VITAL ENERGY: THE DEVELOPMENT OF A CORE CONCEPT

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The present research was designed to investigate the development of vital energy reasoning. Previous research has demonstrated that children and adults reason about vitalistic causality in the domain of biology. However it is not clear if reasoning in terms of energy transfer/exchange (a component of vitalistic causality) is later recruited to explain phenomena in other domains of thought. The present study set out to investigate if vital energy reasoning is recruited to explain biological and psychological phenomena, and if this reasoning is further extended to explain transcendental and/or spiritual phenomena. Study 1 presented children and young adults from the USA with situations in which a character has either a biological (ex: sick) or psychological (ex: sad) condition. Participants judged whether a series of natural and social-psychological sources of vital energy could help the character improve their condition. Most of the participants had a similar pattern of response, associating energy transfer with biological conditions and natural sources. However there were some age differences when it came to children's judgments of the psychological conditions. Study 2 used a cross-national sample from Brazil and the USA, and examined whether reasoning about energy exchange/transfer is recruited to explain transcendental/spiritual processes. Young adults were presented with a hypothetical death scenario to see how they reason about the continuity of vital energy (psychological and biological) when the biological body ceases functioning. Participants from both nationalities were more likely to reason about a positive psychological vital energy transcending into an afterlife. Furthermore, participants were more likely to conceive this energy continuity as

attached to an identity, such as a soul or spirit. Findings also pointed to a relationship between people's alternative beliefs, such belief in an immanent religiosity, in alternative medicine, and in the supernatural, and their likelihood to assume a continuity of vital energy.

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PREFACE

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1.0 INTRODUCTION

The field of *Cognitive Science of Religion* (CSR) is centrally concerned with revealing the basic cognitive mechanisms that enable humans to develop religious beliefs and practices. In this quest, empirical work has strongly converged to study what constitutes the basic cognitive underpinnings that drive belief in supernatural concepts. A wealth of studies have pointed out that these beliefs are initially anchored in intuitive concepts, that later extend to supernatural practices and beliefs. Attention has focused on identifying the specific core intuitive concepts that are at the root of such supernatural ideas, borrowing heavily from a theory-theory theoretical approach (Barrett, 2000; Bering, 2006; Boyer, 2001).

More specifically, research in CSR is driven by the premise that ordinary (intuitive) concepts extend to supernatural concepts (Boyer, 2001). A wealth of literature investigating people's concepts of supernatural agency (such as ghosts and deities) points to an intuitive theory of mind underlying such ideas (Bloom, 2004; Bering & Parker, 2006). However, recent attention to the concept of *spirit* and *soul* has drawn awareness to yet other intuitive ideas grounding such concepts. Intuitions about essence may underlie an understanding of soul (Richert & Harris, 2006, 2008), and intuitions about vital energy may underlie ideas about spiritual energy (Roazzi, Nyhof, & Johnson, 2009).

The present paper focuses on examining the culture and development of people's conceptions of vital energy. Study 1 investigates whether reasoning about energy

exchange/transfer may be recruited in the biological and psychological domain, and how this takes place in the course of development. Study 2 examines whether reasoning about energy exchange/transfer is recruited to explain transcendental/spiritual processes. Studies draw a cross-national sample from Brazil and the USA. The research sheds some light on the issue of domain specificity of reasoning in terms of energy transfer/exchange and at the same time brings a developmental perspective on the similarities and differences across ages and cultures, pointing to how this reasoning process develops over time.

2.0 VITAL ENERGY AND THE COGNITIVE SCIENCE OF RELIGION

2.1 THEORY - THEORY

"Theory-theory" is a theoretical position holding that from early on children develop their everyday understanding of ordinary things and their causes by elaborating theories about the world, very much like scientists (Gopnick, 1996; Keil, 2006) but at an intuitive level. Intuitive theories emerge early in development and function to provide *domain specific, intuitive causal-explanatory* accounts of ordinary events in the world. They are termed intuitive because, unlike scientific theories, they are not elaborated with a level of awareness where evidence and theory are consciously accounted for. Intuitive theories are formed implicitly, that is, on the spot, without the person being aware of the mental processes involved in the making and justifying of that belief (Hodge, 2008).

Intuitive theories are reported to emerge early in development, organizing core domains of experience, mainly involving physical (knowledge of material objects), psychological (knowledge of intentional beings), and biological (knowledge of living things and their processes) kinds of explanation (Wellman & Gelman, 1998; Wellman & Inagaki, 1997). These domains are distinguished by their evolutionary significance and their centrality and ubiquity in human thought (Slaughter & Lyons, 2002).

Intuitive theories function to provide domain-specific causal explanations. Thus children explain psychological phenomena by making use of psychological causal relations, physical phenomena by making use of physical causal relations, and biological phenomena by making use of biological causal mechanisms (Gelman 2003, Hickling & Wellman 2001, Inagaki & Hatano, 2002). Being domain specific, causal-explanatory schemes used to explain phenomena in one domain will not be used to explain phenomena from another domain, thus physical causal relations will not be used to explain psychological phenomena, and vice-versa.

2.2 THEORETICAL POSITIONS IN CSR

Traditionally, social science research on religion predominantly focused on observing and describing the seemingly endless variety of religious beliefs and practices across cultures and throughout history. The CSR discipline has developed a different approach, leaning towards the study of shared cognitive mechanisms (Bering, 2002)

The core idea is that religious concepts are understood as being the natural product of ordinary cognitive processes. Barrett (2000) describes this perspective as the 'naturalness-of-religion thesis' claiming that 'religion is explained by *ordinary* cognition plus the exposure to an ordinary environment' (Barrett, 2000, p. 29). Thus the field of CSR is currently focused on three main issues: a) how people represent supernatural concepts, b) what are the intuitive cognitive foundations of these concepts and how they develop, and c) how these intuitive concepts are later recruited in different cultural contexts.

Early theoretical elaborations in CSR focused on understanding what ties all seemingly discrepant manifestations of religious beliefs and practices together. Towards this end, Pascal

Boyer (2001) claimed that diverse of religious beliefs and practices commonly appeal to the existence of supernatural agents. *Agents* are defined as beings that possess ordinary mental features, ordinary mental attributes such as desires, beliefs, memories, intentions, and expectations whereas *Supernatural Agents* (see Figure 1) are depicted as beings that possess these ordinary mental attributes, just like human agents, but also include characteristics that violate intuitive expectations of human agency, such as not possessing a physical body, or being able to fly and travel through walls. Boyer extends his claims by highlighting the attention grabbing potential of supernatural agents due to the fact that they violate basic expectations associated with our intuitive understanding of the world. Because agency is associated with mental characteristics, Boyer (2001) claimed "the *only* feature of humans that is *always* projected onto supernatural beings is the mind" (p. 163).

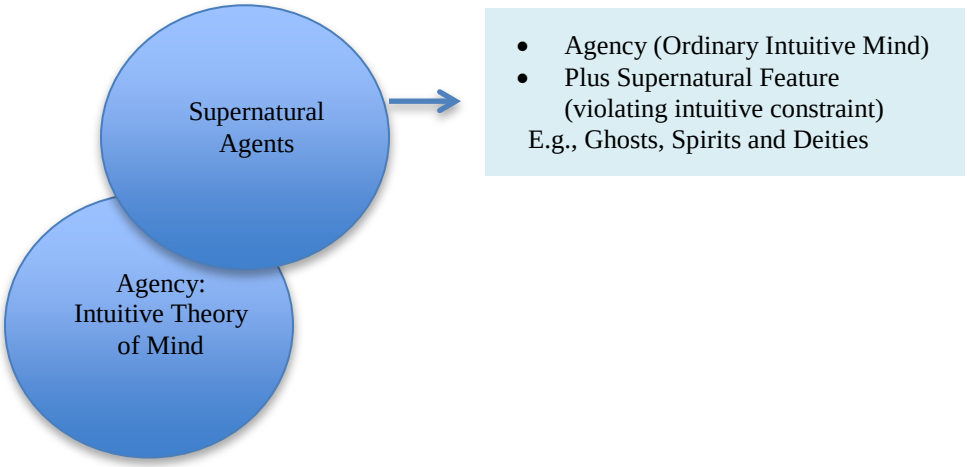

Figure 1: Diagram illustrating Pascal Boyer's description of supernatural agency

Cognitive anthropologists and empirical psychologists began to look at people's intuitions of supernatural agents such as God (Barrett & Keil, 1996), Ghosts (Bering, 2002; Harris & Gimenez, 2005) and Souls (Richert & Harris, 2006, 2008). An underlying common goal of these studies was to ascertain if in fact people's intuitions of these agents were being driven by an implicit theory of mind. A selection of these studies is reviewed in the following section.

2.2.1 It is all about mind: a case for an intuitive theory of mind

To illustrate work in CSR regarding people's intuitions about supernatural agents, empirical studies looking at the intuitions of children and adults concerning the afterlife are initially presented. This research most clearly illustrates how an intuitive theory of mind readily provides the basis for inferences about the afterlife, depicting how the conceptions of ordinary agents naturally lead to inferences about supernatural agents.

Bering and Bjorkland (2004) conducted a pioneering study of afterlife beliefs. They asked North American children and adults to watch a puppet show in which an alligator eats a brown/white mouse. The mouse was presented as having characteristics that are biological (eating, drinking water, growing up), psychobiological (thirst, hunger, feeling sleepy or sick), perceptual (e.g., hearing, tasting, smelling, sight), based on desire (e.g., wishing, wanting hoping), emotional (sad, angry, scared) and epistemic (thinking, believing, knowing). Following the puppet presentation, participants were questioned about the continuity versus discontinuity of these biological, psychobiological, perceptual, desire-based, emotional, and epistemic functions after the mouse was eaten by the alligator, thus after it had died.

Results indicated that younger children, between ages 4-6, tended to provide a stronger continuity pattern of responses, judging more frequently that all functions continue after the

mouse's death, while older children, between ages 6-8, and adults were more likely to infer the discontinuity of biological, psychobiological, and perceptual functioning in contrast to inferring the continuity of epistemic, emotional, and desire-based functioning. Thus, younger children's continuity answers appeared to be driven by their intuitions of mental kinds, leading them to attribute continuity of mental functioning after death. In contrast, the discontinuity answers given by older children and adults seemed to be guided by their explicit knowledge of biology, reflecting exposure to teaching about biological functioning and its implications regarding life sustainability. But with increase in biological understanding, the discontinuity reasoning of older children and adults was more likely to be applied to mental states that are obviously linked to the body (perceptual and psychobiological) than to other mental states that are easily detached from the body (epistemic, emotional, and desire-based).

These findings show that children and adults tend to infer the existence of mental functioning in agents even after their death, that is, even after they do not possess a functioning body. The degree and the selective mental properties that are projected may vary with age, but nevertheless, participants still inferred that the dead mouse held some sort of mental functioning after death.

In another study, Bering (2002) looked at how participants' explicit afterlife beliefs (i.e., extinctivist, agnostic, immortalist, reincarnationist, eclectic, and other believers) influence their intuitions of the continued functioning of biological, psychobiological, perceptual, desire-based, emotional, and epistemic states after death. In an interview designed to elicit intuitions, undergraduate students were questioned on whether a set of mental and biological properties continue after a character is killed in an accident. Results show that "those who believe in *some* form of life after death (and, to a certain extent, even those who do not) implicitly represent dead

agents' minds in the same way: psychobiological and perceptual states cease while emotional, desire, and epistemic states continue" (Bering, 2002, p. 263). Even participants that described themselves as "extinctivists" (i.e., personal consciousness ceases with death) showed a tendency to attribute more continuity to epistemic, emotional, and desire-based states, as compared to biological, psychobiological, and perceptual states. This study showcases how one's explicit ideas concerning the discontinuity of all functioning after death might be overridden by implicit intuitions inferring the continuity of some mental functioning after death.

In another line of research, Harris and Giménez (2005) have reported that people appear to commonly operate with two different perspectives about death; a secular perspective in which death involves the cessation of all bodily and mental functions, and a metaphysical perspective, in which death is conceived as a metamorphosis, where bodily life discontinues and a new life begins that is not constrained by biological processes. These different perspectives on death appear to be distinctly elicited in different contexts. Thus, Harris and Giménez presented two narratives (secular and religious) to a group of 7- and 11-year-olds, from a public school in an urban city in Spain. The secular narrative described the death of a grandparent in a secular/medical context and the religious narrative described death in a metaphysical/religious context. After each story, children were asked to judge and justify the functioning or non-functioning of various bodily and mental processes after the grandparent's death. Children were more likely to judge that certain processes continue after death when they were questioned in the context of the religious as opposed to the secular narrative. They were also more likely to claim that mental processes continue functioning after death as compared to bodily processes, regardless of the narratives presented. The results showed that both age groups hold a dual

conception of death as a biological endpoint on the one hand, and as a metaphysical transformation on the other.

To see if this pattern held up in a different cultural setting, Astuti and Harris (2008) conducted a similar study with Vezo tribes in rural Madagascar. They tested children, from 8- to 17-years-old, and adults from 19- to 71-years-old. Participants were presented with a secular (corpse) narrative and a religious (tomb) narrative, where a character dies. They were then asked whether bodily and mental processes continue after death. Participants often claimed that processes cease at death (discontinuity theory of death), however such claims were more frequent for bodily processes than mental processes, and more frequent among the secular narrative (i.e., the corpse narrative) than with the religious narrative (i.e., the tomb narrative). This pattern was consistent across the different age groups. Similar results were also reported by Roazzi, Dias, and Roazzi (2010) in a replication of this study in Brazil.

Literature looking at the reasoning of children and adults about the afterlife suggests that an implicit theory of mind underlies inferences they make about these supernatural agents. The evidence presented supports the view that human beings are naturally intuitive dualists. According to Bloom (2004), Cartesian dualism infers a crucial distinction between *res extensa*, our physiological machinery, and *res cogitans*, which refers to our minds and our thoughts. In other words, "we use our bodies to experience and act on the world, but we ourselves are not physical things, we are immaterial souls" (Bloom, 2004, p. 11). Bloom advances his argument by stating that we are natural Cartesians and that due to this fact dualistic thinking comes naturally to us, making us think of bodies and minds as distinct (Bloom, 2006). On this basis, concepts of soul and spirit are similarly viewed as essentially derivative of the concept of mind (Bering & Bjorkland, 2004; Bloom, 2004).

Cohen and Barrett (2008) take this argument a step further to give an account of spirit possession. They wanted to explore possible cognitive factors influencing the cross-cultural incidence of spirit possession concepts, to gain a more refined understanding of an intuitive mind-body dualism (Bloom, 2004) in terms of a supernatural kind of action. Towards this end, Cohen and Barrett (2008) looked at how English undergraduate students reason about the effects of a hypothetical mind-migration across a set of behaviors. These behaviors consisted of items that referred to physical/bodily attributes (e.g., appetite, strength, speed, visual acuity) contrasted with items not tightly anchored to particular physical attributes (e.g., appetite, strength, speed, visual acuity) contrasted with items not tightly anchored to particular physical attributes (e.g., math competency, sociability, emotionality). They presented participants with a set of hypothetical mind-transfer scenarios in which the mind of one person (A) is transferred into the body of another person (B), the host. Participants were asked to reason about the new post-transfer person's behavioral attributes. The results showed that the majority of participants reasoned that while the post-transfer person's performance on physical attributes (e.g., sprinting) would be similar to the host's (B), the performance on mental attributes (e.g., math) would be similar to the person whose mind had been transferred (A). Thus mental characteristics seem to be attributed to the incoming agent, while characteristics that are physical in any way are attributed to the host's body, implying that only distinctly "mental" attributes travel during the migration. Moreover, participants overwhelmingly inferred the mind to transfer completely (all or nothing) instead of partially. Thus one gets the whole mind as a package.

This data is consistent with Bloom's claim of Cartesian dualism since participants distinguished mental from bodily behaviors and aptitudes, transferring the mental, and not the bodily attributes. In addition, participants tended to infer a complete displacement of minds, such

that the post-transfer person's mental performance on mental task items was reasoned to be *identical* to incoming person's performance. On this basis, they hypothesize that *spirit* possession is naturally conceived as *mind* possession, consisting of a complete displacement of mind properties from one body to another.

In summary, the dominant view has been that the ontology of immaterial agents commonly emerges from an intuitive theory of mind. Considerable evidence reviewed above supports the view that human beings are naturally intuitive dualists, which provides the basis for imagining the possibility of mind as a mental-causal organization functioning independent of the physical-causal constraints of the body (Wellman & Johnson, 2008). On this basis, concepts of *soul* and *spirit* are viewed as essentially derivative of the concept of *mind* (Bering & Bjorkland, 2004; Bloom, 2004).

2.2.2 More than mind: a case for soul and spirit

In spite of the empirical evidence that points to a theory of mind as being the underlying intuitive base that drives inferences of supernatural agency, recent work in the field has suggested that there is something more than mind at the heart of religious conceptions.

This suggestion was first raised in studies on adults and children's intuitions of soul. The assumption in the field was that the concept of soul was basically grounded in an intuitive understanding of mind. Questioning this assumption, Richert and Harris (2006) compared children's inferences about the soul with their inferences about the mind and brain. They asked children how mind, brain, and soul are affected by a religious ritual (baptism) and how different kinds of functioning - cognitive, non-cognitive, and biological - would continue without the presence of the mind, brain, and soul. Their results indicate that children believed mind and brain

change and grow over time, in contrast, the soul remains constant and is devoted to predominantly, spiritual functions (i.e., moral purpose, connecting to the divine life-giving force both in life and afterlife, and love). In a second study, Richert and Harris (2008) explored adult's conceptions of the ontological and functional properties of the mind as compared to the soul. The existence of the mind was generally tied to the human lifecycle of conception, birth, growth, and death, and was primarily associated with cognitive (i.e., problem solving, thinking, telling right from wrong, memory) as opposed to spiritual functions (i.e., life force, afterlife, connection to higher power, spiritual essence). In contrast, the existence of the soul was less systematically tied to the lifecycle and frequently associated with spiritual as opposed to cognitive functions.

Based on their findings, Richert and Harris (2006, 2008) have argued that the concept of soul develops independently from the concept of mind, claiming that children and adults conceive of the soul more as the enduring essence of a person, while mind consists of changing mental competences.

Just as the concept of soul does not appear to reduce to the concept of mind, Roazzi et al. (2009) have proposed that the concept of spirit may have still other intuitive roots. Cohen and Barrett (2008), in their work on spirit possession argued that it is intuitively processed as a mind possession, thus equating mind with spirit. In contrast, Johnson (2008) argued that the concept of spirit originally refers to the vital force of life. In this account, spiritual ideas do not primarily emerge from concepts of mind and agency, but from concepts of life and energy. In this regard, the ordinary concept of "spirit" seems ambiguous, referring sometimes to life force and sometimes to supernatural agents, like ghosts.

To examine these differences Roazzi et al. (2009) tested adult's inferences about *mind* and *soul* as well as *spirit.* Their study was the first to compare intuitions about these three

concepts together in the context of considering how different cultures and religions may recruit similar or different intuitive ideas. Methodologically, the study was built on the hypothetical transplant/transfer methods employed in previous research (Cohen & Barrett, 2008; Johnson, 1990). Undergraduate students from Brazil, Indonesia, and the USA were presented with a series of conditions where one character's soul, mind, or spirit transfers to the other character's body. These different conditions involved the transfer of different attributes of human functioning - *cognitive*, *bodily*, *social*, and *moral*. Given the dual interpretation of spirit as being either an agent (mental kind) or a vital energy (vital kind), characters initially differed in either a *level of ability* (i.e., skill) or *level of passion* (i.e., energy) for the attribute being transferred. Participants were then asked to judge if the transfer yielded either a *complete*, *partial*, or *no transfer* of the highlighted attribute being measured. The results point to differences as well as considerable overlap of participants' conceptions of mind, soul and spirit, along with influences of culture and religion. Across countries, the mind tended to be more associated with ability and cognitive attributes, while soul and spirit were relatively more associated with passion and social and moral attributes. These findings are consistent with Richert and Harris (2006, 2008) who also reported evidence of the mind being more associated with cognitive abilities, while the soul was more associated with moral and spiritual qualities. In addition, soul and spirit were more distinctly related to religious influences. However, spirit was not distinctly associated with passion (energy). Instead, the data suggest that passion/energy is equally an integral part of concepts of mind, soul, and spirit. The authors concluded that the three disembodied entities - soul, mind, and spirit - held both a mental dimension and an energy dimension.

These findings, along with findings reported by Richert and Harris (2006, 2008), seem to point to a yet richer set of intuitive origins that involve not only a basic intuitive theory of mind, but also involve intuitions pertaining essence and energy.

The goal of this paper is to further examine the development of an intuitive understanding of vital energy (vitalism) further exploring how it extends to spiritual thinking. Roazzi et al. (2009) found that intuitions of energy do not necessarily hold a one-to-one correspondence to either mind, soul, or spirit. In addition, the authors indicate that their results were limited to the language terminology that they used, as they come to capture these terms. Furthermore, their measure of energy was limited, focusing only on an individual's personal engagement in a given activity.

Results yielded from Roazzi et al. (2009) raise deeper questions about what vital energy is, how it is conceptualized, and how it should be studied, thus calling for a more careful look at the concept of vital energy (versus spirit) as it is represented across cultures. The following is a short review of how this concept has been commonly represented across different historical and cultural contexts. This review will provide a basis for later consideration of the origins of this concept in early cognitive development.

3.0 VITAL ENERGY ACROSS TIME AND CULTURES

> The history of [different parts of] the world bears a striking resemblance. Even separated by a thousand years or ten thousand miles, people everywhere have realized that qì is the original substance from which the universe formed. It is the true origin of life. Tang Zheng Xu (in Zhang & Rose, 2001)

Concepts that refer to vital energy appear to be ancient and widespread across many cultures. The text above by Tang Zheng Xu makes reference to the pervasive nature of the Chinese concept of *ch'i (qì)*. In Chinese philosophy *ch'i* refers to an energetic fluid that vitalizes the body, especially the breath, which circulates outside us as the air (Wright & Eisenberg, 1995). The concept of *ch'i* dates back in the earliest manuscripts of Chinese history, and has a wide array of interpretations and usages (Zhang & Rose, 2001). Despite this variability, *ch'i* is recurrently referred to as a *breath* or *vapor*, as a *creative force*, as *divine flow*, that comes to embrace properties "which we would call physical, psychic, emotional, spiritual, numinous, and even mystic" (Schwartz, 1985). In everyday life, *ch'i* is to be cultivated and/or accumulated in order to achieve enlightenment and a long life (Zhang & Rose, 2001). As an example, breathing techniques, meditation and martial arts (such as Tai chi chuan) are ways in which one can heighten *ch'i* force. Comparable to the Chinese notion of *ch'i* is the Indian Ayurveda concept of *prana*, conceived as a vital, life-sustaining force of living beings that is believed to flow through a network of fine subtle channels in one's body (King, 1999). One can cultivate *prana* with the

practice of yoga, meditation, and breathing techniques. The Ayurveda representation of *prana* seems to endow it with properties that influence one's physical, mental, and spiritual well-being.

In Afro-Brazilian religions we find yet a different representation of the vital energy principle, named *axé*. African slaves that came from Yoruba traditions brought this concept to Brazil. It is defined as an invisible force that is magical and sacred and fundamental to all existence, both physical and spiritual (Cohen, 2007). *Axé* can be sowed, cultivated, shared, used (spent), and even renewed. To receive *axé*, means to incorporate material and symbolic representations of the vital principle both from a physical world (*aiye*) as well as its correlates from a spiritual world (*orun*), meaning there is always a constant interplay of *axé* between both worlds. In the physical world, *axé* is energy that can be found in the animal (e.g., human and animal blood), vegetable (e.g., *dendê* oil and honey), and mineral (e.g., copper, bronze, and gold) kingdoms. It can be transmitted via rituals in which elements from these kingdoms are manipulated, as well as transferred via speech, breath, and saliva (Neimark, 1993). Thus Afro-Brazilian religious groups, such as *Candomblé* and *Umbanda*, describe *axé* as a magical force that acts upon not only one's biological health, but also one's spiritual and psychological well-being.

Finally, in Inca culture, there are two terms referring to energy, *hucha*, a heavy, dense black energy, and *sami*, a high frequency, light, subtle energy that comes from being in harmony with the universe (Langevan, 2002). *Sami* permeates the natural world, animating all living beings and passing on 'power' to natural objects and places where it accumulates. An increased amount of *Sami* in one's body is correlated with a life of harmony and well-being with others and the natural world. *Hucha*, in contrast, is created by human beings, naturally accumulated through human action and interaction as well as through human emotions. Accumulation of

hucha energy is not desired because it negatively affects one's physical, emotional, mental, and spiritual states. As an example, when someone became sick they were thought to be full of *hucha*, acquired due to selfish attitudes. A high amount of *hucha* does not allow the flow of *sami* in one's body, leading the person to become physically sick. In this case, the energy of human agency (*hucha*) is sharply contrasted with vital energy (*sami*).

The examples above depict the different ways in which cultures appear to recruit thinking in terms of vital energy, thus generating these diverse representations. Consistent with CSR, the proposal here is that there is a common intuitive core underlying this variety of ideas. It is not clear what this common intuitive core is, but what can be drawn from these examples is that in spite of cultural diversity, people's concepts of vital energy are being elicited to understand/explain biological, psychological, and spiritual processes.

To advance further understanding of vital energy, theory and research need to target three core issues: a) What are the intuitive foundations of people's concept of vital energy? b) How do these concepts develop? c) How do different cultural environments affect the development of these intuitive ideas?

The first two issues target the underlying intuitive foundation of concepts of vital energy and its development. Literature looking at children's understanding of vital energy is limited, but points to vital energy as a core concept that is inherently part of the domain of intuitive, naïve biology.

4.0 THE DEVELOPMENT OF A CORE CONCEPT

Research on children's understanding of vital energy emerged in the field of cognitive development, specifically in literature looking at children's naïve biology. Two Japanese psychologists, Kayoko Inagaki and Giyoo Hatano, initiated this research agenda. In their investigations on how children reason in the domain of naïve biology, Inagaki and Hatano (2002) claimed that young children possess a causal-explanatory framework exclusively grounded in naïve biology. This causal-explanatory mechanism received the name of *vitalistic causality* and is portrayed as being an implicit or intuitive theory children come up with in order to explain biological phenomena. Vitalistic causality is made up of two core components: *organ intentionality* and the *transfer/flow of vital energy*. Research in the development of naïve biology anchored in vitalistic causality is reviewed.

4.1 NAÏVE BIOLOGY

Adopting a theory-theory theoretical approach, it is possible that a child's initial understanding of vital energy is part of an intuitive theory. Intuitive theories are made up of core concepts that specify causal relationships among a set of entities within a domain, enabling a child to acquire and integrate new knowledge (Morris, Taplin, & Gelman, 2000). Different intuitive theories

function to explain different kinds of phenomena - physical, biological and psychological (Hirschfield & Gelman, 1994).

Initial research on early reasoning in biology claimed that children do not possess naïve biology (Carey, 1985). Lacking knowledge about physiological mechanisms, Carey proposed that children under the age of 10 rely on *psychological causality* to explain biological phenomena. Thus, children reason that a person's intention causes a certain targeted biological phenomena (Hatano & Inagaki, 1994). Otherwise, Au and Romo (1999) later proposed that young children, make use of a *mechanical causal explanatory-framework* (rooted in children's understanding of the causality in the domain of physics) in explaining biological phenomena (Au & Romo, 1999). Because the mechanical explanation can be applied to both living and nonliving physical things (Inagaki & Hatano, 2002) it is not exclusive to the domain of biology. Thus, one position in the field has been that children initially lack a specific naïve domain of biology because their causal explanatory frameworks are being driven by their knowledge from either the domain of psychology (i.e., intuitive theory of mind) or from the domain of physics.

Inagaki and Hatano (2002) objected to this position, claiming that young children do in fact possess a causal-explanatory framework exclusively grounded in naïve biology. This causal-explanatory mechanism was called *vitalistic causality* and is portrayed as being an intuitive theory uniquely accounting for biological phenomena. Ideas derived from vitalistic causality consist of two components: a) Organ intentionality: biological phenomenon is caused by the activity of an internal organ, which has "agency" (a tendency to initiate and sustain behaviors); b) Transfer/flow of vital energy: this activity is usually described as a flow or exchange of vital force (Inagaki & Hatano, 1993). The authors further proposed that vitalistic causality emerges when children are reluctant to use intentional causality to explain biological

phenomena, but are still incapable of understanding mechanical biological causes (Inagaki & Hatano, 2002). Thus vitalistic causality would be an intermediate step in children's development of knowledge in the domain of biology. Studies looking at the development of vitalistic causality are reviewed; however given that the present study is focused on investigating vital energy and not vitalistic causality, it is the component of transfer/flow of vital energy that is of primary interest.

Inagaki and Hatano (1993) conducted a study (experiment 2) in Japan with 6- and 8-year-old children and adults, examining whether they would favor vitalistic over intentional causal explanations, and if over time, whether they would favor mechanical over vitalistic causal explanations. Participants were questioned about a series of biological phenomena, such as eating, breathing, blood circulation, feeling pain, urination, and having a baby. As an example, for the eating condition, children were asked "why do we eat food every day?" and were then presented with three types of explanations and asked to choose the one they thought was more plausible. The following three options were presented: a) because we want to eat tasty food (intentional); b) because our stomach takes in vital power from the food (vitalistic); or c) because we take the food into our body after its form is changed in the stomach and bowels (mechanical). Results revealed that the 6-year-olds chose vitalistic explanations more often, whereas, 8-year-olds and adults were more likely to favor mechanical explanations.

Because the 6-year-olds were more likely to accept vitalistic explanations over intentional ones, Inagaki & Hatano (1993) argued that these children already possessed a form of biological understanding differentiated from psychology (Inagaki & Hatano, 1993). The results also indicated that, with time, children start to increasingly endorse more mechanical explanations. This was an expected outcome due to enculturation and exposure to scientific

explanations for biological phenomena that are heavily anchored in mechanical causality (Hatano & Inagaki, 1994). However this data alone does not provide a strong argument for a naïve domain of biology because Japanese children are probably more exposed to ideas of vitalistic causality due to the concept of *ki* that is part of their culture. Studies in different cultural settings would have to provide similar results in order to provide a stronger claim.

To address this, Miller and Bartsch (1997) ran a similar study with English-speaking children, investigating whether American 6-year-olds were more likely to endorse vitalistic explanations over intentional and mechanical ones. However, instead of presenting the three causal explanations together, they presented them in pairs - vitalistic versus intentional, and, vitalistic versus mechanical. Their results matched the findings from Japanese children. American 6-year-olds were more likely to endorse vitalistic causal explanations over intentional ones for explaining biological phenomena. The authors claim that their data, along with Inagaki and Hatano (1993), provide strong support for arguing that children do conceive biology as a domain distinct from psychology (Miller & Bartsch, 1997).

Finally, Morris et al. (2000) investigated whether Australian children also favored vitalistic explanations. They built their study on Inagaki and Hatano's (1993) methodology, translating their instrument and adapting it for English speaking children (Experiment 1). Their results replicated data from Japanese children, where younger children were more likely to favor vitalism as an explanation of biological phenomena. The authors also tested whether children were more likely to endorse vitalistic causality as organ intentionality as opposed to vitalistic causality in terms of transfer of vital force (experiment 2), presenting both options. Their results demonstrated that western children were more likely to endorse vitalistic causality as transfer of vital force. Further, in a third experiment, the authors examined whether the results from

experiment 2 indicated a rejection of organ intentionality, or just a preference for energy transfer/flow. Children were asked to make judgments about organ intentionality and transfer/flow of energy separately. In this case, children chose both, though a preference for vitalism as transfer/flow of energy was still observed.

The results from Morris et al.'s (2000) study further endorse the claim that children possess a causal-explanatory framework that is unique to biology, thus strengthening the claim for naïve biology. However they also found that children in western societies are more likely to conceive vitalistic causality as transfer/flow of energy, and least likely to conceive it as organ intentionality. This pattern is expected because organ intentionality is culturally endorsed in Japanese culture,[1] but not in western cultures. Studies reviewed so far indicate that vitalistic causality in different cultural settings serves as a causal placeholder in naïve biology until more precise mechanisms are known, but the two components of vitalistic causality seem to be separable, at least in western societies (Inagaki & Hatano, 2002).

Research from the field of naïve biology suggests that young children reason in terms of vital force or vital energy as an unidentified energy that is an integral part of biological functioning. Literature has also shown that later in development children substitute vitalistic causality as a whole for mechanistic causality, which reflects modern scientific theory. The question that remains unanswered is whether thinking in terms of vitalistic causality is dropped completely or if it is shifted or recruited to explain other kinds of phenomena that are not biological in nature.

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[1] Japanese culture holds belief in *ki* that stem from the Chinese concept of *qì*. Both assume some sort of organ agency in biological functioning.

To address this question, in their original study Inagaki and Hatano (1993) also investigated if children extend thinking in terms of vitalistic causality to the domain of *psychology,* thus using it to explain psychological phenomena. They interviewed Japanese 6-year-olds asking questions about biological and psychological phenomena. Each question had two possible explanations and they were asked to choose the explanation they found more appropriate. One of the explanations represented intentional causality in which a given phenomenon was attributed to a person's intention or desire, and an alternative represented vitalistic causality, where the phenomenon was attributed to agency of a bodily part. An example of a psychological item follows: "when a pretty girl entered the room, Taro went over to her. Why did he do so? a) Because Taro wanted to become friends with her (intentional); b) Because Taro's legs wanted to go over to her (vitalistic)" (Inagaki & Hatano, 2002, p. 113). Results showed that children were more likely to attribute vitalistic causality to biological phenomena and intentional causality to psychological phenomena. The authors further concluded that vitalistic causality does not seem to extend to reasoning in the domain of psychology.

Before concluding that reasoning in terms of vitalistic causality is restricted to the domain of biology, thus not extending to explain psychological phenomena, a couple of methodological limitations need to be addressed.

First, as reviewed above, vitalistic causality is made up of two main components - organ intentionality and flow or transfer of vital force. The study by Inagaki and Hatano (1993) investigating its extension to the domain of psychology measured vitalistic causality specifically as organ intentionality. However, Morris et al. (2000) found that, at least for western children, transfer/flow of energy is the component of vitalistic causality that is more appealing, and may

be more readily culturally recruited for explanations in domains of thought distinct from biology.

5.0 STATEMENT OF THE PROBLEM

The present research is designed to investigate the development of vital energy reasoning. Research reviewed thus far indicates that children and adults reason about vitalistic causality in the domain of biology. However it is not clear if reasoning in terms of energy transfer/exchange (a component of vitalistic causality) is later recruited to explain phenomena in other domains of thought.

The present studies extend research on vital energy reasoning by focusing on four core questions: First, is vital energy reasoning in fact recruited to explain biological phenomena? Second, when does vital energy reasoning extend from the biology domain to that of psychology? Third, when does it further extend to explain transcendental and/or spiritual phenomena? Finally, how does this reasoning develop across age in different cultures?

By focusing on these questions, it is possible to address whether vital energy reasoning is originally domain specific and whether this changes in development. From a CSR standpoint, this research can point to the core intuitive grounds of this reasoning process (whether it starts of as domain specific- biology domain- in distinct cultural settings). It can also point to differences on how culture recruits these ideas to understand and explain phenomena from other domains of thought. These findings will also contribute to the CSR effort to elucidate how people reason about vital energy as a transcendental force.

Two studies were conducted to address these issues. Study 1 examined whether reasoning about energy exchange/transfer is recruited in the biological and psychological domain, and how this takes place in the course of development. Children between the ages of 5-13 and young adults were interviewed. Study 2 examined whether reasoning about energy exchange/transfer is elicited to explain transcendental/spiritual processes. A hypothetical death scenario was used to investigate how young adults reason about the continuity of vital energy when the biological body ceases functioning. Study 1 recruited participants from the USA. Study 2, however, drew from a cross-national sample from Brazil and the USA. The cross-national aspect of the study was included not to make direct comparisons between countries but rather to replicate the same study in these two locations to provide an indication of the generality of the findings. A more detailed account for the importance of a cross-national design and for the specific choice of a Brazilian and an American sample follows.

5.1 A CROSS-NATIONAL APPROACH

The present research examines how people reason about vital energy. The theoretical framework adopted comes from the field of CSR. The Cognitive Science of Religion investigates the intuitive cognitive foundations of these concepts, how they develop, and how they are recruited in different cultural contexts. Intuitive concepts represent the first order idea people come up with to frame and understand ordinary, domain specific phenomena. Thus an intuitive belief is formed without the person being aware of the mental processes involved in the making and justifying of that belief (Hodge, 2008). In other words, CSR research focuses on how people

across different cultural groups recruit the same core knowledge when reasoning about supernatural and/or religious concepts.

It is hypothesized that there is an intuitive base for vital energy reasoning that is later on recruited by culture in different ways. Given the findings reported by past research, it was expected that early on children would reason about vital energy in the biology domain, and that this pattern would be present at around the same developmental period cross-nationally. It was also expected that culture is going to play a role on how an intuitive reasoning over vital energy gets extended to beliefs about an afterlife. How these ideas are extended will vary across different cultures. The present study recruited participants from two distinct backgrounds: Brazil and the USA. What follows is an assessment on how these countries may differ on their conception and use of terms that refer to vital energy.

5.1.1 Brazil and the USA

This study included participants from Brazil and the USA. Brazil serves as a useful contrast to the USA because concepts of vital energy appear to be comparatively more prevalent, being recruited in practices and beliefs that stretch across biological, psychological, supernatural domains of explanation. These differences are evident in the more widespread acceptance of “alternative” medicine, psychotherapy, religion and superstition.

In alternative medicine, vital energy is a central concept in therapies such as acupuncture (that balances chi), homeopathy (interprets diseases and sickness as caused by disturbances in vital force), floral therapy (remedies contain the “energetic” nature of the flower that can be transmitted to the user), and crystal healing (crystals remove blockages in the aura or the body's electromagnetic field). In Brazil, based on the author’s experience, alternative medicine is widely

endorsed and is commonly used alongside allopathic medicine. In addition, alternative therapies commonly stem from holistic philosophies, where vital energy is believed to affect not only biological states, but also psychological and spiritual. Brazilians appear to be more accepting of alternative medicine and seemingly more "open" to talk about vital forces beyond the boundaries of biology.

In terms of mainstream religious beliefs, Brazil and the USA are nominally similar. In the 2000 Brazilian census, 73.9% of the population was from Roman-Catholic denominations, 15.4% from Protestant faiths, and 10.37% Pentecostal, compared to only 1.68% that were from pre-modern and new age religions. In a 2008 survey, the USA population was found to be predominantly Christian (76%: 25.1% Catholic and 50.9% non-Catholic), whereas new religions and "others" was only made up of 1.2% of the population (Kosmin & Keysar, 2009). What distinguishes Brazil is not belief in "alternative religion" so much as a more open boundary between what is mainstream and what is alternative.

In general, Brazilians appear to be more open to a wider variety of alternative beliefs than Americans. This conclusion is in the first place motivated by the author's personal experience living and conducting research with different religious groups in both cultures. Furthermore, Antoniazzi (2003) reported on a recent survey that examined the religious affiliation of populations from six major metropolitan areas in Brazil. This survey showed that 25% of the participants were committed to more than one religion, and that 12.5% regularly attended more than one religious setting. Similar findings were reported by Roazzi, Harris, Roazzi, and Dias (2008). When asking a sample of Brazilian undergraduates to report on their religious affiliation, participants frequently said they had one mainstream religion as their "official" faith, but at the same time they were regulars in other religious traditions and practices that were usually

alternative and/or less mainstream. Thus, even though many people are self-proclaimed Catholics, many, for example, go regularly to Buddhist or Spiritist group meetings or to Umbanda ceremonies.

In the USA the pervasiveness and endorsement of alternative religious practices varies across regions. The specific population recruited for this study comes from western Pennsylvania. The population from this region seems to be quite traditional in religious terms, usually holding to one mainstream religious affiliation. Alternative religious beliefs seem to be more widely endorsed in certain parts of west and southwest of the USA.

Superstitious beliefs and practices also appear to be more widely accepted in Brazil as compared to the USA. Superstitious beliefs and practices are a major part of Brazilian Folk beliefs and practices such as *simpatias*[2] (Legare & Souza, under review). While links between vital energy and superstition are not altogether clear, a recent study by Lindeman and Saher (2007) found that when compared to skeptics, superstitious adults were more likely to explain biological processes in terms of organ intentionality and energy transmission and to think of energy as a vital force. Thus it seems as if superstitious individuals may be more accepting of theories that imply vital energy reasoning.

In sum, while there is an "alternative" movement in the USA, this "alternative" appears to be more defined as separate from the mainstream practices as compared to Brazil, where mainstream and alternative beliefs are more blended. Brazil is more "open" to talk about vital forces beyond the boundaries of biology, as evident in everyday acceptance of alternative medicine, religion and superstition.

[2] *Simpatias* are widely available, endorsed, and used for everyday problem-solving purposes in Brazil. They are characterized as ritualistic remedial procedures, not confined to any particular Brazilian religious group. They are used to solve a variety of everyday biological (e.g., sinusitis, asthma), psychological (e.g., depression, anxiety), and existential problems (e.g., lack of luck, infidelity) (Legare & Souza, under review).

The author is aware that supposed differences between the countries are quite speculative, based on personal experience and limited data. To ascertain that both countries differ in the direction suggested by the author, the following control measures were obtained from the adult sample in Study 2: a) belief in transcendental religiosity (mainstream religious beliefs); b) belief in immanent religiosity (alternative religious beliefs); c) superstitious belief; d) superstitious practices; e) belief in alternative medicine; and f) use of alternative medicine.

6.0 STUDY 1

This study investigates the development of reasoning in terms of vital energy transfer/exchange. Past research (Inagaki & Hatano, 2002) has been limited to studying vital energy originating from *sources*, such as rest, food, and water, *affecting* ones biological body (i.e., biological domain). The present study proposes to expand past research by looking at inferences about vital energy as affecting both biological and psychological well-being.

Specific research questions asked were: First, when is vital energy reasoning used to explain biological and psychological well-being? Second, are children more likely to infer certain sources of vital energy for enabling psychological or biological well-being? Does this vary throughout development?

Participants were presented with a series of vignettes displaying conditions in which a character is suffering from either biological or psychological distress and then asked to indicate what *sources* of vital energy might help the character improve.

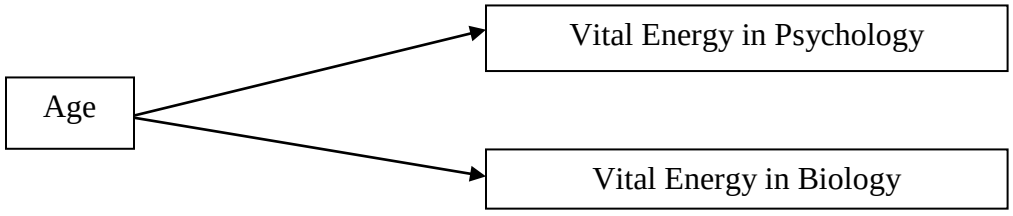

Figure 2: Diagram depicting the variables and their relationship.

Age groups were selected based on the review of relevant literature in the field of naïve biology and cognitive science of religion (see Figure 2 above). The child sample is divided into three age groups: 5-7-year-olds, 8-10-year-olds, and 11-13-year-olds. Previous research indicated that children do not begin to exhibit vitalistic reasoning until about five years of age (Inagaki & Hatano, 2002). Pre-tests also indicated that younger children had difficulties in concentrating and understanding the questions being asked. The 8-10-year-old group was targeted because previous research indicated that vitalistic biological reasoning is most prevalent at this age (Inagaki & Hatano, 2002). The 11-13-year-old group was selected because this age is marked by the development of cultured scientific and religious ideas that extend beyond intuitive understanding (Roazzi, Dias, & Roazzi, 2010). Finally, an adult sample was included to obtain a marker of mature thinking in this domain.

6.1 METHOD

6.1.1 Participants

The child sample was recruited from two afterschool programs located in urban settings in western Pennsylvania. The child group was made up of 78 participants divided into three age groups: 5-7-year-olds, 8-10-year-olds, and 11-13-year-olds. The *5-7-year-old* group initially had 28 participants, but three younger children were excluded from the sample because they had difficulty focusing on the task and provided their answers without paying any attention to the questions being asked; thus the final sample came down to 25 participants, with a mean age of 6.43 years (*SD* = .64; range = 5 years and 5 months to 7 years and 4 months; 15 male, 10

female). The *8-10-year-old* group had 25 participants with a mean age of 8.51 years (*SD* = .678; range = 7 years and 6 months to 9 years and 8 months; 8 male, 17 female), and finally the *11-13-year-old* group had 25 participants with a mean age of 11.25 years (*SD* = 1.26; range = 10 years and 1 months to 13 years and 8 months; 12 male, 13 female). Thus there were a total of 75 child participants. Parents reported on their families' ethnic and religious backgrounds. The ethnic diversity of the child sample was 68% Caucasian, 16% African American, 8% Multiracial, 5.3% Latino/Hispanic, and 2.7% Asian. In regards to religion, 36% reported affiliation with Protestant denominations of Christianity, 28% reported no religious affiliation, 21.3% reported affiliation with Catholic denominations of Christianity, 6.6% reported family multi religious affiliation (more than one religion), 5.3% reported Judaism, and 2.7% reported other religious affiliation. Throughout this paper, each age group is referred to based on mean age; thus 5-7 is referred to as the 6-year-old group, 8-10 is referred to as the 8-year-old group, and 11-13 is referred to as the 11-year-old group.

Participants in the young adult group were 60 undergraduate psychology students at a public university in western Pennsylvania. The mean age of participants was 20 years (*SD* = 4.75; range = 18.00 to 46.08; 29 male, 30 female). The ethnic composition was 78.3% Caucasian, 11.7% Asian, 6.7% African American, and 3.4% other. With respect to religion, 36.7% reported as Catholic, 23.3% reported no religious affiliation, 18.3% reported as Protestant, 15% reported another religious affiliation, and 6.7% reported Judaism. As part of their Introduction to Psychology class, participants were required to complete research hours, and so received credit towards their class for completing the questionnaires.

6.1.2 Measures

Three questionnaires were presented: a background information questionnaire (completed by young adults and a parent of the child participants); a vital energy (biology & psychology) questionnaire (completed by young adults and children); and a source rating questionnaire (completed by young adults only).

6.1.2.1 Background information

For the child sample, upon signing their child's consent form, one of the child's parents was asked to complete a family background information questionnaire.

This questionnaire asked parents for their child's date of birth, gender, and ethnicity. It also asked for mother and father's ethnicity and educational background (less than high school, high school, bachelor, post-bachelor, other) as well as their family income (under 25k, 26-50k, 51-100k, over 100k). The questionnaire asked them to report their families' religious affiliations (Catholic, Protestant, Jewish, Muslim, Buddhist, other, or none), how important religion was in their family life (not at all, mildly, moderately, strongly - scores ranging from 0-3), and how often their child and their family were involved in organized religious activity (never, rarely, moderately, frequently - scores ranging from 0-3). In a second section of this questionnaire, parents were asked to report on their families' use of *healing treatments*, inquiring how often their family made use of traditional medicine, alternative medicine, spiritual healing, and alternative diets (never, rarely, moderately, frequently - scores ranging from 0-3). Finally, family *Superstitious/Spiritual practices* were measured by asking how often their family contacted the dead, performed rituals to get rid of evil spirits, consulted psychics, consulted fortune tellers, and

displayed magical and superstitious practices (never, rarely, moderately, frequently - scores ranging from 0-3).

Participants in the young adult sample were asked comparable questions. They were asked to report on their age, gender, and ethnicity, whether they were affiliated with a religious community (no/yes) and their current religious affiliation. Furthermore, they were asked to report how important religion was in their current life and how important it was in their families while they were growing up (not at all, mildly, moderately, strongly - scores ranging from 0-3); the frequency of their participation in organized religious activity, as well as the frequency of their participation in organized religious activity when growing up (never, rarely, moderately, frequently - scores ranging from 0-3). They were also asked to report on their current use and when growing up their families' use of *Healing Treatments*, and *Superstitious/Spiritual practices*. Use of *Healing treatments* was measured by asking how often they and their family made use of traditional medicine, alternative medicine, spiritual healing, and alternative diets (never, rarely, moderately, frequently - scores ranging from 0-3). *Superstitious/Spiritual practices* were measured by asking how often they and their family contacted the dead, performed rituals to get rid of evil spirits, consulted psychics, consulted fortune tellers, and displayed magical and superstitious practices (never, rarely, moderately, frequently - scores ranging from 0-3).

6.1.2.2 Vital Energy Interview/Questionnaire

An instrument was designed to measure participants' reasoning about the possible transfer/exchange of vital energy as affecting people's biological and psychological well-being.

Different characters were presented in various conditions of apparent biological or psychological ill being. Participants were then asked about the effects of various sources of potential energy. The biological conditions presented were: a) sick body, b) delayed growth, and c) tired body. The psychological conditions presented were: a) sadness, b) mean child, and c) laziness. The biological conditions selected for this measure were adapted from past studies that targeted vitalistic causality reasoning in naïve biology. The psychological conditions assessed in this study represent situations involving psychological distress. The psychological items were selected because they encapsulate situations that are easily grasped by the child sample, that is, they are a part of their everyday vocabulary and they reflect an unbalance in vital energy affecting emotions (sadness), morality (mean child) and motivation (laziness). Each condition was presented with a vignette (see Appendix A for all vignettes). For example "This is Johnny (Suzy). His (Her) body is always sick" (biology) and "This is Tommy (Tamara). He (She) is always sad" (psychology). The character in the vignette matched the participant's gender. Biological and psychological conditions were randomly presented in blocks (psychological block and biological block). Within each block, conditions were presented in a random order. Following each condition, participants were presented with different sources of vital energy that have the potential to improve the character's well-being. For each vignette, participants were presented in a random order with the same seven sources of vital energy along with two control items: a) four *natural* sources of vital energy (breathing fresh air, eating hand-picked fresh vegetables, laying down under the warm sun, and drinking fresh water from the mountains) adapted from past studies that targeted vitalistic causality reasoning in naïve biology; b) three *social-psychological* sources of vital energy, which presented activities in which someone receives energy from another person via social interactions (playing with friends, receiving a

hug, and hanging out); the selection of these items is based on the fact that in many cultures people express being affected by other people's energy and in addition, children can easily relate to specific actions chosen - these activities involved the character interacting with someone that had their opposite trait (sick/healthy, tired/lively, delayed growth/growing well, sad/happy, mean/nice, lazy/active); c) two control items that lack the element that implies the presence of some sort of vital energy were included (chewing bubble gum, accidently bumping into someone).

All child participants were interviewed individually with each vignette accompanied by drawings of the character being exposed to each of the sources of energy (see Appendix B) followed by a question (see Appendix A for all the questions). The young adult participants filled out a questionnaire, with no accompanying drawings. Example questions were: (psychology-sad) "What do you think will happen to his/her sadness if he/she lies under the warm sun?", (biology – tired) "What do you think will happen to his tired body if he/she plays with friends that are very lively?", (psychology-mean) "What do you think will happen to his/her meanness if he/she receives a hug from someone who is very nice?", (biology-sick) "What do you think will happen to his/her sick body if he/she hangs out with friends that are very healthy?", and (psychology-lazy) "What do you think will happen to his/her laziness if he/she chews bubble gum?". Following each question, all participants were presented with a 4-point *Likert* scale and asked to rate how they believed each source of energy was able to affect the character regarding his/her biological/psychological well-being - will not get better, will get a little better, will get a lot better, or will get completely better.

Children were presented with a *Likert* scale with a visual aid (see Appendix C) whereas the adult sample were presented with a *Likert* scale with the verbal distinctions alone (see

Appendix C). Children had to point to the scale indicating their chosen response and say their answer out loud, whereas the adults marked their answers on the questionnaire.

Finally, if participants indicated that the character improved after exposure to a vital energy source, they were asked to judge whether this improvement was due to a change of *emotion* or *energy ("explanation judgment").* Specifically they were asked to choose whether the improvement was due to the source making the character feel happy (emotion) or due to the source giving the character energy. In the child interviews, these questions were presented with a visual aid, whereas the young adult questionnaire just presented text (see Appendix D). There were two different question formats: a) "Why do you think he will get better? Because the sun makes him feel happy and this will make him get better, or because the sun gives him energy and this will make him get better?" b) "Why do you think he will get better? Because the sun gives him energy and this will make him get better, or because the sun makes him feel happy and this will make him get better?" Within each condition, all questions, following their *Likert* scale judgments, were presented in the same format. However the question format was alternated between conditions.

6.1.2.3 Source rating

In addition to the above questions, young adults alone were presented with a list of all the actions in the vital energy questionnaire described above, and asked to judge how much each action would make people happy or give people energy (not at all, a little, moderately, a lot). As an example, "How much does *breathing good fresh air* make people happy?" and "How much does *laying under the sun* give people energy?" A complete list of items is in Appendix E. Items were presented in a random order.

6.1.3 Procedure

Children were assessed with an interview format where a researcher interviewed each child individually with pictures accompanying the questions asked. Adults answered the same questions but in a pencil/paper format. Adults answered this questionnaire individually in a classroom setting with other participants present, with no drawings provided.

6.1.3.1 Child Interviews

The experimenter contacted schools and afterschool programs. Upon compliance to participate in the study, consent forms were sent to parents of children between the ages of 5-13. A very low number of signed consent forms were sent back. So a second approach to recruit participants involved the PI going to the schools and talking to parents as they were signing their children out from the afterschool program. Parents were asked if they had a minute to spare, if they responded yes, the PI introduced herself and explained the study and its overall objective and procedures; subsequently parents were asked if they were interested in signing their child up to participate in the study. Parents who decided to sign up their child either completed the documentation (informed consent form and background information questionnaire) on the same day or sent it to school within a week or two.

A total of three researchers conducted the child interviews (the PI and two research assistants). In a lab setting, the PI trained the research assistants on how to conduct the interviews; a role-playing session took place where the research assistants took turns interviewing one another. After the research assistants were familiar with the interview procedure, they accompanied the PI to the schools and observed two interviews. Finally, on a separate day, the PI observed each research assistant conducting two child interviews. During

this observation session, both of the research assistants successfully conducted the interviews and subsequently proceeded to run interviews on their own. The interviewers met twice a month with the PI to discuss any problems or questions that had come up with regards to the interviews and its procedures[3].

Only children with signed consent forms were interviewed. All interviews took place in a corner made available by the afterschool program within the institution's property. The researcher asked the school staff which children were present on that given day and randomly chose which child to interview. The afterschool program staff took the child to the location of the interviews. To establish rapport, the experimenter introduced him/herself and talked to the child about their day at school and asked them about their overall interests until the child felt comfortable.[4] Next, children were introduced to the overall purpose of the study and told that the researcher was interested in discovering how children know and think about the human body and about emotions. The experimenter told the children that he/she was going to ask them many questions about the human body and about children's emotions. It was also explained that the experimenter was interested solely in the children's opinions and that none of the questions presented had a wrong or right answer. The experimenter further asked each child if he/she wanted to participate. Upon the child's assent to participating in the experiment, the experimenter started the interview procedure. Children were presented with six vignettes: three biological and three psychological. Vignettes were presented in blocks: biological conditions followed by psychological conditions, or alternatively, psychological conditions followed by

[3] Preliminary analysis looking at the effects of interviewer on the DV's indicated no significant differences.
[4] Researchers were present in the afterschool programs for many days. While there, when not interviewing, they talked to and played with children in the program. Thus, by the time most children were interviewed they had already gotten to know the researcher, or at least had seen him/her in the afterschool program interacting with other children.

biological conditions. Within each condition, the order of the vignettes was randomized. The researcher recorded the participant's answers on a coding sheet. This took place onsite and throughout the interview. Interviews lasted anywhere between 20 and 40 minutes depending on the age of the child. After completion, the experimenter thanked the children for their participation and they resumed the activities in which they were previously engaged.

6.1.3.2 Adult interviews

The adult sample was recruited from a pool of subjects studying introduction to psychology. Participants were assessed in a classroom in the psychology department. Participants were presented as a group with the overall objective of study. Following this, consent forms were distributed and they were given 15 minutes to read the forms and ask any questions before deciding to participate or not. The experimenter was present during this period to answer individually any relevant questions pertaining to the study procedures. Participants who did not wish to participate were allowed to leave,[5] with only the participants that signed the consent form remaining in the room. Next, they filled in a questionnaire in a pencil/paper format. Questionnaires matched the participants' genders and followed the same randomizing criteria used in the child interviews. Participants took between 20 and 30 minutes to answer the questionnaire. The questionnaire first contained a cover page, followed by the *vital energy*, the *source rating*, and the *background information questionnaires*.

[5] Participants that left still received research credits.

6.1.4 Coding

Responses given to the *background information questionnaire* were coded as follows. For gender, female participants were coded as 0 and male participants as 1. Family and own religious importance was coded with scores ranging from 0-3 (not at all, mildly, moderately, strongly). Family and own religious frequency was coded with scores ranging from 0-3 (never, rarely, moderately, frequently). Parental education was coded as 0 for less than a bachelor's degree and 1 for a bachelor's degree or more. Income was coded as 0 for under 25K, 1 for 25-50K, 2 for 50 - 100K and 3 for above 100K. Family and own use of *healing treatments* and *Superstitious/Spiritual practices* were all coded with scores ranging from 0-3 (never, rarely, moderately, frequently).

Responses given to the *vital energy (biology & psychology) interview/questionnaire* were coded as follows. For the answers provided for the first questions, exploring participants' *improvement judgments* (i.e., *Likert* scale), if participants indicated that there was no improvement their answer was coded as 0, if they indicated that there was a little improvement their answer was coded as 1, if they indicated that there was a lot of improvement their answer was coded as 2, and if they indicated that there was a complete improvement their answer was coded as 3.

During the interviews, the researcher noticed that children recurrently appeared to associate the sun with happiness and/or focused on the "laying down" portion of the statement "laying under the sun", ignoring the potential psycho-physiological effects of "sunning". Hence, this item was excluded from the analysis. In all coding and analyses natural sources of energy were reduced to three items: eating vegetables, drinking water, and breathing air.

Within the biological conditions mean scores were computed for their answers for each source category (scale: 0 - won't get better/3 - will get all better). Thus a mean score ranging from 0-3 was generated for each of the following categories: natural source, social-psychological source, and control items. The same coding procedure was applied to the psychological conditions. Finally, overall mean scores were computed for the psychological and biological conditions, excluding the control items.

With regards to the *emotion or energy* choice, judgments that the change was due to increased happiness were coded as 0, judgments that the improvement was due to an energy transfer were coded as 1. A count score of energy items was computed by creating a sum of all the energy answers provided. Energy count scores were computed for natural sources in psychology, natural sources in biology, social-psychological sources in psychology, and social-psychological sources in biology. Overall energy count scores were also computed for overall biological and psychological conditions.

For answers given to the *source rating questionnaire* (with the young adult group alone), a "not at all" response was coded as 0, "a little" was coded as 1, "moderately" was coded as 2, and "a lot" was coded as 3 Mean scores were computed for items that reflect natural sources of energy making people happy (Natural-Happy), items that reflect natural sources of energy giving people energy (Natural-Energy), items that reflect social-psychological sources of energy linked to a psychological trait (happy, nice, and active) giving people energy (SocialPsych-Psych-Energy), items that reflect social-psychological sources of energy linked to a psychological trait (happy, nice, and active) making people happy (SocialPsych-Psych-Happy), items that reflect social-psychological sources of energy linked to biological traits (healthy, growing well, lively) giving people energy (SocialPsych -Bio-Energy), items that reflect social-psychological sources

of energy linked to biological traits (healthy, growing well, lively) making people happy (SocialPsych-Bio-Happy), control items giving people energy (Control-Energy), and control items making people happy (Control-Happy).

6.1.5 Design

The between-subjects variable is age, with four levels (5-7-year-olds, 8-10-year-olds, 11-13-year-olds, and young adults). The within-subjects variables are condition (two levels) and source (three levels). The two levels of condition are biology and psychology. The three levels of source are natural, social-psychological, and control.

6.2 RESULTS

6.2.1 Descriptive statistics

Table 1 summarizes descriptive statistics for child and adult participants, separately. Notably, the child and young adult sample reported on variables that involve a family characteristic differently. In the child sample this information was reported by one of the child's parents, whereas in the young adult sample, the participant reported this information, based on his/her recollection of his/her upbringing.

In the child sample, most of the families came from either Protestant or Catholic religious faiths; in addition many families (28%) reported having no religious affiliation.

Table 1: Descriptive Statistics

Characteristics	Children (*n*=75), *M* or *%* (*SD*)	Young Adults (*n*=60), *M* or *%* (*SD*)
Age	8.4 (2.2)	20.0 (4.7)
Male	48 %	50%
Participant Ethnicity		
Caucasian	68%	78.3%
African American	16%	6.7%
Asian	2.7%	11.6%
Hispanic/Latino	5.3%	-
Multiracial	8%	-
Other	-	3.4%
Family Religious belief		
Catholic	21.3%	42.4%
Protestant	36.1%	22.0%
Jewish	5.3%	6.8%
Other	4.0%	11.8%
Multi (more than one)	5.3%	10.3%
None	28.0%	6.7%
Family Religion – Importance	0.5 (1.0)	1.0 (1.0)
Family Religion – Frequency	0.4 (1.1)	1.2 (0.9)
Child Religion – Frequency	0.4 (1.0)	-
Family Use of healing treatments		
Traditional medicine	1.9 (0.8)	2.1 (0.8)
Alternative medicine	0.6 (0.8)	0.4 (0.8)
Spiritual healing	0.6 (0.9)	0.5 (0.8)
Alternative diets	0.4 (0.6)	0.4 (0.6)
Family Superstitious/spiritual practices		
Contacting the Dead	0.0 (0.2)	0.1 (0.4)
Rituals to get rid of evil spirits	0.0 (0.1)	0.1 (0.4)
Consulting psychics	0.1 (0.2)	1.0 (0.5)
Consulting fortune tellers	0.1 (0.4)	0.0 (0.2)
Use of magical & superstitious practices	0.0 (0.1)	0.2 (0.5)
Family Income		
Under 25K	4.4%	10.3 %
25K - 50K	25.0%	22.4 %
50K - 100K	22.1%	31.1 %
Above 100K	48.5%	36.2 %
Highest Parental Education		
Less than high school	-	-
High School	2.7%	23.3%
Bachelor's Degree	25.3%	33.3%
Post-Bachelor's Degree	65.3%	38.3%
Other	6.7%	5.1%

Table 1: (Continued)

Characteristics	Children (*n*=75), *M* or *%* (*SD*)	Young Adults (*n*=60), *M* or *%* (*SD*)
Young adults only		
Own Religious belief		
Catholic	-	36.6%
Protestant	-	20.0%
Jewish	-	6.6%
Other	-	15.1%
None	-	21.7%
Own Religion – Importance	-	1.5 (1.2)
Own Religion – Frequency	-	1.4 (1.2)
Own use of healing treatments		
Traditional medicine	-	2.0 (0.8)
Alternative medicine	-	0.3 (0.6)
Spiritual healing	-	0.5 (0.9)
Alternative diets	-	0.3 (0.6)
Own Superstitious/spiritual practices		
Contacting the Dead	-	0.0 (0.2)
Rituals to get rid of evil spirits	-	0.0 (0.2)
Consulting psychics	-	0.1 (0.5)
Consulting fortune tellers	-	0.0 (0.2)
Use of magical & superstitious practices	-	0.2 (0.5)

As for use of healing treatments, there was a greater reported use of traditional medicine, followed by alternative medicine and spiritual healing. With regards to spiritual/superstitious practices, more than 95% of the parents reported never making use of any of the listed practices. Thus given the lack of distribution, these variables were not used in further analysis. Finally, most of the children came from relatively privileged families, with at least 70% reporting an annual income above 50K and 65% had at least one parent with a post-bachelor degree.

In the young adult sample, most participants reported being raised in families from either Catholic or Protestant religious faiths. As for use of healing treatments, most participants reported that their families had used traditional medicine more often than the other treatments. With regards to family use of spiritual/superstitious practices, more than 91% of the young adults

reported that their families never made use of any of the listed practices. Thus these variables were not used in further analysis.

Finally, at least 66% of the young adults were raised in families with an annual income above 50K and 71% reported having currently at least one parent with a post-bachelor degree. When it came to young adults reporting their own current practices, a *t* test comparing their current practices with that of their families growing up yielded that the only significant difference was between religious importance, $t\ (57) = 3.84, p < .001$ and religious frequency $t\ (58) = -4.99, p < .001$, with greater frequency and importance placed in participants' experience growing up. With regards to current religion affiliation, participants were more likely to report being Catholic, Protestant, or no religious affiliation.

6.2.2 Preliminary Analysis

Preliminary analyses were run with the objective of investigating how variables measured correlated with each other. As a first step, Table 2 and 3[6] presents a correlation matrix displaying how the independent variables correlate to one another for child and young adult participants separately. Results from Table 2 indicate that family religious importance, family religious frequency, and child religious frequency were all significantly correlated with one another. Furthermore, spiritual healing was significantly correlated with family religious importance and family religious frequency. Finally, the variables contacting the dead, rituals to get rid of evil spirits, consulting psychics, consulting fortunetellers and use of magical and superstitious practices were all correlated with one another, all measuring superstitious/spiritual practices.

[6] Personal and family use of healing treatments and superstitious/spiritual practices had similar means, so only participant's personal use variables were included in the correlation table.

With regard to the young adult data, Table 3 indicates the variables family religious importance, family religious frequency, religious importance and religious frequency were all significantly correlated with one another. Family religious frequency was also significantly correlated with contacting the dead. Spiritual healing was significantly correlated with religious importance, religious frequency, rituals to get rid of evil spirits, consulting psychics, consulting fortunetellers and use of magical and superstitious practices. Alternative Medicine was significantly correlated with contacting the dead, rituals to get rid of evil spirits, consulting psychics, consulting fortunetellers and use of magical and superstitious practices. Alternative diets were also significantly correlated with rituals to get rid of evil spirits, consulting psychics, consulting fortunetellers and use of magical and superstitious practices. Finally, the variables contacting the dead, rituals to get rid of evil spirits, consulting psychics, consulting fortunetellers and use of magical and superstitious practices were all significantly correlated with one another.

Table 2: Child sample family demographics, family use of healing treatments and family superstitious/spiritual practices – correlations (*n*=75).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 - Age																
2 - Gender	.06															
3 - Parental Education	-.12	.03														
4 - Religious Belief (a)	-.40	-.05	-.08													
5 - Religious Belief (b)	-.17	-.08	-.11	-												
6 - Family Religion Import.	.06	-.03	-.15	.37	-.16											
7 - Family Religion Frequency	-.02	-.07	-.06	.18	-.03	.80**										
8 - Child Religion Frequency	.01	.02	.04	.25	-.14	.74**	.78**									
9 - Traditional medicine	.08	-.23	-.08	-.27	-.06	.04	.14	.16								
10 - Alternative medicine	.01	-.13	.19	-.07	.22	-.20	-.15	-.20	.27*							
11 - Spiritual healing	.09	-.18	-.21	.18	.09	.41**	.40**	.19	.20	.17						
12 - Alternative diets	.05	-.14	.11	-.02	-.10	-.12	-.02	-.10	.06	.22	.30					
13 - Contacting the Dead	.13	.01	.05	-.20	.14	.08	.10	.10	.01	.30	.27	.16				
14 - Rituals to get rid of evil spirits	-.07	-.11	.04	.00	.27	.06	.18	.07	.01	.21	.19	.11	.70***			
15 - Consulting psychics	-.07	-.11	.04	.00	.27	.05	.18	.07	.00	.21	.19	.14	.70***	1.0***		
16 - Consulting fortune tellers	.04	-.15	.09	-.06	.08	-.08	.00	-.10	-.06	.14	.19	.18	.29*	.44**	.44**	
17 - Use of magical & superstitious practices	.12	-.10	.11	-.07	.10	.02	.02	.01	.02	.27	.33	.26	.63***	.28*	.28*	.35*

Gender: 0 = female, 1 = male. Parental education: 0 = less than bachelors, 1 = bachelors or more. Religious belief (a): 0 = Catholic, 1 = Protestant. Religious belief (b): 0 = Catholic and Protestant, 1 = other beliefs. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 3: Young adult reports of family demographics, own use of healing treatments and own superstitious/spiritual practices – correlations (*n*=60)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 - Age	-																
2 - Gender	-.03	-															
3 - Parental Education	.02	.09	-														
4 - Religious Belief (a)	.45	-.15	-.23	-													
5 - Religious Belief (b)	-.12	.10	-.18	-	-												
6 - Family Religion Imp.	-.04	-.07	.15	.04	-.17	-											
7 - FamilyReligion Freq.	.12	-.00	.18	.09	-.12	.77***	-										
8 - Religious Importance	-.21	-.09	.20	.13	-.04	.61***	.30*	-									
9 - Religious Frequency	-.30*	-.15	.10	.26	-.05	.44**	.31*	.77***	-								
10 - Traditional medicine	-.22	-.27	-.16	.17	-.03	.09	.21	.10	.08	-							
11 - Alternative medicine	.20	-.03	-.09	.20	.17	-.18	-.22	.13	.24	.08	-						
12 - Spiritual healing	.17	-.10	-.18	.17	-.04	.17	.10	.40**	.32*	.11	.23	-					
13 - Alternative diets	.10	.20	.03	.18	.11	.13	.15	.10	.11	.21	.23	.19	-				
14 - Contacting the Dead	-.00	-.00	-.10	.00	.20	-.28	-.33**	.05	.20	-.12	.62***	-.01	.04	-			
15 - Rituals to get rid of evil spirits	-.03	-.08	-.03	-.12	.08	.00	-.05	.24	.25	.20	.47***	.45***	.34**	.38**	-		
16 - Consulting psychics	-.04	.03	-.06	.00	.20	-.04	-.08	.17	.17	.15	.30*	.33*	.51**	.37**	.80***	-	
17 - Consulting fortune tellers	-.03	-.00	-.10	.00	.20	-.09	-.14	.17	.17	.13	.33*	.30*	.47**	.48**	.81***	.98***	-
18 - Use of magical & superstitious practices	-.08	-.10	-.33*	.12	.02	-.06	-.19	.13	.13	.01	.40**	.38**	.31*	.28*	.64**	.62***	.64**

Gender: 0 = female, 1 = male. Parental education: 0 = less than bachelors, 1 = bachelors or more. Religious belief (a): 0 = Catholic, 1 = Protestant. Religious belief (b): 0 = Catholic and Protestant, 1 = other beliefs. *$p < .05$. **$p < .01$. ***$p < .001$.

After looking at the relationship of the independent variables amongst each other, the next step was to look at how these independent variables correlate with the dependent variables measured. These correlations were computed separately for child and young adult samples. In the *Vital Energy Interview/Questionnaire*, participants answered two questions - Improvement Judgment and Explanation Judgment. Given that the focus of this study is to explore vital energy reasoning, subsequent inferential statistics focus on participants' answers to the explanation judgments, specifically targeting energy explanation judgments. Therefore, dependent variable targeted in this preliminary analysis is a measure obtained by adding the total number of *energy* explanation judgments provided for the explanation judgment questions in each condition (Biological and Psychological), not taking into account *happy* explanation judgments. Results reported in Table 4 indicate that for the child sample, age significantly correlated with energy explanation judgments provided in the psychological condition, and that for the young adult sample, parental education and religious importance were significantly correlated with energy explanation judgments provided in the psychological condition.

Table 4: Correlation of independent variables with dependent variables (Energy reasoning judgments - Biological and Psychological conditions) for both child and young adult samples.

	Biological Condition	**Psychological Condition**
Child Variables		
Age	-.20	-.42**
Gender	-.7	.02
Parental Education	-.00	.15
Religious Belief (a)	.14	.19
Religious Belief (b)	.53	.11
Family Religion Import.	.05	-.02
Family Religion Freq.	.16	.16
Child Religion Freq.	.05	.03
Traditional medicine	.8	.05
Alternative medicine	.01	.14
Spiritual healing	-.02	-.00
Alternative diets	.05	.03
Contacting the Dead	.03	-.02
Rituals to get rid of evil spirits	.15	.20
Consulting psychics	.15	.20
Consulting fortune tellers	-.02	.06
Use of magical & superstitious practices	-.02	-.06
Young Adults Variables		
Age	-.05	-.02
Gender	.04	-.20
Parental Education	.19	.36**
Religious Belief (a)	.16	.15
Religious Belief (b)	-.20	-.24
Family Religion Import.	.03	.10
Family Religion Freq.	.10	.07
Religious Importance	-.03	.33*
Religious Frequency	-.08	.20
Traditional medicine	.14	.09
Alternative medicine	.04	.14
Spiritual healing	.24	.22
Alternative diets	-.01	.01
Contacting the Dead	-.13	.02
Rituals to get rid of evil spirits	.22	.16
Consulting psychics	.20	.13
Consulting fortune tellers	.14	.12
Use of magical & superstitious practices	.11	.03

Gender: 0 = female, 1 = male. Parental education: 0 = less than bachelors, 1 = bachelors or more. Religious belief (a): 0 = Catholic, 1 = Protestant. Religious belief (b): 0 = Catholic and Protestant, 1 = other beliefs.
*$p < .05$. **$p < .01$. ***$p < .001$.

The final step is to investigate if there are differences on participants' improvement judgment and energy explanation judgments between scenarios that are in the same condition. Participants were presented to two conditions, being that biological and psychological. Within the biological condition, the three scenarios presented were sick, tired and delayed growth, within the psychological condition, the three scenarios presented was sad, mean and lazy. Statistical tests were performed comparing participants' responses to all scenarios presented, enabling us to see whether within each condition participants were answering differently to the scenarios presented. Table 5 presents these results divided by sample and by the two types of questions presented (improvement judgment and explanation judgment). *T*-tests were run for improvement judgments and Wilcoxon for explanation judgments.

Within the Biological conditions, children and adults improvement judgments were significantly different for the scenarios sick (M_{child} = 1.38, M_{adult} = 1.03) and tired (M_{child} = 1.52, M_{adult} = 1.33). Adult's energy explanation judgments were also significantly different for the scenarios sick (M = 2.94) and tired (M = 3.66). When comparing the scenarios sick ($M_{improvemnet}$ = 1.03, $M_{explanation}$ = 2.94) and delayed growth ($M_{improvemnet}$ = 0.58, $M_{explanation}$ = 2.19), adult's responses to both types of questions (improvement judgment and explanation judgment) differed significantly. In the tired ($M_{child\ improvement}$ = 1.52, $M_{child\ explanation}$ = 3.0, $M_{adult\ improvemnet}$ = 1.33, $M_{adult\ explanation}$ = 3.66) and delayed growth ($M_{child\ improvement}$ = 1.27, $M_{child\ explanation}$ = 2.60, $M_{adult\ improvemnet}$ = 0.58, $M_{adult\ explanation}$ = 2.19) comparison, both children and adults significantly distinguished both scenarios when answering both types of questions. Overall, within the biological condition, participants were more likely have higher improvement and explanation judgments for the sick scenario, followed by tired and delayed growth.

Table 5: Statistics comparing answers given to all the situations presented (sick, tired, delayed growth, sad, mean and lazy)

	Improvement Judgment		**Explanation Judgment**	
	Child	**Adult**	**Child**	**Adult**
	t (75)	***t (59)***	***z (1)***	***z (1)***
Sick vs. Tired	-2.61*	-4.88***	-1.10	-3.44***
Sick vs. Delayed Growth	1.68	7.43***	-1.43	-3.88***
Sick vs. Sad	-4.61***	3.38***	-5.44***	-5.52***
Sick vs. Mean	.50	-.29	-6.32***	5.79***
Sick vs. Lazy	-1.97	-3.12	-.467	-2.38*
Tired vs. Delayed Growth	-3.71***	-10.87 ***	-2.32*	-4.99***
Tired vs. Sad	-2.34*	1.28	-5.72***	-6.26***
Tired vs. Mean	2.62 *	4.60***	-6.45***	-6.14***
Tired vs. Lazy	.38	1.71	-.64	-1.24
Delayed Growth vs. Sad	-5.76***	-11.67***	-4.16***	-4.13***
Delayed Growth vs. Mean	-1.13	-8.16***	-5.97***	-5.09***
Delayed Growth. Lazy	-3.06**	-10.55	-1.97*	-4.50***
Sad vs. Mean	4.83 ***	4.06***	-3.78***	-1.72
Sad vs. Lazy	3.21**	.49	-5.00***	-6.00***
Mean vs. Lazy	-2.00*	-3.12	-6.35***	-5.95***

*$p < .05$. **$p < .01$. ***$p < .001$.

Within the psychological conditions, there were significant differences between the sad (M_{child} = 1.68, M_{adult} = 1.24) and mean (M_{child} = 1.36, M_{adult} = 1.04) scenarios, for both child and adults answers to the improvement judgments. Children's reasoning judgment answers also significantly differed for sad (M = 1.82) and mean (M = 1.30) scenarios. There were also significant differences between the sad and lazy scenarios, for child's' answers to the improvement judgments (M_{sad} = 1.68, M_{lazy} = 1.50) and for child and adult's answers to explanation judgments (M_{child_Sad} = 1.82, M_{child_lazy} = 2.95, M_{adult_Sad} = 1.31, M_{adult_lazy} = 3.38). Finally, when comparing mean and lazy, significant differences were found for children's answers to the improvement judgments (M_{mean} = 1.36, M_{lazy} = 1.50) and for child and adults answers to explanation judgments (M_{child_mean} = 1.30, M_{child_lazy} = 2.95, M_{adult_mean} = 1.03, M_{adult_lazy} = 3.38). Overall, within the psychological condition, participants were more likely to have higher improvement judgments for the sad scenario, followed by lazy and mean. As for

explanation judgments, participants were more likely to have higher improvement judgments for the lazy scenario when compared to sad and mean. Findings from these comparisons point that participants seem to differentiate the scenarios, even if they represent situations in which there is an energy imbalance that affects the same domain, i.e., biological or psychological. Therefore more attention needs to be placed in understanding why participants are differentiating these items.

In proceeding to perform inferential statistics, a few general considerations need to be made from the preliminary findings. Results suggest that there are many independent variables correlating with one another, in special those the rated to religiosity and those related to superstition. Furthermore, many of the independent variables do not correlate with the dependent variables. Therefore, in proceeding with the inferential statistics, only selected variables will be targeted. When variables are highly correlated with one another, in trying to reduce the number of variables composite score can be created, or specific variables can be chosen to represent that group of variables. To reduce the number of variables we will target on specific variables instead of creating composite scores.

In the child sample, since many variables that measure religiosity were correlated with one another, the two variables targeted will be religious importance and religious frequency. As for the variables that measure superstitious/spiritual practices, even though they are all highly correlated with one another, none of them correlate with the dependent variable, so they will not be targeted in subsequent analysis. As for the adult sample, out if the four variables that measure religiosity (family religious importance, family religious frequency, religious importance and religious frequency) only family religious importance and frequency will be targeted. Furthermore, religious importance and religious frequency were also correlated with spiritual

healing, so out of these three, only spiritual healing will be targeted. Finally, with regards to the variables that measure superstitious/spiritual practices, none of these will be targeted because they do not correlate with the dependent variable.

6.2.3 Inferential statistics

To examine what sources of vital energy people think are more likely to improve biological and psychological well-being, participants were asked to make judgments about whether natural or social-psychological sources of energy would improve the well-being of a character who was under either biological or psychological distress. These responses are referred to as *improvement judgments*. If participants thought an improvement took place, they were further asked if that improvement was attributed to an energy transfer/exchange or if it was because of an increase in happiness. This question was asked to assess the reasoning process behind participants' improvement judgment. Answers to the second question are referred to as the *explanation judgment*.

Figure 3 shows the mean of improvement judgment as a function of biological and psychological conditions for natural, social-psychological, and control items for children and adults. An inspection of Figure 3 reveals that within the biological condition, participants judged more often that natural sources of energy would yield an improvement and within the psychological condition participants judged more often that social-psychological sources of energy would yield an improvement. In both conditions the control items were the least likely to be judged to yield an improvement.

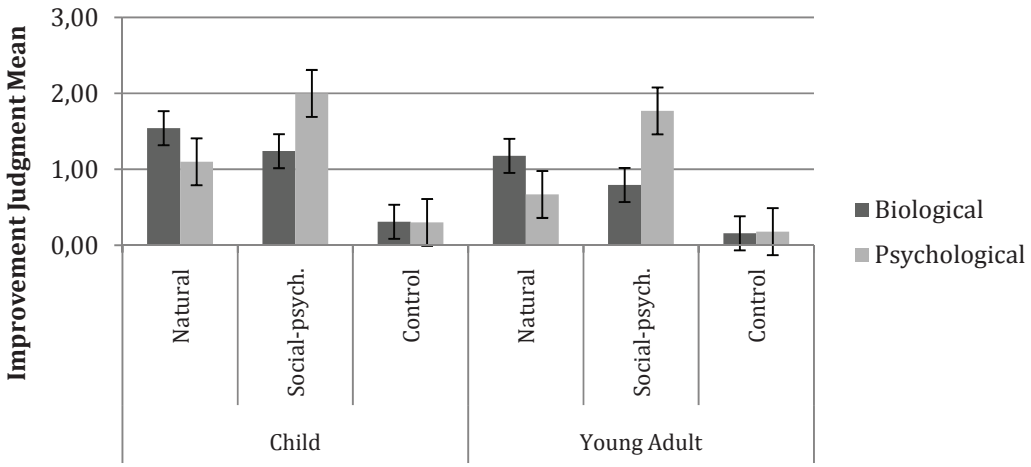

Figure 3: Children's and young adults' improvement judgment mean as a function of source items (natural, social-psychological, and control) for biological and psychological conditions.

A series of *t* tests was computed to see if there was a significant difference between the control items and the measured items. Results, displayed in Table 6, indicate that both child and adult groups distinguished test items from the controls. Furthermore, there were significant differences between all other comparisons for both sample groups.

Table 6: Statistics comparing energy source items to control items within the biological and psychological conditions

Conditions	Comparison	Child		Young Adult	
		t(74)	*p value*	*t(58)*	*p value*
Overall	Biological vs. Psychological	2.95	.004	5.03	< .001
Within Biological	Natural vs. Control	18.9	< .001	16.5	< .001
	Social-Psych vs. Control	11.6	< .001	10.9	< .001
	Natural vs. Social-Psych	3.96	< .001	6.05	< .001
Within Psychological	Natural vs. Control	10.3	< .001	8.9	< .001
	Social-Psych vs. Control	20.7	< .001	20.2	< .001
	Natural vs. Social-Psych	-12.13	< .001	-15.08	< .001

It is important to note that, even though adult participants are indicating that improvement took place, most of their improvement means displayed Figure 3 are around 2, indicating that they are judging that these energy sources are only promoting a little improvement.

While the improvement judgment results show that participants infer that natural and social psychological sources will improve in the well-being of the character, the explanation for these inferences is not clear. Hence it is important to look at the *improvement judgments* in relation to the *explanation judgments*.

Tables 7 and 8 describe the frequency of happy and energy explanation judgments given by children and adults as a function of condition (psychological and biological) and source category (natural and social-psychological). In addition, significant results yielded from chi-square tests are highlighted. The values only represent participants who responded that an improvement took place. Within biological conditions, participants were significantly more likely to judge that an improvement was due to energy coming from natural sources; as for social psychological sources, significant differences were less frequent and when present, favored an improvement due to happiness. Within the psychological conditions, participants were also significantly more likely to judge that an improvement was due to energy coming from natural sources; as for social psychological sources, in most cases participants were significantly more likely to judge that an improvement was due to an increase in happiness coming from social psychological sources. However the psychological condition of laziness was the only one in which a health improvement was attributed to energy coming from social-psychological sources, such as playing with friends (children and adults) and hanging out with friends (adults).

Table 7: Children's count of explanation judgments (happy or energy)

Source Category	Source Items	Biological Conditions						Psychological Conditions					
		Tired		Sick		Growth		Mean		Sad		Lazy	
		H	E	H	E	H	E	H	E	H	E	H	E
Natural	Vegetables	8	58*	8	63*	9	65*	11	24*	14	34*	7	52*
	Breathing	21	38*	19	48*	16	37*	21	27	15	42*	17	37*
	Water	7	50*	11	50*	9	54*	14	27*	15	35*	6	42*
Social Psych.	Hug	41*	12	34*	6	29*	6	62*	2	65*	7	43*	11
	Play	24	38	19	28	19	28	56*	8	60*	13	24	45*
	Hang out	32	29	28	16	26*	5	63*	3	67*	4	36	32

Note: * indicates a significant difference ($p < .001$) yielded from a chi-square test. For each question there were a total of 75 possible answers. The numbers above only represent answers implying an improvement, thus they do not represent the participants who judged that no improvement took place.

In looking at the energy source categories, explanation judgments based on energy exchange/transfer were mostly associated with natural sources of energy and less so with social-psychological sources.

Table 8: Young adults' count of explanation judgments (happy or energy)

Source Category	Source Items	Biological Conditions						Psychological Conditions					
		Tired		Sick		Growth		Mean		Sad		Lazy	
		H	E	H	E	H	E	H	E	H	E	H	E
Natural	Vegetables		53		51	1	50*	2	15*	3	23*	1	38*
	Breathing	11	37*	8	37*	6	16*	14	15	13	27*	3	38*
	Water	2	45*	1	47*	1	34*	5	12	6	19*	3	32*
Social Psych.	Hug	21	18	22*	5	8	2	48*	4	52*	4	22*	8
	Play	22	27	23*	8	5	8	47*	6	54*	1	15	40*
	Hang out	21	29	21	11	6	2	45*	7	52*	1	17	37*

Note: * indicates a significant difference ($p < .001$) yielded from a chi-square test. For each question there were a total of 60 possible answers. The numbers above only represent answers implying an improvement, thus they do not represent the participants who judged that no improvement took place.

Results suggest that both children and adults primarily judge that vital energy coming from natural sources distinctly improves biological well-being. However further analysis is required to

address whether there are overall differences between the conditions and source categories, if this varies across the different age groups, and which independent variables are influencing participants' explanation judgments. Given the sample size, a Repeated Measures Regression was chosen because it provides a single statistical procedure that tests for age effects, how our independent variables predict explanation judgments, also enabling us to contrast the different conditions of the dependent variable (ex: explore the differences between the biological and psychological conditions), therefore giving us more power to detect differences.

Because the focus of this study lies in investigating when reasoning based on *energy transfer/exchange* is elicited, the mean of participants' *energy count scores* for overall biological condition, overall psychological condition, natural source in psychology, natural source in biology, social-psychological source in psychology, and social-psychological source in biology were computed. An initial inspection of the newly computed scores yielded non-normal distributions.

Since the distribution of the explanation judgments is bimodal, the data were analyzed using a Repeated Measures Poisson Regression using a Generalized Estimating Equation (Liang & Zegler, 1986). Three regressions were run looking at three situation comparisons: a) one looking at the overall difference between biological and psychological conditions; b) within the biological conditions, one looking at the differences between natural and social-psychological sources of energy; and c) within the psychological conditions, one looking at the differences between natural and social-psychological sources of energy. Since the family-related independent variables were reported differently, regression analyses were run separately for the child and adult samples.

6.2.3.1 Children

Due to sample size, only nine variables could be included in the model, based on the eight-participants/variable ratio, for the regression models to be robust. Data screenings were run to determine which variables were to be included in each model. There were no gender differences; thus in subsequent analyses gender was not included as a predictor. Although ideally only nine variables should be included in the regression model, because this study looks at different age groups, each age comparison was entered in the model as a separate variable; thus the final model had a total of 12 variables entered.

The same set of 12 variables was chosen to be included in the regression model[7] for *biological X psychological*, *biological (natural X social-psychological)*, and *psychological (natural X social-psychological).* Independent variables included were parental education (less than bachelor's degree vs. bachelor's or more), age group (11- vs. 6-year-olds/11- vs. 8-year-olds) as between-subjects predictor variables; family religious importance, family religious frequency, family income, family use of traditional and alternative medicine, family use of spiritual healing, repeated measure comparison[8] (biological condition X psychological condition/within biological conditions - Natural source X social psychological source/within psychological condition - Natural source X social psychological source), and an interaction between 6-year-olds' X repeated measure comparison and 8-year-olds' X repeated measure comparison. All assumptions were met.

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[7] An initial inspection of the correlations between the explanation judgments and the independent variables (see preliminary analysis) also guided our choice of the variables to be included in the model for both adult and child Poisson repeated measures regression analysis.

[8] Because this is a Repeated Measures Poisson Regression with GEE, in each regression model a different comparison is being made with regards to different conditions (biological and psychological) and different sources of energy (natural and social-psychological) within each condition.

The first column of Table 9 shows the results from the Repeated Measures Poisson Regression with Generalized Estimating Equation (GEE) on the rate of energy explanation judgments across biological and psychological conditions[9]. There was a significant difference in the rate of energy explanation judgments as a function of age (11 vs. 6), χ^2 (1) = 14.00, $p < .001$, with the rate of energy explanation judgments of the 6-year-old group (M = 8.50, SE = 1.29) 1.55 times that of the 11-year-old group (M = 6.35, SE = .92) (see Figure 4).

Table 9: Child sample Repeated Measures Poisson Regression results

	Situations Compared with Repeated Measures GEE		
	Biological X Psychological	Biological (Natural X Social Psych)	Psychological (Natural X Social Psych)
Variable	e^b	e^b	e^b
Parental education	1.01	1.02	.80
6-year-old	1.55***	1.13	1.57
8-year-old	1.21	1.13	1.77**
Family religious importance	0.97	1.00	0.82**
Family religious frequency	1.16**	1.15***	1.32***
Family income	1.05	1.06	1.02
Traditional medicine	1.05	1.09*	1.00
Alternative medicine	1.05	1.00	1.06
Spiritual healing	0.93*	0.93*	0.95
Repeated measure comparison †	1.67***	2.64***	3.29***
6-year-old X Repeated measure	.74**	1.02	.90
8-year-old X Repeated measure	.85	.88	.67

*** = p<.001; **= p<.01; *= p<.05; 11-year-olds as reference group.

† Each regression model made a specific repeated measure comparison. Comparisons specific to each regression model are displayed on the top of each column.

e^b is the exponentiation of the B coefficient, which is an odds ratio. This value is reported because odds ratios can be easier to interpret than the B coefficient, which is in log-odds units.

[9] When running a Repeated Measures Poisson Regression with GEE, none of the major statistical software (SPSS and SAS) calculates if each of the overall regression models is significant, only reporting significant findings for each variable entered in the model. Therefore we are unable to report this statistic.

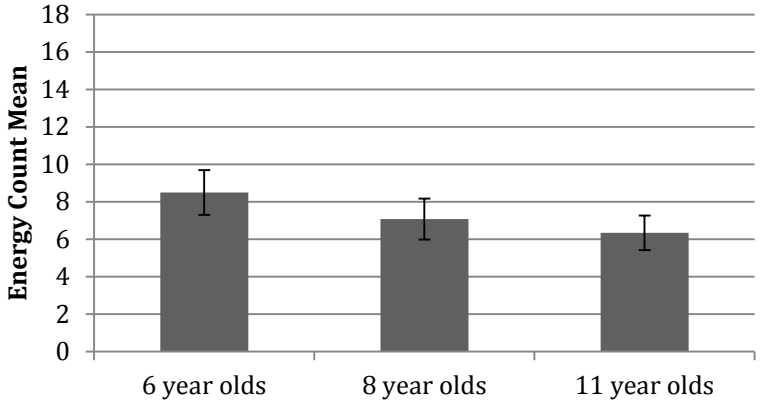


Figure 4: Energy judgment count mean as a function of age group (both conditions).

Second, there was a significant difference in the rate of energy reasoning judgments as a function of family religious frequency, χ^2 (1) = 7.11, p = .008, and spiritual healing, χ^2 (1) = 4.16, p = .04. The rate of explanation judgments increased by a factor of 1.16 for each standard unit increase in family religious frequency and decreased by a factor of .93 for each standard unit increase in family use of spiritual healing. Furthermore, there was a significant difference in the rate of explanation judgments as a function of condition (psychological vs. biological), χ^2 (1) = 38.35, p < .001, where the rate of explanation judgments for the biological condition (M = 8.70, SE = 1.34) was 1.67 times higher than for the psychological condition (M = 6.16, SE = .97). Finally, there was a significant interaction between age group (6 vs. 11) and condition (biological vs. psychological) displayed on Figure 5 below, χ^2 (1) = 9.63, p = .002. The rate of explanation judgments for the psychology condition was higher for six-year-olds (M = 7.63, SE = 1.17) than eleven-year-olds (M = 4.92, SE = .77); however there were no significant differences among explanation judgments rates within biological conditions.

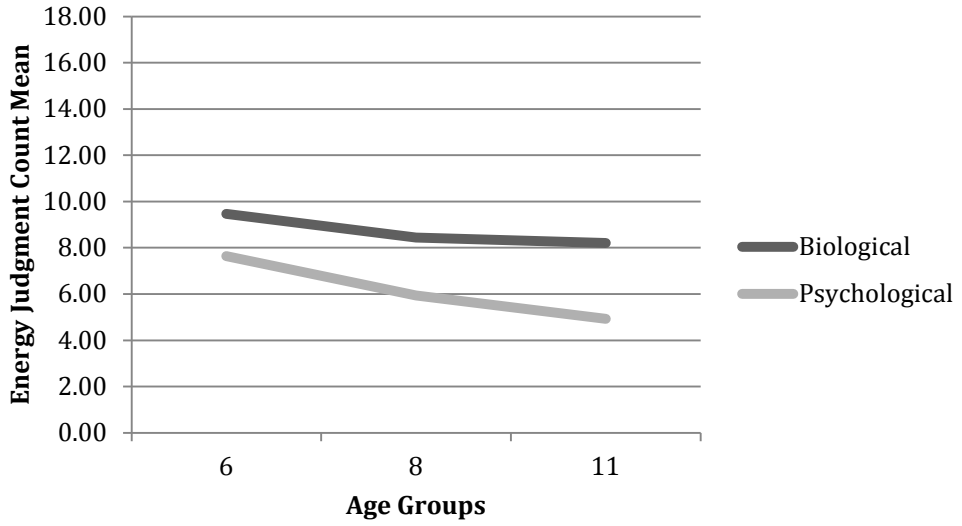


Figure 5: Interaction effect between age groups and conditions on the rate of energy judgments based on estimated marginal means.

The second column in Table 5 shows the regression results on the rate of energy explanation judgments for natural and social-psychological sources of energy within the biological condition. There was a significant difference in the rate of energy explanation judgments as a function of religious frequency, χ^2 (1) = 10.51, $p < .001$, traditional medicine, χ^2 (1) = 5.89, $p = .02$, and spiritual healing, χ^2 (1) = 5.60, $p = .02$, where the rate of energy explanation judgments increased by a factor of 1.15 times for each standard unit increase in religious frequency, increased by a factor of 1.09 for each standard unit increase in traditional medicine, and decreased by a factor of .93 for each standard unit increase in spiritual healing. Finally, there was a significant difference in the rate of energy explanation judgments as a function of energy source (social-psychological vs. natural), χ^2 (1) = 31.31, $p < .001$, where the rate of energy explanation judgments for natural sources of energy ($M = 6.31$, $SE = .85$) was 2.64 times higher than the social-psychological sources of energy ($M = 2.47$, $SE = .44$) (see Figure 6 below).

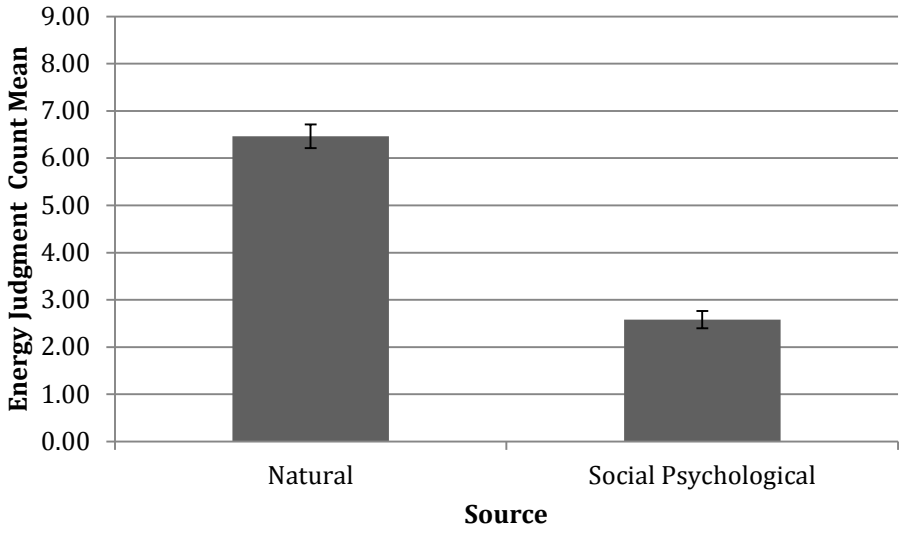


Figure 6: Energy judgment count mean as a function of energy source within biological conditions.

The third column in Table 5 shows the regression results on the rate of energy explanation judgments for natural and social-psychological sources of energy within the psychological condition. There was a significant difference in the rate of energy explanation judgments as a function of age (11 vs. 8), χ^2 (1) = 7.92, p = .005, with the rate of energy explanation judgments of the eight-year-old group (M = 2.82, SE = .61) 1.77 times that of the eleven-year-old group (M = 1.94, SE = .44) (see Figure 7).

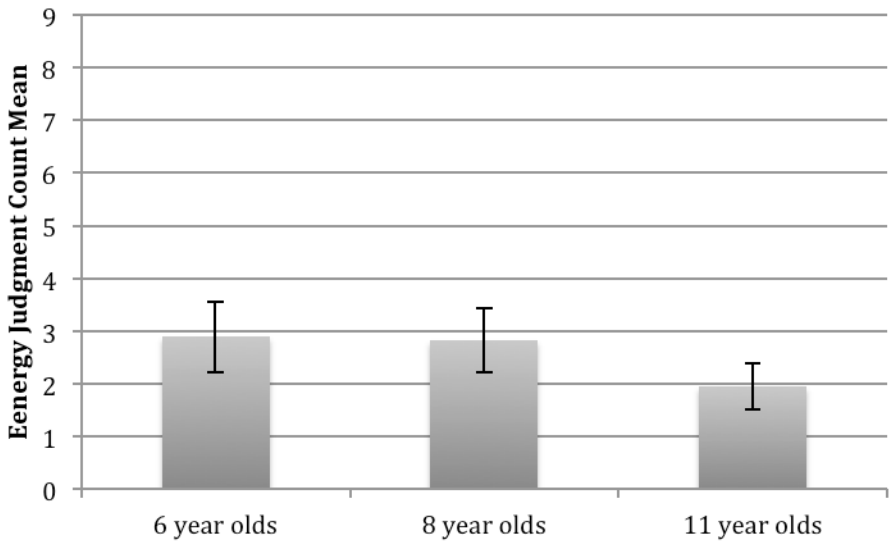


Figure 7: Energy judgment count mean as a function of age group within psychological conditions.

There was a significant difference in the rate of energy explanation judgments as a function of family religious importance, χ^2 (1) = 7.78, p = .005, and family religious frequency, χ^2 (1) = 16.98, p < .001; the rate of energy explanation judgments decreased by a factor of .82 for each standard unit increase in family religious importance, and increased by a factor of 1.32 for each standard unit increase in family religious frequency. Finally, there was a significant difference in the rate of energy explanation judgments as a function of energy source (social-psychological vs. natural), χ^2 (1) = 33.92, p < .001, where the rate of energy explanation judgments for natural sources of energy (M = 4.19, SE = .97) was 3.29 times higher than the social-psychological sources of energy (M = 1.54, SE = .39) (see Figure 8).

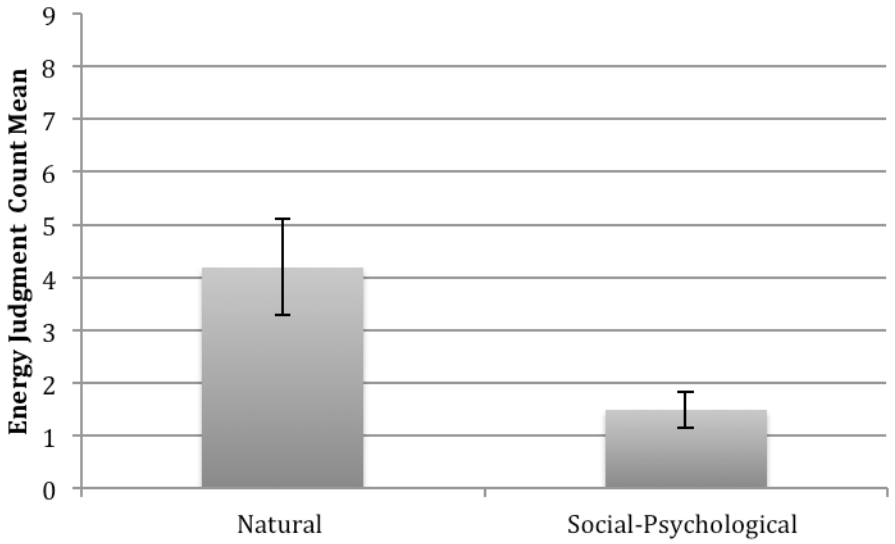


Figure 8: Energy judgment count mean as a function of energy source within psychological conditions**.**

(a) Summary

Overall, results from the child sample indicate that a judgment of improvement due to an energy exchange/transfer is mostly given to biological conditions, that is, when the character is suffering from a biological imbalance (sick, tired, and delayed growth), and coming from natural sources of energy, that is, air, water, and vegetables.

In looking at age differences across both conditions, six-year-olds offered more energy judgments when compared to eleven-year-olds. Within the conditions, six-year-olds gave more energy judgments for psychological conditions when compared to the eleven-year-olds. This finding lines up with past research, where young children around 6-7 years of age are more likely to display vitalistic causality reasoning. Furthermore, in looking at the regression for answers given to psychological conditions, the eight-year-olds were giving more energy judgments when compared to eleven-year-olds. An inspection of Figure 7 shows that six-year-olds also seemed to be giving more energy judgments when compared to eleven-year-olds; however the statistical results show that this difference was only marginally significant, χ^2 (1) = 4.35, p = .06. Thus the

results suggest that younger children are more likely to give overall energy judgments, and specifically more likely than older children to give energy judgments, to psychological conditions.

In looking at which variables seem to be affecting children's responses, across all regressions, an increase in religious frequency was associated with an increase in energy judgments. However an increase in family spiritual healing practices (such as prayer, meditation, and laying on of hands) was associated with a decrease of overall energy judgments and also a decrease within biological conditions. Finally an increase in religious importance was associated with a decrease in energy judgments within psychological conditions. Of all these variables related to religiosity/spirituality, only religious frequency predicted an increase in energy judgments. It is not clear how children's frequent exposure to organized religious activities, such as Sunday/Bible school, translates into an energy judgment increase. Speculatively, one possibility is that exposure to stories that deal with possibilities outside of the ordinary, such as God's power over the world exemplified on the story of Noah's arc, bring upon the idea of an invisible force that affects the world, not only the natural world, but that also affects living beings. In trying to make sense of a transcendental power, this might also encourages children to be more open to the possibility of the existence of imminent (worldly) powers and or energy, therefore somehow translating into children's energy reasoning judgments.

Thus, with regards to items related to the spiritual and religious domains, findings are mixed, with some practices increasing energy judgments while others decreasing.

6.2.3.2 Young Adults

Due to the sample size, only eight variables could be included in the model, based on the eight-participants/variable ratio, for the regression models to be robust. Previous data screenings were run to determine the variables to be included in each model. There were no gender differences; thus, for subsequent analyses gender was not included as a predictor. Even though ideally only eight variables should be included in the regression model, because there was a significant difference between own and family religious frequency and importance, all four variables were entered. Therefore the final model had a total number of nine variables entered. The same set of variables was chosen for all regression models: parental education, family religious importance and frequency, own religious importance and frequency, own use of traditional medicine, alternative medicine and spiritual healing, and Biological X Psychological conditions.

Table 10: Young adults' Repeated Measures Poisson Regression results.

	Situations Compared with Repeated Measures GEE		
	Biological X Psychological	Biological (Natural X Social Psych)	Psychological (Natural X Social Psych)
Variable	e^b	e^b	e^b
Parental education	0.74*	0.87	0.76*
Family religious importance	0.92	1.00	0.91
Family religious frequency	1.04	0.99	1.01
Own religious importance	1.06	0.94	1.17
Own religious frequency	0.95	1.00	0.94
Traditional medicine	1.05	1.05	1.04
Alternative medicine	0.96	0.98	0.97
Spiritual healing	1.13*	1.11*	1.11
Repeated measure comparison †	1.51***	3.07***	2.31***

*** = p<.001; **= p<.01; *= p<.05; 11-year-olds as reference group.

† Each regression model made a specific repeated measure comparison. Comparisons specific to each regression model are displayed on the top of each column.

e^b is the exponentiation of the B coefficient, which is an odds ratio. This value is reported because odds ratios can be easier to interpret than the B coefficient, which is in log-odds units.

The first column in Table 10 shows the results from a Repeated Measures Poisson Regression with GEE on the rate of energy explanation judgments across biological and

psychological conditions. There was a significant difference in the rate of energy explanation judgments as a function of parental education, χ^2 (1) = 5.63, p = .02, and spiritual healing, χ^2 (1) = 6.42, p = .01. The rate of energy explanation judgments for parents with less than bachelor's degrees was .74 times lower than for parents with bachelor's degrees or more. In addition, it increased by a factor of 1.13 for each standard unit increase in spiritual healing. Finally, there was a significant difference in the rate of energy explanation judgments as a function condition (psychological vs. biological), χ^2 (1) = 43.32, p < .001, where the rate of energy explanation judgments for the biological condition (M = 7.85, SE = 1.26) was 1.51 times higher than for the psychological condition (M = 5.21, SE = .81).

Results of the regression analysis on the rate of energy explanation judgments across social-psychological and natural sources of energy within the biological condition yielded a significant difference for spiritual healing, χ^2 (1) = 5.04, p = .02, and between social-psychological and natural sources, χ^2 (1) = 112.40, p < .001. Participants' energy explanation judgments increased by a factor of 1.11 for every standard unit increase in spiritual healing. Finally, the rate of energy explanation judgments for natural source (M = 6.45, SE = .96) was 3.07 times higher than for social-psychological source (M = 2.10, SE = .42) (see Figure 9).

Results of the regression analysis across energy sources within the psychological condition yielded a significant difference for parental education, χ^2 (1) = 4.06, p = .04, and between social-psychological and natural sources, χ^2 (1) = 61.25, p < .001. The rate of energy explanation judgments for participants with parents with less than bachelor's degrees was .76 times lower than for those with a bachelor's degree or more. Finally, the rate of energy explanation judgments for natural source (M = 3.92, SE = .85) was 2.31 times higher than for social-psychological source (M = 1.69, SE = .39) (see Figure 9).

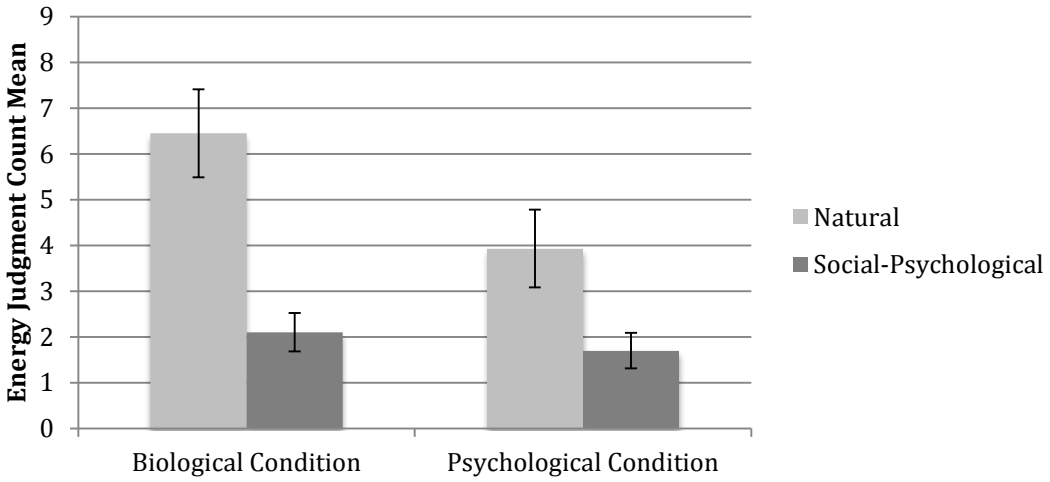


Figure 9: Energy judgment count mean as a function of energy source for biological and psychological conditions.

Young adults were also asked to rate how they believed each of the sources measured above were capable of giving people energy and making people happy. Table 11 displays the computed means of participants' source rating. First, there were significant differences between the control items and all the source items: Natural happy > control happy ($p < .001$), Natural energy > control energy ($p < .001$), social-psych biology happy > control happy ($p = .01$), social-psych psychology happy > control happy ($p = .01$), social-psych biology energy > control energy ($p < .001$), social-psych psychology energy > control energy ($p < .001$).

In looking at their ratings from natural sources of energy, participants were more likely to rate natural sources as giving people energy than making people happy, t (58) = -3.31, $p < .01$. As for their ratings for social psychological sources of energy, if the social interaction was with someone with a biological trait (i.e., lively, healthy, and growing well), they were equally likely to rate that these items make people happy and give people energy. Furthermore, if this social interaction was with someone with a psychological trait (i.e., nice, active, and happy), they were

more likely to rate these sources as making people happy, rather than giving people energy, t (58) = -9.85, $p < .001$.

Table 11: Results from source rating questionnaire.

Source	Happy	Energy
	(*N*=59), *M* or (*SD*)	
Natural (activity: breathe air, drink water, eat vegetables) **	1.30 (.63)	1.50 (.66)
Social Psychological (activity: hang out, hug, play)		
Biology trait	1.25 (.62)	1.26 (.63)
Psychology trait ***	1.93 (.65)	1.49 (.72)
Control	0.45 (.52)	0.41 (.48)

*** = p<.001; **= p<.01; *= p<.05; Mean scores represent items that reflect natural sources of energy making people happy (Natural-Happy), items that reflect natural sources of energy giving people energy (Natural-Energy), items that reflect social-psychological sources of energy linked to a psychological trait (happy, nice, and active) giving people energy (SocialPsych-Psych-Energy), items that reflect social-psychological sources of energy linked to a psychological trait (happy, nice, and active) making people happy (SocialPsych-Psych-Happy), items that reflect a social-psychological sources of energy linked to biological traits (healthy, growing well, lively) giving people energy (SocialPsych -Bio-Energy), items that reflect social-psychological sources of energy linked to biological traits (healthy, growing well, lively) making people happy (SocialPsych-Bio-Happy), control items giving people energy (Control-Energy), and control items making people happy (Control-Happy).

(a) Summary

Overall, results from the young adults sample indicate that a judgment of improvement due to an energy exchange/transfer is mostly given to biological conditions, and coming from natural sources of energy. The same pattern of findings was evident in the results from the source rating. In looking at what variables seem to be affecting young adult responses, in the biological X psychological regression and in the psychological regression, there was an effect of parental education, where less education was associated with less energy explanation judgments. Finally, in the biological X psychological regression and in the biological regression, an increase in use of spiritual healing was associated with an increase in energy explanation judgments. This

finding did not match findings from the child sample, where an increase in family use of spiritual healing predicted a decrease in energy explanation judgments.

6.3 DISCUSSION

The overall objective of the present study was to explore children's and adults' reasoning about vital energy. A primary goal was to investigate when vital energy reasoning is used to explain biological and psychology well-being. Results indicated that children and adults use vital energy reasoning to explain biological processes from an early age and continue to use this reasoning throughout development. The entire sample was more likely to judge that an energy exchange/transfer improved a biological condition than a psychological condition. In addition, when asked to choose if an improvement was due to an energy transfer or to an increase in happiness, children and adults were more likely to assign the energy transfer to biological conditions and the increase in happiness to the psychological conditions.

The second goal of this study was to explore if children were more likely to assign specific sources of vital energy for enabling psychological or biological well-being. Participants were presented with sources of energy that were either natural or social-psychological. Findings revealed that children and adults were more likely to associate natural sources of energy as improving one's well-being via an energy transfer than by happiness and that this effect was even stronger when the distress was biological. Furthermore, social-psychological sources of energy were more linked to an improvement of psychological distress via happiness, especially in the mean and sad psychological conditions.

The final aim was to investigate if this reasoning process changed throughout development. In general, most of the participants had a similar pattern of response, with an energy transfer associated with biological conditions and with natural sources. However there were some age differences in children's explanation judgments of the psychological conditions. Younger children more often judged that psychological improvement due to energy than did older children.

These findings suggest that when it comes to an energy reasoning within biology, across the different age groups, participants think alike, but with age children become less likely to associate an improvement of psychological distress with energy.

The methodology adopted in the present study required participants to provide an explanation judgment by choosing either happiness or energy exchange/transfer. This required participants to make a choice that was probably guided by reasoning anchored in intuitive domains of thought. Thus when reasoning about the improvement of a character that had a biological imbalance, their reasoning followed a causal-explanatory framework grounded in naïve biology; alternatively, when reasoning about the improvement of a character that had a psychological imbalance, their reasoning followed a causal-explanatory framework grounded in naïve psychology.

This forced choice method may neglect some overlap in children's understanding. During the interviews, children sometimes spontaneously judged that characters improved because of both happiness and energy. When asked to choose which one they thought was making the character improve the most, their preference was consistent with intuitive theory.

Contrary to the forced choice method used in the vital energy questionnaire, the young adults source rating questionnaire allowed them to rate how much they thought each specific

item gave people energy and made people happy. In looking at their source rating responses, results showed that even though there was again a tendency to associate energy with natural sources of energy, participants were still associating all sources to some degree with both making people happy and giving people energy. Future studies should investigate this reasoning process with methodologies that allow children to express if they think that each action can bring about an improvement because of happiness and if this is also accompanied by an energy exchange. This sort of methodology seems to capture the holistic aspect of vital energy reasoning better.

Finally, in looking at which variables were influencing participants' responses, in the child sample there were mixed findings when it came to religious and spiritual beliefs and practices, with family frequency of religious activities increasing energy explanation judgments and family religious importance and spiritual healing practices decreasing energy explanation judgments. In looking at the young adult results, spiritual healing practices were positively correlated with an increase in energy judgments. Child sample dissonant effects of religious importance and religious frequency on energy explanation judgments might reflect the importance of one's own experience with religion. When parents reported on family frequency of organized religious activity this involved the child being personally engaged in religious activities, an experience that most likely reflected on their energy explanation judgments. On the other hand, when parents reported on the importance their family placed on religion, this was most likely a subjective assessment that did not directly reflect the child's viewpoints and experiences. Following the same reasoning, conflicting effects of spiritual healing on energy explanation judgments might also reflect one's own experience with religion. When parents reported on spiritual healing practices (such as prayer, meditation, and laying on of hands) this reflected practices that children were not necessarily engaged in (with the exception of prayer),

or invested in. On the other hand, when young adults reported on spiritual healing practices, this most likely reflected their own personal engagement and investment in such activities. Therefore, findings suggest that it is not only overall religion that affects energy judgments, but it is also possibly one's personal experience, investment, and engagement with religion. This ultimately points to a link of energy reasoning with religion and spirituality, suggesting that one's religious and spiritual experiences might impact how later in development adults reason about energy transcending into a spiritual domain.

Building on the relationship between religion/spirituality and energy reasoning, Study 2 extends this research by exploring the "end state" of these concepts across a broader sample of participants, therefore looking at whether energy reasoning is elicited to explain transcendental/spiritual processes.

7.0 STUDY 2

Whereas Study 1 examined whether and when reasoning about vital energy exchange/transfer is employed in the biological and psychological domains, Study 2 was designed to investigate whether reasoning about vital energy extends from the biological and possibly psychological domains to include transcendental and/or spiritual phenomena. A hypothetical death scenario was used to investigate how people reason about the continuity of vital energy when the biological body ceases functioning. In looking at this reasoning process, attention needs to be directed not only to whether vital energy is judged to continue, but also how this continuity takes place.

Past research on afterlife beliefs has explored children's and adults' reasoning about the continuity of mental and biological functioning after death (Astuti & Harris, 2008; Bering, 2002). Findings indicate that later in development participants tend to infer the discontinuity of biological functioning, but at the same time infer the continuity of mental functioning. Thus, afterlife beliefs are guided by an intuitive theory of mind, where a transcendental self, possessing mental features such as memory, thoughts, and beliefs, is believed to continue detached from a physical body. However vital energy continuity has never been explored in this context.

The present study will investigate the continuity of biological and mental functioning in relation to the continuity of vital energy in reasoning about the afterlife. Vitality items will reflect both psychological and biological aspects of vital energy. Based on past research (Astuti

& Harris, 2008; Bering, 2002), participants were expected to be more likely to infer continuity of mental functioning over bodily functioning. It was not clear if vital energy reasoning would be elicited as continuing alongside mentality or not, but given that continuity is inferred, psychological vital energy was expected to be more likely to be judged as continuing as opposed to biological vital energy.

Importantly, after-life inferences about vitality may differ in an important way from after-life inferences about mentality. Mentality is inherently tied to agency and personhood. It is hard to imagine thoughts or beliefs existing independently of a person or individual. Vital energy, on the other hand, can be a part of an individual self (as evidenced by the western concept of vital energy), but can also exist independently from it, as an impersonal energy in the world (as evidenced by Ayurveda philosophy, where *prana* is believed to be dispersed back into the broader universe as an impersonal energy). To tease this apart, it is important to measure the continuity of vital energy as intertwined with mentality, but at the same time to measure its continuity as detached from it. CSR research on soul concepts has shown that people view the soul as being one's essence and identity (Richert & Harris, 2006, 2008); therefore, by looking at vital energy continuity along with soul continuity we can look at the individual vs. impersonal aspects of these conceptions.

The present study included open-ended questions that targeted continuity of vital energy and soul, exploring if participants believe in its continuity after death, whether it continues attached to an identity or dispersed back into the universe, and if it continues into this world or into some other heavenly world.

Given the scope of what needs to be addressed in relation to vital energy reasoning in a spiritual/transcendental domain, the specific research questions addressed by this study are as

follows: a) is vital energy inferred to continue in the absence of a physical body? b) Given that continuity is inferred, is this continuity attached to an individual self or dispersed back into the universe? c) Given continuity, is vital energy judged to continue in this world (i.e., as an immanent force) or into some other heavenly world (i.e., as a transcendental force)? d) How are continuity judgments affected by nationality?

In the present study, participants were presented with a death scenario and then asked to judge the continuity of mental functioning (memories, thoughts, and beliefs), bodily functioning (brain functioning, eyesight, and feelings of hunger) and vital energy. Since in many cultures vital energy is conceived as a holistic force that affects body, emotions, and spirituality, perceptions of vital energy were measured in two different ways: *Biological vital energy* (bodily liveliness, bodily vigor, and bodily energy), capturing the link of vital energy with the body, and *psychological vital energy*, measured as positive vital energy (good vibes, good aura, and good energy) and negative vital energy (bad vibes, bad aura, and bad energy), capturing the link of vital energy with emotions and morality. For each question participants were asked to indicate if the given characteristic ceases or continues after death. Consistent with prior research, it was hypothesized that participants would be more likely to indicate the continuity of mentality over bodily functions. As for vital energy, it was hypothesized that continuity would be inferred in some cases, depending on cultural variation.

Young adults from two distinct cultural settings (the USA and Brazil) were interviewed. In contrast to Study 1, the present study did not draw from a child sample due to the need to explore cultural differences in adults first, before looking at this developmentally. In looking at this cross-nationally, it is equally important to identify variables that might affect how participants in both countries are responding. As reviewed earlier, Brazil is more “open” to talk

about vital forces beyond the boundaries of biology, as evident in everyday acceptance of alternative medicine, religion, and superstition. Given that alternative medicine, religion, and superstition seem to elicit vital energy reasoning and that Brazil and the USA seem to differ on how these ideas are endorsed and/or recruited, measures for belief in alternative medicine, belief in superstition and belief in transcendental religiosity, use of alternative medicine, and use of superstitious practices were obtained (see Figure 10).

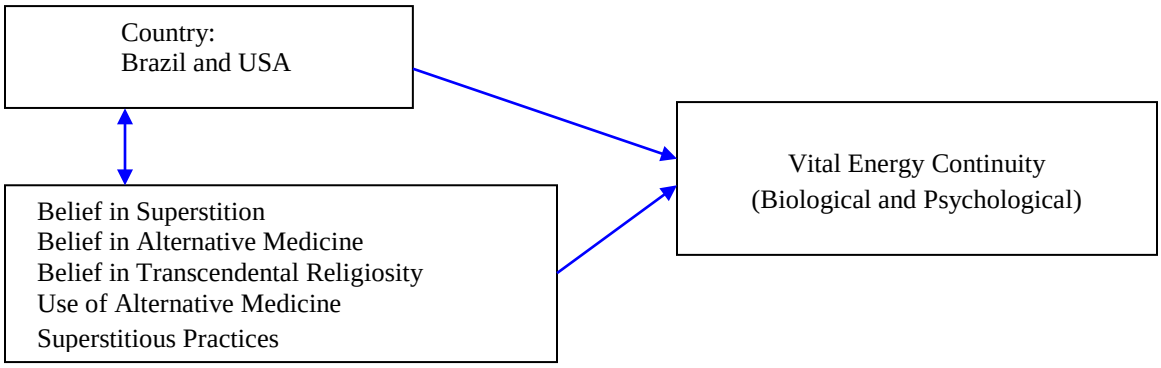


Figure 10: Diagram depicting IVs explored in Study 2 and their relationship with the DV.

It was hypothesized that Brazilians would display higher rates of alternative beliefs and practices as compared to USA participants and that these higher rates would be related to higher rates in inferring the continuity of vital energy after death. In contrast, *belief in transcendental religiosity* measured participants' more conventional supernatural beliefs, which are a core part of mainstream religions, such as belief in God, heaven, and hell. It was hypothesized that both Brazilians and Americans would display high belief scores for transcendental religiosity. However given that Brazilians are more likely to endorse a wide array of alternative belief systems, in Brazil it was predicted that belief in transcendental religiosity would be accompanied

by beliefs in alternative medicine, immanent religiosity, and superstition, whereas in the USA it would not.

7.1 METHOD

7.1.1 Participants

The participants in the USA were 113 undergraduate psychology students at a public university in western Pennsylvania. As part of their Introduction to Psychology class, participants were required to complete research hours and so received credit towards their class for completing the questionnaires. The mean age of participants was 19 years (*SD* = 3.74; range = 18 to 52; 58 male, 54 female). Reported ethnicity was 85% Caucasian, 8.8% Asian, 4.4% other, 1.8% Latino/Hispanic. Reported religious affiliations were 34.5% no religious affiliation, 33.6% Catholic, 23.9% Protestant, 2.7% Judaism, and 5.3% other.

The participants in Brazil were 144 undergraduate students majoring in humanity courses (Psychology, Education, or Pedagogy) from a public university in the northeast. The mean age of participants was 24 years (*SD* = 7.73; range = 18 to 62; 21 male, 123 female).[10] Ethnicity was not accessed in this sample because this is not a measure used with this population.[11] Reported religious affiliations were: 31.9% Catholic, 24.6% no religious affiliation, 20.3% Protestant,

[10] Gender differences in the sample reflect gender differences in the population being sampled. In Brazil, humanities courses have a higher female to male ratio.

[11] Brazil is considered to be a melting pot; therefore centuries of miscegenation among the races have created a society in which racial distinctions are not easily made, essentially blurring racial boundaries.

9.4% Buddhist, 8% Spiritist, and 5.8% other. Participants were recruited from their classrooms and asked if they wanted to participate in this study.

7.1.2 Translation

All research documents translated from English to Portuguese, and vice versa, were made by two native Portuguese speakers who were fluent in English. One of the translators was raised in an English-speaking country and the other obtained both a PhD and a Post-doctorate in English speaking institutions. Both were qualified to translate the questionnaires used in Study 2.

All the research documents presented to the Brazilian population (with the exception of the signed consent form) followed the same procedure to ensure the accuracy of the translation. For the Brazilian population, to ensure verification of the accuracy of translation, the full set of measures presented above were first translated from English to Portuguese, and then back-translated by second person from Portuguese to English. The PI then compared both English versions to see if they consistently mapped onto each other. Neither of the translators was linked to the project and both were unaware of the hypothesis being tested.

7.1.3 Measures

Demographic and background information was obtained, including not only participants' current beliefs and practices, but also the beliefs and practices of their families when they were growing up. In addition four measures were obtained. First they completed a *disembodied vital energy* questionnaire, which was designed for this study to examine how people reason about vital energy continuity when the physical body stops functioning. Second, a *superstition belief*

measure was obtained by using the Revised Paranormal Belief Scale (RPBS) (Tobacyk, 2004), along with additional items that were developed by Lindeman and Saher (2007) to supplement this scale (see Appendix E). The additional items were included to obtain a more accurate measure of superstition. Third, a *belief in transcendental religiosity* measure was obtained using a subset of items that were extracted from the RPBS (Tobacyk, 2004). Fourth, a *belief in immanent religiosity* measure was obtained using items designed for this study, targeting alternative religions' beliefs, such as reincarnation and karma. Finally, a *belief in alternative medicine* questionnaire adapted from an original measure developed by Lindeman and Saher (2007) was used to obtain a measure of belief in alternative medicine.

7.1.3.1 Demographic and background information

Participants were asked to report their age, gender, and ethnicity (USA only). In addition, they were asked if they were affiliated with a religious community (yes/no), what was their current religious affiliation, how important religion was in their life (not at all, mildly, moderately, strongly - scores ranging from 0-3), and how much they were currently involved in organized religious activity (never, rarely, moderately, frequently - scores ranging from 0-3). They were also asked to report on their current use of *healing treatments* and *superstitious/spiritual practices*. Use of *healing treatments* was measured by asking how often they made use of traditional medicine, alternative medicine, spiritual healing, and alternative diets (never, rarely, moderately, frequently - scores ranging from 0-3). *Superstitious/spiritual practices* were measured by asking how often they contacted the dead, performed rituals to get rid of evil spirits, consulted psychics, consulted fortune tellers, displayed magical and superstitious practices (never, rarely, moderately, frequently - scores ranging from 0-3).

With regards to their family life when growing up, participants were asked what their family's religious affiliation was, how important religion was in their family life (not at all, mildly, moderately, strongly - scores ranging from 0-3), and how often they were involved in organized religious activity (never, rarely, moderately, frequently - scores ranging from 0-3). Participants were also asked about their family use of *healing treatments* and *superstitious/spiritual practices*, paralleling the items described above. Furthermore, they were asked to report their parents' education background (less than high school, high school, bachelor, post-bachelor, other) and family income. With regards to family income, participants from the USA were asked to report their annual income (under 25K, 26-50K, 51-100K, over 100K). In Brazil this had to be measured differently. Brazilians usually do not like to report their income and commonly choose not to report it.[12] An alternative way of getting at income is by asking them what social class they belong to. Thus instead of asking them to report income they were asked to report their perceived social class (working class, lower middle class, upper middle, and upper class). In order to attempt to have a comparable measure, participants in the US that reported income less than 25K were classified as working class, 25-50K as lower middle class, 50 -100K as upper middle class, and above 100K as upper class.[13] This is not a good way of equating these measures, but given that SES is not a variable of main interest in this study, it is believed that this will not seriously jeopardize the reliability and validity of the findings.

[12] This information comes from the PI's past experience conducting research with Brazilian population.
[13] Social class categorization and its related income are based on Thompson and Hickey's (2005) social class division of American society.

7.1.3.2 Disembodied vital energy

A new instrument was designed to measure how participants reason about vital energy when the physical body ceases functioning. This questionnaire has two parts. Part 1 measured participants' forced choice judgments about the continuity/discontinuity of a series of *psycho/biological properties* after death, including mental functions, bodily functions, and vital energy. Part 2 of the questionnaire examined participants' beliefs in the continuity of vital energy and soul, making use of open-ended questions.

Part 1 introduced a character that dies: "*This is John/Jane. John's/Jane's body stopped working and he/she died."* Participants were then asked, *"What continues, if anything, after he/she died?"* A sketch (see Appendix F) accompanied the narrative to help participants visualize the hypothetical scenario proposed. Participants were presented with a series of questions about the possible continuity of the mental function (beliefs, thoughts, and memories), bodily function (brain, hunger, and eyes), and vital energy (biological vital energy [bodily energy, bodily liveliness, and bodily vigor], positive psychological vital energy [good energy, good vibe, and good aura], and negative psychological vital energy [bad energy, bad vibe, and bad aura]). See Appendix D for the full questionnaire. The full set of psycho/biological items was presented in a random order.

Pre-tests indicated that participants were confused when asked to judge the continuity of both positive and negative vital energy, treating the character as either a good or bad person as a whole. Hence, half the participants received three questions about positive energy continuity; the other half received three questions about negative energy continuity.

The questions created borrow from past research (Bering, 2002; Cohen et al., 2011; Harris & Gimenez, 2005; Ryan & Frederick, 1997) and are categorized as (Mentality) "Now that

he is dead, do you think John's *memories* continue? (Biological vital energy) "Now that she is dead, do you think Jane's *bodily liveliness* continues? (Psychological vital energy) "Now that he is dead, do you think John's *good energy* continues? (Bodily functioning) "Now that she is dead, do you think Jane's *feeling of hunger* continues? The gender of the character presented in the narrative was counterbalanced and randomly distributed.

The second part of the questionnaire consisted of six open-ended questions in two sets. One set consisted of three questions about the continuity of *good and/or bad energy/vibes*. The other set consisted of three questions about the continuity of the *soul*. The order of presentation of these two sets was counterbalanced across participants.

Within each set, the first question presented, asked about the overall continuity of either the *soul* or *good and/or bad energy/vibes.* This question was formatted as follows:

Now I want to ask you a general question. When somebody dies, one possibility is that the soul *continues; another possibility is that* good and/or bad energy/vibes *continues; another possibility is that nothing at all continues. Do you think it's possible that* (the soul or good and/or bad energy/vibes) *continues? How so?"*

Following, two subsequent questions investigated if continuity is attached to an individual self, and if it is judged to be an immanent or transcendental force. The order in which these questions were presented was counterbalanced. The questions made were as follows:

"Given the continuity of (the soul or good and/or bad energy/vibes) *after death, one possibility is that it continues to be identified with/attached to a specific person; another possibility is that it joins the broader universe, separate from the person; or maybe there is yet another possibility. What do you think is possible? Please explain."*

"Given the continuity of (the soul or good and/or bad energy/vibes) *after death, one possibility is that it continues in this world; another possibility is that it continues in some other heavenly world; or maybe there is yet another possibility. What do you think is possible? Please explain."*

For the Brazilian population, parts 1 and 2 of the disembodied vital energy questionnaire followed the same translation procedure used for the previous materials. There was some difficulty in finding a Portuguese term that mapped into the English term *bodily liveliness*, but after some consideration the PI along with the two translators decided to use the term "*vivacidade do corpo*", which maps onto the English term *vivacity*, which is a synonym of liveliness.

7.1.3.3 Belief in superstition

In order to measure participants' belief in superstition, the present study adopted the measure used by Lindemen and Saher (2007). Their measure includes items from the RPBS, by Tobacyk (2004), with additional items included to measure a more diverse set of paranormal beliefs (see Appendix G). Additional items and subscales were included because the items on the RPBS cover only some aspects of superstitious and magical beliefs (Lindemen & Aarnio, 2007). However, for this study, items measuring belief in extraterrestrial beings and religiosity were excluded in order to measure "alternative" beliefs that may be more related to energy beliefs, independent of traditional religion.

The superstition questionnaire has 44 items, measured on a five-point Likert scale (0 = strongly disagree, 4 = strongly agree). Belief in paranormal agents was measured with seven items (e.g., belief in witches, ghosts). Belief in the paranormal abilities of human beings was

measured with 10 items (e.g., beliefs in telepathy, spiritualism, precognition, and psychokinesis). Luck beliefs were measured with nine items (e.g., belief in omens of luck, rituals, and amulets). Belief in astrology was measured with five items. Belief in the claims of feng shui was measured with five items. The mean scores of all the items were computed to measure overall superstition.

Reliabilities were good for both samples. For the USA sample the Cronbach's alpha coefficients were belief in paranormal agents ($\alpha = 0.86$); belief in the paranormal abilities of human beings ($\alpha = 0.88$); luck beliefs ($\alpha = 0.88$); belief in astrology ($\alpha = 0.94$); belief in feng shui ($\alpha = 0.86$); overall superstition ($\alpha = 0.95$). For the Brazilian sample the Cronbach's alpha coefficients were: belief in paranormal agents ($\alpha = 0.80$); belief in the paranormal abilities of human beings ($\alpha = 0.89$); luck beliefs ($\alpha = 0.81$); belief in astrology ($\alpha = 0.86$); belief in feng shui ($\alpha = 0.77$); overall superstition ($\alpha = 0.94$).

7.1.3.4 Belief in transcendental religiosity

In order to obtain a measure of participants' transcendental religiosity separate from superstition, the subscale of religiosity from the RPBS was used (see Appendix H). It was measured on a five-point Likert scale (0 = strongly disagree, 4 = strongly agree) with four items (e.g., belief in God and hell). A Cronbach's alpha of 0.90 was obtained with the USA sample and of 0.70 with the Brazilian sample.

7.1.3.5 Belief in immanent religiosity

In order to obtain a measure of participants' immanent religiosity separate from superstition, a scale was created (see Appendix H). Immanent religious beliefs were measured with three items (belief in karma, reincarnation, spirits) on a five-point Likert scale (0 = strongly disagree, 4 =

strongly agree). A Cronbach's alpha of 0.73 was obtained with the USA sample and of 0.87 with the Brazilian sample.

7.1.3.6 Belief in alternative medicine

This measure is composed of the following 16 items that represent alternative medicine methods: chiropractic, relaxation techniques, acupuncture, homeopathy, natural remedies, hypnosis, stone therapy, spiritual healing, macrobiotics, Reiki, shiatsu, color therapy, aromatherapy, floral therapy, reflexology, and meditation. For each item, participants were asked to rate their belief on a six-point scale (ranging from 0 = I do not know the therapy to 5 = I strongly believe in the efficacy of this treatment). This measure was adapted from Lindemen and Saher's (2007) alternative medicine belief questionnaire; however their original scale had 22 items. Six items were excluded because they represented alternative health practices that were not common in either Brazil or the USA. Lindemen and Saher (2007) reported on the reliability of this measure ($\alpha = 0.90$). In the present samples, Cronbach's alphas were of 0.81 (USA sample) and 0.83 (Brazilian sample).

7.1.4 Procedure

Participants were recruited from a pool of psychology students in the USA and from undergraduate humanities major classes (psychology, education, and pedagogy) in Brazil. They were assessed in a classroom on the university campus, filling out questionnaires in a pencil/paper format.

In a group, participants were initially presented with the overall objective of the study. Following this introduction, consent forms were distributed and participants were given 20

minutes to read and ask any questions before deciding to participate or not. The experimenter was accessible during this period to answer individually any relevant questions pertaining to the study procedures. Only the participants that signed the consent form remained in the room.[14] Next, participants were given a cover page introducing the study, followed by the *disembodied vital energy* questionnaire (part 1 followed by part 2). After completing the *disembodied vital energy* questionnaire, participants received the *belief in superstition*, *belief in transcendental religiosity*, *belief in immanent religiosity*, and the *belief in alternative medicine* questionnaires. The order in which these four measures were presented was counterbalanced. At the end, participants were asked to answer a series of questions that collected demographic and background information. Participants took between 20-40 minutes to answer all questionnaires presented.

7.1.5 Coding

7.1.5.1 Demographic information

For gender, female participants were coded as 0 and male participants as 1. For religious affiliation, participants that indicated no religious affiliation received a score of 0. If they indicated affiliation with a religious community, they received a score of 1.

Family and own religious importance was coded with scores ranging from 0-3 (not at all, mildly, moderately, strongly). Family and own religious frequency was coded with scores ranging from 0-3 (never, rarely, moderately, frequently). Parental education was coded as 1 for less than high school, 2 for high school, 3 for bachelor, 4 for post-bachelor, and 5 for other.

[14] Two participants from the USA and three from Brazil decided not to participate in the study, therefore leaving the room.

Social class (a measure that came from USA income and Brazil perceived social class) was coded as 0 for working class (USA: under 25K), 1 for lower middle class (USA: 25-50K), 2 for upper middle class (USA: 50 -100K), and 3 for upper class (USA: above 100K). Family and own use of *healing treatments* and *superstitious/spiritual practices* were all coded with scores ranging from 0-3 (never, rarely, moderately, frequently).

7.1.5.2 Disembodied vital energy

For part 1 of the disembodied vital energy questionnaire, *no* judgments were coded as 0, and *yes* judgments were coded as 1. A total count of *yes* judgments was obtained by adding the three *continuity judgments* for mental functioning, positive vital energy, negative vital energy, biological vital energy, and biological functioning, yielding final scores ranging from 0-3, where higher scores indicated more continuity judgments.

For part 2, a different set of categories was created to code each of the questions presented. These can be seen in Appendixes I, J, and K, and are explained in more detail in the qualitative segment of the results section.

7.1.5.3 Other measures

Mean scores for the overall *superstitious belief* questionnaire were computed, ranging from 0-4. Higher scores indicate a stronger belief pattern. A separate mean score for *belief in transcendental religion* and *belief in transcendental religiosity* was computed, ranging from 0-4. Higher scores indicate a stronger belief pattern. Finally, to compute mean scores for the *belief in alternative medicine* two steps had to be taken. First all scores of 0 indicated that the participant did not know that specific therapy; thus responses of 0 were recoded as missing, number 1 recoded as 0, number 2 responses recoded as 1, number 3 recoded and 2, and number 4 recoded

as 3. A mean response was obtained with only the answers to therapies participants were familiar with, ranging from 0-3, where higher scores indicate a stronger belief in the efficacy of the treatment.

7.1.6 Design

Part 1 of this study measures psycho/biological property continuity, holding three within-subjects outcome variables (mind continuity, biological energy continuity, and bodily functioning continuity) and two between-subjects outcome variables (positive and negative energy continuity).

Additional measures obtained were demographic information (age, gender, ethnicity, religious affiliation, social class, parental education), family and own superstitious/spiritual practices, family and own healing practices, belief in superstition, belief in transcendental religiosity, belief in immanent religiosity, and belief in alternative medicine.

The second part of this study involves a qualitative design. Open-ended questions elicited answers regarding how and where vital energy continues after death. Specific categories are available in Appendixes I, J, and K.

7.2 RESULTS

7.2.1 Descriptive statistics: are there differences between Brazilian and American undergraduate students?

Descriptive information for the sample by country can be found in Table 12. Notably the Brazil sample had more female participants and participants were slightly older when compared to the USA sample. As for religious belief, both samples had a similar distribution, with more Catholics, followed by Protestants, and those with no religious belief.

In comparison to the USA, the Brazil sample placed stronger importance on religion and reported participating in organized religious activities more frequently. With regards to use of healing treatments, the USA sample reported making more use of traditional medicine, whereas the Brazil sample was more likely to use alternative medicine and spiritual healing. When it came to alternative diets, the samples did not differ. As a whole, participants from Brazil were more likely than participants from the USA to make use of all the superstitious/spiritual practices measured, also reporting on stronger supernatural beliefs. Finally, the samples did not differ significantly when it came to belief in alternative medicine, immanent religiosity, and transcendental religiosity.

It was initially hypothesized that both participants from the USA and from Brazil would display high transcendental belief scores, but that Brazilians would be more likely to endorse a wide array of competing belief systems. This hypothesis was partially confirmed. Participants from both countries were equally likely to report high belief scores for transcendental religiosity when compared to other belief systems, but they only differed from each other when it came to belief in superstition, not belief in immanent religiosity or belief in alternative medicine.

Table 12: Descriptive statistics by country

Characteristics	USA Undergraduates (*N*=113), *M* or *%* (*SD*)	Brazil Undergraduates (*N*=144), *M* or *%* (*SD*)
Undergraduate Characteristics		
Age ***	19.0 (3.7)	24.0 (7.7)
Male	51.8 %(0.5)	14.6% (0.3)
Ethnicity		
Caucasian	85.0%	-
Asian	8.8%	-
Hispanic/Latino	1.8%	
Other	4.4%	-
Religious belief		
Catholic	33.6%	31.9%
Protestant	23.9%	20.3%
Jewish	2.7%	-
Buddhist	-	9.4%
Spiritist	-	8.0%
Other	5.3%	5.8%
None	34.5%	24.6%
Religion – importance ***	1.5 (1.3)	2.1 (1.0)
Religion – frequency **	1.4 (1.1)	1.7 (1.1)
Use of healing treatments		
Traditional medicine***	2.5 (0.7)	2.0 (0.9)
Alternative medicine***	0.4 (0.7)	0.8 (1.0)
Spiritual healing***	0.7 (1.0)	1.5 (1.2)
Alternative diets	0.3 (0.8)	0.4 (0.8)
Superstitious/spiritual practices		
Contacting the dead**	0.0 (0.2)	0.2 (0.5)
Rituals to get rid of evil spirits***	0.0 (0.3)	0.2 (0.6)
Consulting psychics***	0.0 (0.2)	0.2 (0.6)
Consulting fortune tellers*	0.0 (0.2)	0.1 (0.4)
Use of magical and superstitious practices*	0.2 (0.5)	0.4 (0.8)
Beliefs		
Belief in superstition *	2.0 (0.6)	2.2 (0.7)
Belief in alternative medicine	2.9 (0.6)	2.6 (0.7)
Belief in transcendental religiosity	3.4 (1.4)	3.8 (1.0)
Belief in immanent religiosity	2.3 (1.1)	2.7 (1.4)
Family and household characteristics growing up		
Social Class		
Working class	1%	18.2%
Lower middle class	18.7%	52.4%
Upper middle class	30.8%	28%
Upper class	49.5%	1.4%
Highest Parental Education		
Less than high school	-	24.6%

Table 12: (continued)

Characteristics	USA Undergraduates (*N*=113), *M* or *%* (*SD*)	Brazil Undergraduates (*N*=144), *M* or *%* (*SD*)
High school	9.8%	25.4%
Associate's degree/technical training	-	11.3%
Bachelor's degree	34.8%	16.9%
Post-Bachelor's degree	52.7%	14.1%
Other	2.7%	7.7%
Family religious belief		
Catholic	48.7%	67.2%
Protestant	27.4%	14.2%
Jewish	1.8%	-
Muslim	1.8%	-
Buddhist	-	3.7%
Spiritist	-	6.7%
Other	8.8%	2.2%
None	11.5%	6.0%
Family religion – importance	1.8 (1.1)	1.9 (0.9)
Family religion – frequency*	2.2 (1.0)	1.9 (0.9)
Family use of healing treatments		
Traditional medicine***	2.6 (0.6)	2.2 (0.9)
Alternative medicine***	0.4 (0.7)	0.8 (1.0)
Spiritual healing***	0.7 (0.9)	1.5 (1.2)
Alternative diets	0.3 (0.7)	0.2 (0.5)
Family superstitious/spiritual practices		
Contacting the Dead***	0.0 (0.2)	0.3 (0.7)
Rituals to get rid of evil spirits***	0.1 (0.4)	0.3 (0.7)
Consulting psychics***	0.1 (0.2)	0.4 (0.7)
Consulting fortune tellers	0.0 (0.2)	0.1 (0.5)
Use of magical and superstitious practices***	0.1 (0.4)	0.6 (0.9)

Note. Significance levels reflect the statistical significance of differences between undergraduate students in the USA and Brazil. Significant differences for categorical variables were not measured. Descriptive statistics are unweighted.*$p < .05$. **$p < .01$. *** $p < .001$.

When looking at family and household characteristics growing up, American participants reported higher parental education and income. The Brazilians were somewhat more Roman Catholic in upbringing. Remarkably, Americans were reportedly more likely than Brazilians to attend organized religious activity growing up.

With regard to family use of healing treatments, the results matched the findings of participants' current use of healing treatments. Finally, looking at family superstitious/spiritual

practices, Brazilians were significantly more likely to report consulting psychics, contacting the dead, use of rituals to get rid of evil spirits, and magical/superstitious practices, but there was no difference between families' consulting of fortunetellers. It is important to point out that these were small differences, but nevertheless in the predicted direction.

In sum, both samples are quite "conventional" but there is modest support for certain more "alternative" beliefs and practices among the Brazilians, especially spiritual healing.

7.2.2 Inferential statistics: What properties are judged to continue after death?

One of the proposed objectives of the present study was to investigate if vital energy is inferred to continue in the absence of a physical body. Thus, participants were presented with a hypothetical death scenario and asked to judge if a series of psychological/biological properties continue after death. For each of the psychological/biological properties measured, participants answered three questions presented in a yes/no format. Participants' answers were computed as count scores, ranging from 0-3. An initial inspection of the data indicated that these variables did not have a normal distribution, thus non-parametric tests were adopted to test their differences. Figures 11 and 12 display the mean of the count continuity scores as a function of the psychological/biological properties for the USA and Brazil samples separately.

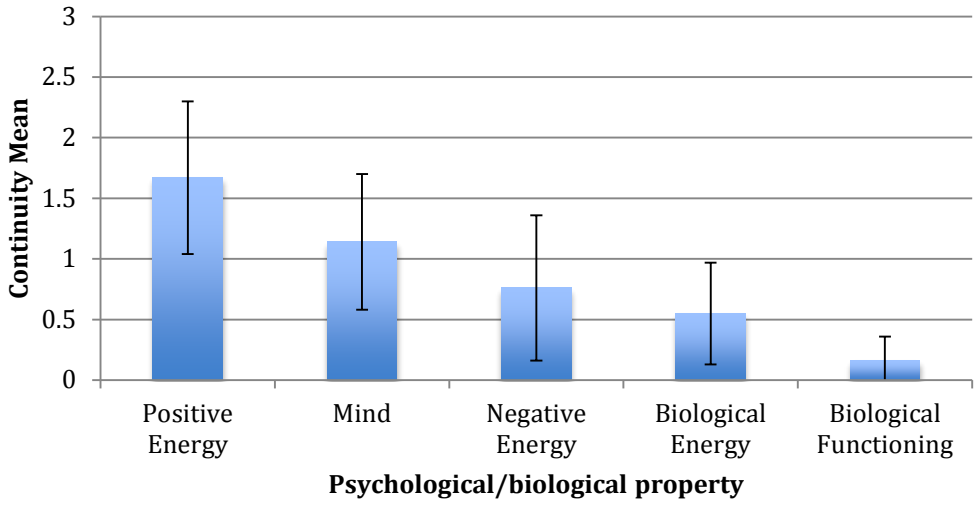


Figure 11: Continuity mean as a function of psychological/biological property for USA sample.

It was hypothesized that participants would be more likely to indicate the continuity of mind and vital energy over bodily functions. An inspection of Figure 11 indicates that USA participants most frequently affirmed the continuity of positive energy, followed by mind and negative energy, and were least likely to affirm continuity of biological energy and biological functioning.

To test the significance of these differences a series of nonparametric tests was conducted. Continuity scores did not differ significantly between mind (M = 1.14, Mdn = 1.00) and positive energy (M = 1.67, Mdn = 2.00), z = -1.82, p = .07, r = -.24[15], but they were significantly higher for positive energy (M = 1.67, Mdn = 2.00) than for biological energy (M = .55, Mdn = .00), z = -4.79, p < .001, r = -.31, and for positive energy (M = 1.67, Mdn = 2.00) than for biological functioning (M = .16, Mdn = .00), z = -5.49, p < .001, r = -.36. Furthermore, continuity scores were significantly higher for positive energy (M = 1.67, Mdn = 2.00) than for

[15] r values represent an estimate of the effect size. These values are reported as a standardized measure of the effect observed, complementing the p value.

negative energy (*M* = .76, *Mdn* = .00), U= 1953.50, z = -2.32, *p* = .03, *r* = -.19.[16] Continuity scores did not differ significantly between mind (*M* = 1.14, *Mdn* = 1.00) and negative energy (*M* = .76, *Mdn* = .00), z = -1.05, *p* = .29, *r* = -.14, but they were significantly higher for mind (*M* = 1.14, *Mdn* = 1.00) than for biological functioning (*M* = .16, *Mdn* = .00) z = -6.91, *p* < .001, *r* = -.45, and for mind (*M* = 1.14, *Mdn* = 1.00) than for biological energy (*M* = .55, *Mdn* = .00) z = -4.76, *p* < .001, *r* = -.31. Finally, continuity scores were significantly higher for negative energy (*M* = .76, *Mdn* = .00) than for biological energy (*M* = .55, *Mdn* = .00), z = -2.19, *p* = .03, *r* = -.29, and for biological energy (*M* = .55, *Mdn* = .00) than for biological functioning (*M* = .16, *Mdn* = .00), z = -4.70, *p* < .001, *r* = -.31.

Overall, the hypothesis was met, with USA participants being more likely to assume continuity of mind and positive and negative energy and least likely to assume continuity of biological functioning and biological energy. So it is not just overall vital energy that is judged to continue after life, but it is specifically psychological vital energy that is distinct from a biological vital energy.

An inspection of Figure 12 suggests that the Brazil sample displayed a similar pattern of results, being more likely to affirm the continuity of positive energy, followed by mind and negative energy, and least likely to affirm the continuity of biological energy and biological functioning.

[16] Statistical comparisons between positive and negative energy judgments were carried out with a Mann-Whitney U test because they were independent measures (i.e., between subjects).

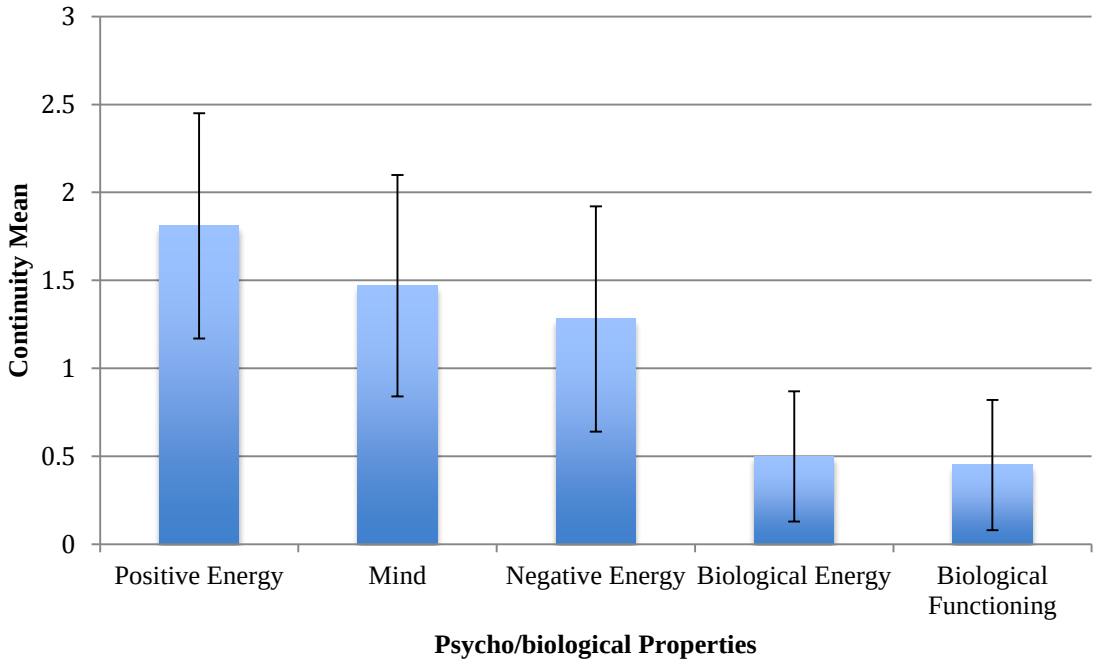


Figure 12: Continuity mean as a function of psychological/biological properties for the Brazil sample**.**

For participants from Brazil, continuity scores were significantly higher for positive energy (*M* = 1.81, *Mdn* = 2.50) than for mind (*M* = 1.47, *Mdn* = 1.00), z = -1.99 *p* = .04, *r* = -.11. They were also significantly higher for positive energy (*M* = 1.81, *Mdn* = 2.50) than for biological energy (*M* = .50, *Mdn* = .00), z = -5.92 *p* < .001, *r* = -.35, and for positive energy (*M* = 1.81, *Mdn* = 2.50) than for biological functioning (*M* = .45, *Mdn* = .00), z = -5.94 *p* < .001, *r* = -.35. Furthermore, continuity scores were significantly higher for positive energy (*M* = 1.81, *Mdn* = 2.50) than for negative energy (*M* = 1.28, *Mdn* = 1.00), U = 982.50, z = -3.67, *p* < .001, *r* = -.30. Continuity scores did not differ significantly between mind (*M* = 1.47, *Mdn* = 1.00) and negative energy (*M* = 1.28, *Mdn* = 1.00), z = -1.73, *p* = .08, *r* = -.21, but they were significantly higher for mind (*M* = 1.47, *Mdn* = 1.00) than for biological energy (*M* = 1.28, *Mdn* = 1.00), z = -7.22, *p* < .001, *r* = -.42, and for mind (*M* = .1.47, *Mdn* = 1.00) than for biological functioning (*M* = .45,

Mdn =. 00), z = -7.66, $p < .001$, r = -.45. Finally, continuity scores were significantly higher for negative energy (*M* = 1.28, *Mdn* = 1.00) than for biological energy (*M* = .50, *Mdn* = .00), z = -4.07, $p < .001$, r = -.50, but did not differ between biological energy (*M* = .50, *Mdn* = .00) and biological functioning (*M* = .45, *Mdn* = .00), z = -.60, *p* - .55, *r* = -.05.

Similar to the findings in the USA, the Brazil sample was more likely to affirm continuity of mind and positive and negative energy and least likely to affirm continuity of biological functioning and biological energy. Thus, the findings indicate that participants do affirm that psychological vital energy continues, in addition they also seem to differentiate positive from negative energy, being more likely to assume that positive energy continues. These results are a good starting point to begin understanding how people reason about vital energy as detached from a physical body. However, what these data do not tell us is how and where people think energy continues after death. To address these questions participants were presented with a series of open-ended questions that are analyzed in the following section.

7.2.3 A qualitative analysis: How does vital energy continue and where does it go?

Participants were presented with open-ended questions that targeted how and where vital energy and the soul continue. These questions probed whether good/bad energy/vibes or soul continues attached to an identity or not and whether it continues in an earthly world or a heavenly world. In order not to influence participants' responses, first an open-ended question about vital energy or soul continuity was presented in which they could express how they thought vital energy or soul would continue. This was followed by two questions that targeted whether vital energy or soul continues attached to an identity or alternatively is dispersed in the universe and if it continues in an earthly or heavenly world.

To analyze participants' answers to the open ended questions, three steps were taken. First, categories were created to code participants' answers; second, to ensure the robustness of the created categories, Kappa interrater reliabilities were measured based on 25% of the coding; third, all the participants' answers were categorized. Results were limited to answers to the vital energy continuity questions because they shed more light into the questions being asked by this study.

7.2.3.1 Pathway to analysis: categorization

As a first step, the principal investigator read all responses given by the participants and developed a different categorization scheme for each of the questions. There were some differences between the categories developed for each country, but for the most part they were the same (see Tables 13, 14, and 15)

Following this first step, for answers given by USA undergraduates, two native English-speaking research assistants, who were blind to the study objectives, were trained to rate each of the questions (see coding categories in Tables 13, 14, and 15). For answers given by the Brazilian undergraduates, one Portuguese-English speaking research colleague, who was blind to the study objectives, was trained to rate each of the questions. Both trainings consisted of presenting a list of categories with an example and explanation of what each category was intended to capture. The PI explained each category and definition and parameters of each category were discussed. Next, a practice session took place, in which each rater judged the items individually. For the USA sample answers, two research assistants made these ratings, for the Brazil sample answers, the PI (a native Portuguese speaker) and the research colleague made

these ratings. Finally, the individual ratings were compared and disagreements were settled by discussion.

During the training session it became apparent that some of the answers given by the participants captured more than one of the coding categories; thus a coding decision-making rule was developed. This decision-making rule targeted categories that were more commonly clustered together, thus allowing coders to select one specific category when participants' answers captured more than one category. The decision-making rule was as follows: a) disbelief and discontinuity was coded as discontinuity; this choice was made because in most cases participants did not clearly explain if their disbelief was in the existence of vital energy or if it was an disbelief in its continuity, so it made more sense to focus on the aspect of their answers that was more clearly stated, thus discontinuity; b) discontinuity and unsure was coded as discontinuity; this decision followed the same rationale as the previous one, that is, when participants answers captured these two categories, the one that was more strongly supported in their answers was discontinuity; c) psychological continuity and continuity as an identity/entity was coded as continuity as an identity/entity; the reason for this choice lies on the fact that this questions was specifically designed to measure transcendental aspects of vital energy, thus if participants were making references to these two possibilities, it was decided to focus attention on the transcendental portion of it; and d) psychological continuity and continuity in universe/nature was coded as continuity in universe/nature; this decision once again reflected the primary focus of investigating a transcendental vital energy. The same decision-making rule was adopted for coding answers from both countries.

Following the practice session, the same raters were given a sample of answers to perform reliability coding. Because of different sample sizes, the number of answers used for

training and reliability coding in each country varied. The American sample had an $n = 113$. To perform the interrater reliability coding for the three open-ended questions, 33% of the total sample of answers was used, yielding a total of 35 responses each. Out of these, 8% were used for training (9 responses) and 25% (28 responses) for the interrater reliability. The Brazilian sample had an $n = 144$, 33% of the total sample of answers was used, yielding a total of 47 responses each. Out of these, 8% were used for training (11 responses) and 25% (36 responses) for the interrater reliability. An interrater reliability analysis using the Kappa statistic was performed to determine consistency among raters.

Kappa scores for the *overall* energy continuity item were USA: Kappa = 0.79 ($p < 0.001$), 95% CI (0.625, 0.954); Brazil: Kappa = 0.70 ($p < 0.001$), 95% CI (0.528, 0.874). For the question about continuity of energy as *attached to an identity or as a force in the universe* scores were USA: Kappa = 0.87 ($p < .001$), 95% CI (0.738, 1.00); Brazil: Kappa = 0.79 ($p < .001$), 95% CI (0.643, 0.937). For the question about continuity of energy *in an earthly or in a heavenly world*, scores were USA: Kappa = 0.77 ($p < .001$), 95% CI (0.595, 0.944); Brazil: Kappa = 0.78 ($p < .001$), 95% CI (0.611, 0.928).

Usually Kappa values from 0.40 to 0.59 are considered moderate, 0.60 to 0.79 substantial, and 0.80 outstanding (Landis & Koch, 1977). Thus, the Kappa values obtained were within an acceptable range. To finalize the categorization of answers, rating disagreements were settled by discussion. Next, for the USA sample, one research assistant coded the remaining answers for overall continuity and identity/universe, while the other coded earthly/heavenly world. For the Brazil sample, the PI coded answers for the overall continuity question, while the research colleague coded the remaining two. To view a sample of the answers given by the

participants see Appendixes I, J, and K, in addition the coding manual is also attached in Appendix L.

7.2.3.2 Qualitative Results

Table 13 displays the response categories obtained from asking participants about overall energy continuity. *Continuity as a presence* and *unsure* were categories only present in the Brazil sample, while discontinuity responses referencing *biological* processes were only present in the USA.

With regards to the USA sample, 39% did not believe in the existence of energy or expressed that energy does not continue after death. In contrast, a total of 55.7% expressed that energy does continue; however there was some variation in how they believed it to continue. Among the subcategories of energy continuity, there were two that participants expressed the most, that of psychological continuity (24.9%) and continuity as an identity/entity (15.9%).

As for the Brazil sample, 30.6% did not believe in the existence of energy or expressed that energy does not continue after death. In contrast, a total of 67.3% expressed that energy does continue. Among the subcategories of energy continuity, there were two that participants expressed the most, that of continuity as an identity/entity (38.6%) and psychological continuity (12.9%). Thus, typical responses for continuity as an identity/entity were "*Eu acredito que essas energias, vibrações, belas ou más continuam na alma do indivíduo, ele leva consigo o que ele é*" (I believe that these energies, vibes, good or bad, continue in the person's soul; he takes with him what he is).

Table 13: Percentage of the categories used to code open-ended answers to questions about overall continuity of vital energy after death.

Category	USA (*N*=113) *%*	Brazil (*N*=144) *%*	Explanation
Unsure	-	1.4	Answers imply the person is unsure about what energy is or about what happens to it after death.
Disbelief	6.2	.7	Answers imply that the person does not believe in the existence of good or bad energy/vibes.
Overall discontinuity			
Discontinuity	10.6	14.3	Answers that express belief in discontinuity without any further explanations.
Biological	10.6	-	
Only soul continues	3.5	7.1	Answers that imply the energy does not continue and what continues is only the soul/spirit.
Only psychological continuity	8.1	7.1	Answers that imply that vital energy discontinues and that the only thing that continues is a person's impression on the world (legacy) and on the people they interacted with (memories and feelings associated with the dead person).
Overall continuity			
Continuity	3.5	7.1	Answer implies continuity without clearly stating how it continues.
Continuity as presence	-	5.1	Answers imply that energy continues as a presence in this world among the living, without clearly attaching energy to an identity or to an entity
As an identity/entity	15.9	38.6	Answers that imply that energy continues attached to an identity or some other immaterial entity (Soul, Spirit, Ghost, Aura).
Psychological continuity	24.8	12.9	Answers that imply that energy continues as a person's impression on the world (legacy) and on the people they interacted with (memories and feelings associated with the dead person).
Universe and/or nature	7.1	2.9	Answer implies that energy continues in the universe or in nature (our natural world).
Good or bad	4.4	.7	Answers that imply that either bad or good energy continue. Not both.
Not categorizable	5.3	2.1	Answers that were not categorizable

A majority of participants in both countries judged that that vital energy continues after death. However, compared to the Brazilian participants, the USA participants were somewhat less likely to affirm continuity and more likely to explain continuity in psychological terms, rather than in terms of identity.

Table 14 displays the response categories obtained from asking participants if they believed in the possibility of energy continuing attached to an identity/entity or if it continues as a force in the universe.

With regards to the USA sample, 69.1% of participants expressed that energy does continue. Among the subcategories of energy continuity, there were three that participants expressed the most, being that of continuity as an identity/entity (31.1%), continuity as force in nature/universe (18.6%), and psychological continuity (15.9%). In Brazil, 71.5% of participants expressed that energy does continue; however there was some variation in how they believed it to continue. Among the subcategories of energy continuity, most of the participants expressed that energy continues as an identity/entity (34.6%), followed by continuity as force in nature/universe (12.8%) and psychological continuity (12.1%).

Once again, participants from both countries were more likely to assume that energy continues after death, with both American and Brazilian participants tending to believe more often in the possibility of energy continuing attached to an identity/entity.

Table 14: Percentage of the categories used to code open-ended answers given to questions about continuity of energy as attached to an identity or as a force in the universe

Category	USA (*N*=113) *%*	Brazil (*N*=144) *%*	Explanation
Unsure	3.5	2.1	Answers imply the person is unsure about what energy is or about what happens to it after death.
Disbelief	12.4	8.6	Answers imply that the person does not believe in the existence of good or bad energy/vibes.
Discontinuity	11.5	9.3	Answers that express belief in discontinuity without any further explanations.
Continuity			
Attached to an identity/entity	31.1	34.6	Answers that imply that energy continues attached to an identity or some other immaterial entity (Soul, Spirit, Ghost, Aura).
Thru reincarnation	-	6.3	Answers imply that energy continues thru reincarnation.
Psychological continuity	15.9	12.1	Answers that imply that energy continues as a person's impression on the world (legacy) and on the people they interacted with (memories and feelings associated with the dead person).
Universe and/or nature	18.6	12.8	Answer implies that energy continues in the universe or in nature (our natural world).
As an identity in the universe	3.5	5.7	Answer implies that energy continues in the universe as an identity.
Uncategorizable	3.5	8.5	Answers that are uncategorizable.

Table 15 displays the response categories obtained from asking participants if they believed in the possibility of energy continuing in an earthly world or in a heavenly world.

Table 15: Percentage of the categories used to code open-ended answers given to questions about continuity of energy in an earthly or in a heavenly world.

Category	USA (*N*=113) *%*	Brazil (*N*=144) *%*	Explanation
Unsure	1.8	3.6	Answers imply the person is unsure about what energy is or about what happens to it after death.
Disbelief	9.9	5.7	Answers imply that the person does not believe in the existence of good or bad energy/vibes.
Discontinuity	17.1	7.1	Answers that express belief in discontinuity without any further explanation.
Continuity			
In an earthly world	23.4	18.6	Answers that imply the continuity of energy in this world. Some might conceive it as in nature, in the broader universe or in some parallel dimension. Usually negating the continuity to heaven, or negating heaven's existence.
In a heavenly world	24.4	25.7	Answers imply that energy continues in some other heavenly world. Sometimes conceived as heaven and hell and sometimes conceived as a transcendental world (not part of this world). Energy might be associated with soul or not.
Psychological continuity	4.5	5.0	Answers that imply that energy continues in this world as a person's impression on the world (legacy) and/or on the people they interacted with (via memories and feelings associated with the dead person).
Transitioning between an earthly and heavenly world	10.8	22.9	Answers imply the possibility of energy continuing both in an earthly world and in a heavenly world, transitioning from one to the other.
Transitioning both worlds via reincarnation	-	3.6	Answers imply the possibility of energy continuing both in an earthly world and in a heavenly world, transitioning from one to the other thru reincarnation.
Uncategorizable	8.1	7.9	Answers that are uncategorizable.

In the USA, 63.1% of the sample expressed that energy does continue; however there was some variation in how they believed it to continue. Among the subcategories of energy continuity, there were three that participants expressed the most, being that of continuity in a heavenly world (24.4%), continuity in an earthly world (23.4%), and continuity transitioning between a heavenly and an earthly world (10.8%). As for the Brazil sample, 75.9% of the sample expressed that energy does continue, with participants expressing a continuity in a heavenly world the most

(25.7%), followed by continuity transitioning between a heavenly and an earthly world (22.9%) and continuity in an earthly world (18.6%). A typical response would be "*Elas continuam existindo neste mundo e no mundo celeste. Quando a pessoa morre a alma dela se desprende do corpo material e vai para o mundo celeste se preparar para a reencarnação. A alma carrega as energias. As pessoas quando morrem não esquece da vida que viveu neste mundo e vem visita-lo"* (They continue to exist in this world and in a heavenly world. When a person dies, his or her soul detaches itself from the physical body and goes to a heavenly world to prepare for reincarnation. The soul carries the energies. When the person dies, he or she does not forget this world or his or her life and he or she comes to visit it).

Once again participants from both countries were more likely to assume that energy continues after death, with both samples tending to believe more in the possibility of energy continuing in a heavenly world. However participants from Brazil more often endorsed the possibility of energy continuing transitioning between a heavenly and an earthly world.

The primary focus of Study 2 is to explore transcendental aspects of vital energy, that is, the goal is to investigate if people believe vital energy can continue into an afterlife and how it continues. In looking at how participants explain the overall continuity of vital energy, there were two categories that prevailed - psychological continuity and continuity attached to an identity. Psychological continuity responses express that one's energy continues as one's legacy in the world, and/or via living people's memories and feelings associated with the deceased. A typical answer given was "*Maybe a person's impact on other people can cause this. A morally good person will be remembered by others positively. And someone's ideas or beliefs can live on and survive, despite the person's death, if others accept them"*. This rationale does not represent the transcendental vital energy continuity that we are aiming to investigate in this study. In

contrast, continuity attached to an identity expresses belief in energy continuing attached to an immaterial entity such as a soul or a spirit, clearly capturing vital energy transcendental beliefs.

The USA sample tended to provide more explanations that expressed psychological continuity (24%), whereas the Brazil sample provided more answers that express continuity as an identity (38%). This finding calls into question if the continuity judgments given to positive and negative energy (presented in the previous section) are in fact representing this underlying notion of vital energy transcending from a physical body into another transcendental world/universe. So to try to understand better if energy continuity judgments were associated with psychological continuity responses, attention was given to the number of participants in each country who explained energy continuity with either psychological continuity or continuity as an identity/entity, discarding participants that gave other kinds of explanations. Then out of these, the number of explanations that were also accompanied by a positive or negative energy continuity judgment answer with at least one yes response were studied.

In the USA sample, a total of 30 participants judged at least one energy item (including positive and negative energy together) to continue after death. Out of these, 16 provided psychological continuity explanations and 14 provided continuity as an identity/entity explanation. In the Brazil sample, a total of 66 participants judged at least one energy item (including positive and negative energy together) to continue after death. Out of these, only 16 provided psychological continuity explanations, and 50 provided continuity as an identity/entity explanation. This result indicates that when the Brazilian participants are judging *yes* responses to energy continuity, they predominately interpreted this continuity to be part of the continuity of a personal identity in the afterlife. Comparatively, the USA participants viewed the continuity of energy in more psychological terms.

In conclusion, even though the American sample favored a psychological continuity explanation when answering the question about overall energy continuity, when further probed about the possibility of energy continuing attached to an identity/entity or dispersed back into the universe, there was a shift in participants' answers and they started to report the possibility of energy being attached to an identity/entity instead of a psychological continuity more, demonstrating some inconsistencies in their responses.

7.2.4 Inferential Statistics: What variables predict participants' continuity judgments for psychological/biological properties after death?

Regression analyses were planned to examine how independent variables influenced participants' afterlife continuity judgments for psychological/biological properties. An initial inspection of the data revealed that many of the characteristics measured correlated highly with one another, thus violating the multicollinearity assumptions of multiple regression. Furthermore, given the current sample size, there is a limit to the number of variables that can be included in a regression model. For this reason, a principal component analysis was run with the objective of creating composite scores and reducing the number of variables to be used in the regression analysis.

A principal component analysis is a variable reduction procedure. It is useful when working with a large number of variables that display some redundancy. In this case, redundancy means that some of the variables are correlated with one another, possibly because they are measuring the same construct. Due to this redundancy, it is possible to reduce the observed variables into a smaller number of principal components that will account for most of the variance in the observed variables.

7.2.4.1 Principal component analysis

An initial inspection of the data showed that components loaded similarly for both countries. Therefore, instead of running one principal component analysis for each country, one procedure was run for the entire sample.

As explained above, a principal components analysis was used to identify and compute composite scores. In this analysis, 26 variables that measured beliefs, use of healing treatments, superstitious/spiritual practices, importance given to religion, and frequency of organized religious activity were included.

The variable by participant ratio was 1/9, which is above the 1/5 ratio required. Further inspection of the data using well-recognized criteria for factorability was done. First, all of the 26 items correlated at least .3 with at least one other item, suggesting reasonable factorability. Second, the Kaiser-Meyer-Olkin measure of sampling adequacy was .69, within the recommended value, and the Bartlett's test of sphericity was significant, χ^2 (325) = 2788.1, $p <$ .001, suggesting that the sample was factorable.

After running a first analysis, the diagonals of the anti-image correlation matrix indicated that all variables included were above the acceptable level of .5, and the communalities were all above .3, confirming that each item shared some common variance with other items.

Furthermore an inspection of the scree plot indicated that seven components were to be extracted, all holding eigenvalues above 1. Three of the 26 variables (i.e., family religious frequency, family religious importance, and family spiritual healing) did not load on any of the seven components; thus they were removed.

A final principal component analysis of 23 items, using an *oblimin* rotation was run. The *Oblimin* rotation was chosen because it allows for the different components to correlate with

each other, therefore resembling how these components are related in real life situations. The results, in Table 16, point to seven component loadings with eigenvalues above 1.0, explaining 65% of the variance.

Table 16: Component loadings based on a principal component analysis with *oblimin* rotation

Component	1	2	3	4	5	6	7
Family – Contacting the dead	0.84	-0.12	0.18			.16	
Family – Consulting psychics	0.80		0.20				
Family – Rituals to get rid of evil spirits	0.74		-0.13	0.10			
Contacting the dead	0.68					-0.13	
Rituals to get rid of evil spirits	0.58	0.13	-0.28			-0.29	-0.14
Consulting psychics	0.53					-0.31	-0.25
Religious importance		0.87					
Belief in transcendental religiosity		0.82	0.11				0.12
Religious frequency		0.78	-0.11	-0.13		0.14	
Spiritual healing	0.17	0.70					-0.21
Use of magical and superstitious practices			0.80	0.12	-0.11	-0.14	0.11
Family – fortune teller	0.12		0.66		0.13		-0.23
Family - magical and superstitious practices		0.24	0.65				
Fortune teller			0.60	-0.10		-0.19	-0.11
Traditional medicine				0.93			
Family use of traditional medicine				0.92			
Alternative diet					-0.86		
Family alternative diet					-0.84		
Belief in immanent religiosity						-0.86	
Belief in superstition			0.20		0.10	-0.82	
Belief in alternative medicine				0.12	-0.18	-0.61	-0.19
Use of alternative medicine			0.12				-0.87
Family use of alternative medicine					-0.25	-0.11	-0.74
% of Variance	18.99	13.97	8.25	7.19	6.49	5.65	4.37

Note. Factor loadings < .1 are suppressed.

The items that loaded on component 1 all relate to *psychic practices*, the items on component 2 relate to *religiosity*, items on component 3 relate to *superstitious practices*, items on component 4 relate to *traditional medicine*, items on component 5 relate to *alternative diets*, items on

component 6 relate to *alternative beliefs,* and items on component 7 relate to use of *alternative medicine.*

Because some of the items above were on a 4-point *Likert* scale and others were on a 5-point *Likert* scale, all 23 variables were standardized to reflect a z-score (at an average of zero and a standard deviation of 1). Using the new standardized values, composite scores were created by calculating a mean for each of the seven components. Table 17 presents descriptive statistics of the new composite scores.

Table 17: Descriptive statistics for the seven components extracted *(N* = 257*)*

Components	N°. of items	Min	Max	M	SD	Cronbach's Alpha
1 - Psychic practices	6	-0.32	4.33	0.00	0.74	.84
2 - Religiosity	4	-1.73	1.21	-0.01	0.83	.84
3 - Superstitious practices	4	-0.37	4.25	0.00	0.74	.73
4 - Traditional medicine	2	-2.70	0.89	-0.01	0.94	.85
5 - Alternative diets	2	-0.42	3.91	0.00	0.89	.70
6 - Alternative belief systems	3	-1.71	2.24	0.00	0.82	.76
7 - Alternative medicine	2	-0.68	2.57	0.00	0.88	.72

Overall, these analyses indicate that seven distinct components account for most of the variance in this set of observed variables. Only alternative belief systems was normally distributed, which indicated that non-parametric statistical analyses were needed for these new composite scores.

7.2.4.2 Negative Binomial Regression

The next step in the analysis was to investigate how the variables above predicted participants' continuity judgments. Therefore analyses were run to see if independent variables, such as religiosity and superstitious practices predicted participant's continuity judgments. Given the number of variables that needed to be tested, as well as limited sample size, a regression analysis

was selected because it enabled for testing the effects of numerous variables while still maintain good statistical power. Participants answered three questions concerning continuity of mind, positive energy, negative energy, biological energy, and biological functioning. These questions were presented in a yes/no format. For example, “Now that he is dead, do you think John’s good energy continues?” A no response was coded as 0 and a yes response was coded as 1. Next, count scores were computed for mind, positive energy, negative energy, biological energy, and biological functioning by adding the number of yes responses, ranging from 0-3. As is common with count variables, many participants judged a non-continuity of the attributes, yielding variables that are zero-inflated and highly skewed with a preponderance of zeros. Such distributions violate fundamental assumptions of OLS regression; thus a negative binomial regression was run instead (Hilbe, 2007). Regressions were run separately for each country.

(a) USA

Because the American sample had 113 participants, only 14 variables could be included in the model, based on the eight-participants/variable ratio, for the regression models to be robust. Questions about continuity of mind, biological energy, and biological functioning targeted the full sample, but questions about continuity of negative and positive energy were between subjects, hence limiting the number of variables to be included in those regression models to no more than seven. Therefore, data screenings were run to determine which variables should be included in each model. There were no gender differences; thus gender was not included as a predictor. Regression analyses for dependent measures that targeted the full sample are presented first, followed by analyses for the between-subject dependent measures. All other assumptions were met.

The same set of ten variables was included in the regression models for mind, biological energy, and biological functioning. Variables included were age, social class (included as a continuous measure), religiosity, traditional medicine, alternative diet, alternative medicine, superstitious practices, psychic practices, alternative belief systems, and a religiosity X psychic practice interaction.

Results, presented in Table 18, indicate that the overall mind regression model was only marginally significant, with mind continuity response rate significantly increasing by a factor of 1.56 for each standard unit increase in religiosity, χ^2 (1) = 7.99, p = .005. The remaining overall biological functioning and biological energy regression models were not significant, with only one individual significant effect of alternative belief systems predicting biological energy continuity.

Table 18: Effects of the IVs on American participants' afterlife continuity inferences of psycho/bio properties.

	Mind	Biological Energy	Biological Functioning
Variable	e^b	e^b	e^b
Age	0.87	0.92	0.96
Social class	0.85	0.86	0.86
Religiosity	1.56*	0.86	0.66
Traditional medicine	0.92	1.69	1.11
Alternative diets	0.97	0.72	0.24
Alternative medicine	0.73	0.93	1.52
Superstitious practices	1.05	0.75	1.04
Psychic practices	0.49	1.38	0.47
Alternative belief systems	1.32	1.76*	1.76
Religiosity X Psychic practices	1.81	1.17	0.75
χ^2	χ^2 (10) = 17.43, p = .06	χ^2 (10) = 10.97, p = .36	χ^2 (10) = 8.50, p = .58

** = p<.001; *= p<.05;
e^b is the exponentiation of the B coefficient, which is an odds ratio. This value is reported because odds ratios can be easier to interpret than the B coefficient, which is in log-odds units.

Next, a negative binomial regression was performed with the rate of positive energy continuity answers predicted by religiosity, use of traditional medicine, alternative diets, use of alternative medicine, alternative beliefs, and psychic and superstitious practices. The overall model was only marginally significant, χ^2 (7) = 13.47, p = .06, with a significant difference on the rate of positive energy continuity as a function of psychic practices, χ^2 (1) = 9.05, p = .003, superstitious practices, χ^2 (1) = 4.92, p =. 03, and alternative belief systems, χ^2 (1) = 5.26, p = .02. The rate of positive energy continuity answers increased by a factor of 1.7 for each standard unit increase in superstitious practices, decreased by a factor of .19 for each standard unit increase in psychic practices, and increased by a factor of 1.38 for each standard unit increase in alternative belief. Although the overall model was marginally significant, the variables that yielded significant effects were still reported because the lack of overall significance is probably due to limited power attributed to the small sample size (n=57).

Next, a negative binomial regression was performed with the rate of negative energy continuity answers predicted by religiosity, use of traditional medicine, alternative medicine, psychic practices, and alternative beliefs. There was no significant prediction of the rate of negative energy continuity by the variables included in the regression model, χ^2 (5) = 6.49, p = .26. Once again, although the overall model was not significant, variables that were significant were psychic practices, χ^2 (1) = 5.25 p = .02, and alternative belief systems, χ^2 (1) = 6.18, p = .01. The rate of negative energy continuity answers increased by a factor of 1.8 for each standard unit increase in psychic practices and increased by a factor of 2.14 for each standard unit increase in alternative belief.

(i) Summary

Overall these findings indicate that, for the USA, sample religiosity was positively correlated with mind continuity judgments. It is possible that an increase in reported religiosity goes hand in hand with stronger beliefs in religious supernatural agents, such as souls, saints, and God. These supernatural agents are commonly portrayed in religious faith as possessing mental functioning, such as beliefs, memories, and thoughts.

Furthermore, alternative belief systems were positively correlated with increased continuity judgments for psychological/biological properties related to energy, as evidenced in the biological energy, positive energy, and negative energy regression models. Therefore, as was hypothesized, a relationship was found between participants' alternative beliefs, such as belief in an immanent religiosity, in alternative medicine, and in the supernatural, and their likelihood of assuming a continuity of vital energy.

An interesting finding was a positive correlation between negative energy and psychic practices and a negative correlation between positive energy and psychic practices. These psychic practices measured participants' practices that involved contacting the dead and rituals to get rid of evil spirits; thus it is possible that participants who were more likely to report psychic practices tended to view the afterlife as not exclusively good, but also as comprised of evil spirits and bad energy, thus explaining this finding. However this needs to be investigated further. Finally, an increase in superstitious practices was associated with an increase in positive energy continuity.

(b) Brazil

Because the Brazil sample had 144 participants, only 18 variables could be included in the model, based on the eight-participants/variable ratio, for the regression models to be robust. As with the USA sample, questions concerning continuity of mind, biological energy, and biological functioning targeted the full sample, but questions concerning continuity of negative and positive energy were between subjects, thus limiting the number of variables to be included in those regression models to no more than nine. Thus, data screenings were run to determine which variables were included in each model. There were no gender differences; thus for all the analyses that follow gender was not included as a predictor.

Regression analyses for dependent measures that targeted the full sample are presented first, followed by analyses for the between-subject dependent measures. The same set of variables included in the USA: mind, biological energy, and biological functioning regression models were included in the Brazil regression models.

Table 19: Effects of the IVs on Brazilian participants' afterlife continuity inferences of psychological/biological properties.

	Mind	Biological Energy	Biological Functioning
Variable	e^b	e^b	e^b
Age	1.02	1.00	1.01
Social class	1.27*	0.91	1.13
Religiosity	1.20	1.34	1.85*
Traditional medicine	1.00	1.21	0.97
Alternative diets	0.82*	0.96	1.13
Alternative medicine	1.21*	1.09	0.74
Superstitious practices	1.03	1.20	1.10
Psychic practices	0.98	0.89	1.09
Alternative belief systems	1.51***	1.71***	2.05***
Religiosity X Psychic practices	0.80*	0.88	1.04
χ^2	χ^2 (10) = 34.3 p <.001	χ^2 (10) = 20.28 p =.03	χ^2 (10) = 25.89, p =.004

*** = p < .001; *= p < .05;

e^b is the exponentiation of the B coefficient, which is an odds ratio. This value is reported because odds ratios can be easier to interpret than the B coefficient, which is in log-odds units.

Results (see Table 19) indicated that all three overall regression models were significant. The mind continuity response rate significantly increased by a factor of 1.27 for each standard unit increase in social class, χ^2 (1) = 7.34, p = .007, by a factor of 1.21 for each standard unit increase in alternative medicine, χ^2 (1) = 4.93, p = .02, by a factor of 1.51 for each standard unit increase in alternative belief systems, χ^2 (1) = 15.52, p < .001, and by a factor of .82 for each standard unit increase in alternative diets, χ^2 (1) = 4.85, p = .03. Finally, there was an interaction effect between religiosity and psychic practices predicting mind continuity, displayed in Figure 13, with the effect of religion on mind being moderated by psychic practices. This means that the effect of religion on mind continuity increases 2.06 times if psychic practices are at one standard deviation above the mean, increases 1.2 times if psychic practices are at the mean (0), and increases .33 times if psychic practices are at one standard deviation below the mean.

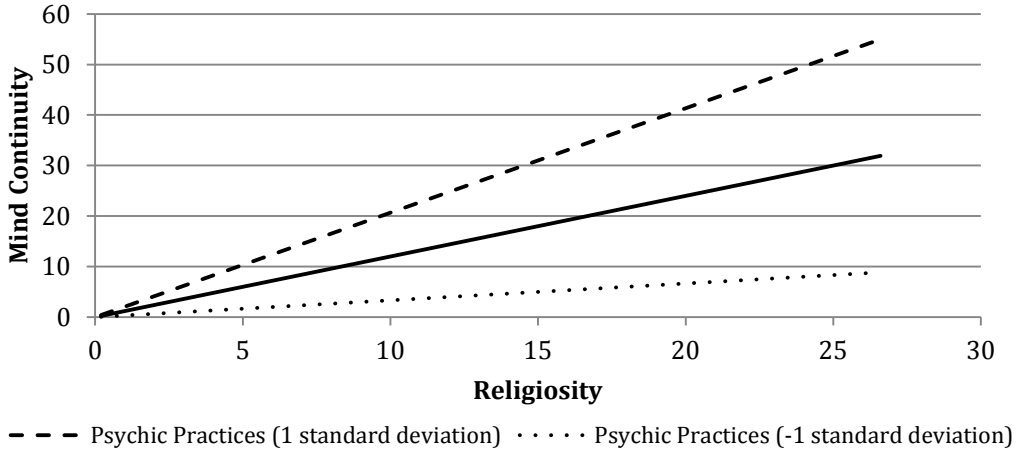


Figure 13: A graphical interpretation of the interaction effect of psychic practices and religiosity on continuity.

Results also indicate that the biological energy continuity response rate significantly increases by a factor of 1.71 for each standard unit increase in alternative belief, χ^2 (1) = 13.57, $p < .001$. The biological functioning continuity response rate significantly increases by a factor of 2.05 for each standard unit increase in alternative belief, χ^2 (1) = 16.25, $p < .001$, and by a factor of 1.85 for each standard unit increase in religiosity, χ^2 (1) = 6.96, $p = .008$.

Next, a negative binomial regression was performed with the rate of positive energy continuity answers predicted by religiosity, use of traditional medicine, alternative diets, use of alternative medicine, alternative beliefs, and psychic and superstitious practices. There was a significant prediction of the rate of positive energy continuity by the variables included in the regression model, χ^2 (7) = 26.21, $p < .001$. There was a significant difference in the rate of positive energy continuity as a function of alternative beliefs, χ^2 (1) = 15.56, $p < .001$, where the rate of positive energy continuity answers increased by a factor of 1.92 for each standard unit increase in alternative beliefs.

Finally, a negative binomial regression was performed with the rate of negative energy continuity answers predicted by religiosity, use of traditional medicine, alternative diets, use of alternative medicine, psychic practices, and alternative beliefs. There was a significant prediction of the rate of negative energy continuity by the variables included in the regression model, χ^2 (6) = 29.46, $p < .001$. There was a significant difference in the rate of negative energy continuity as a function of religiosity, χ^2 (1) = 6.32, $p = .01$, alternative diet χ^2 (1) = 4.45, $p = .03$, psychic practices, χ^2 (1) = 3.92, $p =. 05$, and alternative beliefs, χ^2 (1) = 15.52, $p < .001$. This means that the rate of negative energy continuity answers increased by a factor of 1.18 for each standard unit increase in psychic practices and increased by a factor of 2.15 for each standard unit increase in alternative belief. In addition, the rate of negative energy continuity answers

decreased by a factor of .56 for each standard unit increase in religiosity and decreased by a factor of .75 for each standard unit increase in alternative diet.

(i) Summary

Overall, as predicted, an increase in alternative belief systems was associated with an increase in continuity judgments for all of the psychological/biological properties measured, as evidenced in all the regression models. Higher levels of participation in psychic practices were related to higher levels of responding that negative energy continues after death and higher levels of participation in superstitious practices were related to higher levels of responding that positive energy continues after death, findings that were also present in the results from the USA sample. Thus there might be something specific about these practices and how they are related to positive and negative energy.

Findings specific to the Brazilian sample show social class as a predictor of mind continuity judgments; however, based on the current sample, it is not clear why social class significantly predicted continuity judgments. In addition, higher levels of religiosity predicted a lower continuity responding for negative energy and higher levels of responding for biological functioning continuity.

The data seem to distinguish the effects of alternative diets from those of alternative medicine. Higher involvement in alternative medicine predicted the continuity of mind responding, whereas higher alternative diet scores were related to lower mind and negative energy continuity scores. As had been discussed previously, alternative medicine beliefs involve the underlying notion that there are energies that flow, such as in Reiki therapy, where energy from the universe is channeled by a therapist to the sick patient, or Feng Shui, where an

equilibrium of energy must be achieved in the environment to bring harmony to the environment. Thus, it is possible that people who believe in and use alternative medicine are more likely to think about some continuity into an afterlife. With regards to alternative diets, it is possible that people who adopt these diets are preoccupied with what they ingest and how it is going to affect their health; thus they might think of energy as being more biological and less transcendental.

8.0 DISCUSSION

The present study was designed to investigate whether reasoning about vital energy exchange/transfer extends from the domains of biology and possibly psychology to include transcendental and/or spiritual phenomena. Participants were presented with a hypothetical death scenario and asked to judge the afterlife continuity of a series of psychological/biological properties.

It was predicted that participants would be more likely to judge the continuity of mental and psychological vital energy properties and less likely to judge the continuity of biological vital energy and biological functioning properties. Findings from the present study confirm this hypothesis. Results from both countries indicate that participants were more likely to judge the continuity of positive energy, followed by mind and negative energy, and least likely to judge the continuity of biological energy and biological functioning. Even though vital energy is judged to continue in the afterlife, participants construe it as mainly a psychological vital energy (positive and negative) that continues and not a biological vital energy. Furthermore, positive energy was considered as more likely to continue than negative energy.

Participants' judgments seem to reflect domain specificity, where properties associated with a biological domain, such as biological energy and biological functioning, are not judged to continue whereas properties associated with a psychological domain, such as psychological energy and mind, are often judged to continue. A similar pattern of results was observed in

Brazil and the USA. Therefore, with regards to the issue of domain specificity, it seems as if an intuitive TOM (psychology domain) guides reasoning about vital energy continuity into an afterlife or at least a combination of both an intuitive TOM with components from naïve biology, such as the notion of energy exchange/transfer. The fact that similar findings were observed in participants from distinct national backgrounds offers some support for the idea that core knowledge provides a foundation of common understanding.

The judgment data about whether vital energy continues or not does not specify how participants are thinking about this continuity. Findings from the open-ended questions enable a deeper look into their thought process. Given a judgment that vital energy continues, participants were asked how and where it continues. They were asked whether vital energy continues as part of identity or as a force in the universe and whether the continuity is in an earthly world or a heavenly/transcendental world. Findings from both countries show that in general most of the responses reflected a belief in the possibility of energy continuing after death. When asked about overall energy continuity, the American sample displayed more responses attributing this continuity as being psychological followed by continuity as an identity. Psychological continuity is clearly not the transcendental continuity this study aimed to investigate, and in fact reflects a very secular view of energy continuity. The Brazilian sample, on the other hand, favored explanations that involved a continuity attached to an identity/entity, such as attached to the soul.

Even though the American sample favored a psychological continuity explanation when answering the question about overall energy continuity, when further probed about the possibility of energy continuing attached to an identity/entity or dispersed back into the universe, there was a shift in participants' answers and they started to report the possibility of energy being attached to an identity/entity instead of a psychological continuity more.

Answers provided by the USA sample captured a clear tendency to attribute vital energy continuity, conceiving it at times as either a psychological continuity or continuity as an identity. Answers provided by the sample from Brazil also favored a continuity of vital energy, conceiving it at times as continuity of vital energy as an identity/entity into a heavenly world or transitioning between a heavenly and earthly world, therefore demonstrating that Brazilian participants consistently think about vital energy as being attached to a supernatural agent, more commonly referred to by them as a soul or spirit

The energy that is being judged to continue into an afterlife was initially attached to an identity and to a mind (i.e., it belonged to John/Jane); therefore it is justified that participants are explaining this continuity alongside an identity. However, in looking at their open-ended continuity answers, they are not saying that energy continues *as* an identity, but more so that it continues *attached* to an identity. Hence vital energy seems to be reasoned as being a component part of a person and therefore the psychological and moral aspects of vital energy can transcend into an afterlife attached to a disembodied mental agent.

Cohen and Barrett (2010) have provided a helpful framework for understanding this notion of personhood as its components, emphasizing that a disembodied *personhood* holds different elements, especially *mentality* (mind/agency), *vitality* (vital energy), and *identity* (essence). Intuitions on mentality would be anchored in intuitive psychology (theory-of-mind), intuitions on vitality would be anchored in intuitive biology, and intuitions on essence would be anchored in some sort of essentialist or biological intuitive theory. A helpful tool to understand this reasoning process is by elaborating a venn diagram. Every living human being has a body, a mind, energy, and an essence; these are the components of a personhood (see Figure 14). When you die, one possibility is that all of the components above cease to exist; this view characterizes

a secular concept of death. Alternatively, a religious/spiritual death concept implies that when someone dies, the body ceases functioning, but the soul/spirit continues into an afterlife. Research looking at people's afterlife concepts suggests that what continues is a soul that has a mind and some sort of essence or morality; however past research did not look at what happens to the energy component.

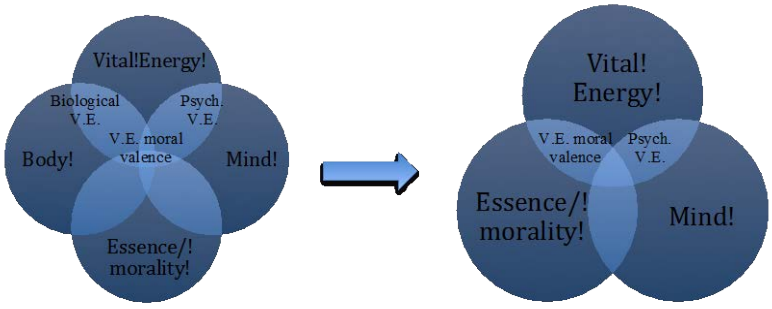


Figure 14: Venn diagram illustrating the components of personhood before and after death.[17]

Findings from the present study indicate that what continues is a psychological vital energy, in special, one that is morally good (positive vital energy); furthermore, participants thought of this vital energy continuing attached to the other components and not simply dispersed into the universe. Thus this example encapsulates well this holistic view of vital energy.

Research in CSR is also invested in how different cultures recruit intuitive ideas throughout development, enabling the multiplicity of religious and spiritual beliefs and practices. With regards to how people reason about vital energy/energy transfer, it was hypothesized that there is an intuitive base that is later recruited by culture in different ways. Given the findings reported by past research, the culture specific to each country was expected to play a role in how

[17] *V.E* in the diagram stands for vital energy.

intuitive reasoning about vital energy got extended to beliefs about the afterlife. One of the predictions made was that both Brazilians and USA participants would display high belief scores for transcendental religiosity (mainstream religious beliefs). This was confirmed, with both samples reporting high belief rates for transcendental religiosity when compared to other belief systems. This finding reflects that in both countries participants demonstrate a strong faith in mainstream Christian and particularly Catholic religions.

Furthermore, one important way in which these countries were expected to differ is that in the USA, alternative beliefs are much more defined/separate from the mainstream practices, whereas in Brazil there seems to be much more blending, with the boundaries being much less restricted. Findings offer some support this proposal, with the Brazil sample significantly scoring higher in transcendental religiosity (mainstream religious beliefs) but equally being more likely than the USA sample to report *use of alternative medicine*, *alternative beliefs*, and *superstitious/spiritual practices*. Furthermore Brazilians who rated high in religiosity were more likely to judge mind continuity if they also rated high in psychic practices. This is a clear marriage of mainstream with alternative, with both of these competing practices recruited to understand afterlife continuity. In addition, in the USA, alternative belief systems predicted increased continuity judgments for psychological/biological properties related to energy, whereas in Brazil it predicted continuity judgments for all psychological/biological properties. Thus, as was hypothesized, there is a relationship between people's alternative beliefs, such belief in an immanent religiosity, in alternative medicine and in the supernatural, and their likelihood to assume a continuity of vital energy.

CONCLUSION

The main objective of this study was to investigate the development of vital energy reasoning. Study 1 explored children's and adults' reasoning about vital energy by looking at when is it used to explain biological and psychology wellbeing. Past research (Inagaki & Hatano, 2002) suggested that young children reason about vitalistic causality as an integral part of biological functioning, and that later in development children substitute this reasoning as a whole for mechanistic biology (Au & Romo, 1999). Furthermore, Inagaki and Hatano argued that vitalistic causality reasoning does not seem to extend to the domain of psychology.

Results from study one confirm Inagaki and Hatano's (2002) research on vitalistic causality, indicating that early in development there is a strong link between vital energy reasoning and the biological domain. However, contrary to the claim that vitalistic biology reasoning gives way to a mechanical biology in middle childhood (Inagaki & Hatano, 1993; Morris et al., 2000), our findings suggest that this reasoning is not completely dropped when children acquire a mechanistic biology. Across all age groups, vital energy was primarily judged to apply to biological functioning. As for the relationship of vital energy and the psychological domain, younger children were more likely to infer such as relationship, whereas older children and adults dismissed it. However it is important to emphasize that in spite of this age difference, when contrasting energy reasoning for biological and psychological domains, participants across all age groups applied more energy reasoning to the biological domain. These findings also

confirm Inagaki and Hatano's (2002) claim that vital energy reasoning primarily functions the domain of biology, and not psychology.

In spite of this initial pattern, the forced choice method may have neglected some overlap in children's understanding, where psychological and biological improvement can be attained by both a change in energy and emotion. Children were presented to a list of sources of vital energy and asked to judge if the character would improve after exposure to such sources. To rule out psychological reasoning and to make sure participants were thinking about this improvement employing vitalistic reasoning, the current methodology asked participants to choose if the character got better because such source made him/her feel happy, or if it was because he received some sort of energy, therefore not allowing children to express if they were considering both options as viable.

This brings upon the issue of cross-domain reasoning, i.e., when are children able to make inferences over vital energy across domains? In a recent study with a Japanese sample, Toyama (2010) looked at children and adults use of vitalistic reasoning with physically induced and psychogenic (bodily outcomes with origins in the mind) bodily reactions. Toyama's (2010) findings also suggested that a vitalistic reasoning did not disappear from adult biological reasoning. His undergraduate sample often referred to vitalistic concepts when explaining psychogenic bodily reactions; on the other hand, in his preschool sample, vitalistic concepts were mainly observed in explanations about physically caused bodily reactions.

Vital energy cross-domain reasoning was evidenced in Toyama's study (2010), with young children recruiting vital energy reasoning within the biological domain, but later in development shifting to a cross-domain reasoning, where mental states can bring upon biological ailment. However, Toyama's research took place in Japan, a country that is known to cultivate

vital energy reasoning. Based on findings from the present research, as well as Toyama's (2010) evidence for cross-domain reasoning, future studies should investigate vital energy reasoning in different cultures and nationalities, where vital energy reasoning are distinctly recruited; developing methods in which participants are allowed to make cross-domain inferences. This would enable a better look at the onset of vital energy reasoning (as part of a naïve biology) and how different cultures recruit this concept to explain holistic concepts (i.e., psychogenic diseases), thus shifting from a domain specific to a cross-domain reasoning.

This raises discussion not only about the issue of cross-domain reasoning, but also about possible cross-domain properties of vital energy concepts. Study 2 investigated the end "end state" of this concept looking at whether energy reasoning is elicited to explain transcendental/spiritual processes. Results from the Brazil and USA samples converged, with participants being more likely to attribute afterlife continuity to a mental functioning and psychological vital energy. In addition, when asked to think about what happened to vital energy after death, participants from both samples were more likely to think that vital energy continues, and that it continues attached to an identity, especially by being attached to the soul).

Furthermore, in looking at participants qualitative answers it was clear from their narrative that those that didn't conceive the possibility of energy continuity, usually expressed their opinion saying they didn't believe in energy, or that energy was biological, therefore reasoning with biological terms, whereas those that believed in vital energy continuity most of the time made use of religious concepts and imageries to fundament their viewpoint. Furthermore, regression analysis also indicated that participants' continuity responses were significantly related to religion and alternative beliefs. This association was particularly stronger among the Brazil sample, suggesting that culture possibly plays a role on how these ideas are

sorted out.

Findings build on previous theory in CSR, where afterlife beliefs are believed to reflect solely an intuitive theory of mind. Results however indicate that it is not just mind that participants tend to attribute continuity. Even though an intuitive theory of mind seems to be more salient (given more continuity of mental functioning and psychological vital energy), there is evidence to suggest that an intuitive biology might also be playing a role. According to a vitalistic intuitive biology, biological functioning is thought in terms of the transfer/flow of vital energy that is regulated by the agency of organs. When explaining what happens to vital energy after death, most participants referred to energy leaving the body and continuing into an afterlife, attached to the soul or spirit. This evidenced participants' use of the component of vitalistic causality that refers to the transfer/flow of vital force in their responses, with this energy flowing from a physical body into a spiritual one.

In sum, the initial position in CSR was that belief in supernatural agency was anchored in an intuitive theory of mind; recent advances in the field led researchers to consider the possibility of something other than just an intuitive theory of mind guiding people's beliefs in supernatural agents such as ghosts and deities. As presented earlier, personhood is considered to be composed of 4 components: body, mind, essence and energy. Findings from the present research suggest that when participants think about supernatural agency in a death context, they infer that not only the mind continues, but also energy. Thus future research should not only focus on an intuitive theory of mind, but expand their scope looking at other core intuitions, such as an intuitive biology, that are also elicited when reasoning about supernatural agency. Given our findings, it remains to be investigated if vital energy is still attributed to supernatural agents in a context that doesn't involve afterlife continuity. It is equally important to understand specifically what are the

characteristics of this psychological vital energy that seems to continue into an afterlife. Finally, these findings need to be replicated in different cultural contexts to investigate if this reasoning in specific to the countries explored in this study or if it is recurrent across different cultures.

In considering the validity of our findings, there were several limitations in study 2 that are worth pointing out. First, our sample was of undergraduate students, therefore limiting the generalizability of our findings. Furthermore, assuming that vital energy concepts are later on recruited by culture, targeting an older sample might make these cultural influences more salient. Finally, results for psychological vital energy (between-subject variable) ended up with a smaller sample size, possibly limiting our power to detect significant findings.

Overall, findings from both studies point that participants initial intuitive vitalistic reasoning is clearly anchored in an intuitive biology, what is not clear yet is how culture fits into this picture. To explore this in more detail it is important to look more look at how specific cultural groups conceptualize, experience and transmit energy concepts. As suggested previously, it would be interesting to expand this research to look at cultures that place a strong emphasis in biological vital energy (ex: *Ki* in Japan) as well as cultures that place a strong emphasis in more spiritual aspects of vital energy (ex: *axé* for *Candomblé* groups in Brazil). In this regard, a cultural study is needed, taking a deeper look into cultural traditions and social practices that regulate express, and possibly transforms vital energy reasoning throughout development. This can be achieved with an idiographic approach to the research question, starting off with qualitative methods that would later on enable a better development of quantitative methods for measuring the development of this vital energy reasoning, therefore exploring the interaction between a universal intuitive understanding and cultural influences. Furthermore, within this cultural approach, it would be interesting to further explore the

distinction participants made between positive and negative vital energy continuity and how this is related to religion and morality, as well as explore vital energy reasoning as elicited when thinking about the living (psychogenic disorders, transfer of energy between people) along with vital energy reasoning into an afterlife and in relation to religion and spirituality.

This study was a first step to begin exploring vital energy reasoning outside of a biological framework. Findings suggest that vital energy reasoning was in many instances correlated with participants religious, spiritual, and alternative beliefs and practices, but more work needs to be developed to understand if and how this reasoning steps out of biological framework to encompass an all-inclusive concept. Advances in this research will contribute to the field of CSR, gaining a better understanding of all the underlying cognitive underpinnings involved in the development and transmission of supernatural concepts, specifically helping researchers pinpoint what are the intuitive domains, other that an intuitive psychology, that universally enable humans to develop beliefs in supernatural agents. Finally, it will also significantly contribute to the field of intuitive biology, not only helping strengthening the claim for a naïve biology, but also allowing a better understanding of how children and adults may recruit this reasoning to understand other aspects of the world that aren't strictly biological.

APPENDIX A

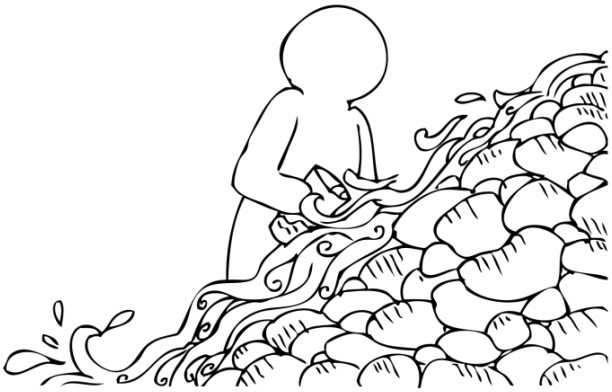
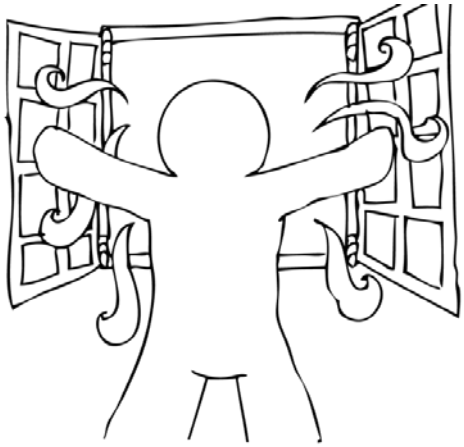
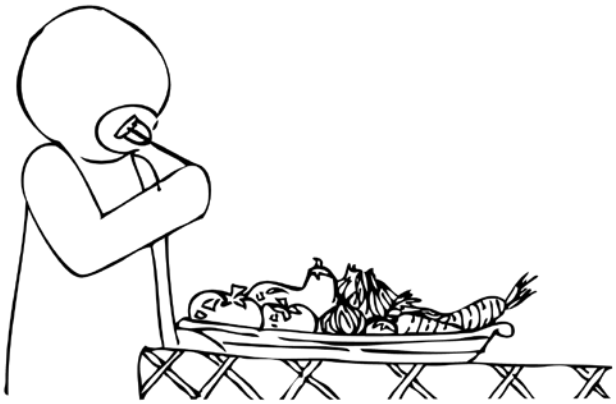
VITAL ENERGY (BIOLOGY & PSYCHOLOGY)

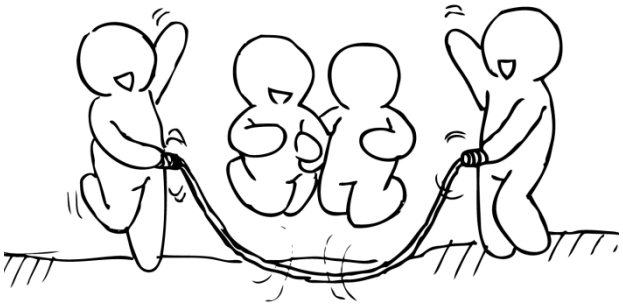
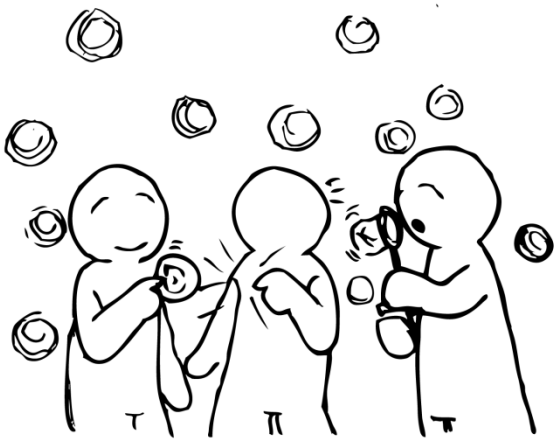
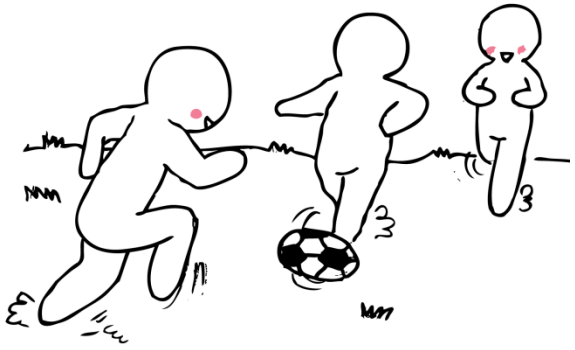
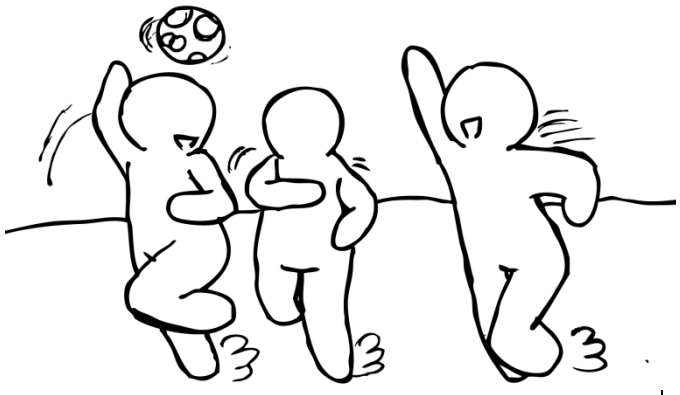
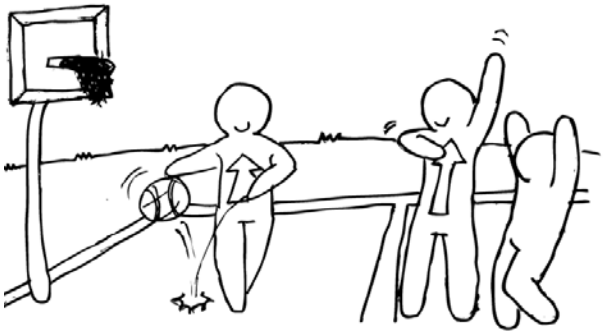
Table 20: Conditions and Questions presented in the vital energy interview/questionnaire

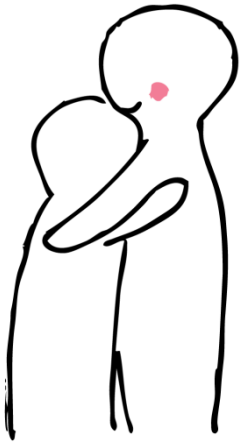
Conditions Presented		
Blocks	**Items**	**Vignettes presented**
Biological Conditions	**Sick Body**	This is Johnny (Suzy). His/Her body is always sick. What do you think will happen to his/her body if……?
	Delayed Growth	This is Jack (Jill). His/her body isn't growing as fast as other kids bodies. What do you think will happen to his/her body growth if …….?
	Tired Body	This is Paul (Paula). He/She is very very tired; he/she feels his/her body is worn out. What do you think will happen to his/her tired body if …….?
Psychological Conditions	**Sad**	This is Tommy (Tamara). He/She is always sad. What do you think will happen to his/her sadness if……?
	Mean	This is Mario (Maria). She/He is usually mean to others. What do you think will happen to his/her meanness if ……..?
Questions Asked		
Energy Source	***What do you think will happen to Paul/Paula's _____ if …***	
Natural Source	he/she lies under the warm sun?	
	he/she opens the window and breaths some good fresh air?	
	he/she eats fresh handpicked vegetables?	
	he/she drinks fresh clear water from the mountains?	
Social-Psychological Source	he/she receives a hug from someone who is healthy/ growing well/ active / happy/ nice/ lively ?	
	he/she plays with friends that are healthy/ growing well/ active/ happy/ nice/ lively ?	
	he/she hangs out with friends that are healthy/ growing well/ active/ happy/ nice/ lively ?	
Control Items	he/she chews bubble gum?	
	he/she accidently bumps into someone?	

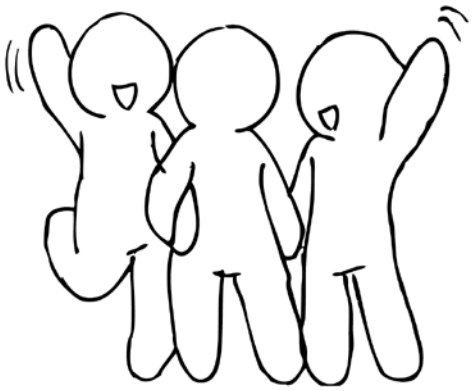
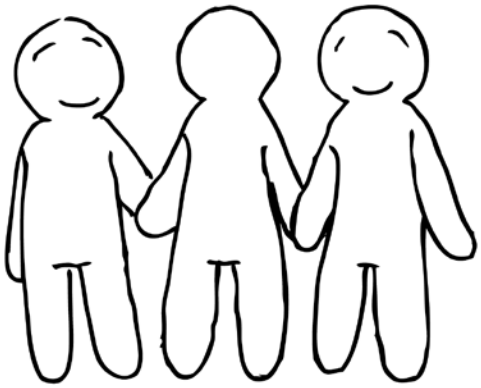
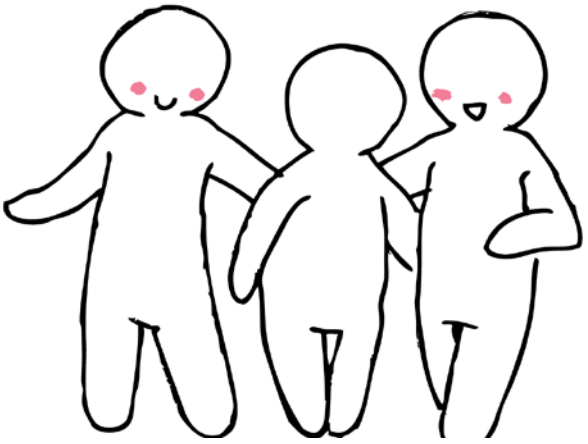
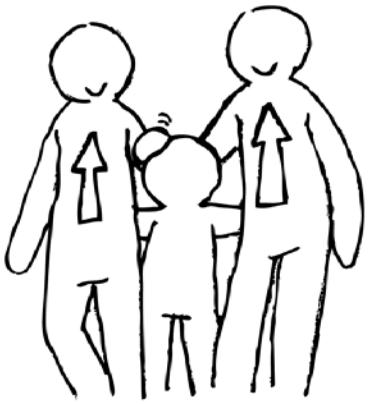
APPENDIX B

DRAWINGS PRESENTED

Drinks fresh clear water from the mountains	Breaths some good fresh air
	
Eat fresh handpicked vegetables	**Lies under the warm sun**
	

Plays with friends that are very happy	Plays with friends that are very lively
	
Plays with friends that are very nice	**Plays with friends that are very healthy**
	
Plays with friends that are very active	**Plays with friends that are growing well**
	

Receives a hug from someone who growing well	Receives a hug from someone who is very lively
	
Receives a hug from someone who is very nice	**Receives a hug from someone who is very happy**
	
Receives a hug from someone who is very healthy	**Receives a hug from someone who is very active**
	

Hangs out with people who are very happy	Hangs out with people who are very lively
	
Hangs out with people who are very active	**Hangs out with people who are very nice**
	
Hangs out with people who are very healthy	**Hangs out with people who are growing well**
	

Accidently bumps into someone	Chews bubble gum
	

Figure 15: Drawings accompanying explanation judgment questions during child interviews

APPENDIX C

LIKERT SCALES

Child Sample Scale

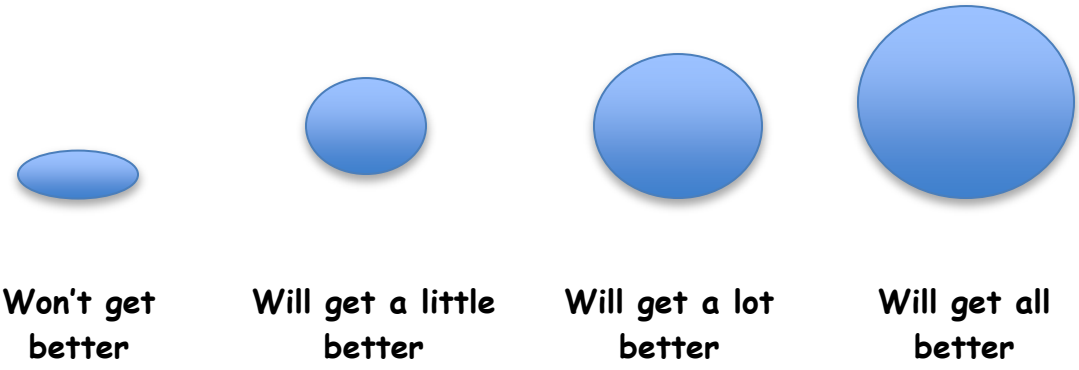


Figure 16: *Likert* scale accompanying improvement judgment questions during child interviews.

Young Adult Sample Scale

Won't get better	Will get a little better	Will get a lot better	Will get all better
0	1	2	3

Figure 17: *Likert* scale accompanying improvement judgment questions during adult interviews

APPENDIX D

HAPPPY ENERGY EXPLANATION JUDGMENT

Child Sample Stimuli

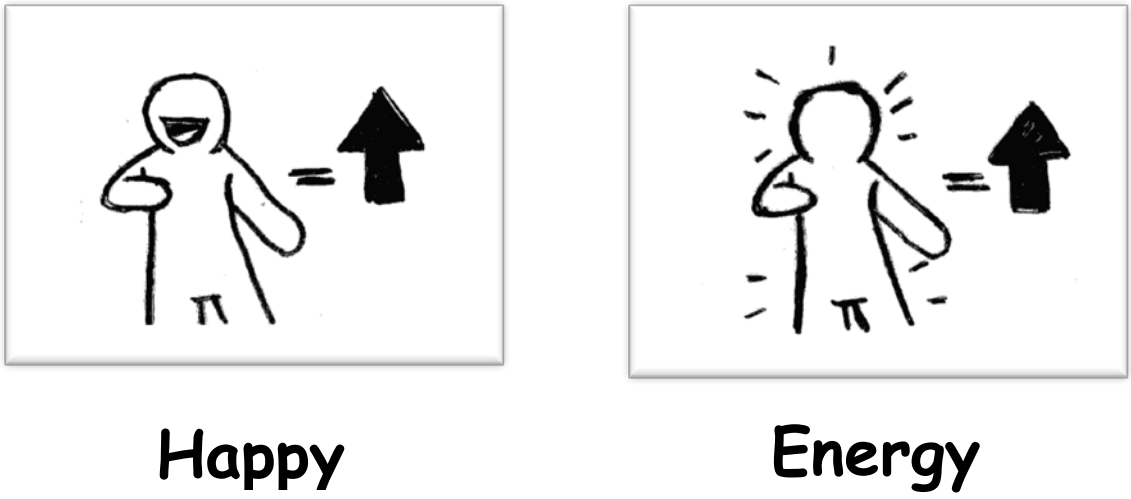


Figure 18: Stimuli accompanying explanation judgment questions during child interviews

Young Adult Sample Stimuli

Table 21: sample of stimuli presented to young adults for explanation judgment questions.

This is Julie, she is always sick. What will happen to her sick body of she……..?						
	Won't get better	Will get a little better	Will get better	Will get all better		
Lies under the warm sun?	1	2	3	4	Because laying under the sun makes her feel happy (___)	Because laying under the sun gives her energy (____)

APPENDIX E

SOURCE RATING QUESTIONNAIRE

Table 22: Source rating questionnaire presented to adults in study 1.

	Not at all	**A little**	**Moderately**	**A lot**
How much does *receiving a hug from someone who is very nice* make people happy?	1	2	3	4
How much does *breathing good fresh air* make people happy?	1	2	3	4
How much does *chewing bubble gum* make people happy?	1	2	3	4
How much does *laying under the sun* make people happy?	1	2	3	4
How much does *receiving a hug from someone who is very active* give people energy?	1	2	3	4
How much does *drinking fresh clean water from the mountains* make people happy?	1	2	3	4
How much does *receiving a hug from someone who is growing well* make people happy?	1	2	3	4
How much does *playing with friends that are very lively* give people energy?	1	2	3	4
How much does *chewing bubble gum* give people energy?	1	2	3	4
How much does *playing with friends that are very nice* give people energy?	1	2	3	4
How much does *laying under the sun* give people energy?	1	2	3	4
How much does *receiving a hug from someone who is very lively* make people happy?	1	2	3	4
How much does *playing with friends that are very nice* make people happy?	1	2	3	4
How much does *breathing good fresh air* give people energy?	1	2	3	4
How much does *receiving a hug from someone who is very active* make people happy?	1	2	3	4
How much does eating fresh handpicked vegetables make people happy?	1	2	3	4

Table 22: (Continued)

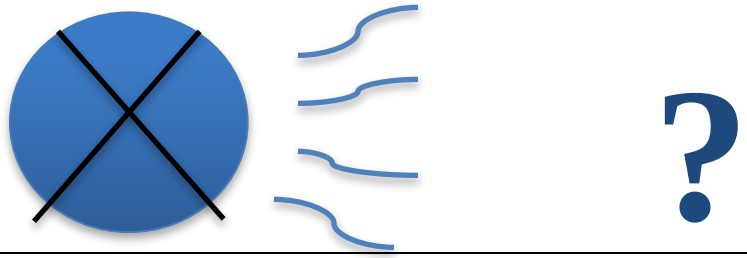
How much does *eating fresh handpicked vegetables* give people energy?	1	2	3	4
How much does *bumping accidently into someone* give people energy?	1	2	3	4
How much does *playing with friends that are very healthy* give people energy?	1	2	3	4
How much does *playing with friends that are growing well* make people happy?	1	2	3	4
How much does *receiving a hug from someone who is very happy* give people energy?	1	2	3	4
How much does *receiving a hug from someone who is very healthy* make people happy?	1	2	3	4
How much does *receiving a hug from someone who is very happy* make people happy?	1	2	3	4
How much does *playing with friends that are very happy* give people energy?	1	2	3	4
How much does *drinking fresh clean water from the mountains* give people energy?	1	2	3	4
How much does *playing with friends that are very active* make people happy?	1	2	3	4
How much does *receiving a hug from someone who is very healthy* give people energy?	1	2	3	4
How much does *receiving a hug from someone who is very nice* give people energy?	1	2	3	4
How much does *bumping accidently into someone* make people happy?	1	2	3	4
How much does *receiving a hug from someone who is very lively* give people energy?	1	2	3	4
How much does *playing with friends that are growing well* give people energy?	1	2	3	4
How much does *receiving a hug from someone who is growing well* give people energy?	1	2	3	4
How much does *playing with friends that are very happy* make people happy?	1	2	3	4
How much does *playing with friends that are very lively* make people happy?	1	2	3	4
How much does *playing with friends that are very healthy* make people happy?	1	2	3	4
How much does *playing with friends that are very active* give people energy?	1	2	3	4

APPENDIX F

VITAL ENERGY CONTINUITY

Part 1: Continuity Questionnaire

Table 23: Questions presented in part 1 of the vital energy continuity questionnaire.

<table>
<tr><td colspan="3">This is John. John's body stops working and he dies.
What continues, if anything, after he dies?</td></tr>
<tr><td colspan="3">  </td></tr>
<tr><th>Component</th><th>Characteristics</th><th>Discontinuity 0
Continuity 1</th></tr>
<tr><td rowspan="3">Mentality</td><td>Now that he is dead, do you think John's thoughts continue?</td><td rowspan="3">Yes (1)
or
No (0)</td></tr>
<tr><td>Now that he is dead, do you think John's memories continue?</td></tr>
<tr><td>Now that he is dead, do you think John's beliefs continue?</td></tr>
<tr><td rowspan="10">Vitality</td><td>Psychological Vital Energy</td><td rowspan="10">Yes (1)
or
No (0)</td></tr>
<tr><td>Now that he is dead, do you think Johns' good energy continues?
Now that he is dead, do you think Johns' bad energy continues?</td></tr>
<tr><td>Now that he is dead, do you think Johns' good vibes continue?
Now that he is dead, do you think Johns' bad vibes continue?</td></tr>
<tr><td>Now that he is dead, do you think Johns' good aura continues?
Now that he is dead, do you think Johns' bad aura continues?</td></tr>
<tr><td>Biological Vital Energy</td></tr>
<tr><td>Now that he is dead, do you think Johns' bodily energy continues?</td></tr>
<tr><td>Now that he is dead, do you think Johns' bodily liveliness continues?</td></tr>
<tr><td>Now that he is dead, do you think Johns' bodily vigor continues?</td></tr>
<tr><td rowspan="3">Bodily</td><td>Now that he is dead, do you think that John's brain functioning continues?</td><td rowspan="3">Yes (1)
or
No (0)</td></tr>
<tr><td>Now that he is dead, do you think that John's feeling of hunger continues?</td></tr>
<tr><td>Now that he is dead, do you think that John's eyesight continues?</td></tr>
</table>

Part 2: Open Ended Questions

Now I want to ask you a general question. When somebody dies, one possibility is that the **soul** continues, another possibility is that **good and/or bad energy/vibes** continues, another possibility is that nothing at all continues.

a)Do you think it's possible that **good and/or bad energy/vibes** continues? How so?

Given the continuity of **good and/or bad energy/vibes** after death. One possibility is that it continues to be identified/attached with a specific person; another possibility it joins the broader universe, separate from the person; or maybe there is yet another possibility.
What do you think is possible? Please explain.

Furthermore, given the continuity of **good and/or bad energy/vibes** after death. One possibility is that it continues in this world; another possibility is that it continues in some other heavenly world, or maybe there is yet another possibility. What do you think is possible? Please explain.

b) Do you think it's possible that the **soul** continues? How so?

Given the continuity of the **soul** after death. One possibility is that it continues to be identified/attached with a specific person; another possibility is that the **soul** joins the broader universe, separate from the person; or maybe there is yet another possibility.
What do you think is possible? Please explain.

Furthermore, given the continuity of the **soul** after death. One possibility is that it continues in this world; another possibility is that it continues in some other heavenly world; or maybe there is yet another possibility. What do you think is possible? Please explain.

APPENDIX G

BELIEF IN SUPERSTITION SCALE

Table 24: items presented in the Belief in Superstition scale.

PARANORMAL AGENTS	
Ghosts	Ghosts exist
	It haunts in some places
	Those who have died a violent death return as ghosts to their place of death
Witchcraft	Black magic really exists
	Witches do exist
	Through the use of formulas and incantations, it is possible to cast spells on persons
	There are actual cases of witchcraft
PARANORMAL ABILITIES OF HUMAN BEINGS	
Extrasensory perception	Some people are capable of transferring thoughts telepathically
	Some people have an ability to perceive hidden objects without physical (known) senses
	Mind reading is not possible (R)
	Some individuals are able to levitate (lift) objects through mental forces
	Psychokinesis, the movement of objects through psychic powers, does exist
	A person's thoughts can influence the movement of a physical object
Spiritualism	Your mind or soul can leave your body and travel (astral projection)
	During altered states, such as sleep or trances, the spirit can leave the body
	Reincarnation does occur
	It is possible to communicate with the dead
ASTROLOGY	
Astrology	Knowledge about an individual's personality can be achieved through astrology
	A horoscope carefully devised by a professional describes a person's future reliably.
	The position of the stars at the time of birth influences personality
	Astrology is a way to accurately predict the future
	The horoscope accurately tells a person's future
FENG SHUI	
Feng shui	Furnishing according to the principles of feng shui balances your environment and thus effects your health and success in a positive way
	There should not be items in front of the outer door that hinder the flow of life energy inside the house
	The northern side of the housing is the side of the water element; therefore blue and black as well as a fountain and a fish pool balance the energy of this area
	You should not place cactuses at home or at your office because they may bring about imbalance
	You should not have a TV in the bedroom because the screen superimposes too strong life energy to make peaceful sleep possible

Table 24: (Continued)

LUNAR EFFECTS	
Lunar effects	Lunar madness does exist
	Moon's gravitational forces cannot affect a person's mental well-being (R).
	The moon has an influence on how farming pans out
	Moon's position (e.g., full moon) affects fertility
	Full moon deteriorates some people's mental health
	People are more violent than usual during the full moon
	People are more active than usual during the full moon
	Moon's position may influence people's behavior
LUCK BELIEFS	
Amulets	Amulets, for instance a specific piece of jewel, bring good luck
	By using a lucky charm people can protect themselves against illnesses
	It is useful to carry some lucky charms in exciting situations to guarantee success
Rituals	Going through some rituals before an exciting event can bring good luck
	When talking about luck, it is useful to knock on wood so that the luck doesn't turn away
	I don't believe that rituals have an influence on success (R)
Omens of luck	Black cats can bring bad luck
	If you break a mirror, you will have bad luck
	The number "13" is unlucky

APPENDIX H

BELIEF IN TRANSCENDENTAL RELIGIOSITY SCALE AND BELIEF IN IMMANENT RELIGIOSITY SCALE

Belief in Transcendental Religiosity

1. The soul continues to exist though the body may die
2. There is a devil
3. I believe in God
4. There is a heaven and a hell

Belief in Immanent Religiosity

1. Spirits wonder in this world
2. After dying, you can come back to this world through reincarnation
3. Good or bad behavior in one life will be passed on to have effects on future incarnations.

APPENDIX I

SAMPLE OF ANSWERS GIVEN TO QUESTION ABOUT OVERALL CONTINUITY OF ENERGY AFTER DEATH

Table 25: Sample of answers given by both samples (USA and Brazil) to the question about overall continuity of energy after death.

Brazil	
Category	Example (Translation)
Unsure	Não sei. (I don't know)
Disbelief	Eu não acredito em energia e vibração. (I don't believe in energy and vibes)
Overall discontinuity	
Discontinuity	Não, pra mim quando um indivíduo morre, tudo que havia nele deixa de existir, eu não acredito que possa existir alguma possibilidade de haver energias de alguém que morreu. (No, for me when a person dies, everything about him stops existing, I don't believe that there is the possibility of energy of a deceased)
Only soul continues	Não, porque o corpo virá pó e já não serve mas para nada e o espírito dependendo do que viveu na terra volta para Deus. (No, because the body becomes dust and it's useless and the spirit, depending on how he lived his life while on Earth, goes to God)
Only psychological continuity	Não. Quando a pessoa morre, neste mundo em que ele vivia não fica nada, apenas lembranças. Nem energia boa ou má fica neste mundo. (No. When a person dies, in this world where she lived, nothing remains, but the memories. Neither god nor bad energy stays in this world)
Overall continuity	
Continuity	É possível que ela exista, mas não acredito que a mesma interfira nas relações do mundo em que vivemos. (It is possible that it exists, but I don't believe it interferes in this world we live in.)
Continuity as presence	Sim, eu acho que a energia que a pessoa emana, boa ou má, nunca desaparece, mesmo depois que ela morre, a energia dela vai continuar passando bons ou maus sentimentos as pessoas vivas. (Yes, I think that energy a person emanates, good or bad, never disappears, not even after death. The person's energy continues transmitting good and bad feelings to the living.)

Table 25: (Continued)

As an identity/entity	Sim, permanecem atadas ao espírito, que continua existindo, porém, fora do corpo carnal que morreu. (Yes, they stay attached to the spirit where it continues existing, however now outside of the carnal body).
Psychological continuity	Sim, podem continuar existindo, pois em outras pessoas; como em "ensinamento" do que a pessoa foi. É possível lembrar de alguém e isso energizá-lo positivamente. A boa vibração (ou má) existiria através da evocação de recordações do que João/a pessoa, foi. (Yes, they can continue existing, in other people; as the teachings of what that person was. It is possible to remember someone and this will positively energize you. The good (or bad) vibes would continue thru invocations of memories of what Joao had been.)
Universe and/or nature	Sim. Questão de física, as energias são emanadas do corpo para o meio externo. Sendo assim não existe em João mas no exterior. (Yes, it's a matter of physics, energies emanate from the body to the outside world. Therefore, it no longer exists in Joao, but on the outside.)
Good or bad	Não. Creio no tempo da renovação e do arrependimento. Não haveria finalidade se a pessoa continuasse com maldade. (No. I believe in a time for renovation and repentance. There wouldn't be a point for people to continue bad.)
Uncategorizable	Não sei como encaminhar uma discussão/diálogo/suposição, usando essas palavras. Me parece confuso tentar, então, não sei responder por essa via. Se fosse alma eu me remeteria a fé religiosa para falar. (I don't know how to follow my discussion/dialog/supposition, using these words. It seems confusing to me to try to do so, thus I don't know how to respond through these means. If it were the soul, I would use religious faith to speak)
USA	
Category	Example
Unsure	There really isn't a way to be sure either way.
Disbelief	No, I am not sure that I believe in good/bad energy or vibes.
Overall discontinuity	
Discontinuity	I do not think that any kind of vibes continues.
Biological	No. Energy usually associates with body. If the body is dead (physically) then there's no way that energy will remain.
Only soul continues	No, I do not believe that energy vibes of any type continue. I feel that it simply is impossible for energy or vibes to leave a person's body and move on, however I do believe that a soul moves on, but is unrelated to energy.
Only psychological continuity	No, the person is dead - nothing other than the memory of that person continues to exist.
Overall continuity	

Table 25: (Continued)

As an identity/entity	Although I am not entirely sure what is meant by “good/bad energy/vibes”, I will do my best to express my beliefs and how I interpret these terms… I do think it is possible that good/bad energy/vibes continue in a sense that in impossible to be perceived by humans. I believe that these energies/vibes go along with a soul. To elaborate, I believe a person's soul still exists after they die, and this soul is made up of an individual's energy- along with other essences of life
Psychological continuity	I think it is possible in the way that people who are still alive attribute certain events to the angry spirit, or generous spirit of a close one that has recently passed. They continue through the memory of the living.
Universe and/or nature	I know that energy cannot be destroyed, so it would make sense that the energy in our bodies continues on after we die and are no longer aware of it. I don’t think this energy contains any information about the person it was in - I think the energy is just diffused back into the environment after one dies.
Good or bad	I do not think that any bad energy continues. I think after we die, that we feel nothing but happiness and good
Uncategorizable	I think it could be possible because of many people's spiritual sense.

APPENDIX J

SAMPLE OF ANSWERS GIVEN TO QUESTION ABOUT CONTINUITY OF ENERGY AS ATTACHED TO AN IDENTITY OR AS A FORCE IN THE UNIVERSE

Table 26: Sample of answers given by both samples (USA and Brazil) to the question about continuity of energy as attached to an identity or as a force in the universe.

Brazil	
Category	Example
Unsure	Não sei. (I do not know)
Disbelief	Não acredito nisso. (I don't believe in this)
Discontinuity	Essas energias e vibrações existem sim no universo, mais não após a morte e muito menos continua vinculada a identidade do indivíduo. (These energies and vibes exist in the universe, but not after death, and even less attached to the identity of an individual.)
Continuity	
Attached to an identity/entity	Penso que essas energias/vibrações podem continuar após a morte. Dependendo do tipo de energia (boa ou má), acredito num direcionamento a essa porção de energia. Mas, ela permanece identificando a alma. (I think that these energies/vibes can continue after death. Depending on the type of energy, good or bad, I believe this portion of energy is directed somewhere. But it continues to be identified with the soul.)
Thru reincarnation	Cada pessoa tem uma alma, uma "energia" dentro de si. O corpo é apenas um instrumento de "suporte" para esta alma. Quando morremos nosso corpo sofre a decomposição, mas nossa alma continua viva. Cada alma tem uma missão na terra, se completamos essa missão ela está livre para viver seus dias de glória no plano superior. Se o corpo morrer antes do término da missão, está alma renascerá em um outro indivíduo que seu corpo está se formando, dentro do ventre de sua mãe. Assim a alma vagará de corpo em corpo até sua missão está completa. e assim se liberta para viver sua eternidade em paz. (Each person has a soul, an "energy" within them. The body is merely an instrument to support the soul. When we die our body decomposes, but our soul remains alive. Each person has a mission n Earth, if it completes its mission on earth, it is free to live its glory days in a superior plane. If the body dies before completing its mission, this soul reborn in another body that is in formation, within the mother's womb. So, the soul will wonder from body to body until its mission in complete, a like this it will release itself to live in eternal Peace.)

Table 26: (Continued)

Psychological continuity	Como respondi na outra pergunta, o que ficam são lembranças. E a lembrança da boa/má energia que tal pessoa, já morta, passava que nos faz sentir essa energia outra vez. Mas não quer dizer que aquela esteja vagando por ai. (As I said before, what remains are the memories. And the memory of good/bad energy that such person, already dead, passed, which makes us feel this energy again. But this doesn't mean that it Wonders around.)
Universe and/or nature	Mas plausível que, caso fosse uma realidade, que a energia prossiga como uma força na amplitude do universo, a parte do corpo morto, pois independente do corpo a energia vinda dele poderia perdurar possivelmente. (It is more plausible that, if it were a reality, that the energy continues as a force in the ample universe, the body portion dead, because independent from the body the energy coming from such body could possibly linger on.)
As an identity in the universe	Que a possibilidade da energia continuar no universo e vinculada a pessoa é a mais certa. Como a pessoa morre a energia "continua" seu caminho com uma espécie de direção definida que a liga a identidade do indivíduo. (the possibility of energy continuing in the universe and attached to a person is the most correct one. As the person died, the energy continues its path as a kind of defined direction that attaches it to an individual identity.)
Uncategorizable	Se o aleatório no universo indicasse bondade ou maldade, sim energias boas ou más se desprenderiam no corpo material para vagar no espaço astral. Mas eu pessoalmente, não acredito nisso pois as energias (vibrações, são força de pensamentos e ações). O universo conspira negativa ou positivamente segundo nossos desejos. (If the randomness of the universe indicated good or evil, yes, good or bad energies would detach from the material body to wander in the astral space. But, I personally do not believe in this because energies are the force on ones thoughts and actions. The universe conspires positively or negatively according to our desires.)
	USA
Category	Example
Unsure	I do not know much about forces, either attached or separate from the body. But I do believe the soul would leave the body after death.
Disbelief	I hold no belief in good or bad energy vibes. I find it hard to believe such thing could actually occur.
Discontinuity	How can energy be transferred without a vessel? I don't feel that the vibes can be moved since they are only felt while alive.
Continuity	
Attached to an identity/entity	I think the good/bad energy/vibes continue with the identity of the person. As previously stated, these energies/vibes help determine what happens to a person's soul in the afterlife and I believe they continue on with a person's soul.
Psychological continuity	I think the good/bad energy/vibes stay with the dead person's living family.
Universe and/or nature	The energy/vibes are attached to the person and when the person dies, they dissipate back into the universe.
As an identity in the universe	Combination of both a force in the broader universe and attached to the identity of the person
Uncategorizable	I do not see how energy can be classified as good or bad. Energy is a scientific concept, and though I believe it has some level of continuity, I have trouble classifying it as positive or negative

APPENDIX K

SAMPLE OF ANSWERS GIVEN TO QUESTION ABOUT CONTINUITY OF ENERGY IN AN EARTHLY OR HEAVENLY WORLD

Table 27: Sample of answers given by both samples (USA and Brazil) to the question about continuity of energy in an earthly world or heavenly world.

	Brazil
Category	Explanation
Unsure	Não sei. (I don't know)
Disbelief	Eu acredito que não há energias/vibrações boas ou más.(I don't believe in the existence of good or bad energies/vibes.)
Discontinuity	Acho que as vibrações/ energias morre com o individuo, não tem vida. (I think that vibes/energies dies with the person, it doesn't have life.)
Continuity	
In an earthly world	Como disse no exercício anterior, penso que as vibrações/energias ficam a espera de algo. Quando um ser morre, as energias ficam armazenadas no universo a procura de algo. (As I said before, I think that vibes/energies stay and wait for something. When someone dies, the energies stay stocked up in the universe in search of something.)
In a heavenly world	Após a morte a energia vai permanecer no outro mundo, ou seja, no celestial. (After death, energy will remain in another world, that is, in heaven.)
Psychological continuity	Talvez elas permanecam neste mundo, na memória dos vivos. Não acredito em outro mundo celeste (étereo). [Maybe they remain in this world, in the memory of the living. I don't believe in another heavenly (ethereal) world.]
Transitioning between an earthly and heavenly world	Acredito na união das duas possibilidades. Acho que os mundos possuem ligação e que a única coisa que não existe em ambos é o corpo biológico. (I believe in the union of both possibilities. I think that both worlds hold a connection, and that the only thing that doesn't exist in both world in the biological body.)

Table 27: (Continued)

Transitioning both worlds via reincarnation	Eu acredito que seria ilógico nós fazermos tantos laços de amizade, aprendermos tanta coisa para em determinado tempo vir a morte e acabar com toda uma existência. Acredito sim que estamos nesse plano para aprendermos o máximo e desenvolvermos as nossas qualidades em busca da nossa perfeição. Chegado o tempo (a morte) voltaremos para o nosso estado original de espírito desencarnado e voltaremos ao plano etéreo onde encontraremos espíritos afins. Caso necessário retornaremos ao plano terrestre por meio de reencarnações quantas vezes forem necessárias. (I believe that it wouldn't be logical for us to make so many bonds of friendship, learned so much, for death to then come and end our existence. I believe we are in this plane to learn as much as we can and to develop our qualities, seeking for perfection. When it is time (death) we will return to our original spiritual state, disincarnating and returning to an ethereal plane where we will find spirits alike. If its necessary, we will return to an earthly plane via reincarnation, as many times as are necessary.)
Uncategorizable	A religião cristã diz que no céu entra os justos e bons. E no inferno os ruins. Mas despindo-se da identidade religiosa por um momento, tudo quanto fazemos é por vontade própria ainda que por vezes somos levados a fazê-lo sem vontade no inicio. Não há um lugar (específico a meu ver) para ("descarregar" essas vibrações (boas ou más) senão em nossos pensamentos. (Christian faith says that only the good and fair enter heaven. And in hell the bad. But, detaching from a religious identity for a moment, everything we do is from our own will, even if at times we do so without initially wanting to. There is no specific place (in my opinion) for these energies/vibes (good or bad) to be discharged, but in our thoughts.)

USA	
Category	Explanation
Unsure	I don't know.
Disbelief	I don't think there are vibes.
Discontinuity	I do not think that vibes are a "force" that can "live." They are feelings within a person and their mind.
Continuity	
In an earthly world	I don't think that they go to a heavenly world, but I think that energy can be recycled on earth.
In a heavenly world	The energies could continue in a heavenly world based off of one's spirituality beliefs.
Psychological continuity	If these vibes continue at all, I think they would continue on earth in living people's emotions. I wouldn't call it a force so much as a reputation. Vibes could be living person's feelings or thoughts about a dead person, but I don't believe that these vibes could be called an energy or a force. I don't believe in a heavenly world, just our universe, so I don't believe that posthumous energy/vibes could exist in heaven.
Transitioning between an earthly and heavenly world	I think that it could be both. Every energy will be able to travel between the heavenly and earthly world for the reason that they are an energy. So I think that it would be possible for them to be able to travel to both.
Uncategorizable	I don't know about any other world but this one.

APPENDIX L

CODING INSTRUCTIONS

You will be coding participant's open-ended answers to 3 questions, which refer to the possibility of energy continuing after death. Each question has a different coding scheme that is presented bellow. You will code only a sample of participants' responses, and only one question should be coded at a time. As a first step, you will be trained with all the coding procedures to then proceed to code responses independently.

Training
During this training session I want you to randomly read a sample of questions so that you get familiarized with the type of responses participants are giving. Following, as a group I want you to read the coding instructions for the questions you are being trained to code (see codes bellow). In this coding scheme you will be presented to each coding category, its abbreviation, an explanation describing what this category encompasses, and an example of an answer that falls into this category. In addition, a decision making rule (attached) is to be used when answers fall within more than one category. After reading and discussing the answers with your colleagues you will code participants' answers that are highlighted in yellow. This coding needs to be made independently without consulting your colleagues. After everyone has finished this preliminary step, coding will be compared to see if they match. If codings do not match you will discuss with your colleagues what is the correct coding for that answer until an agreement is reached.

Reliability Coding
After training, you are now ready to start coding. You will receive an excel file with participants answers and next to these answers some will be marked for coding. These are spread throughout your spreadsheet. You are only to code the answers that are marked for coding. When you are done coding you need to send your coded file to the PI. A meeting will be scheduled, with you the PI and the second coder, to go over the coding that didn't match so that an agreement can be reached.

Final Coding
After reliability checks are performed, you will be assigned specific questions that you will then code all remaining answers that haven't been coded yet. When coding is complete you are to submit it by email.
Feel free to contact the PI by phone or email if you have any question.

Question 1: Do you think it's possible that good/bad energy/vibes continues? How so?

Table 28: Category explanations for coding open-ended question about overall energy continuity.

Category		Code	Explanation	Example
Disbelief		**DB**	Imply that the person doesn't believe in the existence of good or bad energy/vibes.	*No, I am not sure that I believe in good/bad energy or vibes.*
Disc.	**Discontinuity**	**D**	Answers that express belief in discontinuity without any further explanations.	*I do not think that any kind of vibes continues.*
	Biological	**D_B**	Answers that make reference to bodily biological functioning to explain the discontinuity of energy. Thus energy is inherently part of the body, only.	*No. Energy usually associates with body. If the body is dead (physically) then there's no way that energy will remain.*
	Only Soul continues	**D_S**	Answers that imply the energy does not continue and what continues is only the soul.	*No, I do not believe that energy vibes of any type continue. I feel that it simply is impossible for energy or vibes to leave a person's body and move on, however I do believe that a soul moves on, but is unrelated to energy.*
	Psych. Continuity	**D_PC**	Answers that imply that energy discontinue and that the only thing that continues are a persons impressions on the world (legacy) and on the people they interacted with (memories and feelings associated to the dead person).	*No, the person is dead - nothing other than the memory of that person continues to exist*
Cont.	**With another entity**	**C_E**	Answers that imply that energy continues attached to some other immaterial entity (Soul, Spirit, Ghost, Aura).	*Although I am not entirely sure what is meant by "good/bad energy/vibes", I will do my best to express my beliefs and how I interpret these terms… I do think it is possible that good/bad energy/vibes continue in a sense that in impossible to be perceived by humans. I believe that these energies/vibes go along with a soul. To elaborate, I believe a person's soul still exists after they die, and this soul is made up of an individual's energy- along with other essences of life*
	Psych. Continuity	**PC**	Answers that imply that energy continues as a person's impression on the world (legacy) and on the people they interacted with (memories and feelings associated to the dead person).	*I think the vibes continues not in the person but in those the person had an influence on and touched, that way his/her vibes continue on in another* *I think it is possible in the way that people who are still alive attribute certain events to the angry spirit, or generous spirit of a close one that has recently passed. They continue through the memory of the living.*
	Universe &/or Nature	**C_UN**	Answer implies that energy continues in the universe or in nature (our natural world)	*I am not sure what good or bad vibes are, but according to the conservation of energy by science, energy doesn't just disappear the second of dying. It stays but diminishes until enough time past.* *I know that energy cannot be destroyed, so it would make sense that the energy in our bodies continues on after we die and are no longer aware of it. I don't think this energy contains any information about the person it was in - I think the energy is just diffused back into the environment after one dies.*
	Good or bad	**C_GB**	Answers that imply that either bad or good energy continue. Not both.	*I do not think that any bad energy continues. I think after we die, that we feel nothing but happiness and good*
Uncategorizable		**Unc**	Answers that are uncategotizable	*I think it could be possible because of many people's spiritual sense.*
Other		**O**	Answers that appeared only once: Unsure about existence of energy	*I think it is possible because there really isn't a way to be sure either way.*

Question 2: Now I want you to consider some possibilities about good/bad energy/vibes continuing after death. One possibility is that good/bad energy/vibes continues as a force in the broader universe, separate from the person; another possibility is that it continues to be an energy that is attached to the identity of the person; or maybe there is yet another possibility. What do you think about these possibilities? Please explain.

Table 29: Category explanations for coding open-ended question about how energy continues.

Category		Code	Explanation	Example
Disbelief		**DB**	Imply that the person doesn't believe in the existence of good or bad energy/vibes.	*I hold no belief in good or bad energy vibes. I find it hard to believe such thing could actually occur.*
Discontinuity		**D**	Answers that express belief in discontinuity of vital energy. Some might say they believe only in the continuity of soul, but not energy.	*How can energy be transferred without a vessel? I don't feel that the vibes can be moved since they are only felt while alive.*
Cont.	**With another entity**	**C_E**	Answers that imply that energy continues attached to some other immaterial entity (Soul, Spirit, Ghost, Aura).	*I think the good/bad energy/vibes continue with the identity of the person. As previously stated, these energies/vibes help determine what happens to a person's soul in the after life and I believe they continue on with a person's soul.*
	Psychological Continuity	**PC**	Answers that imply that energy continues as a person's impression on the world (legacy) and on the people they interacted with (memories and feelings associated to the dead person).	*I think the good/bad energy/vibes stay with the dead person's living family.*
	Universe &/or Nature	**C_UN**	Answer implies that energy continues in the universe or in nature (our natural world)	*The energy/vibes are attached to the person, and when the person dies, they dissipate back into the universe.*
Mixed		**Mx**	Answers imply that energy/vibes continues both in the universe but also attached to an identity.	*Combination of both a force in the broader universe and attached to the identity of the person*
Unsure		**U**	Answer implies that they aren't sure about the existence of energy/vibes or about the possibilities proposed.	*I do not know much about forces, either attached or separate from the body. But I do believe the soul would leave the body after death*
Uncategorizable		**Unc**	Answers that are uncategorizable	
Other		**O**	Answers that appeared only once	

Question 3: Now I want you to consider some other possibilities about good/bad energy/vibes continuing after death. One possibility is that good/bad energy/vibes continues as a force in this earthly world; another possibility is that it continues in some other heavenly world, or maybe there is yet another possibility. What do you think about these possibilities? Please explain.

Table 30: Category explanations for coding open-ended question about where energy continues.

Category	Code	Description	Example
Disbelief	**DB**	Imply that the person doesn't believe in the existence of good or bad energy/vibes.	I don't think there are vibes
Discontinuity	**D**	Answers that express belief in discontinuity of energy/vibes. At times it might imply continuity with soul, but without energy.	I do not think that vibes are a "force" that can "live." They are feelings within a person and their mind I do not think one's energy continues once they have died.
Continuity In an Earthly world	**C_E**	Answers that imply the continuity of energy in this world. Some might conceive it as in nature, in the broader universe or in some parallel dimension. Usually negating the continuity to heaven, or negating heavens existence.	People's energy and vibes could still exist on the earthly world because energy and vibes seem like a more earthly thing. I don't think that they go to a heavenly world, but I think that energy can be recycled on earth
Continuity in a Heavenly world	**C_H**	Answers imply that energy continues in some other heavenly world. Sometimes conceived as heaven and hell and sometimes conceived as a transcendental world (not part of this world). Energy might be associated with soul or not.	I think that it could be both. Every energy will be able to travel between the heavenly and earthly world for the reason that they are an energy. So I think that it would be possible for them to be able to travel to both.
Psychological Continuity	**PC**	Answers that imply that energy continues in this world as a person's impression on the world (legacy) and/or on the people they interacted with (via memories and feelings associated to the dead person).	If these vibes continue at all, I think they would continue on earth in living people's emotions. I wouldn't call it a force so much as a reputation. Vibes could be living person's feelings or thoughts about a dead person, but I don't believe that these vibes could be called an energy or a force. I don't believe in a heavenly world, just our universe, so I don't believe that posthumous energy/vibes could exist in heaven.
Mixed	**Mx**	Answers imply the possibility of energy continuing both in an earthly world as well as in a heavenly world.	It seems that the energy or vibes exist both in a heavenly world and remain grounded in the earthly world. It may even be viewed as energy being portrayed from the heavenly world into this earthly world (when one is suddenly remembering a passed loved one, they may resume their task with more vigor).
Uncategorizable	**Unc**	Answers that are uncategorizable	I don't know about any other world but this one
Other	**O**	Answers that appeared only once: Ex: Unsure about existence of energy	There may be a heaven, and it may be exclusive. But, until someone can prove this i.e. come back from the dead we won't know. Since all people who were claimed medically dead that were revived said they felt nothing at all.

Decision Making Rule for Mixed Pattern Responses

- If Disbelief & Discontinuity **Code As** Discontinuity
- If Disbelief & Unsure **Code As** Unsure
- If Discontinuity & Unsure **Code As** Discontinuity
- If Psychological Continuity & Continuity as Entity **Code As** Continuity as Entity
- If Psychological Continuity & Continuity in the Universe/Nature **Code As** Continuity in Universe/Nature

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