DOCUMENT RESUME

ED 262 370 CG 018 605

AUTHOR	Hanley, Gerard L.
TITLE	Memory Specificity as a Reality Monitoring Cue.
PUB DATE	Aug 85
NOTE	16p.; Paper presented at the Annual Convention of the American Psychological Association (93rd, Los Angeles, CA, August 23-27, 1985). Figures 1-4 may be marginally reproducible due to small print.
PUB TYPE	Reports - Research/Technical (143) -- Speeches/Conference Papers (150)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Cognitive Processes; Cues; *Imagination; *Memory; *Perception; *Spatial Ability
IDENTIFIERS	*Reality Monitoring; *Specificity

ABSTRACT

The specificity of memories has been identified as a factor affecting reality monitoring performance. To examine the reality monitoring model of Johnson and Raye (1981) and to explore the relationship between memory specificity and reality monitoring, the amount of cognitive operations involved in processing information was manipulated for 72 subjects who imagined and perceived spatial relationships between objects in treasure maps. Subjects (N=24) in the whole map condition saw a continuous path between five objects, while subjects (N=48) in the segmented map condition saw segments of the path which they mentally combined into a continuous path. All subjects imagined spatial relationships by reading descriptions of imaginery hands of a clock. All subjects perceived ten maps and imagined ten maps. After presentation of the maps, the accuracy of subjects' memory for the relative location of objects was tested and subjects completed a forced-choice recognition and identification of origin task. An identification of origin score computed for each subject reflected the accuracy with which subjects discriminated between memories of imagined and perceived maps. The results indicated that subjects in the whole map condition were significantly more accurate at correctly identifying the origin of maps than were subjects in the segmented map condition. The findings demonstrated that difference in the amount of cognitive operations was a reliable reality monitoring cue and differences in the cognitive operations produced the opportunity for differences in memory specificity to be a reliable reality monitoring cue. (NRB)

MEMORY SPECIFICITY AS A REALITY MONITORING CUE

Gerard L. Hanley

California State University, Long Beach

Paper presented in August, 1985 at the Annual Meeting of the American Psychological Association, Los Angeles, CA with the assistance of Larry Alford and Randi Matchik.

Memory specificity as a reality monitoring cue

Gerard L. Hanley

California State University, Long Beach

The specificity of memories is an important factor in recall and recognition performance (Tulving & Thompson, 1973). When a memory is generated by an encoding process that limits the meaning referred to by an external stimulus or symbol, the retrieval context must cue the limited or specific meaning encoded for sucessful recall (Hashtroudi & Johnson, 1976). In general, the likelihood of retrieving a memory is dependent upon the compatibility of the memory generation and retrieval contexts (Morris, Bransford, & Franks, 1977) and compatibility can be defined as the accuracy with which the retrieval cues match memories generated at encoding.

Specificity of memories has also been identified as a feature affecting reality monitoring performance (Johnson & Raye, 1981). Reality monitoring refers to people's ability to discriminate between memories generated from perception -memories generated from an external source, the "real world"- and memories generated from their imagination -memories generated from an internal source, the mind.

Johnson & Raye (1981) proposed that memories of past perceptions are generally more specific in nature than memories of past thoughts. When a person retrieves a memory and has to identify it's origin, she or he can evaluate the specificity of the memory. This metamemory judgment may then be used to help decide whether one originally perceived or imagined the remembered information. If a memory is very specific, one is likely to decide that the information was perceived earlier because memories of perceptions are typically very specific; if a memory is abstract, the information was probably imagined.

Johnson and Raye (1981) have proposed three other dimensions on which memories of perceptions and imaginations generally differ. Memories of perceptions are typically higher in the amount of sensory information and higher in the amount of information about the spatial and temporal contexts than memories of imaginations but memories of perceptions typically have a lower amount of information about the cognitive operations involved in generating the memory than memories of imaginations. Although the four dimensions are related to each other to various degrees, the present paper will be focusing on the use of memory specificity as a reality monitoring cue.

The reliabiltiy of specificity as a reality monitoring cue is dependent upon how representative the retrieved memory is of the class of memories from the same origin. For example, if a memory of imagined information is very specific, the person is more likely to mistakenly identify the memory as originating from an external source since the internally generated memory was atypically very specific. Evidence in support of this hypothesis was reported by Johnson, Raye, Wang, & Taylor (1979). They grouped subjects into good and poor imagers by the accuracy with which the subjects could recall features of pictures on a secondary task (for example, how many smoke stacks did the ship have?). Johnson et al. (1979) found that subjects who tended to generate memories with more specific details were more likely to mistakenly identify the memories of imagined pictures as being memories of perceived pictures while making frequency judgments of perceived pictures. They concluded that a reduction in subjects abilities to discriminate between imagined and perceived pictures was related to the similarity in accuracy of the internally and externally generated memories.

The present experiment was designed to further examine Johnson & Raye's (1981) reality monitoring model and in particular, the relationship between the memory specificity and reality monitoring. Subjects imagined and perceived spatial relationships between objects in treasure maps and the amount of cognitive operations involved in processing the imagined and perceived information was manipulated. The specificity of the subjects' memories was assessed at the time of encoding by measuring the accuracy with which subjects could locate the objects in the maps. Thus, memory specificity can be directly related to the subjects' ability to subsequently identify the origin of the retrieved cognitive maps.

Method

In the present experiment, spatial relationships between objects in a treasure map were the bits of information that subjects imagined or perceived. Subjects perceived the spatial relationships in one of two ways. Figure 1 shows an example of what one group of subjects saw - a single, continuous path between five objects. The second group of subjects saw segmented maps which had each segment of the path separated into a horizontal display. An example of a segmented map is shown in Figure 2. Subjects who were presented with the segmented maps were instructed to mentally combine the individual path-segments into a single continuous map by connecting the separate path-segments at the endpoints with the common objects.

Subjects in both groups imagined spatial relationships by reading descriptions of imaginary hands of a clock (see Figure 3). The verbal descriptions indicated the direction of one object to another rather than actual lines and from these descriptions, subjects were instructed to imagine the individual path-segments and then mentally integrate them into a single continuous map. The way the subjects had to imagine the spatial relationships was by imagining the first item in the left-most pair (shoes) in the center of a clock and imagine placing the second item (dragon) at the hour on the clock described. Then, the second item (dragon) gets placed in the center of the clock and the third item (crooked tree) is located at the hour described. This imagination procedure is repeated for all four path-segments and the segments were all of equal length. The paths shown in Figures 1, 2, and 3 are all of the same map. While the maps were being presented, the subjects were not allowed to draw the maps or any other cues.

After each map was presented for 40 seconds, the accuracy of the subjects' memory for the relative location of the objects was tested. Subjects had to indicate the direction of two non-adjacent objects on a response sheet. That is, the tested spatial relationships were never directions described with clock directions or lines. Again, subjects were not allowed to draw anything except the required response. The accuracy of the subjects' map accuracy response was measured by the angle between the direction of subjects' drawn line and the actual direction of the target objects.

In sum, twenty-four subjects in the whole map condition perceived 10 whole maps and imagined 10 maps from the verbal descriptions and the second group of forty-eight subjects in the segmented path condition perceived 10 segmented maps and imagined 10 maps (two segmented path conditions were combined for this paper).

After the map learning phase and a 5 minute intervening task, subjects were presented with a forced-choice recognition and identification of origin task. Subjects also rated their confidence in each judgment. As shown in Figure 4, the recognition stimuli were composed of two, numbered whole paths and a numbered list of treasure items. Subjects were told that one of the paths belonged with the items and their task was to first decide which path was the correct, old path and then decide whether they imagined or per·eived the segments of the path.

An identification of origin (IDO) score was computed for each subject to reflect the accuracy with which subjects could discriminate between memories of the imagined and perceived maps. The IDO score was equal to the percentage of recognized maps whose origins were also correctly identified. For example, if a subject recognized 16 of the 20 maps and correctly identified the origin of 12 of the 16 recognized maps, the IDO score would equal 12/16 or 75%. A mean confidence rating in identifying the origin of the recognized maps was also computed. A rating of 10 meant that the subjects were extremely confident and a rating of 1 meant that the subjects were not confident at all.

Results

As shown in Table 1, subjects in the whole path condition were significantly more accurate at correctly identifying the origin of maps and significantly more confident in their reality monitoring performance than were subjects in the segmented path condition. The difference in the cognitive operations involved in perceiving a whole map and mentally integrating the imagined path-segments was greater than the difference between mentally integrating both imagined and perceived path-segments. This greater discriminative cue allowed subjects in the whole path condition to be more accurate and confident in judging the origin of the recognized maps as predicted by Johnson & Raye (1981).

Table 1 also shows that the recognition rate and the accuracy of the maps were not different for the whole path and segmented path conditions. It appears that memory specificity did not function as a reality monitoring cue because the imagined and perceived maps were equally accurate. But when the correlation between the accuracy of each subject's imagined and perceived maps was examined, the correlation was significant for the segmented path condition ($r(46)=.55$) and not significant for the whole path condition ($r(22)=.30$). The same cognitive integration processes involved in the segmented path condition produced significantly related specificity between the imagined and perceived maps while the different encoding processes involved in the whole path condition did not produce related specificity between the imagined and perceived maps.

It is possible that subjects who had a larger difference in specificity between the imagined and perceived maps should be better at identifing the origin of maps. Figure 5 shows the regression lines and correlations between subjects' IDO scores and the difference between perceived and imagined map accuracy. As the whole path subjects generated perceived maps more accurately relative to imagined maps, they were significantly more accurate at remembering the origin of recognized maps. Conversely, as the imagined maps became relatively similar to and even more specific than perceived maps, the whole path subjects were more likely to confuse the origins of the cognitive maps. This result supports Johnson & Raye's (1981) reality monitoring model. As shown in Figure 5, this correlation was not significant for the segmented path condition; the difference in specificity could not function as a reality monitoring cue in the segmented path condition because the specificity of the imagined and perceived maps was consistently similar for subjects in this condition.

If subjects in the whole path condition were aware that they were using the difference in specificity of imagined and perceived maps as a reality monitoring cue, the larger difference in specificity should produce more confidence in their IDO judgements. It was found that only the absolute amount of difference in map accuracy between imagined and perceived paths was significantly correlated to the whole path subjects' confidence in their IDO judgments ($r(22)=.45$). This correlation was not significantly different from zero for the segmented path condition ($r(46)=.09$).

Figure 6 shows separate regression lines and correlations for the whole path subjects when the perceived maps were more accurate than imagined maps and when the imagined maps were more accurate than perceived maps. Like the relationship between specificity and IDO scores, as the perceived maps became relatively more accurate than imagined maps, the subjects' confidence in identifying the origin of the cognitive map increased.

A quite different result occurred as the imagined maps became atypically more accurate than perceived maps. Even though subjects accuracy in identifying the origin of memories decreased as imagined maps became more accurate than perceived maps, their confidence in their origin judgments significantly increased. Thus, these subjects became more confident that they were accurate in remembering the origin of the maps when they were actually becoming more confused.

Discussion

The cognitive and perceptual processes involved in generating memories of imagined and perceived information significantly affected people's reality monitoring accuracy in two ways. First, the difference in the amount of cognitive operations associated with the imagined and perceived memories was an important reality monitoring cue: the larger the difference in amount of cognitive operations, the greater the accuracy and confidence in the reality monitoring judgments. Second, the difference in the cognitive and perceptual processes produced differences in the relationship between the specificity of imagined and perceived memories.

The cognitive integration of perceived lines and the cognitive integration of imagined lines required of the subjects in the segmented path condition engaged common component processes which in turn produced the significant correlation between the specificity of a person's imagined and perceived memories. In contrast, the perceptual processes involved in generating memories of whole maps and the cognitive integration processes involved in generating cognitive maps from imagined path-segments are mental processes that appear _not_ to have common component processes. The independence of these mental operations produced the opportunity for people to vary in the accuracy with which they can engage these different cognitive skills. Consequently, people varied in the degree to which the memory specificity of imagined information differed from the memory specificity of perceived information. Due to the independence of the specificity of perceived and imagined memories, subjects in the whole path condition had the opportunity to use the difference in specificity as a reliable reality monitoring cue.

The reliability with which the specificity cue would predict the correct origin of the memories is dependent upon how representative the retrieved memories are of the general class of imagined or perceived memories. The present results support Johnson & Raye's (1981) hypotheses: (1) as the memories of perceived maps were _typically_ more specifi than memories of imagined maps, reality monitoring accuracy _increased_ and (2) as the imagined maps were _atypically_ more specific than memories of perceived maps, reality monitoring accuracy _decreased_ .

The relationship between memory specificity and reality monitoring confidence suggests that the whole path subjects were simply using the absolute amount of difference in specificity in deciding on the amount of their confidence. Equivalance in specificity of imagined and perceived maps did produce a decrease in reality monitoring accuracy but these subjects were also accurately aware of their inability to correctly identify the origin of the maps; their confidence ratings were low. The result that was particularly interesting occurred when the subjects' memories of imagined maps were atypically more specific than perceived maps. In this circumstance, the subjects were more confident that they were _correct_ in remembering the origin of the cognitive maps while they were in fact attributing the memories to the <u>wrong</u> origin. Thus, when people make reality monitoring errors that are due to atypical differences in specificity of memories, they can be very confident that they are not in error.

In conclusion, the difference in the amount of cognitive operations was a reliable reality monitoring cue and the differences in the cognitive operations can produce the opportunity for differences in memory specificity to be a reliable reality monitoring cue. Although these characteristics of imagined and perceived memories affect reality monitoring accuracy as predicted by Johnson & Raye's (1981) model, the people generating the memories were not always accurate at evaluating their own reality monitoring judgments.

References

Hashtroudi, S., & Johnson, M.K. (1976) Transfer and forgetting: Interpretive sets and stimulus reinstatement. Journal of Experimental Psychology: Human Learning and Memory, 2, 262-272.

Johnson, M.K., & Raye, C. (1981) Reality monitoring. Psychological Review, 88, 67-85.

Morris, C.D., Bransford, J.D., & Franks, J.J. (1977) Levels of processing versus transfer appropriate processing. Journal of Verbal Learning and Verbal Behavior, 16, 519-533.

Tulving, E., & Thompson, D.M. (1973) Encoding specificity and retrieval processes in episodic memory. Psychological Review, 80, 352-373.

TABLE 1

	Presentation Condition	
	Whole Path	Segmented Path
Percent Correct – Identification of Origin (IDO)	77.0%	58.3%
Confidence Rating of IDO Judgement	7.2	4.6
Percent Correct – Recognition	71.2%	70.3%
Mean Angle Error for Perceived Maps	27.2°	27.1°
Mean Angle Error for Imagined Maps	31.0°	28.8°

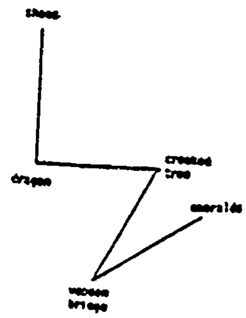


Figure 1.

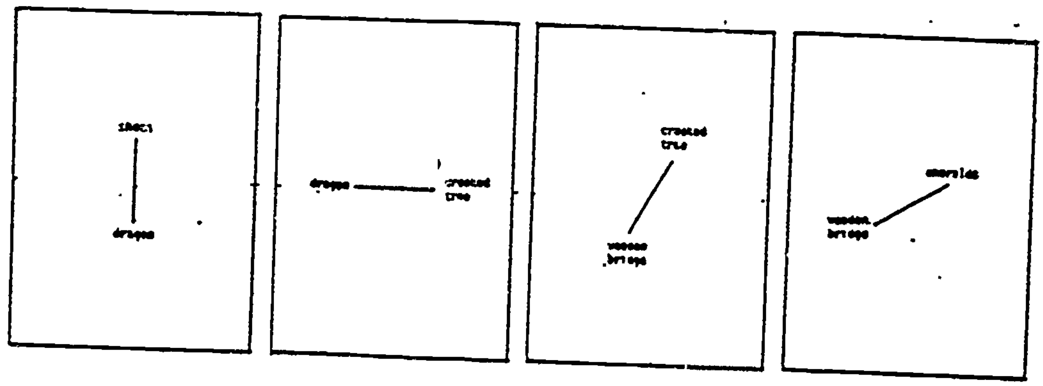


Figure 2.

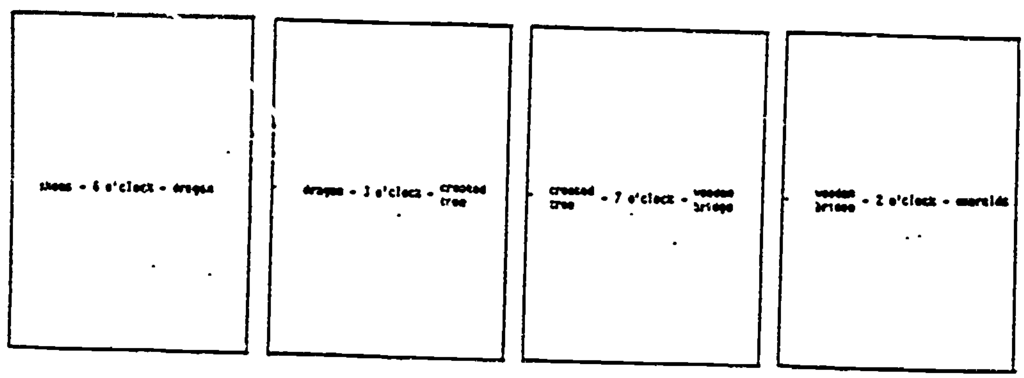


Figure 3.

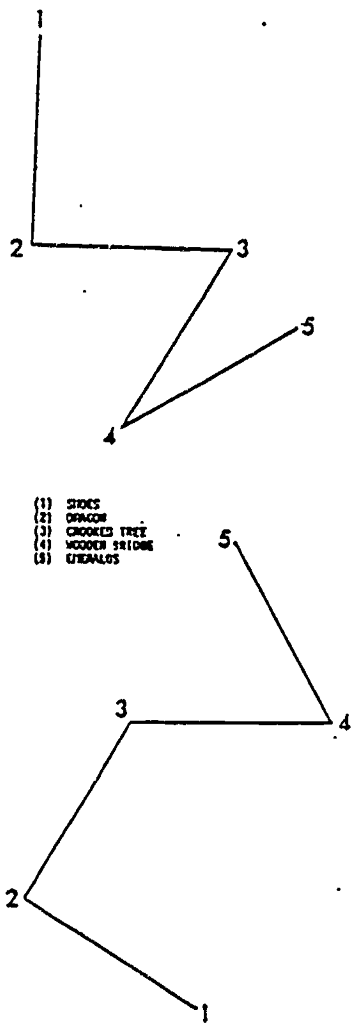
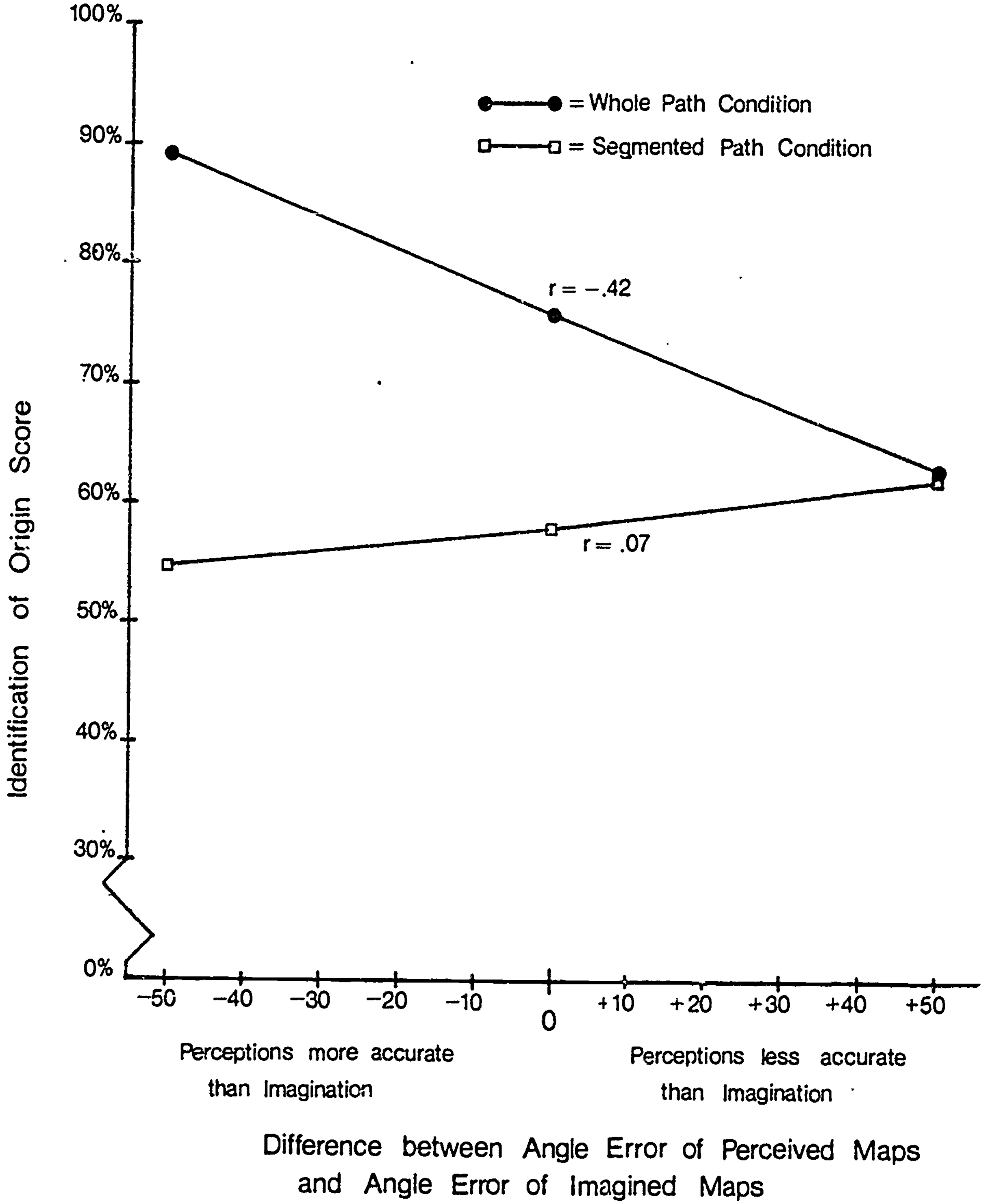


Figure 4.

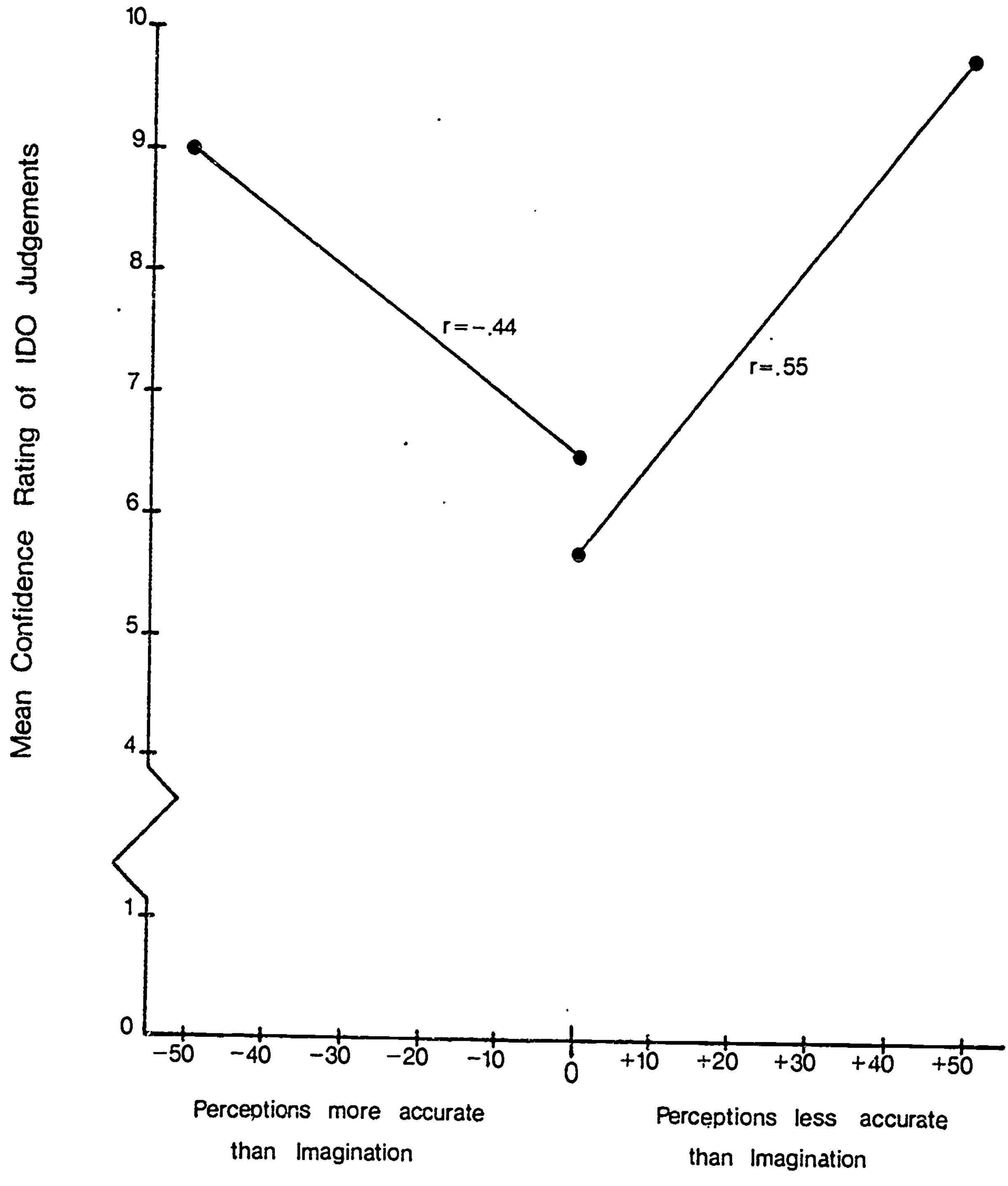
BEST COPY AVAILABLE

FIGURE 5



100%
90%
80%
70%
60%
50%
40%
30%
0%
Identification of Origin Score
= Whole Path Condition
= Segmented Path Condition
r = −.42
r = .07
−50
−40
−30
−20
−10
0
+10
+20
+30
+40
+50
Perceptions more accurate than Imagination
Perceptions less accurate than Imagination
Difference between Angle Error of Perceived Maps and Angle Error of Imagined Maps

FIGURE 6



Difference between Angle Error of Perceived Maps and Angle Error of Imagined Maps for Whole Path subjects