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THE NOETIC PERSPECTIVE
AND INFORMATION PROCESSING

The aim of the present research was to investigate the cognitive representations of the noetic perspective (spirituality) and the influence of the activation of these representations on information processing. The article presents the results of three experiments on groups of students ($N = 186$), using the lexical decision task (LDT) paradigm. In two of these experiments the depth of information processing was also measured by a memory test. The typical result for LDT procedure was not confirmed – the noetic perspective did not cause faster recognition of words related to this perspective. However, the activation of the noetic perspective in the condition of activated attention manifested itself in a better memory of noetic words and in the transfer of positive affect to related noetic objects.

Keywords: noetic perspective, cognitive representation, information processing, lexical decision task.

CONCEPTS OF SPIRITUALITY

The sphere of human spirituality falls within the scope of psychologists' interest with increasing frequency, given its often demonstrated connections with the individual's well-being (Fallot, 1998; Emmons, 1999; George, Larson, Koenig, & McCullough, 2000; Heszen-Niejodek, 2006). Current research has, for

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instance, indicated that regular meditation has a beneficial influence on affect regulation and health (Alexander, Rainforth, & Gelderloos, 1991; Astin, 1997), reducing stress, anxiety, and depression (Wachholtz & Pargament, 2008; Koenig, McCullough, & Larson, 2001) and increasing satisfaction in partner relationships (Mahoney, Pargament, Jewell, Swank, Scott, Emery, & Rye, 1999) as well as the level of self-control. Another series of studies has proven that the activation of spiritual contents brings about prosocial behaviors even towards strangers, reduces egotism (Shariff & Norenzayan, 2007), increases social integrity (Randolph-Seng & Nielsen, 2007), and results in an increase of charitable behaviors (Pichon, Boccato, & Saroglou, 2007). One may therefore conclude that spirituality is an important dimension in individuals' mental functioning, shaping cognition and directing actions.

Theoreticians agree that spirituality does not equate with religiosity, though it may contain some elements thereof (Emmons, 1999; MacDonald, 2000; Piedmont, 1999). Psychological literature, however, does not offer a straightforward definition of spirituality, with chaos prevailing when it comes to the terminology employed – for instance, Różycka and Skrzypińska alone (2011) have presented over 60 definitions that function in Western culture. The selection of a particular concept of spirituality, and, as a consequence, of an operational definition is in fact necessary if one wishes to be part of mainstream academic science (cf. Boski, 2009).

In all human cultures, the social world has two clear dimensions: a horizontal dimension of closeness or liking and a vertical one of hierarchy or status. Haidt (2005) claims that spirituality is the third one. To illustrate that idea, he uses the metaphor of Flatland (see: Abbot, 1884). Flatland is a two-dimensional world whose inhabitants are all geometric figures. The protagonist is a square. One day, the square is visited by a sphere from a three-dimensional world called Spaceland. When the sphere visits Flatland, however, all that is visible to Flatlanders is the part of the sphere that lies in their plane – in other words, a circle. The square is astonished that the circle is able to grow or shrink at will (by rising or sinking into the plane of Flatland) and even to disappear and reappear in a different place (by leaving the plane and then re-entering it). The sphere tries to explain the concept of the third dimension to the two-dimensional square, but the square, though skilled at two-dimensional geometry, does not understand it. He cannot understand what it means to have thickness, in addition to height and breadth (Haidt, 2005). Using that metaphor, Haidt claims that the human mind simply *does* perceive divinity and sacredness, whether or not God exists. By our actions and our thoughts, we move up and down on the vertical dimension of divinity, with

angels up above (feeling elevation) and animals (biological necessities) down below. Normally, people are in the middle.

Also Eliade (1999) shows that the perception of sacredness is a human universal – even atheists feel sacred when touching love or natural beauty. Likewise, for Maslow (1964), states such as the feeling of unity with the surrounding world, euphoria, love, or gratitude constitute a timeless and supracultural propensity of the human mind. Spirituality often tends to be understood in a way close to the concept formulated by Haidt – as a multidimensional construct, with transcendence at its core, that is, as venturing beyond the ego and identifying oneself with a more general concept of being (Socha, 2000; Miller & Thoresen, 2003) – orientation towards the Higher Being, Energy, the Absolute, or the Universum may serve as an example (Hill et al., 2000). Simultaneously, numerous researchers have treated spirituality as a subcategory of psychological terms, at the same time assuming a two-dimensional model of the individual. Miller and Thoresen (2003) suggest that spirituality be treated as an attribute of a subject who possesses the status of a theoretical construct or a latent variable. Heszen-Niejodek and Gruszczyńska (2004) assume that spirituality, like intelligence and temperament, can be measured by means of empirical indicators and they treat this predisposition, readily available to all individuals, as a potential that can undergo further development. Spirituality may therefore be considered as a trait, not only as the participant's current state.

In academic research, we can also find Piedmont's studies. Piedmont (1999) claims that spirituality is the sixth dimension of personality, so he created a new scale of spirituality called the Spiritual Transcendence Scale (STS), later renamed to the Assessment of Spirituality and Religious Sentiments Self-Report Form (ASPIRES). He validated his scale on samples from different cultures and religions: Buddhism, Hinduism, Christianity, and Judaism (Piemont, 1999, 2001, 2007, 2010; Piedmont & Leach, 2002; Piedmont, Kennedy, Sherman, Sherman, & Williams, 2008; Piedmont, Ciarrochi, Dy-Liacco, & Williams, 2009; Piedmont, Werdel, & Fernando, 2009). The STS manifested a single overall factor composed of three "facet" scales: (a) *Prayer Fulfillment*, a feeling of joy and contentment that results from personal encounters with a transcendent reality (e.g., "I find inner strength and/or peace from my prayers or meditations"); (b) *Universality*, a belief in the unitive nature of life (e.g., "I feel that on a higher level all of us share a common bond"); and (c) *Connectedness*, a belief that one is part of a larger human reality that cuts across generations and across groups (e.g., "I am concerned about those who will come after me in life" (Piedmont, 2004, p. 214).

If we assume, after Haidt, that spirituality is a phenomenon from the three-dimensional world called Spaceland (or, to be more precise, the third dimension of the social sphere), then conflict with the assumptions of academic psychology, which treats spirituality as a subcategory of psychological notions (i.e., a Flatland phenomenon), would seem inevitable. It may be assumed, however, that, with the tools for studying three-dimensional phenomena currently unavailable, we will only concern ourselves with the analysis of their projection in the area of two dimensions (instead of spheres, we will be studying their projections onto planes). While this will not suffice for a thorough study of "sphericity," it may yield approximate characteristics as regards the area in question (just as it is impossible to properly describe in words a number of human experiences, which does not alter the fact that people are endeavoring to do so more and more precisely). When attempting to integrate the concepts of spirituality functioning in psychology (i.e., the "dimensional" and the "flat"), one may assume that the phenomena described by psychology have two non-zero coordinates (in two dimensions of a plane), with the third (in the spiritual dimension) equal to zero. This corresponds to Haidt's observation that it is most typical for the human mind to remain in close proximity to zero (i.e., in the middle section) on the spiritual level – between the sacred and the profane. Should the mind find sufficient motivation to follow the third axis in the direction of the sacred, then science can study the mind's projections onto a plane. Likewise, the authors of this article are limiting themselves only to the fragmentary study of spirituality according to two-dimensional academic standards, without disputing the three-dimensionality of the phenomenon under discussion.

THE NOETIC PERSPECTIVE AS A COGNITIVE FILTER

The present article adopts the notion of spirituality as a noetic perspective. The notion of "noetics" (gr. *noětikós*) was introduced to the psychological literature by Frankl (1978) to signify the ontologically separate and most highly developed level in the existence of an individual, for whom psyche and soma constituted a tool for the implementation of the will to meaning. This is undoubtedly a notion derived from the three-dimensional Spaceland. The term "noetic" has also been used with a similar meaning in the description of the spiritual dimension of personality to refer to specifically human needs, values, aspirations, and goals (Popielski, 1994, 1999; Piedmont, 1999; MacDonald, 2000).

Drawing predominantly on Piedmont's (1999) theory, we define the noetic perspective as a specific cognitive frame (state of mind) in which an individual transcends the limits of their own Ego through the feeling of being part of a larger whole (the entirety of existence) and unity with this whole. Such a perspective dictates the specifics of information processing, the effects of which manifest themselves in mental functioning and particular social behaviors. Metaphorically speaking, a drop may experience the feeling of being part of the ocean. The noetic perspective seems to be a specific cognitive filter (allowing the perception of the world through the prism of notions that define man's spiritual sphere), socially conditioned – triggered by different cultures through a variety of contents, and, once triggered, it may bring about slightly diverse cultural consequences (with the principal idea of unity with the generally acknowledged whole remaining) (Różycka & Skrzypińska, 2011). Assuming that the ability to discern, or to experience, the sacred belongs to the sphere of human universals, activating it through transcendence (going beyond the Ego towards a greater whole) should be effective regardless of the participant's religiosity. However, there exists no empirical proof to support this; there is even no proof as to whether there exists any universal representation of the sacred in the human mind. The aim of this article is to demonstrate this fact. If people are able to distinguish features characteristic for a spiritual person, or indeed list the words associated with spirituality, then it would seem logical that a representation of spirituality should exist in the mind. McIntosh (1995) and Ozorak (1997) have described spirituality as a cognitive schema that contains spiritual content and influences the organization of incoming information as well as decision-making. As is acknowledged, cognitive schemata as well as the beliefs resulting from them shape motivation, the type of action undertaken, and the achievement of goals (Bandura, 2001), in addition to having an influence on interactions with others (Baldwin, 1992). By analogy with the above, one may suppose that the basis for mental representations of the noetic perspective consists of notional categories, formed during the development process and/or as a result of transcendence-like, "beyond the Ego" experience. Additionally, all kinds of training (e.g., meditation) may lead to the establishment of noetic categories in the mind. It remains uncertain, however, whether the existence of spiritual representations is universal for the human mind – it may concern merely a small group of people with exceptional traits or interests. The aim of the present article is therefore: 1) to demonstrate the existence of a universal spiritual representation in the human mind as well as 2) to demonstrate that this representation may be activated through the arousal of the noetic perspective, understood as transcendence beyond the Ego and communion with the entirety of being.

At the initial stage, however, one question should be posed: around which "junction points" are the structures of knowledge that may constitute the representation of spirituality organized? The arousal of the noetic perspective should provide access within memory to attributes associated with spirituality or a spiritual person. This, in turn, leads to to the question of the nature of the formal and content-based organization of the noetic category, which we will for the sake of brevity call the notional category, which, in principle, constitutes the basis for the noetic perspective. Every individual seems to associate phenomena of a spiritual kind with notions such as unity, love, or the joy of existence. In religious people, objects of worship have an additional value (e.g., God, Mohammed, Allah, Buddha; see Shariff & Norenzayan, 2007). To demonstrate the existence of a spiritual category, one should generate a set of objects that could belong to this category and then employ it in an experiment aimed at the activation of the noetic perspective, the very process described in this article.

LEXICAL DECISIONS PARADIGM

According to the idea of the semantic network, concepts – that is, schematic (abstracted) representations of the different objects – are stored in long-term memory in the form of a multilevel and multinode structure: a hierarchical network (Collins & Quillian, 1969). Stimulation of a node that constitutes a given concept is associated with the recall of its properties. The nodes are interconnected. The stronger the relationship between representations of concepts, the easier (faster and more effective) the activation of one concept by another. Nodes representing concepts are linked with their typical attributes by strong semantic relations, resulting in the fast matching of a concept (e.g., physician) with its attributes (e.g., auscultation with a stethoscope). Recall of knowledge occurs through the spread of activation in the network. Activation of one concept is distributed across multiple nodes, and the breadth and strength of this chain reaction is dependent on the number of tracks and the strength of connections between nodes (defined as the ease of cross-activation) (Collins & Loftus, 1975).

During the testing of the semantic network model, participants are usually asked to decide whether the concept has designated properties. Processing time depends on how many levels of the network must be stimulated (Collins & Quillian, 1972). Another method is based on the semantic priming paradigm (e.g., Posner & Snyder, 1975). This procedure is used to demonstrate that the preceding stimulus reduces the response time to the target stimulus, which is

semantically related to the first one. The task of the respondent is to determine whether the target stimulus is a word or a non-word – this is called a lexical decision. Research in this paradigm has shown that the activation of different concepts/attributes affects behavior. For example, the activation of the cooperation scheme enhances cooperation between people (Bargh, Gollwitzer, Lee-Chai, Barbdollar, & Trotschel, 2001) and the activation of the steadfast sportsman scheme enhances perseverance in action (Martijn, Alberts, Merckelbach, Havermans, Huijts, & de Vries, 2007). Similar modifications of the paradigm have shown the complexity of processes in semantic memory and demonstrated that it is necessary in research to combine information about the functioning of semantic knowledge with the properties of procedural memory. We conducted three experimental studies in the lexical decision paradigm. According to the thesis based on this paradigm and the model of semantic priming, we advanced the general hypothesis: the activation of the noetic perspective, causing a stimulation of the associated cognitive network, speeds up the processing of the related content.

EXPERIMENT 1

Hypotheses

We formulated two hypotheses: (1) the activation of the noetic perspective leads to faster recognition of noetic than non-noetic words (the effect of stimulus); (2) when the noetic perspective is activated, the recognition of noetic words is faster than it is without such activation (the effect of manipulation).

Participants

A sample of university students were selected from the Institute of Psychology at the University of Gdańsk, Poland ($N = 60$), 54 of whom were women and 6 were men. The average age was $M = 21.57$ ($SD = 1.79$). Both the experimental group and the control group consisted of 30 people.

Measures and Procedure

The experiment was performed in a 2 x 3 design (manipulation: noetic perspective activation, no activation x stimulus: noetic, non-noetic, non-word). In the first step we activated the noetic perspective derived from Piedmont's (1999)

definition of spirituality: "Imagine that you are part of humanity and that you are connected with all nature. Please, describe how you feel and understand your unity with humanity, nature, or universe." Every person responded to the instruction in writing for a few minutes. In the control group, participants described their typical morning and preparations to leave for school or work. In each group there were 30 people (working on 16 computers at a time). In the next step, every person followed the instructions on the computer, completing the task in the LDT procedure (*lexical decision task*; Meyer & Schvaneveldt, 1971) – making decisions about noetic vs. non-noetic words. The experiment was performed by an academic teacher.

The words, related in their content to the activated noetic perspective, were selected on the basis of earlier experiments by Meier et al. (2007), who have demonstrated that spirituality tends to be associated with abstract words pertaining to height and brightness. We selected the following expressions: *wright*, *master*, *high*, *almighty*, *creator* (Meier et al., 2007). Two other words were chosen on the basis of Piedmont's (1999) theory: *connectedness* and *universality*. In addition, we also included the three values of existence, present in the works of Maslow (1964), namely: love, beauty, and goodness. It should be noted that the selection of content included directly in the manipulation (such as: unity, humanity, wildlife, nature, universe, fragment, entirety) would have defeated the purpose, as the time of lexical decision would have been influenced mainly by *priming* with the same words. The set of context words (non-noetic) was made up of: trip, present, flowers, money, chocolate, biscuit, correspondence, birthday, holiday, and beach. The set of non-words was made up of the following clusters of letters: belcfwkt, meksafwxot, actesokf, okprefbon, limnb, kwtbsol, ywtanklobtfakm, kiltsimk, iktyfb, and ekytmib. All the stimuli employed in the experiment were balanced as to affect evaluation (assessment by independent raters[1]), frequency, and the number of letters (the non-words selected were also of a certain length).

The assessment of the duration of noetic perspective-related content processing was carried out in a computer task, constructed according to the LDT paradigm, and based on the descriptions by Lepore and Brown (2002). The task consisted of two sections: training (6 samples) and specific (72 samples). The specific section included words appearing in a random order and belonging to three categories: activated (briefly referred to as noetic), unactivated (context-based – i.e., non-noetic), and non-words. Each word stimulus, displayed for 250 milliseconds, was preceded by a fixation point displayed on the screen for 700

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[1] Kendall's *W* was .71

milliseconds. As soon as any of the letter stimuli appeared, the participant had to take a decision whether the row of letters displayed was a word or not, by selecting an appropriately marked key on the keyboard: Yes/No. Immediately afterwards, another fixation point would appear. The length of time in which the lexical decision was taken was measured with the use of high-quality computers (CPU 2.4 MHz, 2 GB RAM; 15.4 inch monitor, 8 ms matrix reaction time) and Inquisit Web program, version 3.0.4.0 (2010).

Results

Analyses were performed on data resulting from the correct responses of the participants. The error rate was 8.9%. Removed response times that were greater than three standard deviations in the relevant set of measurements – consequently omitted from 90 measurements (about 2.5%). Thus prepared, data were logarithmized and, in this form, they were analyzed statistically, but the graphs show the untransformed values in milliseconds (cf. Ferguson & Bargh, 2004).

In order to check the impact of noetic perspective activation on lexical decision time, two-way *ANCOVA* was performed in the mixed 2 x 3 design (manipulation: activation of the noetic perspective, no activation x type of stimulus: noetic, non-noetic, non-word), using two demographic variables as covariates: age and gender). The statistical control of age was due to the relationship of this variable with the response time, while the statistical control of gender was implemented because of the unequal representation of each of them in the sample (preventing the introduction of gender as a factor). A significant main effect of manipulation was obtained, $F(1, 56) = 4.71$, $p < .05$, $\eta^2 = .08$, which showed that in the condition of noetic perspective activation the average response time was longer ($M = 278.47$ ms, $SD = 104.32$) than in the control condition ($M = 228.61$, $SD = 65.82$). The interpretation of this effect was limited by significant interaction, $F(2, 55) = 4.75$, $p < .05$, $\eta^2 = .15$, but the pattern of means did not confirm the expected pattern (Figure 1).

A post hoc analysis of simple main effects (with Bonferroni correction) showed that in the experimental condition the average response time to noetic words ($M = 267.61$, $SD = 115.62$) was longer than the response time to the non-noetic words ($M = 238.89$, $SD = 95.85$, $p < .005$) as well as longer than the response time to the words of the same (noetic) category measured in the control condition ($M = 211.21$, $SD = 73.77$, $p < .005$).

The results were contrary to expectations. The difference in response times to non-noetic stimuli did not occur between research conditions, but non-words

were recognized more slowly after the activation of the noetic perspective than in the absence of such activation (respectively: $M = 328.90$ and $M = 262.58$, $p < .05$). In the control condition, noetic words were recognized just as fast as fast as non-noetic words. Non-words in both conditions were recognized more slowly than words from the other categories, but this effect is typical of the LDT procedure.
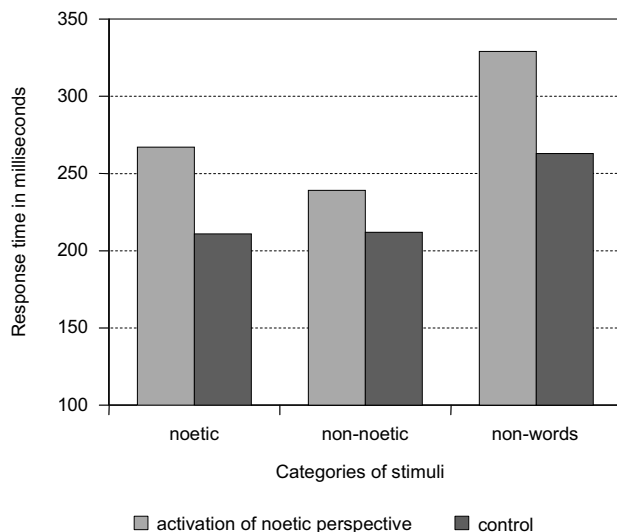

Figure 1. Experiment 1. Lexical decision time to the words of three categories depending on the activation of the noetic perspective or lack thereof.

Discussion

The results showed that the activation of the noetic perspective changes the time of processing the contents semantically related to this perspective. It turned out, however, that the activation does not lead to a reduction but to an extension of the time of response to the activated contents. Also inexplicable was the extension of response time to non-words after noetic perspective activation.

Noetic contents are highly abstract; the nodes representing concepts are located high up in the hierarchy of the semantic net. But the longer time of lexical decisions to noetic than non-noetic words in the experimental condition cannot be explained by the slower processing of abstract categories in comparison to the faster processing of concrete categories (Klatzky & Ryan, 1978) – because there

was no difference in response time between these two categories in the control condition.

For the same reasons, the results cannot be explained by the phenomenon of ambiguity versus typicality of words from the categories of noetic versus non-noetic, although it is true that the former – for example, love or goodness – are used in many different contexts and are associated with a number of concepts (which may result in a weaker activation of more extensive cognitive networks – see Joordens & Besner, 1994).

So, perhaps after the activation of the noetic perspective noetic content is processed more deeply than non-noetic content. It has already been shown that a strong activation of abstract and ambiguous concepts can be accompanied by an analysis of the meaning of the stimulation. Analysis of meaning can be seen as a partially controlled process. Processes of this type are inherently slower than processes to a large extent automatic (such as the "pure" distinguishing of words from non-words). The maximizing of response time occurs when the operation requires control or coordination (cf. Moors & De Houwer, 2006).

Analysis of the meaning of information could start the process of elaborative rehearsal – in particular, to analyze the relationship between the input data and the data stored in long-term memory (Morris, Brandsford, & Franks, 1977). Perhaps the processing of noetic content, deep because of their importance for the participants (analogously to the deeper processing of contents related to the Self), was even deeper due to the noetic perspective. The effect of this deeper processing should be a better memory of contents semantically associated with the activation (see Nęcka, Orzechowski, & Szymura, 2006). Thus, participants should memorize more words semantically related to the activated category than words from the other, similarly abstract category.

So, if the activation of the noetic perspective leads to a deeper processing of associated content, and given fact that deeper processing is often longer (cf. Craik & Lockhart, 1972), lexical decision times to noetic words should be extended. In the next experiment, we verified the truth of the assumption about the deeper processing of noetic content, referring to the process of memory. In order to eliminate the difference in the levels of abstraction between the two categories, which might have an impact on memory, the noetic words (the same as in Experiment 1) were matched by a selection of comparably abstract non--noetic words (based on assessment by competent raters – 10 students of psychology). Alignment in terms of abstraction was also supposed to eliminate a possible source of artifacts when measuring lexical decision time in the LDT procedure. Perhaps the difference in typicality between categories (including

non-words) is revealed by a change in processing time only in the experimental condition (when processing becomes less automatic and more resource-intensive).

Besides the typical, cognitive effects of the activation of the noetic perspective (i.e., memory resulting from the depth of processing, or the speed of association – matching – manifested in the LDT procedure) also we decided to control the affective effects. According to reports on the effects of spiritual practices, a sense of oneness with nature, the universe, and humanity can be manifested in positive affective states. It is known that the emotions increase the alertness of attention and direct attentional resources to the source of emotions (Constantine, McNally, & Hornig, 2011). This phenomenon results in a better remembering of affective stimuli (Christianson & Sven-Ake, 1992; Labar & Phelps, 1998). But should it manifest itself in the extension of reaction time to the "noetic" content? In other words, does the positive experience of transcendence, causing (possibly) the mobilization of cognitive resources and deepening the attention during the processing of noetic content, also change the automatic reaction to the same content in the LDT into the controlled reaction and thus increase the response time?

In Experiment 2, a straightforward answer to this question was not possible because the assessment of respondents' affect towards the selected noetic words would have interfered with the estimate of their remembrance. Therefore, an indirect way of measuring was chosen – we examined whether manipulation by the feeling of unity with the whole of existence manifested itself in a preference for photographs of the cosmos, people, and nature (as compared to other pictures – e.g., ones of urban areas).

EXPERIMENT 2

Hypotheses

We verified the main hypothesis that the activation of the noetic perspective leads (1) to a better memory of noetic than non-noetic words and (2) to a better memory of noetic words than without such activation.

Participants

A sample of university students were selected from the Institute of Psychology at the University of Gdańsk, in Poland ($N = 60$), 48 of whom were women

and 12 were men. The average age was $M = 20.78$ ($SD = 3.02$). Both the experimental and the control group consisted of 30 people.

Measures and Procedure

The experiment was performed in a 2 x 3 design (manipulation: noetic perspective activation, no activation x stimulus: noetic, non-noetic, non-word), by the same academic teacher who carried out Experiment 1. The set of context words (non-noetic) was different from the one in Experiment 1 and made up of: elasticity, value, ability, color, shape, symmetry, geometry, recreation, personality, chariness (words equally abstract as noetic words). All stimuli employed in the experiment were balanced as to the affect value (assessed by independent raters[2]), frequency, and the number of letters.

In the second part of the experiment, after the lexical decision task, participants reported their liking for randomly presented pictures: universe (5 pictures), nature (7 pictures), people (7 pictures), and industrial cities (11 pictures). All pictures came from the *International Affective Picture System* database (IAPS; Lang, Bradley, & Cuthbert, 1999) and were balanced as to the affect value[3]. Every person evaluated how attractive each picture was for her/him on a scale from 1 (*not attractive*) to 10 (*very attractive*). Picture evaluation was treated both as a distracter before the recognition task and as a measure of affect activated after manipulation (it was hypothesized that people with activated universality or connectedness would prefer pictures of nature, universe, or people rather than urban areas).

The last step was the memory task. Participants followed the instruction: "Please write all the words and non-words that you remember from the computer task." The number of words remembered (that is, correctly written) by participants was the indicator of the depth of information processing.

Results

We made the same screening of time measurements of lexical decisions as in Experiment 1. The overall error rate was 9.6%. The effect of removal of time values higher than three standard deviations above the average was the loss of 17 measurements (about 0.5%).

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[2] Kendall's concordance coefficient of the raters (10 randomly selected students of psychology) was $W = .71$.

[3] Kendall's $W = .63$.

As in Experiment 1, we conducted a two-way *ANCOVA* in a mixed 2 x 3 design (manipulation: activation of noetic perspective, no activation x type of stimulus: noetic, non-noetic, non-word) with covariates: age and gender. The dependent variable was the logarithmized time of lexical decisions. The analysis did not reveal any significant effects (in addition to the typical long response to non-words).

Then, we analyzed the attractiveness of the pictorial stimuli of four presented categories: cosmos, nature, people, urban agglomerations. Two-way *ANOVA*[4] was conducted in a mixed 2 x 4 design (manipulation: activation of noetic perspective, no activation x pictorial stimulus category). We obtained a significant main effect of stimulus type: $F(3, 57) = 49.90$, $p < .001$, $\eta^2 = .71$. Pair-wise comparisons (with Bonferroni correction) showed that the rate of liking was the highest for images of nature ($M = 7.86$, $SD = 1.41$), slightly lower for images of space ($M = 6.98$, $SD = 2.01$) and people ($M = 6.31$, $SD = 2.09$), and the lowest for urban areas ($M = 4.96$, $SD = 1.70$). Among all of these groups, the average ratings of stimuli significantly differed ($p < .001$). The main effect of the manipulation did not appear ($F < 1$), but the expected effect of interaction appeared: $F(3, 57) = 3.55$, $p < .05$, $\eta^2 = .16$. This is illustrated in Figure 2.
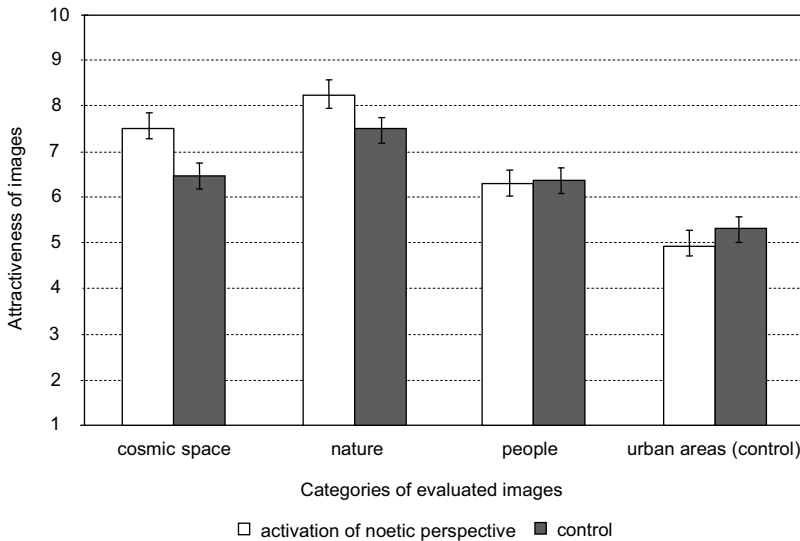

Figure 2. Experiment 2. Affective attitude (on a scale from 1 to 10) to the presented images of cosmic space, nature, people, and urban areas depending on the activation of the noetic perspective or lack thereof.

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[4] Analysis of covariance in an identical design but with age and gender as covariates does not change the significance of the relationships described below.

The analysis of the sources of interaction showed that the statistically significant differences between the activation and the lack of activation of the noetic perspective occurred for stimuli depicting cosmic space (activation: $M = 7.45$, $SD = 1.89$, control: $M = 6.48$, $SD = 2.03$, $t(59) = 1.98$, $p < .05$, $d = 0.52$) and nature (respectively: $M = 8.24$, $SD = 1.40$ and $M = 7.49$, $SD = 1.33$, $t(59) = 2.13$, $p < .05$, $d = 0.55$), which is consistent with the expected direction of the relationship; but in the case of images from two other categories (people: activation of $M = 6.25$, $SD = 2.24$, and the control group $M = 6.36$, $SD = 1.76$; city: activation of the $M = 4.62$, $SD = 1.86$, and the control group $M = 5.30$, $SD = 1.47$), there were no differences ($p < 1$). In addition, regardless of the manipulation, the urban images were rated significantly lower than other stimuli ($p < .001$).

Another analyzed dependent variable was the number of words correctly remembered by the participants during the LDT procedure. It was expected that in the experimental condition participants would remember (1) more noetic that non-noetic words and (2) more noetic words than in the control condition. In order to verify these hypotheses, two-way *ANCOVA* was performed in the mixed 2 x 2 design (manipulation: activation of noetic perspective, no activation x type of the stored stimulus: noetic, non-noetic) with covariates: age and gender. The analysis revealed only a significant interaction effect of manipulation and stored stimulus type: $F(1, 56) = 18.83$, $p < .001$, $\eta^2 = .20$, which confirms the hypotheses (continuous and dotted (---) line in Figure 3).

The post hoc analysis[5] of simple main effects (with Bonferroni correction) showed that in the experimental condition the average number of noetic words correctly remembered was significantly higher ($M = 4.49$, $SD = 1.43$) than the corresponding average in the control condition ($M = 3.10$, $p < .001$), while no difference was observed between the conditions when the number of stored non--noetic words was analyzed (respectively: $M = 1.14$, $SD = 1.13$ and $M = 1.48$, $SD = 1.57$, $t < 1$). The analysis of the following two simple main effects showed that in the activation condition significantly more noetic than non-noetic words were remembered ($p < .001$). More noetic than non-noetic words were also remembered in the control condition ($p < .001$).

Discussion

The results of Experiment 2 are not a replication of the results of Experiment 1, which suggested the extension of reaction time as a result of manipula-

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[5] Despite the comparisons that had been planned, a *t*-test was not carried out in view of the covariates introduced.

tion. There was also no effect of shortening the lexical decisions, typical for the LDT procedure. However, no LDT effect should be discussed any longer because the results suggest the existence of two processes that may manifest themselves in the deepening of the processing of noetic content.

The first of these supposed processes is the deepening of the processing of noetic content that is cognitive in nature. The noetic perspective, giving the Self more importance or at least a different kind of importance (i.e., expanding the Self by making it part of a larger whole) and activating transcendent concepts, probably triggers the analysis of the meaning of the stimulation. In this way, the noetic perspective evokes a process more strongly controlled than a simple distinction between words and non-words. Deeper processing of (noetic) content is accompanied by greater consolidation of its memory traces (see Craik & Tulving, 1975).

The second of the processes that would result in a deepening of the processing of noetic content is affective in nature. Designing Experiment 2, we suspected that the activation of the noetic perspective, resulting in a pleasant feeling of unity with the greater whole will also positively affect the objects representing the whole. The revealed differences in the attractiveness of images of space and nature between the experimental and control condition confirmed this assumption. However, the absence of such differences when assessing the attractiveness of photographs of people may indicate that the respondents did not treat these people as "mankind" but as concrete objects (analyzing the details of their physiognomy). Perhaps the noetic perspective corresponds more with abstract than with concrete content – and perhaps it would have been enough to replace the images of specific individuals with images of the crowd to obtain a result such as that obtained for cosmos and nature pictures. It is also possible that our relationship with nature and the universe is felt to be easier than the bond of humanity. However, the result shows that positive affect diffuses into certain objects as a result of the manipulation of the noetic perspective. We might guess that it also diffuses into noetic words (which could not be checked in the experiment together with the study of memory). Therefore, the affect assigned to noetic content would have been another contribution to the more attentive processing of this content. But there is no reason to believe that attentive processing under the influence of affect is associated with increased reaction time (because the emotional reactions to the affective source are often accelerated).

The two likely sources of the deepening noetic content processing, disclosed in Experiment 2, are indicated by a change in the conditions of a typical LDT procedure (where the allocation of resources is meant to be similar for each cate-

gory of words and lexical decisions are based mainly on automatic reactions). To make the test conditions more similar to the typical LDT procedure, we conducted Experiment 3.

Noetic content tends to be processed more deeply, even without activating the noetic perspective – perhaps because of its importance for the participants – as evidenced by its being better remembered than non-noetic content also in the control group. It is possible that it is simply easier to remember than words from the non-noetic category (despite the alignment of the two categories in terms of the level of abstraction, the number of letters, affect, and frequency) and the depth of processing is not a big part of it. Such reasoning, however, contradicts the lack of the main effect of categories in Experiment 2, and the difference between the memory of noetic and non-noetic words becomes apparent only in each group of manipulation separately. In the experimental group the reason for this difference is probably the manipulation, whereas in the control group (where the effect is weaker) the difference may be due to the importance of noetic content and, consequently, to the concentration of attention on this content.

What may be of great significance is the person conducting the experiment (an academic teacher), who makes the study seem more important and, in effect, encourages the use of unique manipulation ("spiritual" or "spirituality" are often regarded in academic circles as synonyms of irrationality). So, maybe the "importance" of the person conducting the experiment, and, consequently, the importance of the whole experimental situation, interacts with the perceived importance of the noetic content – for example, by making participants focus on this content.

EXPERIMENT 3

Hypotheses

We tested the same hypotheses as those stated in Experiment 1.

Participants

A sample of university students was selected from the Institute of Psychology at the University of Gdańsk, Poland ($N = 66$), 58 of whom were women and 8 were men. The average age was $M = 21.29$, $SD = 2.52$). Both experimental and control group consisted of 33 people.

Measures and Procedure

Experiment 3 was a copy of Experiment 2, with two differences. The first difference was connected with the experimenter. Instead of an academic teacher, this role was assumed by a student, who would gather up a random group of participants (fellow students) by promising them extra course credits for participation. It had been assumed that a decline in the importance of the experiment would also weaken the participants' involvement in the manipulation (thus preventing automatic responses from being changed into controlled processes), at the same time retaining the essential condition of the LDT procedure (i.e., the arousal of a category not burdened by affect). The second difference from the previous experiment lay in reverting to concrete instead of abstract words in the set of non-noetic words. This change was implemented in order to reduce the difference obtained in Experiment 2 between remembering noetic and non-noetic words in the control group –neutral concrete words were assumed to be easier to remember than neutral abstract words (and equally well memorized as noetic words).

Results and Discussion

First, we analyzed the effects of memory. As in Experiment 2, analysis of variance for the dependent variable (the number of memorized words) did not show any effects. The results are compared with those of Experiment 2 in Figure 3, calling the participants in Experiment 3 *non-involved* (as opposed to the participants in Experiment 2, who are called *involved*). The smaller involvement in the procedure of the participants in Experiment 3 resulted in their weaker memory of noetic words compared to Experiment 2 (we do not compare words from the non-noetic category because in each experiment we used a different set). In the "non-involved" group the lines representing the experimental and control conditions are the same, which indicates a lack of influence of the manipulation on the memory – both categories of words were processed in a manner equally deep (or rather equally shallow) in the condition involving the activation of the noetic perspective and without such activation. In addition, in both conditions there were negligible differences between the memory of noetic and non-noetic words, which is probably the result of non-noetic words being easier to remember (less abstract) than in Experiment 2. To sum up – in Experiment 3 we obtained conditions in which the effect of deeper processing of noetic content was eliminated.
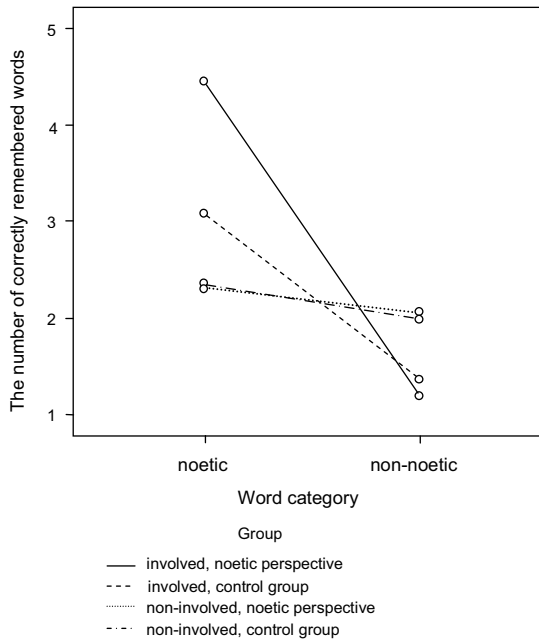
Figure 3. Experiment 2 (group called "involved") and 3 (group called "non-involved"). The memory of words from the noetic and non-noetic categories depending on the activation of the noetic perspective or lack thereof.

In the next step, affect towards images of space, nature, people and urban areas was examined. As in Experiment 2, analysis of variance for the dependent variable (preference for pictures) did not show any significant effects. Thus, the experimental manipulation did not induce a specific affect towards noetic content and did not, in this way, cause its more attentive processing. In the absence of the impact of the two factors that may change the terms of LDT procedure, we examined lexical decision time, returning to the hypotheses advanced at the outset of the series of studies.

Two-way *ANCOVA* in the mixed 2 x 3 design (manipulation: activation of noetic perspective, no activation x type of stimulus: noetic, non-noetic, non-word) with covariates: age and sex, was performed for the dependent variable: lexical decision time – and revealed only an effect of interaction of the manipulation condition and the type of stimulus, the effect being on the verge of significance: $F(2, 61) = 2.41$, $p = .09$, $\eta^2 = .07$ (Figure 4).
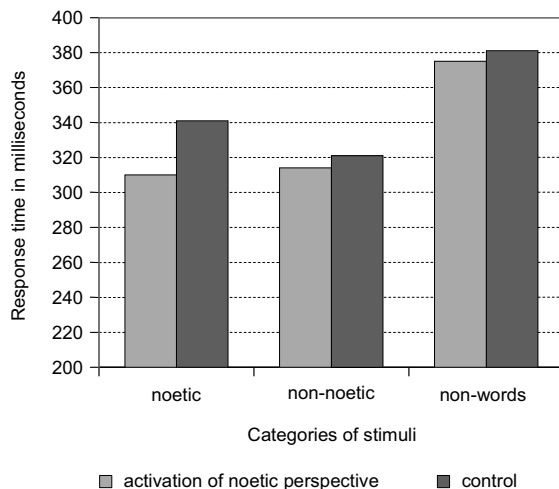
Figure 4. Experiment 3. Lexical decision time to the words of three categories depending on the activation of the noetic perspective or lack thereof.

A post hoc analysis of simple main effects showed that the lexical decision time was shorter for noetic words after the activation of the noetic perspective ($M = 309.73$, $SD = 18.02$, $p < .05$) than in the absence of such activation ($M = = 34.40$, $SD = 18.01$). This is a result consistent with Hypothesis 2, advanced at the outset of research on the LDT procedure, confirming the activation of category (noetic) as a result of manipulation.

However, the activation of the noetic perspective did not result in a response time difference between noetic and non-noetic words ($M = 314.27$, $SD = 15.77$). Perhaps this lack of difference, predicted by Hypothesis 1 stems from the fact that non-noetic words, this time less abstract than noetic words, were easily recognized as words – this conclusion is supported by the obtained difference between the (longer) time of lexical decisions to noetic words and (shorter) time of these decisions to non-noetic words ($M = 320.74$, $SD = 15.77$, $p < .05$) in the control condition. Thus, the equality of the levels of remembering noetic and non-noetic words in the control (and experimental) condition visible in Figure 3 was obtained at the expense of difference in word recognition rates between these two categories. Abstract, noetic words are perhaps more difficult to remember than concrete, non-noetic words. The memory of the former is likely to be supported by their importance; this is not, however, directly associated with their being recognized as words.

We decided to show the dependence of the time of lexical decision to noetic words on the depth of processing of these words and on the activation of the noetic perspective. For this purpose, we constructed an index of difference between the number of noetic words correctly remembered and the number of correctly remembered non-noetic words. The sheer number of memorized noetic words does not show much about the depth of noetic content processing at the moment, because this number is also dependent on the participant's memory efficiency. So, the indicator shows what makes the remembering of noetic words better than the remembering of words qualified as typical and is a relativized measure of the depth of processing of the former. The higher the ratio, the more deeply noetic words were processed (compared to non-noetic words). This ratio is called the memory advantage of noetic words over typical words – in brief: *storage advantage.*

Hierarchical regression analysis was performed by entering age and gender as demographic variables in the first step in order to control them, manipulation and storage advantage in the second step as predictors, and, in the third step, the interaction of manipulation and storage advantage (as the Cartesian product of standardized measures of these variables – Aiken & West, 1991). The results of this analysis are presented in the right part of Table 1.

Table 1

The Summary of Two Hierarchical Regression Analyses, Predicting Lexical Decision Time on the Basis of: 1) Manipulation by the Activation of the Noetic Perspective, 2) the Memory Advantage of Noetic Words Over Typical Words, and 3) the Interaction of Variables 1 and 2

Predictors	Experiment 2			Experiment 3		
	Step 1 β	Step 2 β	Step 3 β	Step 1 β	Step 2 β	Step 3 β
Step 1: Controlled variables:						
Age	-.13	-.12	-.23	-.14	-.18	-.16
Sex	-.14	-.13	-.14	-.03	-.05	.01
Step 2: Independent variables:						
Manipulation		-.03	.03		.21#	.20#
Storage advantage		-.01	-.86*		.17	1.05*
Step 3: Interaction:						
Manipulation x Storage adv.			.93*			-.92*
Adjusted R^2	.00	-.04	.02	-.01	.04	.10*
ΔR^2	.03	.00	.07*	.02	.08#	.07*

**$p < .01$, *$p < .05$, #$p < .1$

The significance of storage advantage is qualified by the interaction of storage advantage and manipulation (Figure 5).
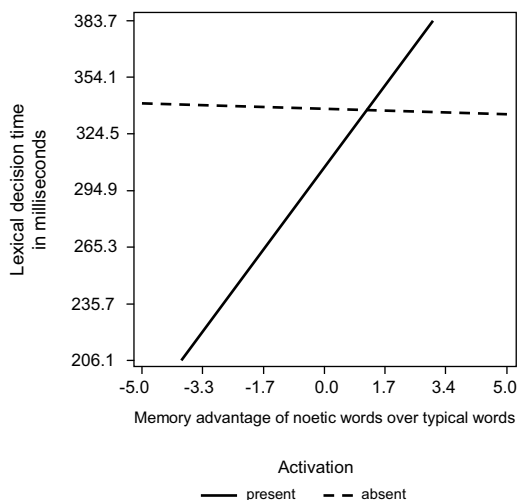

Figure 5. Experiment 3. The interaction of noetic perspective activation and the memory advantage of noetic words over typical words in the explaining lexical decision time to the noetic words.

When the noetic perspective was activated, the higher the memory advantage of noetic words over non-noetic words was, i.e., the (relatively) more deeply noetic contents were processed, the longer the lexical decisions about them took (the skewness of the regression line in the activation condition is significant: $\beta = .07$, $t(60) = 2.66$, $p < .01$). However, in the absence of activation of the noetic perspective, the relationship between the depth of processing of noetic words and the time of their recognition as words was not significant. Note that, as predicted by Hypothesis 2, faster lexical decisions on noetic words as a result of experimental manipulation took place only when the advantage of the depth of processing of noetic words over typical words was not excessive – so when the processing of noetic words was not much different from the typical processing (regression lines intersect at a point close to the 0 of the x-axis). Thus, Hypothesis 2 was confirmed when the processing of noetic content in the LDT procedure was not in-depth. The situation turned to be inconsistent with Hypothesis 2 in participants who processed noetic content relatively deeply (which – according to the position of the average – occurs in Experiment 3 only in a few cases due to reducing the involvement of the respondents in the manipulation).

For comparison, the same regression analysis was performed for the data from Experiment 2 (left side of Table 1). Here, too, the significance of storage advantage in predicting the response time in LDT is qualified by a significant interaction of storage advantage and manipulation (Figure 6).
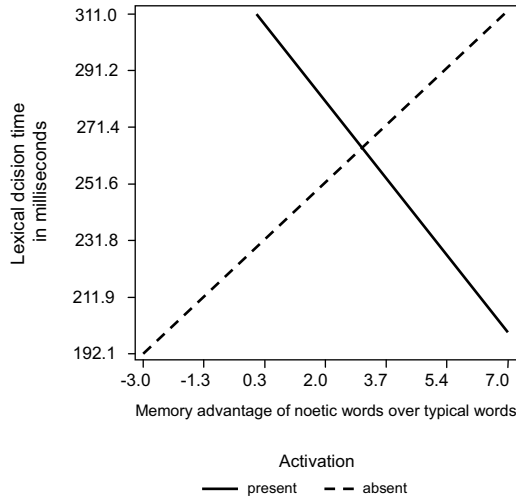

Figure 6. Experiment 2. The interaction of noetic perspective activation and the memory advantage of noetic words over typical words in explaining lexical decision time to noetic words.

However, this interaction is different in nature than that in Experiment 3. The skewness of the two regression lines only verges on significance (for the manipulation condition $p = .09$ and for the absence of manipulation $p = .07$ in one-tiled tests) and further detailed interpretation will be a kind of conjecture. However, we may be tempted to assume that after noetic perspective activation there is a tendency to shorten the lexical decision time to noetic words along with the increasing depth of their processing, and without the activation of noetic perspective we observe the inverse tendency. This prompts the suggestion that in Experiment 2 (and, earlier, in Experiment 1) we "overdid" the manipulation, or – more accurately – the concentration on noetic content, whose processing was too deep (and thus less automatic), compared to the assumption of LDT procedure. During the activation of the noetic perspective, the in-depth processing of the corresponding content was probably aided by positive affect assigned to that content. And affect provides the enhanced allocation of cognitive resources (now often understood as energy resources, the "fuel" for the processing – see Just,

Keller, & Cynkar, 2008). Thus, it is possible that this processing time is shortened rather than lengthened along with the deepening of the processing (as can be seen on the regression line, which represents the experimental condition). Along with the deepening of processing in the experiment, the level of positive affect actually increased. Although we did not directly measure the affect assigned to noetic words, a significant and positive correlation between the memory of noetic words and (averaged) affect assigned to the photographs of space, nature, and people in Experiment 2, $r(61) = .29$, $p < .05$, suggests this direction of interpretation (the correlation remains marginally significant in the manipulation group in Experiment 2, but is insignificant in Experiment 3: $r(66) = .05$, $p = .71$). Given that there is a relationship between the memory of noetic words and affect towards photos that are not very close in meaning to the words (which, on the other hand, suggests that the images of the cosmos and nature, like words such as "ascension," activate a common associative network), we should also expect a relationship between memory and affect towards the same, noetic words. In the absence of manipulation we cannot expect so significant affective, and thus energetic, support for the ongoing processes. However, even without manipulation a deeper processing of noetic content occurs due to the importance of the experimenter person, transferred to the perceived importance of the study and resulting in priming the type of content associated with the "sublime."

GENERAL DISCUSSION

The aim of the series of three studies was to show that it is a phenomenon typical for a man to possess a mental representation of spirituality. In other words, we wanted to show that the attention of people – regardless of religion – is involved in the spiritual phenomena and that they are an important area of human experience and thoughts. If so, there should be in the human memory a record corresponding to these experiences and reflections – that is, a cognitive schema, activated after the stimulation of any node, which encodes this kind of experience. We assumed that a good way to stimulate the scheme – resulting directly from the definition of spirituality – will be the experience of transcendence, a feeling of unity with the whole of existence, which we call the noetic perspective. The second objective of the experiment was therefore to demonstrate that the activation of the noetic perspective also stimulates the spiritual content.

At the outset it was assumed that evidence for such a paired activation can be obtained in a procedure based on the lexical decision paradigm. However, in Experiment 1, contrary to hypotheses, the activation of the noetic perspective did not accelerate but slowed down the processing of content assumed to be associated with the noetic perspective. In Experiment 2 it was shown that this (noetic) content is stored better (and thus processed more deeply) after noetic perspective activation than in the control condition, and in both of these conditions noetic content was remembered better than non-noetic content. In addition, the activation of the noetic perspective manifested itself by more positivity in the estimation of two groups of objects with which the participants "brought together" their Self in the manipulation – that is the cosmos and nature. These results suggest the alteration of the conditions of the typical LDT procedure – that is, in-depth processing of the words from the noetic category and assigning a positive affect to the noetic content as a result of manipulation. This fact forces us to resign from the assumptions of the LDT procedure and no longer expect results typical for LDT. Because according to the assumptions of this paradigm the words of the comparable categories should be processed similarly – the lexical decisions about them require mostly automatic (i.e., shallow) information processing. However, this fact does not interfere with the implementation of the main aim of the study – which was to show that the experience of transcendence activates a specific, cognitive schema of spirituality. It was assumed that the scheme includes concepts such as: brightness, perfection, grandeur, omnipotence, the creator, co-existence, harmony, love, beauty, or goodness. They are all positive and abstract. It is, however, not evident that the unity with the cosmos, with nature, or with the whole humanity would change the way of processing of these contents if they were not engraved in the memory in a close, meaning relationship with transcendence. The fact that the experience of transcendence results in a better memory (due to the expected deeper processing) of just these contents demonstrates the activation of these contents in the experience of transcendence – though not in the manner assumed at the outset.

But, not to ignore the LDT paradigm selected at the outset of research, we performed Experiment 3, in which the natural "power" of manipulation by transcendence and, in particular, the rank of the procedure was significantly reduced. Manipulation had no effect on memory improvement in the case of noetic words and did not cause a more positive affect to the related objects (space, nature, people), either. However, the manipulation proved to be sufficient to reduce the lexical decision time to the words from the noetic category (compared to the condition of absence of manipulation).

The presented studies have shown that the noetic perspective activates specific mental representations that exist in the human mind. Finally, it is worth emphasizing the universality of the issues of spirituality and the possibility of its scientific exploration: investigating the specificity of behaviors and of the psychological functioning of people experiencing the noetic perspective (regardless of religion) seems to be a cognitively important task of psychology, and one that provides major application opportunities.

LIMITATIONS
AND FUTURE RESEARCH

The major limitation of the study undertaken is the mismatch between the manipulation and the paradigm employed. Participants' involvement in the activation of the noetic perspective would most probably have changed the manner in which the perspective-related content were being processed in a manner unanticipated within this paradigm. It was not until involvement was reduced to a level at which it did not arouse positive affect and a deeper processing of "spiritual" content that it was possible to demonstrate that the noetic perspective can in fact bring about consequences analogous to typical *priming*. It should be noted, nevertheless, that this very reduction of involvement in manipulation is somewhat unnatural – relinquishing the noetic perspective's natural potential, by creating a distance to it in Experiment 3, in effect produced an impoverished version, very much as if the Spaceland manipulation were reduced to the rules of Flatland. Transcendence, in principle, is assumed to work without limitation. We have shown that it changes the way in which information is processed but we did not indicate (for obvious reasons) if or how these changes relate to life changes and, as this seems to be the most crucial aim of an individual who undertakes spiritual activity, it may also be an important direction for further research.

Another drawback of the experiments conducted is the problem concerning the selection of a context category for the set of noetic words. When both groups of words were brought to the same level of abstraction, the noetic words also proved to be more easily remembered under control conditions. On reverting to less abstract words (which are, in principle, easier to remember), it turned out that the reaction time had been shortened (in comparison to the noetic words) under control conditions. Despite this measure, the employment of two categories of equally abstract words would have been a better solution – at which point the correct verification of the first hypothesis in Experiment 3, advanced at the

start of the study, would have been possible (i.e., one drawing a comparison between the speed of decision concerning noetic and non-noetic words following the activation of the noetic perspective). A large disproportion in the ratio of women to men is another undisputed drawback of the study (hence sex was entered not as a variable but as a covariate), compounded by the involvement of psychology students (due to the lab's location at the Institute of Psychology). In the future, equal involvement of both sexes should be sought, so as to evaluate possible gender differences.

Subsequent experiments should also strive to consider individual differences, since in some individuals the noetic perspective may be more accessible than in others. Future studies may employ a replication of the results obtained through the participation of individuals classified on the basis of the spirituality scale (Piedmont, 1999). Additionally the stimulus words singled out according to the research by Meier et al. (1997) could be replaced with the traits describing a spiritual person according to Piedmont's (1999) theory. In this way, further experiments could be conducted along one paradigm, which would significantly facilitate the measurement of subtle variables. The next step in the research plan will involve an analysis of the broader consequences of the activation of the noetic perspective, for instance in the areas of well-being, behavior, and social relations.

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Appendix

Sample fragments of self-descriptions elicited in a group o participants after the activation of the noetic perspective (some self-descriptions took up an entire sheet of paper):

(a) *My unity with mankind, nature, and the universe manifests itself in the sense of symbiosis and complete harmony. At the same time, I complement the world that surrounds me. I experience this sense of unity as fulfillment; it guarantees happiness and self-realization.*

(b) *I experience unity with nature as unparalelled peace, a feeling of relaxation and joy thanks to the world, the nature that surrounds me, and other people. I feel that I can unwind and that I should respect nature because I am part of it, just like other creatures.*

(c) *I feel I am a creature who is a harmonious part of nature, and I am one with everything that surrounds me. I melt into all that.*

(d) *I am made up of atoms, as nearly everything in the universe. I eat and breathe the same as other creatures on Earth.*

(e) *All people are born and die. We all meet in different places. We live on the same planet Earth. We are surrounded by nature, by the same flowers and animals. We think and feel alike.*