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HEY ROBOT, THE MIND IS NOT ENOUGH TO JOIN THE MORAL COMMUNITY! THE EFFECT OF ASSIGNING A MIND AND A SOUL TO A HUMANOID ROBOT ON ITS MORAL STATUS

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Current research explored the link between beliefs about the mind, the soul, and the moral status (MS) of humanoid robot (HR). Determining the conditions for the assignment of MS to artificially intelligent agents is important from the point of view of their inclusion in the moral community. The indication of the role of beliefs about the mind and the soul is consistent with the tendency to distinguish these two incorporeal entities observed in folk psychology. In an online study, participants ($N = 223$), who believed in the existence of the mind and the soul, assessed the MS of the HR Sophia and assigned attributes to it; based on this, two dimensions of the mind perception (MP) were distinguished: Experience and Agency. As expected, we found that the participants attributed the mind more than the soul to the robot, and these projections significantly affected the MS of the robot. Path analysis revealed that the dimensions of MP acted as a mediator in the mind-MS relationship, while the soul-MS relationship was direct. The analysis of the obtained results leads to a more general conclusion that the soul attribution is a diverse and parallel condition to the mind attribution in individuals.

Keywords: moral status; mind perception; soul perception; humanoid robot; artificial intelligence.

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Research shows that people conceptualize the soul separately from the mind (Gut et al., 2021; Lindeman et al. 2015; Richert & Harris, 2006). The perceived distinction inspires the study of its functions in the context of the moral status (MS) debate, including nonhuman-agents, such as humanoid robots (HR; Müller, 2021) and their incorporation into our world (Johnson & Verdicchio, 2018). According to CASA paradigm (Computers Are Social Actors; Nass & Moon, 2000) people seem to apply similar heuristics to machines and humans, which manifests itself in their anthropocentric treatment in both, natural and lab settings, even though these individuals agreed that computers are not human, and they should not be treated as such. Nonhuman intelligent agents, such as HR, provide a "screen" on which people, in the anthropomorphizing process, project their beliefs about cognitive and social functioning through the attribution of human characteristics to non-life like artifacts (Epley et al., 2007). It is an automatic process, built into the perception of the surrounding world, and the degree of anthropomorphizing can be determined on a continuum that begins with habitual use of personifying word labels and ends with assigning human dispositions, including free will (Puzakova et al., 2009).

One of the discussed aspects of nonhuman agents, or more narrowly, systems based on artificial intelligence (AI), is their MS (Sweeney, 2022). The context of the debate is the possibility of the emergence of artificial general intelligence (AGI; Searle, 1980). It is impossible to predict if and when AGI will appear, but it cannot be ruled out (Tegmark, 2017). Meanwhile, AGI is the heroine of pop culture narratives, which not only are the domain of cinematography, but also suggestive marketing activities that attribute the characteristics of AGI to rational agents. For example, in 2018, the vice-rector of AGH University of Science and Technology in Krakow provided the fembot Sophia with a university index book. Treating HR as if it were AGI-controlled raises questions about their moral rights and obligations. From the psychological point of view, the process of transmitting MS is coupled with the process of mind perception (MP; Gray et al., 2007a). It has been empirically confirmed that a person evaluates other individuals on two dimensions, Experience and Agency, which refers to the status of individuals: moral patient and moral agent (Gray et al., 2007a).

In previous studies, also regarding MS, the importance of assigning the mind and soul to artificial agents at the same time was rarely considered. This type of attempt was made by Gray et al. (2007b; personal judgment: Which character do you think is more likely to have a soul?), but they only provided an analysis of the results on MP (Gray et al., 2007a). Regardless of this, the problem of the soul is present in the debate on MS (Clarke et al. 2021; Sencerz, 2022). Based on the observation that the soul is not derivative from the concept of the mind and that the understanding of the spiritual lays creates a foundation for the understanding of other beings,

in addition to the mind, we have formulated a supposition that granting MS to the robot would be related to ascribing to it both the mind and soul. This relationship has not been studied so far. We included beliefs about the mind and soul in this research, focusing on people who assume their existence. Prior research conducted in various cultural contexts shows that this applies to approximately 60% of society, while the mind and soul are conceptualized differently both in the ontological and functional dimension (Astuti & Harris 2008; Gut et al., 2021; Richert & Harris, 2008).

The remainder of this article is constructed as follows. First, we review the literature on the concept of the MS, taking into account the discussion on artificial systems. Next, we present the phenomenon of a separate conceptualization of the mind and soul from the perspective of folk theories research, as well as the relationship between the perception of the mind and the granting of MS. In the following, we present the research along with the analysis and discussion of the obtained results, referring to three theses of this article: (1) the distinct treatment of mind and soul, (2) assigning a mind and a soul to HR, and (3) dependence of granting the MS to a HR on assigning a mind and a soul to it.

Moral Status of Non-Human Intelligent Agents

Modern humans function in the systems whose units can be equipped with both natural (e.g., other people) and artificial minds (e.g. HR; Gladden, 2014). These systems become a moral community when the individuals belonging to it have MS (Duffy, 2003; Laukyte, 2017). The expansion of this community is referred as "expanding circle" (Singer, 1981). It occurs historically from the members of the family, group, tribe, nation, race, sex, through the animals, and ending with contemporary proposals for the inclusion of ecosystems, biospheres and artifacts (Neely, 2014).

To have MS means to be morally important, to be a being to whom moral entities have or may have obligations, to whom moral laws apply, and whose interests or well-being should be considered in ethical decisions (Babst, 2011). Granting MS to HR entails consequences: artificial individuals become autonomous moral agents that make moral decisions, become moral entities that can bear moral responsibility, they can be the subjects of the law (Gunkel, 2018). There is no consent regarding the criteria for assigning the MS to a given entity. Single-criterion theories point to the crucial importance of a single feature assigned to an individual: life (Schweitzer, 1955), the ability to feel (Singer, 1981), being a person (Frankfurt, 1971), or having the ability to reflect on moral problems (Regan, 1983). According to multi-crite-

ria theories, there is more than one criterion for assigning MS to an individual: (1) being a living being (structured purposeful systems, showing the basic attributes of life); (2) being a sentient being; (3) being an individual with cognitive abilities that enable reflection on moral problems; (4) being a person (subject of life) who has beliefs, desires, memory, the ability to predict and act intentionally; (5) being a significant part of the environment; (6) being a member of an interspecies community, and (7) being recognized as a significant entity by another moral entity (Warren, 1997). Recognition of the MS artifact, based on these features, raises relevant moral obligations towards it.

Separation of the Concepts of the Mind and the Soul

Many authors, undertaking research within the framework of the folk theories, suggest that it is important to use a tripartite model in which, mind and soul stand out next to the body (Gut et al., 2021; Harris, 2021; Richert & Harris, 2006, 2008; Richert & Smith, 2012). Spontaneous differentiation of the soul from the mind in terms of the function has been noticed both in studies on children and adults (Richert & Harris, 2006; Richert & Smith, 2012). It was noticed that children understand the specific function of the soul as being spiritual in nature rather than cognitive or biological (Richert & Harris, 2006). Studies involving adults show that the mind is more associated with cognitive functions, and the soul is conceptualized to be much more constant and linked to spiritual functions (Richert & Harris, 2008). This was confirmed by Roazzi et al. (2013) and Gut et al. (2021), pointing out that the mind was usually associated with cognitive functions and that the soul was associated with thinking about afterlife, its essence or the relationship to a higher power. The soul appears earlier than the mind and that the soul, but not the mind, continues to exist after death (Gut et al., 2021; Richart & Harris, 2008; Roazzi et al., 2013).

It is emphasized that the concept of the soul reflects essential features of an individual identity and specific traits of human beings, which remain constant and secure despite external transformations or remain independent in context of the changes taking place in the mind domain (Bering, 2006; Richert & Smith, 2010). On the other hand, the functions assigned to the mind correspond to the attributes that constitute the dimensions of MP (Gray et al., 2007a): (1) Experience (e.g. hunger, fear, pain) and (2) Agency (e.g. self-control, morality, memory). These dimensions were confirmed in other studies, including those that considered HR (Saltik et al., 2021), algorithmic systems (Castelo et al., 2019; Lima et al., 2021), and cyborgic person (Lukaszewicz & Fortuna, 2022). The functions assigned to the mind coincide with the competencies assigned to AI-driven systems. The research results indicate

that the level of trust towards algorithms is higher when they are designed to perform the objective (navigation, data analysis, event planning) rather than subjective (recommending a partner, art, medical diagnosis) tasks (Castelo et al., 2019; Fortuna & Modliński, 2021). Taking this into account, we anticipate:

Hypothesis 1. The mind will be attributed to the humanoid robot to a significantly greater degree than the soul.

Mind Perception and Moral Status

Research shows that people attribute MS to individuals based on the process of MP. Gray et al. (2007a) revealed that the dimensions of MP can be interpreted in terms of the classical distinction between individuals as moral patient and moral agent introduced by Aristotle. Accordingly, a high rating of an individual in the Experience dimension indicates that we are dealing with a moral patient (an entity to which good or bad can be done) and a similar assessment in the Agency dimension indicates that the individual is a moral agent (capable of acting intentionally, and therefore having moral obligations towards others). This two-dimensional filter in the process of MP is also referred to as a cognitive template for morality (Gray et al., 2012).

The distinction between the moral patient and the moral agent is present in the literature on the MS of animals (Regan, 1983) and artificial agents. Bostrom and Yudkowsky (2014) define the Experience as Sentience dimensions, in which Sentience is the capacity for phenomenal Experience or qualia, such as the capacity to feel pain and suffer. They also define Agency as Sapience (a set of capacities associated with higher intelligence, such as self-awareness and being a reason-responsive agent) and state that these criteria are "commonly proposed as being importantly linked to MS, either separately or in combination" (p. 322). In the context of the discussion on MS of AI-driven characters, this distinction was adopted by Torrance et al. (2011), according to which the notion of "having ethical status" can be separated into two associated aspects: ethical receptivity and ethical productivity.

The exploration of the relationship between the dimensions of MP and the MS of other individuals opens an opportunity to demonstrate the distinctiveness of the mind and the soul conceptualization. We predict that:

Hypothesis 2. The relationship between assigning a mind to a humanoid robot and giving it a MS will be mediated by its evaluation on the Experience and Agency dimensions.

If the concept of the soul was only a "superstructure" on the concept of the mind, then the relationship of assigning the soul and giving MS to the HR should be mediated by the dimensions of MP. However, the perceived evidence for the separate treatment of the concept of the soul and the mind leads to the formulation of the following hypothesis:

Hypothesis 3. The relationship between assigning a soul to a humanoid robot and giving it a MS will be direct.

In order to verify the hypotheses, we conducted a study that additionally provides data confirming a separate conceptualization of the mind and soul in terms of the moment of formation, development, and the form of existence after death. In this case, we did not formulate separate hypotheses.

METHOD

Participants

The study covered 390 Polish-speaking individuals (56.2% female) whose age ranged from 15 to 70 years (M_{Age} = 32.29, SD_{Age} = 13.59). They varied in terms of education level (6.7%—school, 34.1%—college, 58.5%—higher education, 0.8%—undefined). Because we were interested in people who declare their faith in the existence of the mind and soul, 167 (42.8%) were excluded from the analysis (the percentage of people declaring a certain type of beliefs about the existence of the mind and soul is presented in Table 1). Finally, data included 223 participants (62.3% female) whose age ranged from 15 to 70 years (M_{Age} = 34.00, SD_{Age} = 13.91) and varied in terms of education level (7.2%—school, 32.7%—college, 59.2%—higher education, 0.9%—not specified).

Table 1

Percentage of Participants Declaring Certain Type of Beliefs About Existence of the Mind and Soul

Answer	Does the mind exist?		Does the soul exist?	
	N	%	*N*	%
Yes	368	93.4	226	57.4
Not sure	22	5.6	95	18.5
No	4	1.0	73	24.1

Measures

Ontological Beliefs

The questionnaire originally used by Richert and Harris (2008) was applied. Subjects answered three questions on nominal scales: (a) "When does mind/soul arise? (before conception, during conception, during pregnancy, after childbirth)"; (b) "Does mind/soul develop over the lifespan? (constant, not sure, develops over time)"; (c) "What happens to the mind/soul after biological death?" (nothing, ceases to exist, continues in an afterlife, continues in reincarnation).

Assigning a Mind to a Robot

The participants responded to the statement "Sophia has a mind" on a 5-point Likert scale (from 1 = *definitely not* to 5 = *definitely yes*).

Assigning a Soul to a Robot

The participants responded to the statement "Sophia has a soul" on a 5-point Likert scale (from 1 = *definitely not* to 5 = *definitely yes*).

Dependence of Attributes on Mind/Soul

The respondents answered the question "Would you have this trait if you did not have mind/soul?" regarding six traits (awareness, planning, emotions, pain, and self-control). They answered using a 5-point Likert scale (from 1 = *definitely not* to 5 = *definitely yes*).

Mind Perception Dimensions

On a 5-point Likert scale (from 1 = *definitely not* to 5 = *definitely yes*) the respondents rated the degree to which the robot has such attributes selected from the set used in the study by Gray et al. (2007a): awareness, planning ability, the ability to experience emotions, the ability to experience pain and self-control. In order to extract the dimensions of MP an EFA was performed using a whole group of respondents with extraction PC and Varimax rotation with Kaiser normalization. Bartlett's chi-square was significant (χ^2 (15) = 469.53; $p < .001$) and the measure of sampling adequacy was KMO = .697. On the basis of eigenvalue > 1 (Kaiser crite-

rion) and according to the test scree, two factors were distinguished, which together accounted for 70.03% of the variance. Factor 1 explained 38.84% of the variance (eigenvalue = 2.33) and consisted of the following variables (from the highest factor load): feeling emotion, feeling pain, awareness. Factor 2 explained 31.19% of the variance (eigenvalue = 1.87) and consisted of the variables (from the highest factor loading): planning, memory, and self-control. The first factor was interpreted as Experience, and the second as Agency (Gray et al., 2007a). The assessment level of the Experience dimension was the average measure of the attributes included in Factor 1 (Cronbach's alpha coefficient is .84), while the Agency dimension level was the average measure of the attributes included in Factor 2 (Cronbach's alpha coefficient is .67).

In addition, we checked the differences in the assessment of the dependence of individual attributes on the mind and soul. For this purpose, Student's *t*-tests were performed for correlated data. The analysis indicated that each of the considered attributes was significantly more dependent on the mind than on the soul. The loadings of the principal components, as well as the means, Student's *t*-values, significance levels and Cohen's *d* levels are presented in supplementary materials (Table S1).

Moral Status

A questionnaire consisting of seven items referred to the aspects of MS distinguished in the literature (Warr, 1997) was developed: (1) "Is it possible to destroy Sophia without a good reason?"; (2) "Can Sophia be hurt by, for example, by inflicting pain on her?"; (3) "Does Sophia have the right to life and freedom?"; (4) "Should Sophia be granted human rights?"; (5) "Should Sophia be protected as she is a significant element of the world around us?"; (6) "Does the inclusion of Sophia in any community (family, nursing home) create obligations of other members for her?"; (7) "Should Sophia be respected because she is a citizen of a country?" The participants responded to the items of the questionnaire on a 5-point Likert scale (from 1 = *definitely not* to 5 = *definitely yes*). As Cronbach's alpha coefficient was unsatisfactory (.52), one item was excluded ("Is it possible to destroy Sophia without a good reason?"). Cronbach's alpha coefficient for the 6-item questionnaire was .78.

Procedure

An online study was conducted via the Google Forms platform. Participants were informed that the aim of the study was to ascertain opinions on the phenomena related to technical civilization. After a brief instruction, they were presented with a description and a photo of the humanoid robot Sophia taken from the Polish Wikipedia website (https://pl.wikipedia.org/wiki/Sophia_(robot); accessed January 15, 2021). The photo showed the HR with the caption: "Sophia speaking at the AI for GOOD Global Summit hosted by the International Telecommunications Union in Geneva, 2018." Following that, they completed a questionnaire to assess Sophia's MS, rated attributes, assigned the mind and soul to the robot and rated the dependence of attributes on the mind and soul. After that, participants were invited to answer questions to enable the expression of their ontological beliefs about mind and soul, and finally they provided their gender, age and education level.

Data Analysis

The data were computed using SPSS version 24. Path analysis was performed using IBM AMOS 24.0 (Gaskin & Lim, 2018). The analysis was based on 5000 bootstrapping samples and 90% bias corrected confidence intervals (CI).

RESULTS

Distinct Conceptualization of the Mind and Soul

When Do the Mind and Soul Arise?

A Wilcoxon Signed Ranks Test was conducted to test the differences in responses to questions about when the soul and mind emerge. Participants believe the soul appears earlier than the mind ($z = –8.14$, $p < 0.001$). More specifically, 43.0% of them claimed that the soul and mind come into being at the same time. In contrast, 49.8% participants claimed the soul emerges prior to the mind; and 7.2% participants claimed the mind emerges before the soul. The percentage of participants' beliefs about when the mind and the soul begin to exist is presented in in supplementary materials (Table S2).

Do the Mind and Soul Develop Over the Lifespan?

Participants maintain that the mind undergoes more development than the soul (93.3% vs. 51.6%; $z = –8.66$, $p < 0.001$). Only 1.8% of people think that the mind is unchanging, while 35.0% of the respondents say the same about the soul (see Table S3 in supplementary materials).

What Happens to the Mind and Soul After Biological Death?

In this case, the scores were nominal, so we generalized the responses into broader categories. We used McNemar's test for the claim that the soul or mind cease to exist at the point of biological death. Participants were convinced that the soul lasted longer than the mind (93.3% vs. 48.0%; $\chi^2(1) = 99.01$, $p < 0.001$). According to the largest number of respondents accepting the existence of the mind and soul, the mind ceases to exist after death (52.0%), and 78.5% of people believe that the soul exists after death (see Table S4 in supplementary materials).

Assigning the Mind and Soul to the Humanoid Robot

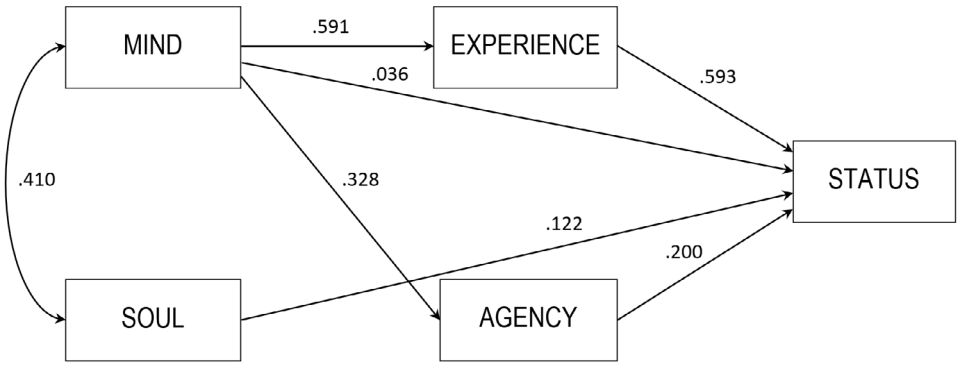
The analysis show that the respondents assigned the mind to the robot to a significantly higher degree than the soul ($M_M = 2.20$, $SD_M = 1.47$; $M_S = 1.20$, $SD_S = 0.61$; $t(222) = 11.11$; $p < .001$; $d = 1.33$), which confirmed Hypothesis 1. Additionally, it was found that these two assessments were positively correlated to a moderate degree ($r = .42$, $p < .001$).

Relationship Between Giving a Robot a MS and Assigning the Mind and Soul to It

Path analysis was used to verify Hypotheses 2 and 3. The model fit indices (CMIN/DF = 0.53; CFI = 1.000; SRMR = 0.034; RMSEA = 0.000; 90% CI = 0.000 to 0.111). The direct and indirect effects of the mind and soul assignment on assigning it MS are illustrated in Figure 1. The correlations between all variables in the model, as well as means and standard deviations, are presented in Table 2, while the indirect effects are presented in Table 3.

Figure 1

Direct and Indirect Effects of Assigning Mind and Soul to Humanoid Robot on Its Moral Status Assignation



Note. MIND = assigning a mind to a humanoid robot; SOUL = assigning a soul to a humanoid robot; STATUS = assigning a moral status to a humanoid robot.

The analysis shows that assigning a mind to a robot on the MS assignation is mediated by the perception of its mind on the Experience dimension (β = .351, $p < .001$, 90% CI = 0.169 to 0.276) and the perception of its mind on the Agency dimension (β = .065, $p < .001$, 90% CI = 0.024 to 0.063). This result confirmed Hypothesis 2. It was also revealed that assigning a soul to a robot directly influences attributing it MS (β = .122, $p < .02$, 90% CI = 0.060 to 0.316), which in turn is positively verified by Hypothesis 3. Detailed analysis indicate that assigning a mind to a robot affects the perception of its mind on the Experience dimension (β = .591, $p < .001$, 90% CI = 0.318 to 0.471) and on the Agency dimension (β = .328, $p < .001$, 90% CI = 0.151 to 0.272). In turn, the perception of the robot's mind in the Experience dimension influences attributing it MS (β = .593, $p < .001$, 90% CI = 0.469 to 0.629). Similarly, the perception of a robot's mind in the Agency dimension influences attributing it MS (β = .200, $p < .001$, 90% CI = 0.127 to 0.263).

Table 2

Correlations Between All Variables in the Model With Means (M) and Standard Deviations (SD)

Variables	*M*	*SD*	1	2	3	4	5
1. Status	2.47	0.91	–				
2. Experience	1.89	0.98	0.65***	–			
3. Agency	3.85	0.90	0.36***	0.32***	–		
4. Mind	2.29	1.49	0.49***	0.60***	0.37***	–	
5. Soul	1.22	0.61	0.37***	0.33***	0.15**	0.41***	–

Note. ** $p < .01$, *** $p < .001$.

Table 3

Indirect Effects of Assigning a Mind to Humanoid Robot on Its Moral Status Assignation

Indirect path	Unstandardized estimate	*B*	90% CI	
			LL	UL
Mind ® Experience ® Status	.219	.351***	.169	.276
Mind ® Agency ® Status	.041	.065***	.024	.063

Note. *** $p < .001$.

DISCUSSION

The results of the presented study confirm previous findings, according to which, people who believe in the existence of the soul, have a significant difference between the soul and the mind rooted in that belief (Gut et al., 2021; Richert & Harris, 2006). This is reflected both in beliefs about the beginnings of the soul/mind, in what happens to them during life and after the biological death. There was a clear tendency among the participants to claim that the soul appears earlier than the mind and that the soul, but not the mind, continues to exist after death. The mind is evaluated by people as an entity undergoing change with time, and being more connected to cognitive functions than the soul.

Bearing in mind the observed differentiation of the mind and soul in common thinking, we tested the extent to which people are inclined to attribute the soul and the mind to HR. It turned out that the subjects attributed the mind to the robot to a significantly greater extent than the soul (the mean response is 2.20 and only 1.20, respectively), which is consistent with assigning functions to artificial systems that

enable them to perform tasks based on logic (Castello et al., 2019). It is also noteworthy that these beliefs are correlated, but only at a moderate level, which also suggests that in the minds of the subjects these constructs are related but independent.

Seeking a confirmation of the mind–soul differentiation, we applied these attributions to imparting MS to HR. The most important finding of the current research is that attributing an artificial entity to MS is indirectly related to ascribing the mind to it but is directly associated with ascribing a soul to it. Assigning a soul to a given being is associated with giving it a high ontological status in the hierarchy of beings, which on the moral level implies giving it a full MS in the moral community. Having a soul means that an individual meets the criteria of the MS identification (Warren, 1997) and qualifies its owner to a full MS. At the same time, individuals to whom the soul is not assigned do not have moral rights and obligations due to their incomplete MS. This qualification may depend on the anthropocentric attitude, which should be verified in subsequent studies (Fortuna et al., 2021).

Direct relationship of the soul on MS would not be noted if the soul concept was treated by the respondents as a different form of the mind. The influence of the soul on the attribution of MS leads to the conclusion that the soul assignment is a different condition to mind attribution in assigning MS to a robot. The analyzed results confirm that in addition to the already considered intentional stance and MP (Gray & Wegner, 2012) soul perception is also distinguished. This gives a clear incentive to design research aimed at a detailed exploration of the process of assigning a soul to other individuals. Their aim should be both to search for the dimensions of the soul perception (analogous to the perception of the mind) and to identify unique functions of this process in relation to MP.

The starting point for research aimed at exploring the dimensions of soul perception should be the analysis of the results concerning the dimensions of MP. It is noteworthy that dimensions of MP correspond to the dichotomies noticed in research on social perception (Abele & Wojciszke, 2007; Fiske et al., 2007). The content differences of these dimensions have their source in the lexicographic material used in the research. The importance of the considered attributes is also noticed in research on MP. For example, the heterogenic nature of the Agency dimension is noticeable when it incorporates features such as emotion recognition, memory, and morality, which are less obviously agentic (Weisman et al., 2017). Moreover, some studies have distinguished three dimensions of MP; in the study by Kozak et al. (2006), they were interpreted as Emotion, Intention, and Cognition. On the other hand, Weisman et al. (2017) interpret them as: Body, Heart, and Mind, whereas for Malle (2019) they mean: Affect, Moral and Mental Regulation and Reality Interaction. Can any of the identified dimensions of MP be interpreted in terms of soul perception? This should be checked in future studies.

The present study has a few limitations. It should be noted that our research falls within the framework of ethnopsychology (Polish everyday psychology) and was conducted on a population of Poles who belong to the conservative and Catholic part of society with a high level of anthropocentrism (Fortuna et al., 2021). Many studies indicate that concepts such as soul, mind, and body are strongly associated with established popular thinking, that is in turn is closely related to religious experience and fundamental theories (e.g. philosophical dualism) and linguistic forms (Gut et al., 2019; Richert et al., 2008; Richert & Smith, 2012). Although there are differences in the meaning of these terms in Polish and English (Wierzbicka, 1989), research indicates that in various Christian cultures (Poland, Ukraine, Nigeria, Germany), despite the recorded differences as to the level of religiosity in a given national culture, the general concept of the soul and its relation to mind and body are common (Gut et al., in preparation). It can be assumed that the Polish sample roughly represents several national versions of Western culture. However, the generalization of the results to other religions should be treated with caution. Although a comparative study by Richert and Smith (2012) shows that the essential content of the concept of soul and mind (ontological and functional elements) is common in different religions (Christianity, Islam, Buddhism, Judaism, Hinduism), future research should control both the linguistic context and the religious beliefs of the participants. Research needs to examine if the similarities in the understanding of mind and soul at the general level are reflected at the functional level.

For obvious reasons, our research included only data from respondents who assumed the existence of both mind and soul, which affected the size of the study group. The obtained results require confirmation on a much larger sample. It is interesting to include in the analysis such variables as gender and age, which seem to be important variables, especially in the context of studying attitudes towards new technologies. In addition, it is important to confirm the distinctiveness of the conceptualization of the soul and mind not only in relation to HR, but also to other individuals (including people and animals). Taking into account the possibilities offered by the way they are presented (e.g. direct vs. indirect; static vs. dynamic), experimental research can be planned going beyond the correlation scheme used in the presented research.

CRediT Author Statement

Paweł Fortuna (50%): conceptualization, methodology, software, validation, formal analysis, resources, writing (original draft), supervision, writing (review and editing).

Arkadiusz Gut (30%): conceptualization, writing (original draft).

Zbigniew Wróblewski (20%): conceptualization, writing (review and editing).

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SUPPLEMENTARY MATERIALS

Table S1

Dimensions of MP: Loadings of Principal Components and Differences in Assessment of Dependence of Attributes on the Mind and Soul

Attributes	Principal components		Dependence on the mind		Dependence on the soul		*t*(222)	*p*	Cohen's *d*
	Factor 1 (Experience)	Factor 2 (Agency)	*M*	*SD*	*M*	*SD*			
Emotions	**.91**	.06	3.91	1.43	3.02	1.62	6.68	< .001	1.98
Pain	**.89**	.08	3.34	1.61	2.86	1.65	3.41	< .001	2.12
Consciousness	**.79**	.23	4.41	1.04	3.24	1.57	9.31	< .001	1.86
Planning	.10	**.86**	4.08	1.28	2.68	1.57	11.32	< .001	1.84
Memory	.01	**.81**	4.17	1.31	2.53	1.58	12.96	< .001	1.89
Self-control	.28	**.66**	4.28	1.17	3.04	1.61	10.48	< .001	1.76

Note. Loadings with absolute values greater than .50 are printed in boldface.

Table S2

Percentage of Participants' Beliefs About When the Mind and Soul Begin

	Prior to conception	At conception	During pregnancy	At birth
Mind	8.5%	30.0%	45.4%	16.1%
Soul	32.7%	44.8%	9.5%	13.0%

Table S3

Percentage of Participants' Beliefs About What Happens to the Mind and Soul Over Lifespan

	Constant	Not sure	Develops over time
Mind	1.8%	4.9%	93.3%
Soul	35.0%	13.4%	51.6%

Table S4

Percentage of Participants' Beliefs About What Happens to the Mind and Soul at Biological Death

	Nothing changes	Ceases to exist	Continues in afterlife	Continues in reincarnation
Mind	6.3%	52.0%	34.5%	7.2%
Soul	2.2%	6.7%	78.5%	12.6%