

Review

on “Analogies and Understanding Intentions”, thesis submitted by Luiza Shahbasjan for partial fulfilment of the requirements for a PhD degree by Prof. Stefan Mateeff, Department of Cognitive Science and Psychology at NBU

Luisa presents a 167 pages thesis. The first 60 pages are introductory. Luisa reviews different theories that may be aimed at explaining various aspects of the human understanding the intentions of other people. A large amount of the introduction is devoted to the paradigm of analogy making. This paradigm has been studied many years by members of the Department; Luisa continues this tradition. The introduction is written with a lot of competency. However, the theoretical sections are too wordy, they should be shortened.

There is not a separate section in which the goals of the study are outlined. Below I will try to use my mindreading abilities in order to understand the intentions of Luisa while undertaking this study.

When subjects encounter a base story with positive outcome, they are expected to respond positively. Negative responses are expected when the story is with negative outcome. These are common-sense results. Since the base and target stories are analogical, such results would be in agreement with the hypothesis that analogies play a basic role in understanding the intentions of others. It seems that Luisa had also the intention to demonstrate that structural analogies are more powerful in this process than superficial ones. This is a good idea for a PhD-study. However, things appear not to be so simple, as often happens in science.

I do not enjoy very much the first experiment. It is extremely complicated, the results are difficult to follow and understand. Luisa employs three base stories, with structural and superficial resemblance to the target and one story with no any similarity. The stories are of negative and positive outcomes. A control story is also employed. Each subject is asked to respond three times by three 7-point Likert scales. Therefore, the raw

results are summarized by $(3 \times 2 + 1) \times 3 = 21$ mean values, which complicates the analysis and the interpretation. These means are given in Table 2 on pg. 74. The design is between subjects, with 7 groups assigned to the 7 base conditions. The number of participants in each group should be given in the table. The entries in the rightmost column are presumably the mean estimates on the “neutral” scale. Why the grand mean of 3.38 is lower than each of the means in the column? This question is not petty-minded. The estimate of 4 is the indifference point of the Likert scale, it is the “neither-nor” response of the participant. It is of importance how much and in what direction the estimates deviate from this point. This is not considered for this experiment and also in the next experiments.

I am more concerned by the use of two opposite Likert scales in the study, the negative and the positive. In fact, one of the scales is mirror image of the other. Luisa speculates (pg. 68) that the scales might be orthogonal. It seems to me that they may be not. Assuming a perfect consistence of the participant’s responses, an estimate of, say 5, on the “positive” scale should correspond to an estimate of 3 on the “negative” scale. Whether this is the case, is easy to establish by “reversing” one of the scales. I have reversed the “positive” scale and compared the means of the “negative” responses with the means of the “non-positive” responses. It appears that a lot of the mean scale values become practically the same. Indeed, some of them differ, but we do not know whether this is an effect of the manipulated factors, or the difference is due to some unavoidable inconsistency of the reports. Anyway, some of the effects demonstrated in Experiment 1 (for example, the difference between the means in fig. 3 on pg. 79 and fig. 5 on pg. 81), seem trivial due to lack of orthogonality.

A basic and important finding emerges in the data of Experiment 1: the participants prefer to respond negatively when the base story is positive. Similar tendency is observed even with the neutral and the control base stories. This is an unexpected effect that contradicts theory and common sense. When the data are in keeping with the theory, this is good. But when they contradict the theory, this may be wonderful. Luisa abandons the study

of the second-order effects of the superficial similarity and in the next experiments she concentrates her efforts in replicating the effect and clarifying its potential causes. This is a meaningful change in the strategy of the study.

The next Experiment 2 is carried out only with structurally similar base stories. The participants are forced to choose one out of two alternative statements about the intentions embedded in the target story. Luisa refers to literature data, which show that the forced choice format of the responses requires “deeper processing”. I would not evaluate this speculation; the literature cited in the text is not present in the references list. The participants in this Experiment 2 are asked to fulfil the aggression questionnaire of Buss and Perry. This is a good idea. Again, the participants prefer to choose the negative response even when presented with the positive story. Therefore, the inverted effect of the analogy between the base and the target stories is confirmed by employing another type of responses. Moreover, no significant relationship between the aggression scores and the responses is obtained. In this way the aggression level may be rejected as potential cause of the inversed effect.

The next Experiment 3 is aimed at studying the potential role of the participant’s stereotypes. The wolves in the previous stories are replaced by ghosts. In this way Luisa avoids the negative stereotype that wolves are always bad, regardless of the end of the story, positive or negative. This manipulation seems successful: the positive ratings increase when the base story is positive. Here, it would be instructive to compare the mean of the positive ratings in this experiment (3.94) with the mean rating under the same condition in Experiment 1 (which is 2.65). The increase in “positivity” is obvious, which is in keeping with the hypothesis that the inverted effect may be, at least partially, due to the stereotype that the wolves are bad. The salient “negativity”, which is evident in the ratings under the control condition, for positive 3.06 and for negative 5.00 (table 7), remains an open question. These two entries (and other in table 7) show again that one of the Likert scales, the “positive” or the “negative” one, may be redundant.

Experiment 4 is a replication of Experiment 3, but with the use of forced choice responses instead of Likert scale. Such replications are not redundant; the inversed effect of the analogy is sufficiently important and needs careful scrutinizing. Here I am somewhat confused: on pg. 102 Luisa writes that the stories in Experiment 4 are the same as those in Experiment 3, i.e. with “ghost” characters, but in the title of Table 9 we see “negative characters”. I assume that ghosts are the characters in the base stories of Experiment 4. The results (Table 9) show a preference toward the “negative” responses. Here, it may be instructive to compare these data with the data from Experiment 2 (Table 4) in which the same type of responses is used, but with wolves as characters. Also, a comparison between Experiment 4 and Experiment 3 may be useful for evaluating the replicability of the “positive” effect of the stereotype.

In Experiment 5 again three types of responses by Likert scales, negative, positive and neutral, are employed, like in Experiment 3. A new type of treatment is used: the subjects are asked either to make a summary of the base stories or to make a comparison between them. Based of literature data, Luisa hopes that the comparison would aid to “deeper processing” of the base stories and to constructing a “schema”, whereas the summary would be equivalent to a simple analogy making (as that in Experiment 3). The data are not very well described. There are two independent variables. One of them is “base content” with two levels, negative and positive outcome of the base story. The other is labelled as “base task”, with levels the tasks of the subjects, to make a comparison or a summary (see table 11 and the figs). However, these labels are not consistently kept in the text; instead “schema” and “analog” are used. This confounds the reader. The basic result is that the “comparison” condition leads to higher negative (and non-positive) estimates than the “summary” condition (the “total” rows in Table 11). The putative “schema” seems to affect the process of mindreading, but again in the paradoxical way of inverted analogy.

I have a basic concern with the data processing. The interpretations are based solely on calculating p -values. There is no effort to evaluate

psychologically the obtained effects as strong, weak, substantial or practically uninteresting. It would be very instructive to compare quantitatively the effects obtained in the five experiments, but the p -values calculated by ANOVA, MANOVA etc. do not provide such possibility. The praiseworthy summary of the effects in Table 13 remains only qualitative; it could be done much better.

Despite my critical remarks, my overall opinion is that this is a good thesis. An interesting and surprising “inverted” effect is found. The effect is replicated and confirmed by a series of experiments. Potential factors that may moderate or modulate this effect, like aggression level, memory etc. are carefully controlled. I agree with the final conclusion of Luisa that the data only moderately support the hypothesis that analogy making is involved in the process of mindreading. At least, this process seems to be affected by many other influences. The “inverted effect” is of importance not only for the academic cognitive science, but also for a lot of fields in the applied psychology, for the studies of education, politics, propaganda, advertisement.

In conclusion, the thesis of Luisa definitely meets the requirements of the Cognitive Science program for the educational and scientific degree “doctor of psychology”.

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