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EVIDENCE OF COLLECTIVE MEMORY:

A Test of Sheldrake's Theory

A. MAHLBERG, *Madison, Wisconsin*

IQ SCORES have been dramatically and consistently increasing over time (FLYNN 3). Flynn has put data generated from various IQ tests into a form that allows them to be compared. His startling finding is that Americans gained 13.8 IQ points over a period of forty-six years and the rate of that increase was fairly consistently .30 IQ points per year. He notes that a comparable increase has been recorded in Japan over a twenty-three year period. It is Flynn's opinion that factors that are known to affect IQ scores can account for only about half of that increase. He has no explanation for the other half. From Sheldrake's hypothesis of formative causation, however, we could predict that the collective unconscious would produce an increase in IQ scores over time (SHELDRAKE 13).

Sheldrake's hypothesis can be seen as a general theory that explains and includes Jung's understanding of the collective unconscious (KEUTZER 7). Basically, Sheldrake postulates that there is a dimension he calls a morphogenetic field that is beyond space and time but has a two-way interaction with events in space and time. The morphogenetic field consists of resonance patterns that are produced by the forms of things that occur within space and time.

When a form is taken in space and time, it is 'recorded' as a resonance pattern in the morphogenetic field. When a similar thing begins taking form, it is influenced by the existing resonance pattern to take similar form. When the second form exists, it likewise effects a resonance pattern, which results in a merging of the two resonance patterns and an increase in the strength of that resonance. It therefore becomes progressively easier and more probable for things to take a form that has already been assumed by previous similar things, including the forms of organisms as well as the forms of human behaviour, emotion and thought. Sheldrake's theory therefore leads to the hypothesis that it is progressively easier to learn something, e.g., IQ test items, as more and more people have already learned that

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material. This is because of the cumulative increase in the strength of the resonance of the material that has been learned, which could be referred to as 'cognitive resonance'.

Jung's theory of the collective unconscious is similar to the morphogenetic field in two respects. The first is that the collective unconscious is outside space and time and is, therefore, a dimension of the psyche that is transpersonal or shared in common by all individuals. Jung saw archetypes as the basic components of the collective unconscious, along with the instincts. Archetypes are basic forms or patterns of behaviour that are related to universal human experiences, such as birth, childhood, parenthood and death. These basic forms have acquired tremendous strength and influence in shaping our experience because they have been repeated by so many people. So the second point of similarity between these theories is that the forms of experience, thought, emotion and behaviour acquire strength through collective repetition.

> There are as many archetypes as there are typical situations in life. Endless repetition has engraved these experiences into our psychic constitution, not in the form of images filled with content, but at first only as *forms without content*, representing merely the possibility of a certain type of perception and action. When a situation occurs which corresponds to a given archetype, that archetype becomes activated (JUNG 6, p. 48).

Sheldrake's thinking suggests that the collective unconscious contains much more than archetypes and instincts. Indeed, if Sheldrake is correct, everything that everyone has experienced, thought or done has effected a resonance pattern, not just those occurring in universal situations. It is this feature that allows the notion of cognitive resonance or collective memory to be empirically tested. If validated, it would expand our understanding of the collective unconscious and would lend credibility to Jungian theory within the scientific community. It is out of those interests that I have tested Sheldrake's theory. In particular, my study tested the hypothesis that material becomes easier to learn as it is learned by more and more people.

Three controlled experiments have been reported that have attempted to test Sheldrake's hypothesis. They have produced mixed results. All have used people's ability to perceive hidden figures. Two such figures were briefly exposed to people in various parts of the world and the percentage of people who correctly perceived them was recorded. Then one of the figures was shown to a large number of people through a television broadcast. Additional groups who had not seen the broadcast were then tested. Sheldrake's theory predicts that the percentage of people perceiving the broadcast figure would increase but the percentage perceiving the unbroadcast figure would not change significantly. The first experiment showed the predicted

pattern (SHELDRAKE 14). A second attempt using the same design produced positive results in Europe but not in America (B/MB 1). Since the broadcast was in Europe, this led to the speculation that the phenomenon is localised rather than cutting through space and time. The follow-up to that experiment actually produced a significant decrease in the perception of the broadcast figure (GREX 4). This mixture of results with similar tasks and research designs has not yet been explained.

Sheldrake has suggested that morphic resonance patterns influence the physical form of organisms through the genes. Essentially, the genes are thought to act as 'receivers' of the resonance pattern produced by previous organisms of the same kind. If this is the case with physical resonance, it may also be that cognitive resonance requires a receiving mechanism in order to influence human learning. The concept of a mechanism that interacts with non-physical form is comparable to Jung's notion of the psychological functions, which are the fixed forms or processes by which the individual interacts with the external world and with the contents of the psyche, including the collective or transpersonal psyche (JUNG 5). Cognitive resonance might be a content of the collective psyche with which a particular psychological function interacts. Jung identified four psychological functions—intuition (N), thinking (T), feeling (F) and sensation (S). The energy of the psyche moves through these functions in both an outward, extraverted (E), and an inward, introverted (I), direction, a feature termed 'attitude'. All people use all of the functions and attitudes, but everyone has stable preferences among them, which result in their being used at different frequencies. Unfortunately, there is no clear theoretical basis for predicting which function and attitude combination might act as a receiver of cognitive resonance.

The present study tested Sheldrake's hypothesis that it is easier to learn material that has already been learned by a large number of people than it is to learn novel material of equal intrinsic difficulty. It was also hypothesised that the novel material would itself become easier as it is learned by increasing numbers of people. It was also decided to see whether this effect is automatic or whether an effort to learn is required. In addition, a receiving mechanism was sought be determining whether the people who show the effects of cognitive resonance differ from those who do not on any of the Jungian personality variables.

METHOD

The international Morse Code was chosen as a system that had been learned by a large number of people that can be altered to form a

Novel Code of equal intrinsic difficulty. 'S' and 'O' were not used since many people probably know the 'SOS' signal who have not otherwise tried to learn the Morse Code. The remaining twenty-four signs were divided into two parts in a way that they were equal in the number of one, two, three and four digit signs that they had. This was done so that each participant could learn part of both codes without having to unlearn the sign for a particular letter. The Novel Code was constructed by assigning the letters at random to the signs in each half.

Both codes were presented to three groups of introductory psychology students. There were thirteen weeks between Groups 1 and 2 and eleven weeks between Groups 2 and 3. The order of presentation was counterbalanced for each group so that an equal number of each sex were given the Morse Code first as were given the Novel Code first. In addition, within each order both halves of each code appeared an equal number of times. For all participants in each sex group at each administration of the experiment, both codes were the same in the frequency of letters, signs and order used. In order to achieve this, some cases were eliminated at random.

Participants were asked to indicate whether they had ever learned, or had attempted to learn, the Morse Code. If they had their scores were not used to test the hypothesis.

Each participant was given a test booklet of six pages. The first page presented a row of twelve letters and a column of twelve signs. They were asked to guess which letter was associated with each sign. There was no time limit for this. The test monitor, the author, indicated when to turn pages. The next page presented the same signs and letters, this time paired as in the code. A time limit of ninety seconds was given for memorising the code. Pre-testing indicated that this time limit would give a good variance of scores while yielding few perfect scores for the kind of participants used. The next page, having the same time limit, was a quiz. The letters were given in a row and the signs in a column. Participants were asked to write the correct letter in a blank next to each sign. The same three-page sequence was then conducted for the other code. The instructions for the entire test packet were given verbally at the beginning and the instructions for each page were given just before the instruction to turn to that page when the page had a time limit. In addition, the instructions for each page were written at the top of the page.

Prior to the code learning task, Group 1 was given the Singer–Loomis Inventory of Personality (SLIP) to measure the Jungian personality variables (Loomis, Singer, 9). The SLIP was chosen because, unlike other personality tests based on Jung's theory, it has separate measures for each function and attitude combination, which should add sensitivity, and it has a format that avoids the

questionable assumption of the bipolar structure of the functions (LOOMIS, SINGER 10, MAHLBERG 11, METZNER, BURNEY, MAHLBERG 12). One member of Group 1 did not complete the SLIP. As recommended by the SLIP authors, the scores for the function and attitude combinations, 'cognitive modes' were determined by dividing the raw scale scores by the total of all raw scale scores, yielding percentage scores (SINGER, LOOMIS 15).

RESULTS

A test of sex-related differences was conducted. A *t* test for differences between the means did not produce significant results using a two-tailed test of significance. It was therefore decided to combine the scores from both sexes in testing the hypothesis.

Table 1 presents the mean scores for the Morse Code and the Novel Code for Groups 1, 2 and 3. The basic pattern of the results is as anticipated in that for each group, Morse Code means were higher than Novel Code means. In addition, Novel Code means appear to have progressively risen over the three groups.

TABLE 1

CODE LEARNING MEAN SCORES AND STANDARD DEVIATIONS BY GROUP

GROUP	*N*			MORSE CODE		NOVEL CODE	
	TOTAL	F	M	$\hat{X}$	SD	$\hat{X}$	SD
1	40	16	24	6·35	2·79	5·13	2·23
2	52	16	36	6·00	2·85	5·62	2·46
3	36	16	20	6·25	2·93	6·05	2·48

Analysis of variance of the data was conducted using a mixed design with repeated measures. As shown in Table 2, a significant difference was found between the codes. The lack of a significant difference between the groups suggests that they did not differ in their overall ability to learn codes. *Post hoc* comparisons between the codes using the Scheffé procedure indicated that the Morse Code mean was significantly greater than the Novel Code mean for Group 1. The differences for Groups 2 and 3 were not significant.

The hypothesis that the Novel Code would itself become easier to learn was tested by making a planned comparison of the Novel Code means between Group 1 and Group 3. As predicted, it was found that the Novel Code mean for Group 3 was significantly greater than for Group 1, $t\ (125) = 1{\cdot}92$, $p < {\cdot}05$ (one-tailed).

If cognitive resonance produced some sort of automatic transfer of knowledge without an effort to learn, guessing scores for the Morse Code would have been higher than for the Novel Code, at least for Group 1. There was no significant difference for any of the groups.

To analyse the effect of personality variables, the participants in Group 1 were derived into two groups, those showing an influence from cognitive resonance (Morse Code > Novel Code scores) and those that were apparently not influenced (Morse Code scores ⩽ Novel Code scores). The influenced group had ten females and thirteen males while the non-influenced group had six females and ten males. The difference between the groups in the ratio of females to males is not significant. The order of the presentation of the codes did not account for the Morse Code being greater than the Novel Code, since thirteen of the influenced group had the Novel Code first and ten had the Morse Code first. The non-influenced group was evenly split in the order of the presentation of the codes.

The mean scores for the cognitive modes of the two group are given in Table 3. The only cognitive mode that showed a significant difference between the two groups is IF, $t\ (37) = 2{\cdot}756$, $p < {\cdot}01$ (two-tailed).

IF had only the third highest mean in the Morse > Novel group and only three people in that group had IF ranked first. It was therefore suspected that the critical factor that distinguished the two groups was not the strength of IF *per se*, but that the feeling function tends to operate with an introverted attitude rather than with an extraverted one. The two groups were therefore compared on the basis of the number of people having IF ⩾ EF and IF < EF. Ties were included with IF > EF since the equal strength (ambiversion) suggests a 50% chance that the introverted attitude is operating when feeling is used. There were three cases of ambiversion in the influenced group and one such case in the non-influenced group. The results of this comparison are given in Table 4. It was found that there is a significant relationship between the attitude of feeling and the relationship between the Morse Code and Novel Code scores, $\chi^2(1) = 5{\cdot}57$, $p < {\cdot}025$.

Given the finding that a personality variable is related to influence by cognitive resonance, it was decided to consider this in looking at the ability to guess the code. The IF group had a mean guess score of 1·048, which is somewhat lower than the EF group mean of 1·158.

TABLE 2

ANALYSIS OF VARIANCE

SOURCE	df	MS	*F*
Between Subjects	127		
Groups	2	3·76	0·40
$Error_b$	125	9·51	
Within Subjects	128		
Code	1	22·56	5·15*
Code X Group	2	5·99	1·37
$Error_w$	125	4·38	

*$p < 0{\cdot}025$

TABLE 3

MEAN SLIP PERCENT SCORES FOR RESONANCE INFLUENCED AND NON-INFLUENCED GROUPS

GROUP	*N*	COGNITIVE MODE							
		ET	IT	EF	IF	ES	IS	EN	IN
Influenced	23	14·02	13·43	11·69	12·55*	11·63	12·49	12·14	12·11
Non-influenced	16	13·55	13·84	12·34	11·46	11·98	13 15	11·94	11·82

E = extraverted; I = introverted; T = thinking; F = feeling; S = sensation; N = intuition.
*$p < 0{\cdot}01$ difference between groups (two-tailed).

TABLE 4

CONTINGENCY TABLE OF IF TO EF RANKING AND CODE SCORE RANKING

CODE RANKING	IF TO EF RANKING	
	IF ⩾ EF	IF < EF
Morse > Novel	16	7
Morse ⩽ Novel	5	11

IF = introverted feeling
EF = extraverted feeling.
χ^2 (1) = 5·57, $p < 0{\cdot}025$

Apparently an effort to learn is required, even with the receiving mechanism.

DISCUSSION

The results of this experiment support Sheldrake's hypothesis of formative causation as it relates to human learning. As predicted, the Morse Code was easier to learn than the Novel Code, though this difference was only significant for the first group learning the Novel Code, and, relative to the Morse Code, the Novel Code was easier to learn for the last group than it was for the first. While no significant comparisons were found for the second of the three groups, their results were consistent with the pattern of the Novel Code becoming easier to learn. Both codes therefore showed evidence of cognitive resonance.

The lack of a significant difference in the results due to guessing is consistent with Sheldrake's position that morphic resonance does not result in an automatic transfer of knowledge. Apparently exposure to the material and possibly an effort to learn is required in order to be influenced by cognitive resonance. This is in contrast to Watson's anecdotally based notion of the Hundredth Monkey Phenomenon, which suggests that knowledge is spontaneously acquired when it has been learned by a 'critical mass' (WATSON 17).

This verification of cognitive resonance also provides empirical support for Jung's idea that there is a collective unconscious and that it contains memory traces from the experience of other people. Since the pioneering work of Ebbinghaus, it has been accepted evidence of memory that it is easier to relearn material that cannot be recalled than it was to originally learn it (EBBINGHAUS 2). This measure of retention is called 'saving'. To apply this concept to collective memory we can think in terms of the material being learned and relearned by different people rather than people learning and relearning the material. This kind of saving effect of collective memory can then be seen in the results of Group 1, who 'relearned' the Morse Code more easily than they acquired the Novel Code, which was being learned for the first time. The saving effect of the learning of the Novel Code also made it easier for it to be relearned by Group 3. The results of this experiment therefore justify the notion of collective or transpersonal memory because the material itself became easier to relearn between individuals.

It appears that Jung was correct that behaviours in universal situations become archetypal through the process of repetition throughout human history. It now seems, though, that the

transpersonal psyche contains much more than archetypes and instincts. If it contains the Morse Code, then Sheldrake may be right that the transpersonal psyche contains virtually every behaviour, feeling and thought that has ever occurred, whether grand or trivial. The difference between archetypal and other material is just a matter of degree of resonance strength. It also follows that the transpersonal psyche or collective unconscious is constantly being altered by new input and repetition.

Perhaps the most important outcome of this study is the finding of a personality variable, introverted feeling, that apparently acts as a receiving mechanism for cognitive resonance. It appears that, regardless of the strength of the feeling function itself, having feeling operate with an introverted attitude results in being influenced by cognitive resonance.

The probability is that only the group with feeling introverted or ambiverted used the receiving mechanism in learning the codes. In Group 1, then, 46% did not use the receiving mechanism. This suggests that the mean scores obtained on the Morse Code as shown in Table 1 underestimate the strength of resonance for that code. This is important because the lack of a significant difference between the codes in Groups 2 and 3 together with the significant increase in the Novel Code scores gives the impression that the resonance strength acquired by the Novel Code from a relatively small number of people virtually equalled that of the Morse Code by Group 3. This is probably a false impression. We shall not know the relationship between the increase in resonance and the number of people contributing to it until studies are done in which all participants use the receiving mechanism.

The receiving mechanism may account for some of the mixed results from previous studies. Sheldrake's second experiment using hidden figures achieved significant positive results in Europe but not in America, leading to the speculation that resonance was localised (B/MB 1). Instead, it may be that his American sample did not include enough people with introverted, rather than extroverted, feeling. It may therefore be important to control for the attitude of feeling in tests of collective memory.

The involvement of introverted feeling also raises the possibility that collective memory is similar to individual memory in that it involves a feeling tone that is instrumental in accessing the other content of the memory. For example, it has been found that when feeling judgments of like or dislike are made of material that is being learned, recall is best for items whose feelings or hedonic tone as made at the time of encoding is compatible with current mood (SLIFE,

MIURA, THOMPSON, SHAPIRO, GALLAGHER 16). This suggests that the feeling response is part of the memory itself. Collective memory may similarly include the feeling tone produced by the like or dislike feeling responses of the people who have previously learned the material. Introverted feeling may access that collective feeling tone. The compatibility of mood and individual feeling response with the collective feeling tone might also be a factor in being influenced by the resonance of the material. This kind of possibility could explain why the test of Sheldrake's theory reported by Fassberg resulted in a significant decline in the perception of the hidden figure that was experimentally given a large amount of resonance (GREX 4). It could be that most people who saw the hidden figure disliked it, so the figure built up a negative feeling tone. This may have produced an aversive reaction in people trying to see the figure who were not in a compatible feeling state. An increase in the perception of the hidden figure would then only be expected among people in a negative mood who were using introverted feeling. This possibility can be examined empirically.

If there is a receiving mechanism for cognitive resonance, there may also be a sending mechanism that adds to cognitive resonance. Extraverted feeling may be a subject-to-object sending mechanism that adds to the feeling tone of collective material. This possibility can also be examined empirically.

The finding that introverted feeling acts as a receiving mechanism for cognitive resonance also has some bearing on a completely unrelated theoretical issue—the bipolarity of the psychological functions. Jung held that the four functions are structured as two bipolar pairs. One pair (sensation & intuition) are defined as bipolar forms of perception or reception of information, while the other pair (thinking & feeling) are defined as bipolar forms of judgment or processing of information. Willeford has made an interesting case for all of the functions involving both perceptive and judgmental aspects (WILLEFORD 18). It has been argued that the questionable nature of the perception-judgment distinction undermines the theoretical basis for the bipolarity of the functions (MAHLBERG 11, METZNER, BURNEY, MAHLBERG 12). Loomis, however, has countered that research does not support the position that all the functions are both perceptive and judgmental (LOOMIS 8). There have been empirical studies that question the bipolar structure (LOOMIS, SINGER 10, MAHLBERG 11). There have not, however, been studies that directly pertain to the judgment-perception distinction. The current study, though, found that feeling, a supposedly judgmental function, is involved in a receptive activity in that it has access to collective memory.

SUMMARY

The Jungian archetype is an example of Sheldrake's hypothesis of formative causation, both of which postulate collective memory. The presence of collective memory was tested by having three groups of students learn the Morse Code, which had been previously learned by a large number of people, and a Novel Code that had never been learned by others and was constructed so as to be of equal intrinsic difficulty. As predicted, the Morse Code was initially easier to learn, and the Novel Code itself became easier over the three groups. The results confirm Sheldrake's theory and lend credibility to Jung's concepts of the archetype and the collective unconscious while suggesting that the latter contains much more than archetypal memories. It was found that this phenomenon was related to the feeling function being introverted or ambiverted rather than extraverted. This suggests that introverted feeling acts as a receiving mechanism for collective memory and leads to the speculation that collective memory includes feeling tones attached to content. It may therefore be that extraverted feeling acts as a sending mechanism which creates that feeling tone.

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As we were going to press we received news that Dr Arden Mahlberg was one of the three winners of a four-year long competition, organised by the Tarrytown Group of New York State, which offered prizes for the person who could conduct the best experiment to prove or disprove Sheldrake's theory of how living things learn.