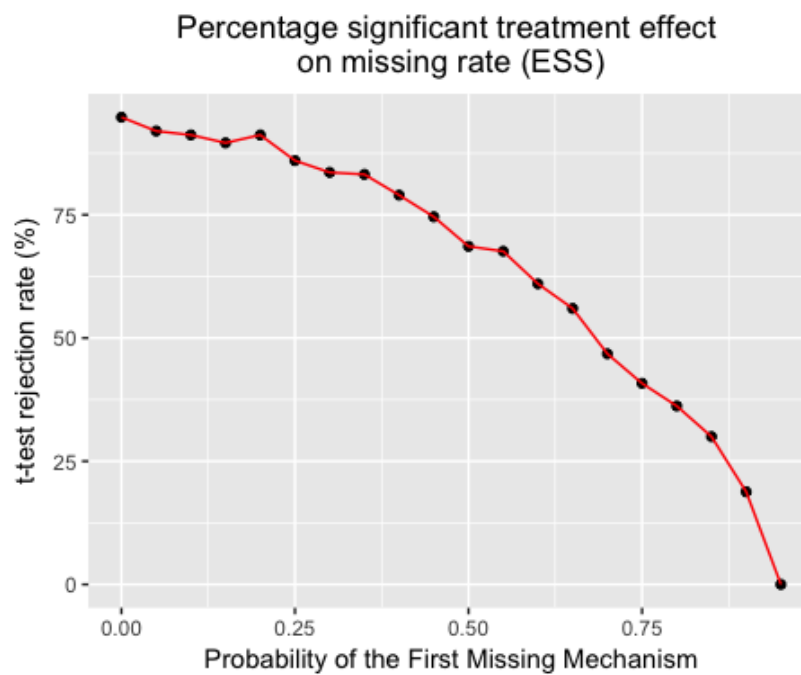


Fig. 2 Percentage significant treatment effect on the probability of the first missing mechanism for ESS

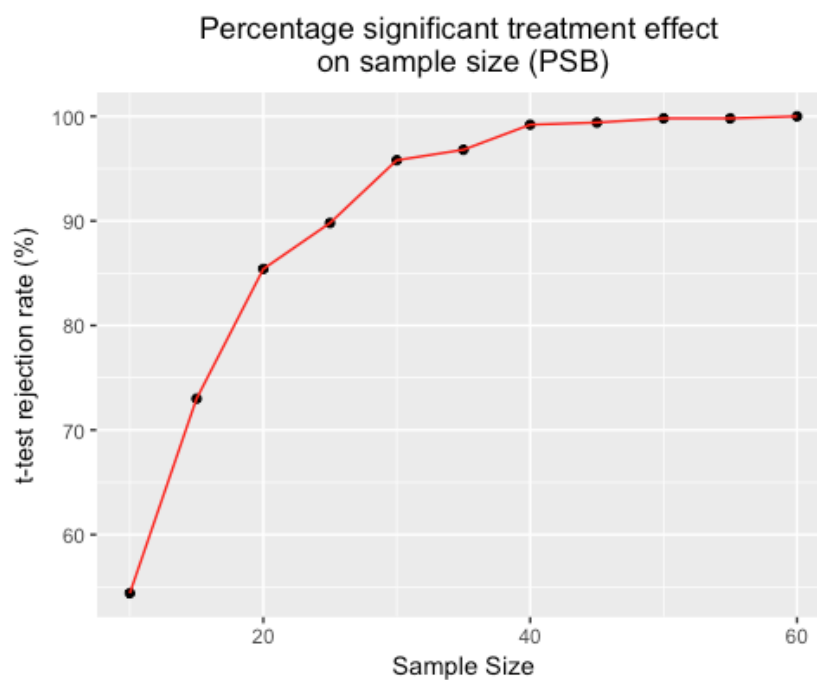


Fig. 3 Percentage significant treatment effect on sample size for PSB

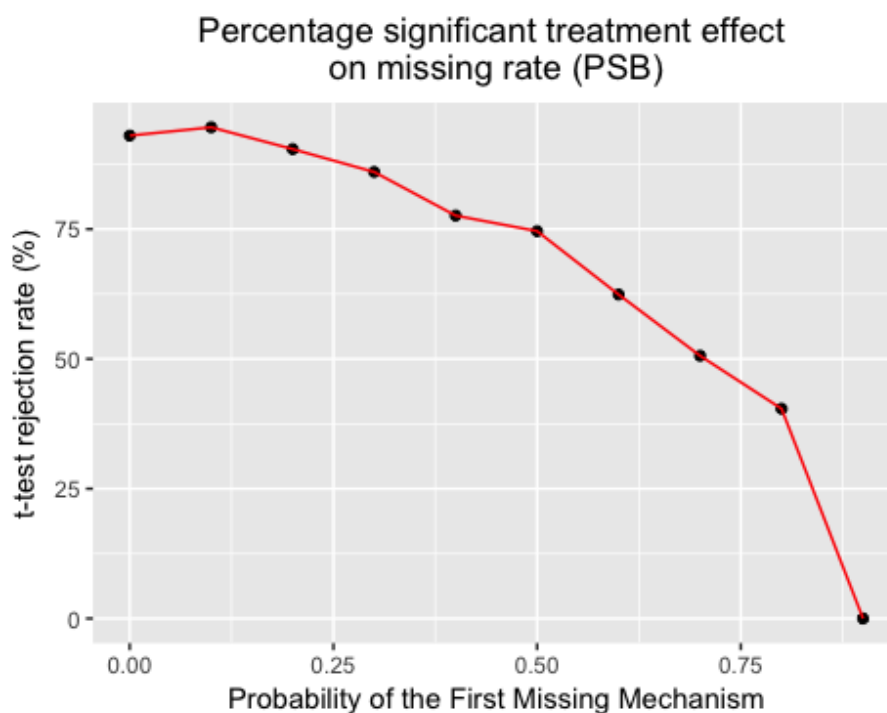


Fig. 4 Percentage significant treatment effect on the probability of the first missing mechanism for ESS