Social robotics assignment - 1

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1 Data

This chapter shows the results of three brief experiments.
In the first one a survey was conducted on a small group of people of different sex, ages (from 22 to 54 years old) and backgrounds. Some people are students while others work in different fields. Here are reported the results of six people only, but to give validity to the test the sample of people should be much greater.
The questionnaire that people had to take is the NARS questionnaire, which studies how people perceive and accept social robots.
The second experiment was the same as the first but the people were all from the robotics master course of the University of Genova.
The third experiment is part of a Goodspeed survey, conducted on the first group of people after watching the video of a social robot, Erica, interacting with humans. Results are shown in tables similar to the previous ones.

The data of all studies is reported in two tables. In the first one each row represents the answers of a single person, each column the answer to a specific question. The grey cells are the inverse items.
The second one shows of sum and mean of each item, the single item variance, the inter item covariances and the Cronbach alpha, that was calculated as:

$$\alpha = \frac{k}{k-1} \cdot \frac{1 - \sum \sigma^2 i}{\sigma^2 x} \tag{1}$$

and that measures the internal consistency of the questionnaire.

1.1 NARS questionnaire on external people

Tables of data:

	Item1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Item9	Item10	Item11	Item12	Item13	Item14	Sum per person
Person1	3	2	3	1	4	4	1	1	1	1	4	1	2	1	29
Person2	5	5	5	3	4	3	1	1	4	2	1	1	2	1	38
Person3	4	3	4	2	4	4	1	1	3	1	4	3	4	4	42
Person4	4	2	1	1	1	4	2	1	1	1	5	1	1	1	26
Person5	5	4	4	2	4	2	1	4	3	1	2	1	1	1	35

Sum	21	16	17	9	17	17	6	8	12	6	16	7	10	8	170
Sigma_i	0,7	1,7	2,3	0,7	1,8	0,8	0,2	1,8	1,8	0,2	34	0,8	1,5	1,8	42,5
Mean	4,2	3,2	3,4	1,8	3,4	3,4	1,2	1,6	2,4	1,2	3,2	1,4	2	1,6	34
Sigma_x	42,5														
Alpha	-0,19258														

1.2 NARS questionnaire on robotics people

Tables of data:

	Item1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Item9	Item10	Item11	Item12	Item13	Item14	Sum per person
Fra	2	3	1	1	2	3	1	2	2	1	2	1	2	5	28
Davide	2	3	1	1	1	2	1	1	1	1	2	1	1	4	22
Chiara	4	2	1	1	4	3	1	3	1	1	4	1	1	1	28
Auro	4	2	3	1	5	5	1	1	2	1	1	2	2	3	33
Gabri	4	5	1	1	3	5	1	1	3	1	4	1	4	3	37
Sara	4	1	3	1	4	4	1	1	3	1	1	1	2	1	28

Sum	20	16	10	6	19	22	6	9	12	6	14	7	12	17	176
Sigma_i	1,066667	1,866667	1,066667	0	2,166667	1,466667	0	0,7	0,8	0	1,866667	0,166667	1,2	2,566666667	26,26666667
Mean	3,333333	2,666667	1,666667	1	3,166667	3,666667	1	1,5	2	1	2,333333	1,166667	2	2,833333333	29,33333333
Sigma_x	32,3														
Alpha	0,579027														

1.3 Goodspeed questionnaire on external people

Tables of data:

	Item1	Item2	Item3	Item4	Item5	Sum per person
Person1	3	3	2	2	2	12
Person2	5	4	4	4	5	22
Person3	2	3	5	4	4	18
Person4	3	3	3	3	3	15
Person5	3	4	3	2	4	16

Sum	16	17	17	15	18	83
Sigma_i	1,2	0,3	1,3	1	1,3	13,8
Mean	3,2	3,4	3,4	3	3,6	16,6
Sigma_x	13,8					
Alpha	0,67893					

2 Analisys of data

2.1 NARS questionnaire on external people

The final result is:

- mean = 34;
- variance = 42.5;
- Cronbach alpha = 0.534

By taking as reference the table that relates alphas to the internal consistency of the questionnaire, the alpha found in this experiment is poor.
However, given the very low number of people who participated in the survey, this number, together with the mean and variance of the results does not have a proper meaning. The notable thing may be that the single item variances are sometimes high. For example it happens for questions 3 and 11, respectively "I feel relaxed talking with robots" and "I feel that if I depend on robots too much, something bad might happen". This is probably due to the heterogeneity of the statistic sample of the survey. Total variance shows the same concept.

2.2 NARS questionnaire on robotics people

The final result is:

- mean = 29.3;
- variance = 26.27;
- Cronbach alpha = 0.464

Alpha is a little lower then before, but this may just be due to chance. Variance indicates that results are generally similar, probably because we have similar robotics backgrounds. The mean, however, is slightly less then before, indicating that robotics students tend to have a more positive approach to social robots.

2.3 Goodspeed questionnaire on external people

The final result is:

- mean=16.6;
- variance=13.8;
- Cronbach alpha = 0.679

As for the other results, the alpha is not meaningful. Merging the results with other students may instead bring to interesting results. In general, however, since it's a higher value then before, it could indicate that the questionnaire is reliable, at least with reference to the population examined.