

Implicit Philosophies of Mind: The Dualism Scale and Its Relation to Religiosity and Belief in Extrasensory Perception

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ABSTRACT. Although the mind/body problem has been vigorously debated for decades by philosophers, virtually nothing is known about the implicit theories of mind held by people who are not specialists on the subject. In this study, a scale was developed that assessed the extent to which respondents endorsed dualistic theories of mind and rejected materialistic accounts. The Dualism Scale revealed that, to a surprising degree, a sample of American undergraduates held dualistic theories of mind that are at variance with contemporary neurophysiology, psychology, and philosophy. Scores on the Dualism Scale were not correlated with responses on a questionnaire assessing religiosity but were correlated with scores on a scale assessing belief in extrasensory perception. Religiosity, however, moderated this relationship. The connection between belief in extrasensory perception and dualistic theories of mind was stronger among subjects lower in religiosity.

THE INTELLECTUAL HISTORY of the mind/body problem is noticeably asymmetric. Although the philosophical literature is voluminous—the product of decades of intense and specialized discussion—psychologists have virtually ignored the question of the nature of the beliefs that people hold about the relation between mind and body. In fact, because of some initial work on the acquisition of mental verbs and the development of a concept of mind (Broughton, 1978; Johnson & Wellman, 1982; Wellman, 1985), we know

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more about children's views on the mind/brain relationship than about those of average adults.

It is possible that this domain contains important discrepancies between expert opinion and general belief that should be of interest to psychologists. For example, the vast majority of working scientists and philosophers reject dualistic views of mind (P. M. Churchland, 1984; P. S. Churchland, 1986; Crick, 1979; Damasio, 1986; Dennett, 1978, 1987; Fodor, 1981; Gardner, 1985; Haugeland, 1981; Mandler, 1984; McCorduck, 1979; Rorty, 1979, 1982; Simon, 1981; Stich, 1983). Nevertheless, most laymen could hold dualistic beliefs because of unfamiliarity with the scientific evidence and philosophical arguments, and also because dualism pervades our language (Ryle, 1949).

The present investigation attempted to address the question by developing a questionnaire designed to elicit the extent to which people endorse dualistic positions on the relation between mind and brain. Responses to the questionnaire were related to the responses on a questionnaire assessing belief in extrasensory perception. There are several reasons that this relationship may be of interest. First, there is reason to suspect that the belief in extrasensory abilities is another domain that displays a large discrepancy between general belief and scientific opinion (Alcock, 1981, 1984; Frazier, 1981; Kurtz, 1985). Also, hostility to purely mechanistic scientific explanations of human behavioral phenomena is a recurring theme in parapsychology literature. In their historical survey, MacKenzie and MacKenzie (1980) argued that

The methods of science demand the possibility of detailed, impersonal (mechanistic) explanations. Parapsychology denies the universal applicability of this kind of explanation, insisting on the irreducible efficacy of some kind of person-environment interaction not mediated by muscles, eyes, etc. (p. 133)

However, while an explicit belief in mind/brain dualism may be acknowledged in the writings of parapsychology researchers (see Cerullo, 1982; MacKenzie & MacKenzie, 1980; Moore, 1977), it is an open question whether such a theory about the relation between mind and brain predisposes members of the general public toward belief in extrasensory powers. Thus, one hypothesis tested in the present study is whether belief in these abilities is linked with dualistic views of mind and brain among a group of individuals not active in parapsychological research.

As an additional feature of the investigation, I administered a questionnaire assessing the strength of religious beliefs, thus examining the previously uninvestigated link between the strength of religious belief and endorsement of dualistic views of mind. The correlation between the former and belief in extrasensory powers has been the subject of previous research, but mixed results have been obtained. Tobacyk and Milford (1983) found that traditional religious belief displayed a low positive correlation with belief in precogni-

tion but no relation to belief in mind reading or psychokinesis. Bainbridge and Stark (1980) presented data indicating that members of conservative religious groups who reported that religion was very important to them were more likely to deny the existence of paranormal phenomena such as ESP and UFOs. Determining this correlation is relevant to the evaluation of the “functional alternative” hypothesis—the idea that belief in paranormal phenomena serves the same type of psychological and social functions as does traditional religious belief (see Emmons & Sobal, 1981; McGarry & Newberry, 1981; Tobacyk & Milford, 1983).

Method

Subjects

The subjects were 163 students recruited from an introductory psychology subject pool. Three of the subjects were determined to be multivariate outliers by the objective methods described by Tabachnick and Fidell (1983) and were removed from the data set. Of the remaining 160 subjects (27 males and 133 females) the mean age was 21 years, 8 months ($SD = 7.2$).

Dualism Scale

The Dualism Scale is composed of 27 statements requiring responses on the following scale: *strongly disagree* (1); *disagree* (2); *neutral or don't know* (3); *agree* (4); and *strongly agree* (5). The items, numbered in the order in which they appeared on the questionnaire, are listed in Appendix A along with the mean item scores and item-test correlations. The statements on the scale were drawn from various contemporary writings on the philosophy of mind. P. M. Churchland (1984) was the source relied upon most heavily. Some items are straightforward statements of Cartesian substance dualism, for example, Items 16 and 26. Other statements reflect what Churchland calls “popular dualism,” the view that

A person is literally a ‘ghost in a machine’, where the machine is the human body, and the ghost is a spiritual substance, quite unlike physical matter in its internal constitution, but fully possessed of spatial properties even so. In particular, minds are commonly held to be *inside* the bodies they control: inside the head, on most views, in intimate contact with the brain. (p. 9)

According to Churchland, this less radical form of substance dualism has fewer problems than Cartesian dualism because “The mind is right there in contact with the brain, and their interaction can perhaps be understood in terms of their exchanging energy of a form that our science has not yet recognized or understood” (p. 9). Items 4 and 19 in part reflect popular dualism.

Several statements are characteristic of dualistic positions on the mind/body problem because they emphasize the separability of the physical and the mental, for example, Items 5, 21, and 23. Others emphasize dualism by asserting that minds can causally affect the operation of brains, for example, Items 1, 9, and 13.

The existence of consciousness and the ability to introspect are often believed to bolster dualism because they are thought to preclude materialist explanations of mind, although most contemporary philosophers think this belief is mistaken (see P. M. Churchland, 1984; P. S. Churchland, 1986; Lyons, 1986). Thus, several statements highlight the existence of introspective abilities and claim that these abilities preclude purely brain-based views of mind, for example, Items 2, 11, and 18.

The property dualist asserts that "While there is no *substance* to be dealt with here beyond the physical brain, the brain has a special set of *properties* possessed by no other kind of physical object" (P. M. Churchland, 1984, p. 10). The basic claim that characterizes all forms of property dualism is the claim of the irreducibility of mental properties. Some items were designed to capture this aspect of dualistic beliefs, for example, Items 2 and 14.

Thus, 14 items (1, 2, 4, 5, 9, 11, 13, 14, 16, 18, 19, 21, 23, and 26) assert various forms of dualistic beliefs about the relation between mind and brain. The remaining 13 assert various materialist positions on the mind/body problem. These items are reverse scored so that disagreement with a materialist theory of mind yields a higher score on the Dualism Scale and agreement with a materialist position yields a lower score.

Items 3, 10, 20, and 24 stress that the natural language terms we use to refer to the mental are really just "stand in" terms for brain processes and/or behavior, a view reflecting the identity theory and philosophical behaviorism. Items 6, 15, and 25 represent different ways of stating the identity theory (e.g., "For each thought that I have there exists a certain state that my brain is in"). Items 12, 17, and 27 attempt to capture forms of eliminative materialism (e.g., "Just as we no longer talk of witches, in the future when we know in detail how brains work we may not talk about minds anymore"). Two items (8 and 22) assert that computers may one day perform operations we now assign to the mind, a position endorsed by most scientists in the artificial intelligence community (McCorduck, 1979; Simon, 1981) and accepted as a possibility by many scientists and philosophers (Gardner, 1985). These statements were included because the advent of thinking machines may have consequences for the layman's views on the mind/body problem (Turkle, 1984). One item (7) questions the incorrigibility of introspective reports, a position supported by both empirical research in psychology (Nisbett & Ross, 1980) and philosophical analyses (Rorty, 1979). Of course, given the complicated issues involved, there is necessarily some overlap in item content.

The instructions to the questionnaire were as follows:

This is a questionnaire in which we are trying to assess how people think about mind, brain, and behavior. There are no right or wrong answers. Please read each statement and try to answer as accurately as you can on the scale provided. If you strongly agree with the statement circle the number 5. If you somewhat agree with the statement circle the number 4. If you feel neutral about the statement or if you are unsure how you feel circle the number 3. If you disagree somewhat with the statement circle the number 2. If you strongly disagree with the statement circle the number 1. Remember, your responses to the questionnaire are anonymous, so please answer as honestly and accurately as you can. Please respond to the statements in order and do not look ahead in the questionnaire.

Extrasensory Perception (ESP) Scale

The ESP scale is composed of 14 statements requiring responses on the same scale as that used for the Dualism Scale. The items, numbered according to the order in which they appear on the questionnaire, are listed in Appendix B along with the mean item scores and item-test correlations. Items 3, 4, 5, 9, 10, and 14 are taken from the Belief in the Paranormal Scale developed by Jones, Russell, and Nickel (1977). Because that scale deals with a wide range of paranormal phenomena (witches, ghosts, the Loch Ness monster, etc.) items were chosen that dealt exclusively with psychic phenomena. Likewise, Items 1, 6, 7, 12, and 13 are taken from the Psi and Precognition subscales of the Paranormal questionnaire developed by Tobacyk and Milford (1983). Items 2, 8, and 11 are new. All items refer to some extrasensory power, either psychic powers generally, or precognition, telepathy, clairvoyance, or psychokinesis specifically. Items 3, 4, 6, and 12 are phrased in the negative, that is, against belief in ESP. Responses on these items were reverse scored so that higher scores indicated greater belief in ESP. The instructions to the questionnaire were as follows:

This is a questionnaire in which we are asking your opinion on the existence of psychic or extrasensory abilities. Please read each statement and try to answer as accurately as you can on the scale provided. If you strongly agree with the statement, circle the number 5. If you somewhat agree with the statement circle the number 4. If you feel neutral about the statement or if you are unsure how you feel circle the number 3. If you disagree somewhat with the statement circle the number 2. If you strongly disagree with the statement, circle the number 1. Remember, your responses to the questionnaire are anonymous, so please answer as honestly and as accurately as you can. Please respond to the statements in order and do not look ahead in the questionnaire.

Religiosity Scale

The Religiosity Scale is composed of four items. The instructions to the questionnaire were as follows:

In this part of the questionnaire we would like some information on the role that religion plays in your life. Remember, your responses to the questionnaire are anonymous, so please answer as honestly and as accurately as you can. Circle the number of the response that is appropriate.

Subjects responded to the statement "I attend religious services" on a 6-point scale (more than once a week, once a week, a couple of times a month, a couple of times a year, hardly ever, never). They responded to the statement "I consider my religious beliefs to be" on a 6-point scale (extremely strong, very strong, strong, moderately strong, somewhat weak, nonexistent). They responded to the statement "My feelings concerning the existence of God are" on a 7-point scale (I am certain that God exists; I am pretty sure that God exists; I think that there probably is a God; I am not sure whether God exists or not; I think that there probably is not a God; I am pretty sure that God does not exist; I am certain that God does not exist). Finally, the question "How important is religion in your everyday life?" required a response on a 5-point scale (extremely important, very important, somewhat important, not very important, completely unimportant). All the statements were scored so that higher numbers indicated stronger religious commitment.

Two additional questions were asked on the Religiosity questionnaire. Subjects were asked, "Would you say that you have been 'born again' or have had a 'born again' experience—that is, a turning point in your life when you committed yourself to Christ?" (taken from Bainbridge & Stark, 1980). This question was answered simply yes or no. Finally, subjects were told, "Please list your religious affiliation on the line below. If you have religious beliefs, but do not consider yourself to have an affiliation, then indicate 'none'. If you are an atheist or agnostic, please indicate."

Procedure

The questionnaires were administered in a classroom setting with the Dualism Scale being completed first, the ESP Scale second, and the Religiosity Scale third. A separate page attached after the Religiosity Scale asked the subjects to indicate their age, sex, and major or intended major. This page also contained an open-ended section introduced as follows:

In the first questionnaire you answered several questions about the mind and brain. If you have thoughts about the mind and brain that were not captured in those questions, please use the space below to write out your thoughts. Feel free to write as much as you want. Use the back of the page if necessary.

Code numbers on the questionnaires were used so that the scales could be linked without sacrificing the anonymity of the subjects.

Results

The mean score on each item of the Dualism Scale is presented in Appendix A along with the item-test correlations. The mean score on the Dualism Scale was 79.5 ($SD = 9.6$). This mean is slightly below the neutral point of the scale (81.0). The internal consistency of the scale was .71 (Cronbach's alpha). The items on the Dualism Scale were subjected to a principal components analysis with varimax rotation. This analysis resulted in 10 factors with eigenvalues greater than 1 and these factors accounted for 63.1% of the variance. Only the first five factors had meaningful interpretations, the remaining factors being primarily singlets and doublets. The loading of each item on these five factors after rotation is displayed in Table 1. For ease of interpretation, loadings less than .25 have been eliminated.

Most items have a single high loading, although Items 1, 11, 24, and 26 are complex. The first component appeared to be the broadest factor, encompassing the endorsement of many items expressive of a dualist position including popular dualism, classic substance dualism, and the separability of the mental and physical. This factor was tentatively labeled Classic Dualism. The items loading highest on Factor 2 were those that required rejection (since the scoring was reversed) of various forms of the identity theory (Items 3, 10, 24, and 25). This factor was tentatively labeled Rejection of Identity Theory. Factor 3 had very high loadings on the two items concerning the possibility of thinking computers. This factor was labeled Rejection of Computer Thought.

Aside from Items 1 and 26 (which were complex), Factor 4 received high loadings from Items 2 and 14, dealing with the irreducibility of the mental, and Items 12 and 27, which involve rejecting the notion that mental terms will one day disappear (eliminative materialism). Thus, this component appears to reflect support for the irreducibility of the mental and was called the Irreducibility factor. In addition to Item 26 (a complex item), Factor 5 received its highest loading from an item endorsing the separability of mind and brain (Item 21) and moderate loadings from two items (11 and 18) claiming that the mental and physical are separable as a result of the existence of introspection. This factor was labeled Separability/Introspection. In subsequent analyses, correlations were calculated on the entire Dualism Scale and five subscales composed of all the items with loadings greater than .25 on each of the factors (unit weighted). Analyses with subscales composed of items loading greater than .50, or with factor scores, produced virtually identical results.

The mean score on each item of the Extrasensory Perception Scale along with the item-test correlations are presented in Appendix B. The mean score on this scale was 42.6 ($SD = 9.8$). This mean is slightly above the neutral point of the scale (42.0), a finding consistent with previous research (Tobacyk

TABLE 1
Factor Loadings of Items on the Dualism Scale

Item	Factor				
	1	2	3	4	5
1	.300	.278		.562	
2				.381	
3		.760			
4	.374				
5	.627				
6			.442		
7					
8			.839		
9		.268			
10		.651			
11	.579		.283		.441
12				.263	
13	.311				
14				.782	
15					
16	.586				
17					
18					.328
19	.645				
20					
21					.827
22			.807		
23	.634				
24	.452	.408	.275		
25		.545			
26	.453	.288		.267	.464
27				.625	

Note. Factor loadings less than .25 have been omitted.

& Milford, 1983). The internal consistency of the scale was .91 (Cronbach's alpha). The items on the scale were subjected to a principal components analysis with varimax rotation. This analysis resulted in two factors with eigenvalues greater than 1, which accounted for 53.5% of the variance. Items 1, 3, 5, 7, 8, 12, 13, and 14 had loadings greater than .50 on the first factor and less than .50 on the second factor, and Items 2, 6, 9, 10, and 11 displayed the opposite pattern. Item 4 displayed loadings of .487 and .469, respectively. This pattern of loadings suggests no easy interpretation. Subscales composed of the items loading highly on each of the factors displayed results virtually identical with those obtained from the full scale in subsequent analyses. Thus, only the full scale results are presented here.

The mean score on the Religiosity Scale was 17.2 ($SD = 3.9$) and the means on each of the four separate items were 3.66 ($SD = 1.34$), 3.88 ($SD = 1.29$), 6.29 ($SD = 1.28$), and 3.34 ($SD = 1.00$), respectively. Unlike the other three items, responses to Question 3 (“My feelings concerning the existence of God are”) were highly skewed. One hundred and six subjects answered that they were certain that God existed, 23 were pretty sure that God existed, 17 thought that there probably is a God, 9 were not sure whether God exists, 1 was pretty sure that God does not exist, and 4 were certain that God does not exist. The four items were moderately correlated with each other. Item 1 displayed correlations with the other three items of .52, .37, and .56, respectively. Item 2 displayed correlations of .48 and .70 with Items 3 and 4, and the latter two items displayed a correlation of .53. Forty of the 160 subjects reported having had a “born again” experience. The distribution of religious denominations is presented in Table 2.

When the sample was considered as a whole, there were no relationships between the various measures. The Extrasensory Perception Scale displayed Pearson r 's of .06 and $-.06$ with the Dualism and Religiosity Scales, respectively, whereas the latter two measures displayed a correlation of .07. However, Bainbridge and Stark (1980) have demonstrated that important relationships within different religious subgroups may be obscured when a sample is considered as a whole (see also Emmons & Sobal, 1981). For example, Bainbridge and Stark found that individuals with conservative or fundamentalist religious beliefs were less likely to accept the existence of paranormal phenomena, whereas persons with no religious affiliation were more likely to believe in the existence of paranormal phenomena. Their findings were supported by the work of Emmons and Sobal, who found that Baptists in particular—as opposed to more liberal Protestant denominations—were more likely to reject the nonreligious paranormal (while believing more strongly in the religious paranormal).

TABLE 2
Means on the Dualism, Extrasensory Perception, and Religiosity Scales as a Function of Religious Affiliation

Affiliation	<i>n</i>	Dualism	ESP	Religiosity
Catholic	64	80.3	43.6	18.2
None	31	78.5	43.3	15.8
Lutheran	14	76.3	41.2	18.9
Baptist	12	83.6	37.3	20.2
Protestant	8	75.6	41.5	15.5
Other	27	80.9	42.5	16.1
Agnostic	4	71.5	45.5	7.3

The possible existence of such subgroup patterns was examined first by studying the mean scores across the religious affiliations of the subjects. Table 2 presents the means on the three scales broken down by religious affiliation. The data support the findings of Bainbridge and Stark (1980) and Emmons and Sobal (1981). The Baptists—the most conservative denomination in our sample—displayed the highest scores on the Religiosity Scale and considerably lower scores on the Extrasensory Perception Scale than the rest of the sample. Baptists also displayed the highest scores on the Dualism Scale.

Within the Baptist sample, a striking pattern of interrelationships among the variables was apparent. There was a strong negative correlation of $-.90$ ($p < .01$; this and all subsequent p values are two-tailed) between scores on the Religiosity and Extrasensory Perception Scales and a moderate positive correlation between the Religiosity and Dualism Scales ($.51$, $.05 < p < .10$). Not surprisingly, then, a strong negative correlation emerged between Dualism and ESP scores ($r = -.84$, $p < .01$). In this particular subsample, religious beliefs and belief in ESP appear to be locked in a strict zero-sum game.

As these strong relationships within the Baptist subsample might possibly have obscured relationships in the rest of the data, correlations were run on the 148 nonBaptists in the sample. Religiosity still did not correlate with the other two variables, but a small significant relationship between the Extrasensory Perception and Dualism Scales did emerge ($r = .18$, $p < .05$). This relationship was due only to the contributions of Factors 1 and 5 (Classic Dualism and Separability/Introspection), as these two factors displayed significant correlations of $.21$ and $.25$ with the Extrasensory Perception Scale, whereas the other three factors did not (showing correlations of $.09$, $.06$, and $.10$, respectively).

An analysis of separate subsamples who had or had not reported a “born again” experience displayed results parallel to but weaker than those obtained by separating out the Baptist subsample. Other subsample results were obtained by dividing the sample of nonBaptist subjects into those above ($n = 73$) and those below ($n = 75$) the mean on the Religiosity Scale (17.2). Scores on the Dualism and Extrasensory Perception scales were unrelated in those high in religiosity ($r = .03$) but displayed a significant correlation among those low in religiosity ($r = .29$, $p < .05$). As in the previous analysis, significant relationships were confined to Factors 1 ($r = .30$) and 5 ($r = .47$) of the scale.

Even stronger relationships were obtained with subgroups defined by responses to the third question on the Religiosity Scale (“My feelings concerning the existence of God are”). This question yielded a highly skewed pattern of responses in which the majority of subjects answered that they were “certain that God exists.” Subjects were thus classified into nonBaptists who were “certain” and “not certain,” respectively. Among the former group ($n = 95$),

the only correlation to approach significance was that between belief in Extrasensory Perception and Religiosity ($r = -.20$). However, among those "not certain" ($n = 53$), there was a significant correlation between Extrasensory Perception scores and Dualism scores ($r = .39, p < .01$). The correlations across the five factors were .42, .40, .23, .22, and .61 ($ps < .01, .01, ns, ns, .02$), respectively. Dualism and Religiosity scores displayed a nonsignificant correlation of .19.

In summary, there appears to have been a relationship between holding dualistic theories of mind and belief in extrasensory perception, but only within certain subgroups of the population. There was a small but significant correlation between these two variables among nonBaptists in the sample. A somewhat stronger relationship obtained when only those low in religiosity were considered, and an even stronger relationship obtained when only those not certain that God exists were considered. Finally, dualistic beliefs were unrelated to religiosity in all of the analyses.

Discussion

The evidence on whether belief in extrasensory perception is related to the tendency to hold dualistic theories of mind was thus mixed. Such a relationship appeared to hold only for those who were low in religiosity and/or were not certain that God exists (although there was a significant but very weak relationship among all nonBaptists). Religiosity itself did not appear to have been in conflict with belief in extrasensory perception, except among fundamentalist religious groups (Bainbridge & Stark, 1980; Emmons & Sobal, 1981). Religious beliefs appeared not to have been sustained by dualistic theories of mind but are perhaps more closely linked to the traditional psychosocial and cultural factors typically studied by psychologists and sociologists (Paloutzian, 1983).

Why religiosity moderated the relationship between dualism and belief in ESP remains a puzzle for future research, although it is not difficult to provide possible explanations for this pattern of results. Perhaps those higher in religiosity—more used to basing their world views on faith—have less need for their beliefs to display congruency, whereas those low in religiosity may be more prone to require consistency in their beliefs about the world. Thus, the low religiosity groups would be more likely to match dualistic views of mind with belief in ESP and materialist views of mind with rejection of ESP.

When relationships with the ESP Scale were obtained, there was a consistent tendency for Factors 1 and 5 of the Dualism Scale to display higher correlations than the other three factors. The Dualism Scale no doubt taps a complex set of beliefs surrounding nonmaterialist ideas about the universe,

as an examination of the factor analysis demonstrates. It is perhaps understandable that these two factors were most closely related to the ESP Scale because they tapped the aspects of classic substance dualism and separability that would seem to be the backbone of belief in extrasensory forces interacting with the brain in unknown ways.

In addition to the correlational findings, the responses to the Dualism Scale provide perhaps the first empirical data on the nature of the theories of mind held by undergraduate students. An examination of the mean responses, in addition to the frequency distributions of responses to individual items, revealed that the baseline endorsement of dualistic views was often at variance with current views in physiology, psychology, and philosophy. Substantial numbers of students endorsed views that contemporary neurophysiologists and philosophers would find implausible (see P. S. Churchland, 1986). For example, 50% of the sample thought that the mind is a special form of energy that is currently unknown to man but that it is in contact with the brain and affects it (Item 4), whereas only 27.5% of the sample disagreed with this statement. The statement that minds are independent of bodies to which they are only temporarily "attached" (Item 5) was endorsed by 22.6% of the sample. The statement that because they can introspect, their thought processes cannot be brain processes (Item 11) was endorsed by 43.8% of the sample.

Forty-nine percent endorsed the classic Cartesian position that the mind interacts with the brain to determine behavior (Item 16). Forty-five percent thought that there is a "self" that they introspect about that controls their minds and brains (Item 18). Twenty-three percent thought that some mental processes have no connection to brain processes (Item 21), 13.7% thought that mental processes are not the result of activity in the nervous system (Item 25), and 28.8% of the sample thought that the mind and the brain are two totally separate things (Item 26). Such views support philosopher Rorty's (1982) contention that the concept of mind is a "blur" to modern man.

The discrepancy between popular and scientific views of mind is perhaps highlighted by a frequent comment on postexperimental interviews with subjects. Several volunteered that they had never thought about the issue of the relation between mind and brain before. This comment also appeared on the open-ended section of several questionnaires. Of course, the relative youth of these college students may have partially accounted for this finding. Nevertheless, one is again confronted with the rueful fact that our day-to-day concerns as psychologists and philosophers may be matters to which the man in the street never gives a thought. Whether or not people consciously think about these issues, however, they certainly must carry around unexamined assumptions about them. Thus, another way to view the Dualism Scale is as an instrument for making explicit the unexamined assumptions that people hold about mind and brain.

The open-ended part of the questionnaire yielded responses that were generally consistent with the responses given on the questionnaire. Some of these responses are reproduced in Appendix C along with that subject's *z* scores on the Dualism, Extrasensory Perception, and Religiosity scales. These open-ended comments appear to be congruent with where the subjects fall on the Dualism Scale.

Although one way to summarize the open-ended responses is to note their general congruence with where the subject stands on the Dualism Scale, considerable confusion is also apparent in many of the responses. Nevertheless, this confusion may be a real fact about beliefs in this domain. We can attempt a rough summary characterization of the general response tendencies by amalgamating the dominant responses to some of the questions. The summary might go as follows (with the questions that are the basis for the summary phrases in parentheses):

These subjects appear to have rejected the total separability of mind and brain (1, 5, 26), but they did endorse some sort of popular dualism where the mind is "something" unknown that is in contact with brain but not identical with the brain (4, 19). The existence of introspection seems to have pushed them toward dualism (11, 18). They endorsed the mind as a causal force for both the brain (9) and behavior (13). An interactionism was endorsed (16) that goes with the two being in contact (4, 19) and mind as a causal force (9, 13). They rejected the idea of thinking computers (8, 22). They thought that consciousness will survive (23); yet they did think that science will explain the mind (2, 6, 14), and that often mind talk was a substitute for brain talk (3, 10). However, they did not think that mind talk will be totally eliminated (12, 24). They agreed that mind states are brain states (15, 21, 25).

These are of course not a coherent set of beliefs, but they may well accurately characterize the confusion in the layman's notions about mind and brain.

In future years, it will be interesting to trace the consequences of the discrepancy between modern science and the layman's beliefs about mind/brain issues. There is, of course, ample precedent for such disparities in other areas of science. The theory of relativity is the basis of modern cosmology but it is generally not understood by the public at large. The existence of the process of evolution is rejected by much of the public—a majority in some surveys—yet evolutionary theory is the foundation of a modern biology that is revolutionizing both modern medicine and our view of ourselves as humans.

The increasing power of materialist theories of mind will no doubt spawn similar conceptual revolutions in views of human nature among the intelligentsia; but the results reported here indicate that, perhaps in other areas just as important as that of evolutionary theory, science will leave the general public behind. Such a development may well have no direct consequences for society, yet one might worry about the indirect consequences of the develop-

ment of a knowledge class increasingly unable to connect with the general public on the most fundamental assumptions about human beings.

APPENDIX A Items on the Dualism Scale

1. The mind is not part of the brain but it affects the brain. (2.54,^a .51)
2. When I imagine a scene in my mind, I am in a state that will forever be beyond explanation by science. (2.68, .31)
3. When I use the word "mind," it is just a shorthand term for the complicated things that my brain does. (R)^b (2.69, .38)
4. The mind is a special form of energy (currently unknown to man) that is in contact with the brain and affects it. (3.24, .31)
5. Minds are in principle independent of bodies, to which they are only temporarily "attached." (2.64, .54)
6. Hundreds of years in the future when we know how brain states and thoughts are related, it might be possible for a physiologist to measure my brain states and know what I am thinking. (R) (2.64, .27)
7. Sometimes when I give reasons for my behavior, those reasons are wrong. That is, my behavior can be affected by things that I am not aware of. When this happens I might give a "reason" for my behavior that is wrong. (R) (2.14, .21)
8. Perhaps it will never make sense to talk about computers having emotions, but some time in the future it may be the case that computers will think as well as humans. (R) (3.64, .38)
9. Mental processes cause changes in brain processes. (3.68, .28)
10. When people talk about their minds they are really just talking about what their brains seem to be doing. Talk about the "mental" is really just a shorthand for brain processes that we are not aware of. (R) (2.66, .35)
11. The fact that I can know my own thought processes (that I can introspect) means that my thought processes cannot be just brain processes. (3.14, .54)
12. Just as we no longer talk of witches, in the future when we know in detail how brains work, we may not talk about minds anymore. (R) (3.86, .29)
13. My mind is the thing that causes me to behave as I do. (3.15, .23)
14. Knowledge of the mind will forever be beyond the understanding of sciences like physics, neurophysiology, and psychology. (2.68, .39)
15. For each thought that I have, there exists a certain state that my brain is in. (R) (2.46, .07)
16. The mind is a nonmaterial substance that interacts with the brain to determine behavior. (3.21, .45)
17. Hundreds of years in the future, when we know much more about the brain and behavior, we might change the way we talk about our behavior and our minds. That is, we might find better ways to talk about our thoughts, feelings, and emotions. (R) (2.03, .20)
18. The "self" that I introspect about controls both the mind and the brain. (3.23, .23)
19. Minds are inside brains but are not the same as brains. (3.01, .43)

Mean scores on each item and item-test correlations are indicated in parentheses. ^b(R) indicates that scoring on the item was reversed.

20. When we say that a person has a "creative mind" this just means that the person tends to produce things that people judge as creative. The statement really has nothing to do with the person's mind. (R) (3.08, .13)
21. Some mental processes have no connection to brain processes. (2.56, .22)
22. In a hundred years or more, it might make sense to refer to a computer as having a mind. (R) (3.78, .34)
23. My consciousness will survive the disintegration of my physical body. (3.31, .42)
24. Not much would be lost if we dropped the word "mind" from our vocabularies. For example, rather than say "I made up my mind" a person might say "My brain decided." Although this might sound funny at first, no meaning would be lost. (R) (3.36, .62)
25. Mental processes are the result of activity in the nervous system. (R) (2.54, .15)
26. The mind and the brain are two totally separate things. (2.74, .56)
27. We talk of the sun rising but we all know that the sun does not rise but instead the earth turns. This is a case of our language not responding to changes in physical knowledge. Some neurophysiologists think this might also be the case for our language about the mental. For instance, if we had adequate physiological knowledge it might be possible to say "My C-fibers are firing!" instead of "I'm in pain!" Just as phrases like "The sun is rising" are expendable (not needed, since the sun really *doesn't* rise) some mental terms may be eliminated or drastically changed in the future when we have better physiological knowledge. (R) (2.78, .38)

APPENDIX B Items on the Extrasensory Perception Scale

1. Some people have the ability to predict the future. (3.39, .77)
2. Some people can heal other people's illnesses by just using their minds. (2.54, .67)
3. All of the reports of "scientific proof" of psychic phenomena are strictly sensationalism with no factual basis. (R) (3.15, .58)
4. The idea of being able to tell the future through the means of palm reading represents the belief of foolish and unreliable persons. (R) (2.73, .68)
5. I believe that psychic phenomena are real and should become part of the field of psychology. (3.13, .69)
6. Mind reading is not possible. (R) (3.26, .71)
7. Dreams can provide information about the future. (3.62, .63)
8. Sometimes it is possible for a person to view a scene when the person is not even there by using another sense. (3.48, .69)
9. I firmly believe that, at least on some occasions, I can read another person's mind through extrasensory perception. (2.69, .64)
10. Through psychic individuals, it is possible to communicate with the dead. (2.29, .65)
11. Some animals can read the minds of humans. (2.43, .54)
12. The idea of predicting the future is foolish. (R) (3.53, .70)

Mean scores on each item and item-test correlations are indicated in parentheses. (R) indicates that scoring on the item was reversed

13. A person's thoughts can influence the movement of a physical object. (2.70, .70)
14. There is a great deal we have yet to understand about the mind of man, so it is likely that many phenomena such as ESP will one day be proven to exist. (3.66, .76)

APPENDIX C

A Selection of Comments from the Open-Ended Section of the Questionnaire

My mind is my emotions, intellect, moods, and background. My brain is only another part of how I use the aforementioned. I choose my actions; my brain does not. I am my mind. (3.2, -2.8, 1.7)

I have always used the words "mind" and "brain" interchangeably without really thinking if there was a distinction. (-1.8, -1.2, -1.1)

I believe that the mind is an unconscious part of our brain. Dreams occur in the mind, and emotions come from the mind. But I think that *all* decisions come from the brain, and creativity (art) happens from impressions left upon the brain from the mind in its unconscious state. (-1.4, -1.6, -1.3)

The mind and the brain work together. One cannot exist or function without the other. However, you cannot see the mind and you can visualize the brain. Nevertheless, the mind and the brain are a team. For instance you cannot see your conscience, but you know you have one. (-0.6, 0.3, 1.5)

I believe that the mind works together with the brain, but is somehow separate. I also believe that the mind has almost more control over us than the brain. (1.4, 1.8, -0.6)

I feel that the mind is totally different from the brain. In your mind, you can capture things such as scenes, pictures, or experiences you've had. The brain only uses emotions or physical things to tell you what your feelings or thoughts may be. (0.6, 0.9, 0.5)

I feel the mind and the brain are the same thing. (-1.0, -0.1, -0.6)

I believe the mind *is* part of the brain—not separate. If your brain is dead, your mind is dead also. There was a question of consciousness after the body has disintegrated—I don't think your "mind" will float around or end up in someone else's body, but I do believe that some part of "me" will go to Heaven, and I will know who I am. (-1.8, -1.9, 0.7)

I feel the mind is psychological; the brain controls your actions but your mind exists on another level that co-exists with the brain. The mind is like a higher thought process. (0.3, -0.9, 1.0)

I feel the mind and the brain are the same thing. My thoughts are guided by my conscience which is influenced by God. All of this takes place in my brain. I feel research in this area is very good and will help us to better understand the way we think. Yet I do not believe that computers will ever be able to think as we do. (-1.0, -0.8, 1.2)

I feel the mind is a separate entity of the brain; yet I also feel that the two interact. For example, when we're in the decision making process. (1.0, -1.0, 0.0)

Z scores on the Dualism, ESP, and Religiosity Scales are shown in parentheses

I think the mind is not separate from the brain, yet they are not the same. It seems as if the mind and the brain may in some way work together. In some ways they may be interconnected. (1.3, 1.2, 0.0)

The mind is a part of the electrical impulses of the brain triggered by various stimuli into reacting with stored knowledge. That is why the past experiences of a person are important. They are stored and can be brought forth at various times. But there is also another part of us that reacts with the stimuli—call it the spirit that produces thoughts and feelings independent of “knowledge.” (0.1, -0.6, 1.7)

It seems that you wanted to know if I thought the mind and the brain were one. In one sense, yes I believe they are but then I think the mind is separate from the brain because to me it seems like another sense (i.e., touch, sight). But I’m not altogether sure because the “mind” is hard. (0.5, -0.6, -0.3)

I believe that the mind can heal the body. But only if the person wants to be healed. I also believe that people can will themselves to die if depressed enough and the desire is there. (0.2, 1.0, 0.7)

I just feel that your mind is the creative and nontechnical aspect of the brain. The mind is the thinking, emotional, and cognitive part of the brain. (0.9, -2.9, -1.8)

I feel that the mind is the conscious state of the brain that gives us life and enables us to socially function. (0.1, 1.1, 0.2)

I believe the mind contains some of our unconscious thoughts that are trying to become part of our consciousness. In many instances they can do so. The “mind” has always intrigued me. (-0.6, 1.3, -2.6)

The mind is the same thing as the brain, yet it is just a different terminology of the brain, a slang word for brain and brain processes. (-0.7, -0.8, 0.2)

What I believe is that “mind” is the same as “soul,” and that the brain is just an organ in the body, although the most important one, it is pretty much just for regulating hormones and nervous systems and memory storage. If a person’s brain is damaged they may behave differently but their soul (I wish I could find another word for “soul,” it sounds too religious) is the same, they are the same person, just as they’d still be the same person if they lost a leg. They may change somewhat, perhaps become depressed, but this way they can still communicate and rationalize. If the brain is damaged, the soul cannot communicate because the major regulator is downed. It’s very hard to explain. (2.2, 0.9, -1.6)

I would hope that scientists or psychologists will not be able to pin down the mind into a science or be able to control the mind. This would destroy the beauty of the individual and individuals’ security of being themselves. Yet I feel the study of the mind can help the progress of humankind. (0.9, 0.8, 0.2)

I believe the mind is a force which directly controls life. The mind exists as a person’s soul. The brain has the capabilities of how to move and produce actions in the human, but the soul decides how and why to do a certain action. I believe that man continues to exist in a different level of consciousness when his body dies, but his soul will transcend into another dimension. A dimension of only total thought. (3.2, 1.7, -0.6)

I believe that the mind is part of the brain, but not in a distinct area. I feel it is the brain, and is a word or idea we use to express the thought of the brain. Example—“I blew my mind” instead of “I blew my brain.” (-2.4, -1.8, -3.1)

I’m not sure what I think or feel regarding the association of mind and brain. Actually, I never thought much about it. However, I’m sure I’ll ponder the subject now

that I've read these questions. Also, I'm sure my answers show my confusion. (-0.4, 1.0, -0.3)

The mind is the brain's ego. You need to have a mind if you are to have a brain. Without a mind you are nothing, even if you have a brain. (-0.8, 1.4, 0.5)

The mind is a process of thought, therefore, a part of the brain. The brain has two sides, one language, one spatial. Therefore, the mind falls somewhere in one of those areas if not both. (0.4, -0.4, 0.2)

I feel that the mind is integrated in the brain when functioning in mental process. I think they are separate identities but interact with each other. Behavior then is not just determined by mind but also with physiological functions within the brain. (1.6, 0.5, -0.6)

I do not fully understand if the mind and brain are two separate things. I think that perhaps they are inter-related, I think a person's mind is just a person's thoughts, feelings, ideas, and a part of one's conscience. (0.2, 1.8, 1.5)

I never thought of the mind and brain as two different things and I'm not sure if I think they are one or two. It's a confusing idea to me. (-0.7, -0.1, 1.5)

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