A QUANTUM MODEL OF HUMAN SUBJECTIVITY FOR MORAL PSYCHOLOGY: USING Q METHODOLOGY TO DEFINE THE FEATURES OF JUDGMENTS IN HILBERT SPACE

By

DANIEL J MARANGONI

Bachelor of Arts in Philosophy
John Carroll University
University Heights, Ohio
2005

Master of Science in Educational Leadership
Oklahoma State University
Stillwater, Oklahoma
2013

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Dissertation Approved:

Dr. Al Carlozzi

Committee Chair

Dr. Diane Montgomery

Dissertation Advisor

Dr. James May

Committee Member

Dr. Francis Grabowski

Committee Member

Dr. Jam Khojasteh

Outside Committee Member

Name: DANIEL J MARANGONI

Date of Degree: MAY, 2018

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Abstract: A major issue in the field of moral psychology is identifying aspects of human morality that can be measured. Kantor's (1959) formulation of a *psychological event* provides a unique option for the field. A psychological event evolves over time through the interaction of current situations and stimuli with historical interbehavioral processes. Kantor's formulation of a psychological event has these elements interacting within the psychological field under review, but the space is undefined. Stephenson (1982) offers Q methodology as a research tool to measure psychological events and does so by defining the psychological field within Hilbert space—a generalized Euclidean space where belief states of individuals are represented as vectors within the space. Using the well-known Julie and Mark vignette (Haidt, 2001) about a sister and brother who decide to make love, this study investigates the viewpoints of participants, who are experts in moral philosophy and psychology, regarding the story. In previous studies with the Julie and Mark vignette, participants were unable to articulate their beliefs about the event: this has led to the conclusion that people have intuitive moral reactions, but they often exhibit *dumbfounding* when they attempt to explain their intuitive reactions (Haidt, 2001). This Q methodology study operationalized the subjective perspectives of participants in order to define their viewpoints. The stable viewpoints are defined with the data and show unique ways of framing the story and are *Personal Autonomy, Human Nature, Outcomes,* and *Individuals in Context.* The interpretation of the findings defines these viewpoints and shows how they differ when the vignette is considered from different perspectives. By setting the psychological field within Hilbert space where quantum theory explicitly applies (Stephenson, 1982), the viewpoints can be used to define the features of belief projections as explained by the important work in quantum cognition and decision making. By defining participants' viewpoints, this study shows that people are not dumbfounded about their moral beliefs.

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CHAPTER I

INTRODUCTION TO THE STUDY

In order to provide an empirically defensible definition of morality, moral concepts are often extrapolated from the data collected during experimentation and measurement. A large number of scales and tests are used—whether a researcher knows what the scale or test measures—because of the belief that something must first be measured before it can be studied scientifically (Stephenson, 1953). Since it is assumed that the fundamental principles of the universe are well understood, the primary goal has simply been to sort out the details. The essential measurement proposition is that the meaning of experimental data refers unambiguously to the properties of the measured object and not to the phenomenon of the system more broadly (Bohm & Hiley, 1993). This is a holdover from classical physics where there was never a serious concern with ontology or epistemology. Epistemology in the system was self-evident since measurement was simply a special case of the laws that applied to this universe, and the observing apparatus obeyed the same objective laws of what was being observed (Bohm & Hiley, 1993). However, researchers do not simply observe what is there since "the boundaries between objects or stimuli are situation-dependent and subjectively-determined" (Peterson, 2013, p. 2).

Much of the research in moral psychology has too eagerly taken assumptions from other areas of experimental science. Many in moral psychology think that measurement has to do with assigning numerals to objects according to a particular rule, despite the fact that only quantitative attributes can be measured this way (Stevens, 1946). This leads researchers to believe that the psychological attributes under investigation are in fact quantitative (Michell, 2004). This is overly simplistic and ignores the fact that the "link connecting the experimental result with its meaning is indivisible, unpredictable and uncontrollable" (Bohm & Hiley, 1993). This link is not purely quantitative, and the meaning of the result involves the complexity of a person's subjective experience as it is lived out in the world.

Background to the Problem

Experimentation and measurement offer rich potential to the study of morality, but there can be an uncritical application of quantitative measurement in the field. This can lead to an inability to articulate what is really true about the human experience, which causes errors in differentiating between preferences, social conventions, and morality. With the decline in Kohlbergian-style moral psychology, there are new criticisms as to what role philosophy and psychology play in the exploration of morality. Essentiall, the issue is a disagreement over the extent to which moral psychology needs to first address philosophical assumptions about morality. Kohlberg (1980) thought it did, but Lapsley and Narvaez (2008) disagree that one ought to address the philosophical aspects of morality before doing research.

In the Lapsley and Narvaez (2008) concept of psychologized morality, research is free from prior philosophical assumptions so that moral psychology is not operating with more restrictions than other types of psychological examinations (Kristjansson, 2009). This

prevents a distortion of the scientific goal of finding objective truth (Kristjansson, 2009). It yields a naturalized ethical theory, which helps avoid a misconception that "considerations about moral character as an ethical meta-construct and/or an educational ideal can be developed in isolation from empirical evidence on the lives of concrete person" (Kristjansson, 2009, p. 817). Nevertheless, there are serious methodological problems plaguing this form of psychological research, and researchers should consequently be critical of adopting the moral world view that they produce.

Many researchers in the past few decades have been busy creating postulates and then deducing conclusions to test by experiment. This leads to *deducing* empirical laws from asserted systems of logic rather than *discovering* them (Stephenson, 1961). This style of hypothetico-deductive investigation has been borrowed through analogy from other areas of science. But, hypotheses were supposed to be grasped by observation and not by logic: they should be induced and not deduced (Stephenson, 1961). The role of observation is limited to the time that the hypotheses are tested, not created, and consequently amounts to little more than finding difference between groups at the conclusion of an experiment (Stephenson, 1961). Research in the field would yield more important results from testing postulates and not from testing the hypotheses deduced from them. Moreover, hypothetico-deductive research ignores the subjective experience of the participants in the research.

An Example

Jonathan Haidt (2001) outlines a dual process model in which emotion and reason are both mental constructs at play in decision making. He has since extended this idea to ensure that intuition (a term he describes as being broader than emotion) is what is first and foremost functioning in moral decisions. The idea is that individuals are flawed reasoners who look to

confirm their own pre-existing beliefs (Haidt, 2013). Haidt (2001) provides four reasons for doubting the role of causal reasoning in moral judgments: (a) there are two cognitive processes, reasoning and intuition, and reasoning is overemphasized, (b) reasoning is often motivated, (c) reasoning constructs post hoc justifications, (d) moral action covaries more with moral emotion than with moral reasoning. A key point is that people construct post hoc justifications for their behavior, and consequently any façade of objectivity is illusory. Moral reasoning is not used to figure out what is really true or good, but rather it is used to prepare explanations that can be used to justify actions if called upon to do so (Haidt, 2013).

Haidt, Bjorklund, and Murphy (2000) use a vignette about Julie and Mark as part of their experiment. Julie and Mark are brother and sister who decide that it would be "interesting and fun" to have sex (p. 18). The story provides assurance no one else will find out, that it will only happen once, and that enough protection is in place to avoid a pregnancy. Participants were asked if Julie and Mark did anything wrong. The experimenter then presented arguments to counter participants' responses as a means of playing devil's advocate. The main counterargument was to remind participants that there was no harm identified in the story and that simply finding the action disgusting did not mean it was wrong. It was expected that people would "make automatic, intuitive judgments, and then be surprised and speechless" as they tried to explain why they thought this act of incest would be wrong (Haidt et al., 2000, p .5). The study found that most people believed that Julie and Mark having sex was wrong, but ultimately they had little to offer by way of explanation. That is, the participants demonstrated some form of moral *dumbfounding*—a phenomenon described in the study as happening when "strong intuition was left unsupported by articulated reasons" (p. 10).

Concerns

The study from Haidt et al. (2000) does not allow for the possibility that there might be something more to the domain of self than self-justification. Since "articulated reasons" (p. 14) are so important to the research design, it would be expected that a more robust tool to measure participants' viewpoints on the issue was put in place. The only tool the study used to gather explanations of beliefs was an open ended question. If participants showed any indication of inexplicability as they responded, the researchers concluded that they had no explanation to offer. Since many of the participants could not give an articulate explanation of their conclusions, especially in the face of an argumentative researcher, the researchers concluded that their hypothesis was true: that people were reacting intuitively to the Julie and Mark situation.

The hypothetico-deductive model of research proves problematic here. The *a priori* assumption that the brain has a dual-process nature of intuition and reason, and the postulate that the intuitive process was the one leading moral decision making, were never tested directly. The only thing that the study did was to test a hypothesis deduced from the postulate. Knowing that people generally disapprove of Julie and Mark having sex is by itself unhelpful in determining whether or not people are reasonable or intuitive when making moral judgments. In function, it offers no real proof that the categories of intuition and reason are operational entities in the decision making process.

The Problem with Categories

Experiments in psychology often rely on the assumption that particular mental categories exist (Smith, 2016). In Haidt et al. (2000), the researchers assumed that intuition and reason are two categories of the mind. Mind is a construct, though, and so intuition and

reason are constructs in reference to it. Constructs are important in science but require a concrete reference to a thing or an event (Smith, 2016). Conceptualizing the brain as a psychological tool does not refer to an actual thing, but refers rather to a construct that draws connection to the biological function of the brain and its role in human behavior (Smith, 2016). Intuition and reason were the assumed categorical parameters in the Haidt et al. (2000) experiment, and so the goal was to figure out which one was working during the experiment—no other outcomes were experimentally possible. The postulate itself was never tested.

What is lacking is a serious understanding of what is should be under investigation in the first place. What should have been of primary concern in the Julie and Mark experiment is the psychological event of participants reading and operationalizing their viewpoints in response. Instead, the focus was about confirming a hypothesis deduced from the assumption of mental categories. Woodworth (1929) understood early on that psychological events should be of primary importance when he recommended using verbs rather than nouns to describe these events. He says one should say "remembering" rather than talking about "memory," or "thinking" instead of "thought" (p. 82). This is because the nouns are simply substitutions for verbs in these cases: the nouns do not refer to actual objects, but rather refer to activities. Creating psychological systems on based on the assumption of categories leads to a breakdown in the system. As, Stephenson's (1961) writes:

> It is not enough to blame [the failure of the system] on the complexity of human conduct, or to seek a way out via statistical procedures of a dubious kind, played with chaotic postulates. Perhaps psychology, in all its…years of systems, has been putting the wrong questions to man. (p. 15)

Haidt et al. (2000) used the Julie and Mark vignette to explore the dual-process theory of the mind, but they never asked the most important question: is human thinking really explained by such a model? The study should have avoided the adoption of untested assumptions at the start of the study. This would have allowed for a more basic exploration of the psychological events of the participants reading the Julie and Mark dilemma. A tool could have been used to explore what participants really believed about the story. The tool cannot exist, though, without a thorough understanding of the nature of the human mind under investigation. What is required is research focused on psychological events without the assumption of pre-existing mental categories. Measurement should be on these events directly and not on hypotheses deduced from assuming that any categories exist.

Expecting the Wrong Things from Measurement

Asking the wrong questions begets the wrong kinds of information, and such is the nature of much of the current moral research. MacIntyre (1984) notes this succinctly in stating that the social sciences "are predictively weak" and that they do not discover "law-like generalization" (p. 89). The failure to find predictive power in human decisions is not the fundamental problem of concern here; rather the fundamental problem is that the expectation of predictability in actions plagues the nature of experimentation in moral psychology. Hence, the concept of *generalization* is used as a predictive conclusion and not as a tool for future use (Stephenson, 1961). Despite the complexity of human morality, researchers in the field are busy trying to grasp lawfulness as conclusions and have not thought very much of "enunciating laws as mere rules to guide their inquiries into things" (Stephenson, 1961, p. 6). For example, Stephenson (1953, 1961) outlines what he calls Freud's Law, that "in conflictual situations the person may defend himself by anomalous

forms of behavior" (p. 7). Stephenson (1961) discusses this law not as conclusion about human behavior, but as a tool to "know what to look for" (p. 6) in future explorations of human action. Thus, the law is never operationalized directly in research, but it used to help guide what to look for moving forward.

What one expects from theoretically derived laws today has everything to do with predictability and regularity—despite the relatively consistent failure to do so. This is not to say that there are no general conclusions, since physics has done the difficult work of finding conclusions that do exist. Perhaps some general conclusions exist in moral psychology as well. This will be hard to find, though, with the current disregard for the nature of systems—in this case, the nature of human consciousness—and an infatuation with hypothetico-deductive measurement. Human morality is more than the observations of single actions, since morality takes place through a self-reflective process of conscious human subjects over time. In this case, there must be something more valuable to measure regarding the moral life of individual people than single behaviors in single experiments.

Statement of the Problem

The fundamental problem that this research addresses is that researchers in moral psychology are not attending to the nature and function of the physical universe and of humans operating within it. By ignoring a salient conceptualization of conscious communication, the goal of measurement in the field has been to make generalizations about human behavior from hypothetico-deductive hypotheses. Because of the methodological approaches being used, the field does not have very much to say about the nature of the human experience as it is lived through an individual subject in specific contexts. In brief, it fails to measure actual psychological events.

Without an understanding of human nature, descriptions of the human condition get confused. One aspect of confusion is the general problem moral psychologists have in distinguishing between preferences, social conventions, and morality. Which actions get divided into which categories largely becomes a matter of personal preference, political agenda, or cultural trends. Researchers doing this sort of work are explicitly convinced that their divisions are not arbitrary—such as Nucci (2009), for example—but the diversity of opinions has not led to consensus. The concern, though, should be with finding empirically relevant things to say about psychological events. Doing this would give researchers the ability to say something about the viewpoints that people have about behaviors as they are acted out in the real world. These viewpoints could be grouped into factors of like-minded people. These factors would create a valuable set of "categories" that could be used as a tool. The information that actual individuals can provide about their own subjectivity and the viewpoints they hold is often met with skepticism, but the field needs robust data from individuals as they communicate their own subjective perspectives.

Theoretical Framework

As basic postulate from Bohr and Stephenson is that there are two sciences, physics and psychology, and that quantum theory applies to both (Stephenson, 1989). Essentially, then, there are three realms: the mental realm, the bodily realm, and the quantum realm. What has become clear in the last century is that the bodily realm is derived from the quantum realm with unexpected properties (Bohm, 1951; Rae, 1986). What is theoretically important for the present research is that the mental realm is derived from the quantum realm. This is a departure from the current models of moral psychology that assume the mental realm is derived from the bodily realm in some form of behaviorism or functionalism

(McGinn, 1982). If the quantum realm is acknowledged at all, it remains irrelevant (Robinson, 1987). The theoretical framework at play here is that both the mental and bodily realms are "different types of ordering of the underlying quantum 'stuff'" (Marshall, 1989, p. 15). Forms of mind/body dualism are to be rejected in their classical formulations, and the problems that arise from them will be seen and corrected.

This rejection of traditional mind/body distinctions has a number of theoretical implications regarding the nature of consciousness. Consciousness as an entity itself becomes less important than its ability to communicate the subjective experiences of actual people. Mind comes into being as quanta (factors) of self-referent statements (Stephenson, 1982). The conscious mind is not a thing, like a brain which is an embodied material object. This type of consciousness must be investigated through the use of language that has as a central focus the self-reference of the one using it. This research is concerned with self-referential communication and the fact that the "mystery of consciousness, in which self-reference is omnipresent, explicit or not" (Stephenson, 1993, p. 5.) needs to be part of the methodological approach. This type of communication can be made with simple statements that are common to those with a shared linguistic culture. Here it is clear how, like Kohlberg (1958) in his dissertation, the use of Q sorts can be valuable. Q methodology, which was developed to use this language to operationalize the beliefs of participants, is theoretically important to the study of subjectivity.

The mind is not derived from the body but both are derived from an underlying quantum reality. The important part of consciousness is communicability of lived subjectivity. This means that individuals can communicate the perspectives of their lived experiences in common terms, a fact that needs to be taken seriously in any discussion about

the moral dispositions of actual humans living out their lives in the real world. Self-referential communication is taken as an active process of the mind that can be measured in the context of actual events.

What is theoretically and methodologically valuable is a centrality-of-self model. The focus on subjectivity has at its core a notion of communicability so the idea of consciousness and unconsciousness as categories can be dispensed with. Theoretically, it is important to get rid of all the categories or faculties of the mind that researchers in moral psychology might typically use. Rather, what are theoretically important are a person's self-referential comments or beliefs, made in relation to interactional situations (Stephenson, 1953). Theoretically, this can be articulated as an event-based approach to psychology (Smith, 2016), and can be measured with Q technique and its methodology (Brown, 1980).

Quantum Theory and Q Methodology

The present study examines quantum models of decision making and judgment that formalize decision making as belief state projections in Hilbert space. A Hilbert space is a generalization of a Euclidean space where belief states of individuals are represented as vectors within the space (Pothos & Busemeyer, 2014: Trueblood, Yearsley, & Pothos, 2017). In doing this, the study will adopt a mathematical formalism of quantum theory to conceptualize decision making (Trueblood et al., 2017). If, for example, someone thinks that Julie and Mark did something wrong, he projects his belief to the subspace for this viewpoint. This subspace has features. To define the features of these subspaces, the present research utilized Q methodology to give participants the opportunity to communicate their viewpoints about Julie and Mark did. In this methodology, like-minded beliefs are grouped together and generalized giving way to viewpoints that can be described by the statements

that comprise it. Q methodology, as defined by William Stephenson (1935), has its roots in quantum theory and specifically operates within a Hilbert Space. In the model that is outlined for this research, people operationalize their viewpoints at the time of measurement to create belief states. Q methodology is subjective and can holistically analyze self-referent beliefs about the Julie and Mark vignette. Likert-type scales result in rating single traits at a time, while Q methodology allows for the holistic examination of all the statements made about the vignette (Watts & Stenner, 2012).

In previous studies with the Julie and Mark vignette, participants were asked to make a judgement, yes or no, about whether or not Julie and Mark did anything wrong. Here, these beliefs are represented as vector subspaces in a Hilbert space of a quantum model of cognition. By their nature, these vectors are informed by features that help define their spaces. The inability of previous research to describe the features of the subspace is not a function of the mental process of the participants; rather, it is a problem with the research methodology. To correct this, the multiple Q sorts are performed by participants under different conditions of instruction, which ask about the story from the perspective of other people, so that the participant can represent his own beliefs and his beliefs about what others might be thinking. These sorts are analyzed through Q method in order to create factors that generalize the multiple perspectives into viewpoints.

Use in Moral Psychology

This investigation is specifically concerned with the subjective experience of individual people working out their own moral lives. Specifically, this research explores the nature of human consciousness as it operates in the context of individual people in the real world. The science of consciousness will be brought to bear on the experimental design, and

the philosophy of morality will be used to discuss the findings. The purpose of this model is to offer a correction to the methodological issues currently found within the field of moral psychology.

To do this, the study explains a methodology for subjective science. This exploration does not deny objectivity nor is it mere subjectivism—it is rather a "mathematical-statistical key to what everyone calls 'mind'" (Stephenson, 1993, p. 2). In this case, the purpose is to specifically identify a scientifically defensible explanation of the moral quality of the human mind. The purpose is not to represent *mind* as a thing or category, but to demonstrate that it is an abstraction from quantum phenomena that is best understood in the activity of psychological events. As a function of moral psychology, it takes seriously the need for an autonomous psychology exploration that is free from overly burdensome presuppositions of moral philosophy. The methodology will attend to the working of actual systems, that is, the function of psychological events. Data from this type of experimentation will be viewed alongside normative philosophical claims about morality to enhance the discussion.

Moreover, as a means of methodology, an outcome of the findings of this study is to show that scientific inquiry can be performed on a small group of participants. To achieve the desired order at the time of testing, the procedures of the study is to shift away from sampling methodology, which has become very common in psychological research, and towards a methodology based on a just a few cases. This methodology was used to sample possible beliefs about this particular case, and to explore a participant's viewpoints on the Julia and Mark dilemma in a way that Haidt et al. (2000) could not do. As it relates to moral psychology, the viewpoints that emerge through Q methodology offer a robust description of

a variety of perspectives such that one can engage the resultant viewpoints against expectations from normative moral philosophy.

Purpose of the Study

The purpose of this research was to investigate the complex perspectives of expert participants regarding the Julie and Mark dilemma. Using Q methodology, participants operationalize their beliefs to formally articulate their clear and stable moral viewpoints. These viewpoints define the features of subspaces, which are represented as belief projections in Hilbert space.

Research Questions

1) What are the viewpoints that expert participants might express about the Julie and Mark vignette?
2) How do these viewpoints differ across multiple perspectives, which are sorted as various condition of instruction?
3) How do these viewpoints define the features of belief subspaces represented in Hilbert space?

Definition of Key Terms

Communicability: In the present study, communicability is the key function of consciousness (see **consciousness**). Communication has two forms, one with self-reference and one without. Without self-reference, communication is the transmission of objective information. What is important here is individuals' self-referential communicability of their viewpoints to provide "new sources of knowledge about oneself" (Stephenson, 1982, p. 240). There is no outside criterion for a person's own point of view and so external concepts of validity do not apply to subjectivity (Brown, 1980).

Condition of Instruction: Refers to some rule under which a Q sort takes place. Each Q sort was performed under a condition of instruction that asked participants to consider the Julie and Mark vignette from different perspectives (see **perspective**).

Connatural knowledge: Refers to a type of true knowledge which is not based on the perfect use of deliberate and fully aware faculties of reason, but rather on an inclination of the knowing subject to the subject known. It is a deeply personal form of knowledge that considers that knowing is an act of the whole person who knows through his intellect, which is at times not fully cognitively aware (Maritain, 1943). In some ways, it appears to be similar to intuitive knowledge, but will be distinguished from an **intuition.**

Consciousness: Refers not to a thing itself, but to a function, i.e. communicability (see **communicability**). In consciousness, self-referential communication is omnipresent and measureable through Q methodology. Consciousness communicates information about the self, which is a source of knowledge, as understood by **connatural knowledge**.

Hilbert space: Refers to a vector space with an inner product operation (Busemeyer & Bruza, 2012) that allows length and angle to be measured. The inner product operation associates each pair of vectors with a scalar quantity—the inner product of the vectors. The inner product between vectors can be zero, and so it can define orthogonality between vectors.

Intuition: Is a "gut feeling" or passions that are often mistaken for the products of reason (Haidt, Bjorklund, and Murphy, 2000, p. 3). They are understood to include a number of automatic and uncontrollable cognitive processes, which are largely "outside the control of consciousness and independent of reasoning" (p. 3). Intuitions are distinguished from **connatural knowledge** in that they do not carry the epistemic weight of true knowledge.

Q methodology: Refers to the subjective, holistic interpretation of factor arrays that emerge from analysis of the data (Brown, 1980). The methodology, considered as having both a method and a technique (see definitions below), creates operant factors—factor arrays free from constructive effects (Stephenson, 1977)—from the measurement of participants' psychological events. These events, which are responses to the Julie and Mark vignette from differing perspective, takes place within a psychological field defined in Hilbert space. Quantum theory applies to this formulation of a psychological event.

Q method: Refers to statistical methods used during the process of analysis (McKeown & Thomas, 2013). For this study, a principal component analysis and varimax rotation were used. A varimax rotation is a method of rotating the orthogonal base resulting in a small number of large loadings (Kaiser, 1958). The final statistical step in Q method is the standard score calculation of each statement within each factor to be used for methodological interpretation.

Q Technique: Refers to the method and methodology of sorting statements onto a form (Watts & Stenner, 2012). For this study, there were 41 statements with a distribution ranging from -5 to +5.

Quantum model of cognition: Is a mathematically principled view of cognition that does not rely on "tool box" models like heuristics and biases. It visualizes belief states within Hilbert space (see Hilbert space above) and displays changes in belief states as projections to vector spaces within the decision space for a particular decision. In the Julie and Mark vignette, Julie and Mark projected their belief state to the vector for *yes* they did want to make love. The discussion of quantum cognition for the present study does not treat the mind as a literal quantum computer. Rather, it applies abstract, mathematical principles

of quantum theory to inquire about decision making in cognitive science (Busemeyer, Pothos, Franco, & Trueblood, 2011).

Viewpoint: Refers specifically to the stabilized factor arrays that emerged from the study. A viewpoint is defined through interpretation of the descriptive explanation of the factor array of statements for each factor. Generally, it is used to discuss the beliefs of participants.

Perspective: For this study, perspective refers to thinking about the vignette through a particular lens. Specifically, through the lens of the sorter himself or from that of another person. This was done through conditions of instruction that allowed participants to take the various standpoints of other people. Participants gave their own perspective and the perspectives of Julie, Mark, their most impulsive selves, etc. Ten conditions of instruction or perspectives were sorted by the participants.

Psychological event: Refers to a cognitive episode which has a stimuls function and a response function within a unique interbehavioral situation (Kantor, 1959). It includes historical interbehavioral processes are included within psychological events, which can also account for a particular medium of interbehavior. In each psychological situation, there is a psychological field which consists of the entire system of factors in interaction. The psychological field is defined by Q methodology's theory that such an event can be communicated (see **Q methodology** and **communicability**) during experimentation.

CHAPTER II

REVIEW OF THE RELEVANT LITERATURE

In previous research with the Julie and Mark vignette, participants were unable to explain their viewpoints (Haidt, 2001). The purpose of this research was to investigate the complex perspectives of expert participants regarding the Julie and Mark dilemma. Research question 1 asks: What are the viewpoints that expert participants might express about the Julie and Mark vignette? To do this, the literature review explores the concept of the mind that led to the previous error in measurement and then offers a correction so that a methodology to measure can be implemented. The section **The Primacy of Judgments in Moral Psychology** defines what it is moral psychology should be attempting to measure. It reviews the *dual-process theories* of the mind and the *Social Intuitionist Model* and describes their failures and provides a methodologically stable view of human cognition. In the section, **Bias and Epistemic Justification**, a quantum model of mind is offered that has direct application to the measurement of the first research question. It articulates the **Issues with Classic Physics and Consciousness as Embodied Cognition** and gives a solution with a quantum model of the *implicate order*. Consequently, the chapter defines **Human Subjectivity and its Communicability** in a way that is methodologically operational.

What is of particular importance to this research is the idea of a psychological event, which is defined in section **Psychological Events**. Research question three asks: How do these viewpoints define the features of belief subspaces represented in Hilbert space? To do this, the chapter defines Hilbert space and the quantum theory that applies to it in the **Quantum Decision Making** section. In the section **Re-Framing the Julie and Mark Vignette**, the quantum notion of cognition and the methodological focus on people communicating their own subjectivity come together. The chapter makes it clear that the first and third research questions can be explored, given an appropriate view of cognition, by a methodology that takes judgments and psychological events seriously. The second research question asks: How do these viewpoints differ across multiple perspectives, which are sorted as various condition of instruction? This chapter demonstrates that this type of perspective taking is possible through self-referential communicability.

Morality is a uniquely human phenomenon. This is specifically a function of the conscious self-awareness that only humans have. Humans are rational animals: they have passions and instincts like animals, but also an intellect that allows them to act with knowledge of their own behaviors (Maritain, 1943). Humans orient their plans and actions towards future goals which, at their core, correspond to the essential constitution of their nature (Maritain, 1943). The ontological structure of human nature is composed of man's intellectual necessities and leads to man's future ends (Maritain, 1943).

While there is something relatively mundane and arbitrary about individual human actions, the totality of human behavior is more meaningful. Individual behaviors serve a larger function within the totality of normal human functioning, which is

coextensive with the whole field of natural regulations of behavior within all people universally (Maritain, 1943). There is an ideal aspect to this because it requires an intelligence that attends to an unchanging structure of human nature. The complexities of individual action might lead to a belief that the ontology of human nature and a striving towards an ideal is not always at play.

Many studies in moral psychology seem to be more concerned with single actions that are only nebulously connected to actual morality. Much of the research in moral psychology has a difficult time distinguishing between social norms and actual morality for that reason. Identifying which specific actions violate social norms and which violate moral ones has more to do with philosophy than psychology. Furthermore, predicting how people will behave in different situations is an unsuccessful research paradigm that will not be taken up here. But the concept of morality as it relates to human nature more broadly is important because it is conscious self-awareness that is the beginning of the moral self. Thus, the defining features of moral judgements are important to moral psychology.

The Primacy of Judgements in Moral Psychology

The "primary psychological referent of the term 'moral' is a judgement, not a behavior or an effect" (Kohlberg, 1980, p. 53). Moreover, morality needs to be defined in terms of the formal character of a moral judgement or a moral viewpoint, which is best seen in "the reason given for a moral judgement" (Kohlberg, 1980, p.53). The formal character of a moral judgement such as the one that people make after hearing about Julie and Mark is important to moral psychology.

A distinction between moral judgments and cognitive-predicative judgements is an important distinction to maintain (Kohlberg, 1980). The ability to predict future events or future behaviors has been at the heart of decision making research for a long time. For example, Tversky and Kahneman (1974) described three heuristics employed in making judgments: representativeness, which are usually employed when people are asked to judge the probability that an object or even A belong to class or process B; availability of instances or scenarios, which is often employed when people are asked to assess the frequency of a class or the plausibility of a particular development; and adjustment from an anchor, which is employed in numerical predications when a relevant value is available (p.1131).

A focus on these types of predictive judgments is not what is of concern for this research in moral psychology. A quantum model of decision making introduces the issue that judgements disturb each other and create uncertainty in subsequent judgments (Busemeyer & Bruza, 2012). In the Q methodology used in this research, a person operationalizes a belief at the time he performs a Q sort and thus creates the belief. The creation of this definite belief state, however, can mean that it is indefinite to subsequent judgments. Consequently, it is not possible to define a joint probability to two questions A and B if question A creates an uncertain response for question B; instead, it is only possible to assign a probability to the sequence of answers to question A followed by question B (Busemeyer & Bruza, 2012).

A heuristic model similar to the adjustment from an anchor (Tversky & Kahneman, 1974) was proposed by Hogarth and Einhorn (1992) where a new state of belief equals the previous (anchor) state plus an adjustment. The model fails to

reproduce the correct ordering across all conditions, and also contains many other substantial quantitative predictive errors demonstrating the challenge of such models to account for uncertainty (Busemeyer & Bruza, 2012).

Q methodology is not used to make predictions about future beliefs or behaviors. The purpose, rather, is to define the formal character of viewpoints as they are operationalized in response to a particular condition of instruction. This supports Kohlberg's (1980) definition of moral judgements as distinct from predictive ones. It makes description the goal of the research inquiry. The reasons given for moral judgments like what Julie and Mark did was wrong, provide the features of the judgement. Kohlberg, Levine, and Hewer (1983) state that "moral reasoning is the conscious process of using ordinary moral language" (p. 69); the present study uses ordinary moral language to explore people's viewpoints.

A Failure to Define Features

There are many reasons that researchers might be unable to define the features of judgments. The specific failure for Haidt (2001) comes from the model he adopts regarding the Julie and Mark vignette. His model, the Social Intuitionist Model, is a misuse of the broader dual-process model of the mind. The subsequent review of the literature will show why both are unhelpful constructions for the issue at hand: defining features of judgments.

Dual-process models. The work of Kahneman (2003) has been influential in supporting a dual process model of the mind and is part of the larger work of Tversky and Kahneman (1974) on heuristics and biases. In this theory, people apprehend reality through two systems: a fast System 1 of intuitive thinking which is automatic, and a slow

System 2 in which thinking is analytical and deliberative (Västfjäll & Slovic, 2013). In Kahneman's (2003) model, the intuitive operations of System I generate impressions which are neither voluntary nor verbally explicit (p. 699) and which can be distinguished from judgments. Judgments are always "intentional and explicit even when they are not overtly expressed" (p. 699). This places judgments within System 2 whether they originate with impressions or from deliberate reasoning (Kahneman, 2003). The Rationalist Model, as seen in Kohlberg's (1969) work, argues that moral judgments are the products of System 2. Kohlberg's theory has judgements as a product of a rational and cognitive process.

Social Intuitionist Model. The Social Intuitionist Model (SIM) of moral judgement places moral judgements within System 1 such that they are the product of a non-rational intuitive process (Haidt, 2001; Haidt, 2007; Haidt and Bjorklund, 2008). This model appeals to the concept of moral dumbfounding in which participants have moral convictions for which they have no articulated justification (Haidt & Hersh, 2001). Dumbfounding was offered as the reason why participants in previous research with the vignette believed that Julie and Mark did something wrong but were unable to describe why they held the belief (Haidt, 2001). Haidt (2001) accepts that reasoning can be used to influence judgements, but argues that this rarely takes place. Consequently, the SIM holds that most moral judgements arise as a function of System 1.

Problems with SIM and other Dual-Process Theories

There are a number of problems with the dual-process theory that preclude it from consideration here. First, the dual-process theory over simplifies the complexity of the human mind by reducing it to two systems. Certainly, these two systems are meant to

compartmentalize complex thinking under easy to comprehend boxes; but this type of reductionism is ultimately not helpful to moral psychology. Second, reductionist theories of the mind tend to be overtly linear and claim to offer a straight line of cause and effect from the brain to physical action: this comes at a cost of "neglecting interdependent actions" (Smith, 2016). Third, a theory of mind that is only understood as a physically-dependent construct ignores quantum theory and the contextual/personal interdependency of behaviors.

Bias and Epistemic Justification

Haidt (2001) argues that "the roots of human intelligence, rationality, and ethical sophistication should not be sought in our ability to search for an evaluate evidence in an open and unbiased way" (p. 821). When it is possible for reasoned judgment to influence intuitions, Haidt (2001) is concerned about the biased nature of this reasoning. He articulates two major classes of motivations that have been shown to bias and direct reasoning: relatedness motives, which deals with impression management and smoother interactions with other people, and coherence motives, which include a variety of defensive mechanisms triggered by cognitive dissonance and threats to the validity of a previously held view (p. 1033). Moreover, he finds most explanations of intuitive judgements to be post-hoc rationalizations rather than causal. His concept of moral dumbfounding leads him to belief that people do not have access to the process behind their intuitive judgement. Consequently, any response they do have would constitute a justification made by consulting *a priori* moral theories (p. 1035). These moral theories are a "pool of culturally supplied norms for evaluating and criticizing the behavior of

others" (p. 1035). What was a play the whole time, though, are the moral emotions and intuitions that are really driving people to make decisions.

Curiously, Haidt (2001) is suspicious of human reason, but thinks that quick mental processes like intuitions are generally quite accurate. There is not a good reason to assume, however, that intuition is exempt from the same biases that plagues reason. Chaiken, Giner-Sorolla, and Chen (1996) demonstrate the possibility that the relatedness and coherence motives can influence intuition in the same way as reason, for example. It would also be important to show that these motives constitute a bias each time they appear.

Epistemic Justification

Liao (2010) reframes the discussion of bias within the work of epistemic justification. He summarizes the general concept along the following lines: if someone X, is epistemically justified in believing P, then X is not biased about P; and if X is biased about P, then X is not epistemically justified in believing P (p. 16). Alston (1985) provides a standard account of epistemic justification as depending in part on whether one has adequate evidence for P and if the judgement was in fact based on that evidence.

In exploring the relatedness motivation—though it could work for both friends and non-friends—one finds a common tendency to agree with friends and allies (Haidt, 2001). That is to say, if one's friend makes a moral judgement against P, it could cause him to take a critical attitude towards P as well. The important question, though, is whether or not a tendency to be motivated to agree with a friend or ally is always a bias. Liao (2010) argues that it is not, since a friend whom you might be motivated to agree with has probably sufficiently demonstrated that he is someone who should be believed.

That is, he has consistently provided evidence of careful thinking, of the exercise of intellectual virtues, and the like. This is precisely why two people might be trusted friends who talk about particular subjects. There is not research to show that a tendency to agree with friends is motivated by agreeableness and ease of conversation rather than for the reasons of trustworthiness mentioned above.

Beyond Intuition for Epistemic Weight

Haidt (2001) argues that the purpose of reasoning is to provide a biased basis for justifications. If reasoned thinking is not always biased, there would be good reason to be suspicious of the SIM. More than SIM, the dual-process model of thinking can be disregarded all together. In dispensing with the System 1 and System 2, a different conceptualization of judgement making can be utilized. This concept, *connatural knowledge*, can be described in similar terms to intuition but also carries with it epistemic weight. Judgements from this type of knowledge are often difficult to define as well, since it comes from deeply embedded information. Nevertheless, it provides evidence for making epistemically justified judgements and it can be defined to give the features of the judgments.

The old concept of connatural knowledge has some superficial similarities with the concept of intuition. Maritain (1943) noticed, though, that William James' interest in intuition never did draw on the older notion of connaturality, a clarification that he laments would have explained his teaching on the subject. Reference to connatural knowledge has to do with knowledge not by facts or figures that one can learn, but by a particular inclination ingrained into the mind. This is how people can give an account of the moral life even without explicitly referring to a formal moral philosophy. In some

ways, this sounds a lot like the distinctions made in dual-process theories between system one (intuition) and system two (reason). Some distinctions need to be articulated, then, that move past mere arguments of semantics.

Intuition is an embodied process of affective responses (Haidt, 2001; Haidt & Bjorkland, 2008). Intuition relates to a type of knowing that can be described as a gut feeling, and in this way, shows that it has less to do with *knowledge* than it does *instinct*. It is a socially useful category because it does explain something particularly primal about human interactions in the real world. Essentially it posits that humans have an "innate preparedness to feel flashes of approval or disapproval toward certain patters of events involving other human beings" (Haidt & Joseph, 2004, p. 56). Haidt and Joseph (2004) say that this is especially true for issues of suffering, hierarchy, reciprocity, and purity. According to their theory, these modules provide "flashes of affect" when certain patterns are encountered by a person in a particular situation (p. 63). These flashes are not virtues, but tools in the construction of future virtues.

Connatural knowledge differs from intuition because it does not simply manifest as an embodied affective response: it is a form of true knowledge from human nature more directly. This type of knowledge is not the same as intuition, but rather it becomes intuitive (Maritain, 1943); it comes from a prior place and makes itself known intuitively through the emotions. The concept of emotion also needs clarification: emotion as it relates to intuition has to do with triggered episodes of affective response, not an enduring state (Moors & Scherer, 2013). Emotion for Maritain (1943) is distinguished from this in terms of referring to personality traits and moods which have more to offer to evaluative judgments (Forgas & Koch, 2013). Connatural knowledge is a deeper and

more fully articulated concept than the embodied notion of intuition or instinct. The philosophical distinction between these concepts might not be as clear as what will be seen in the distinction between the quantum mind and the embodied mind, though, since it will be seen that connatural knowledge is a distinctly quantum phenomenon.

Intuition has more to do with automatic responses and gut feelings. Intuition is cognitive in so much as it is pattern-recognizing, but does not represent a form of true knowledge. Connatural knowledge has an aspect of "some flash of reality" like intuition, but it is born in the "preconscious life of the intellect" and has an aspect of true subjectivity within it (Maritain, 1943, p. 15). In contrast with intuition, the "flash" does not result in simply a feeling of approval or disapproval, rather:

> This unconceptualizable knowledge…causes the intellect obscurely to grasp some existential reality as *one* with the Self it has moved, and by the same stroke all that which this reality, emotionally grasped, calls forth in the manner of a sign: so as to have the self known in the experience of the world and the world known in the experience of the self, through an intuition which essentially tends towards utterance and creation. (Maritain, 1943, p. 19).

This trend towards utterance and creation is a unique response that has implications for experimentation. When a person makes a moral decision, he takes into account more than just what factual knowledge he has available to him; but he also takes more into account than just the flashes of emotional approval or disapproval that might present themselves as affective triggers. He takes into account what he knows of himself by essence of his being, connaturally, as it is expressed in his own subjective perspective. This type of knowledge is difficult to put into words (as Haidt identifies with intuition),

but finding a way to do so is expressly important to the measurement of moral viewpoints as they relate to the subjective identities and experiences of individuals.

Human nature that has both an ontological structure and an ideal goal. This nature is common to all people and is made evident to each through connaturality. Knowing through connaturality is a private and automatic process that is difficult to express in words. It is a fundamental aspect of human consciousness which guides individuals towards the goals they have for their future selves as they live out their own subjectivity in the real world. Consciousness need not be conceptualized as an entity in itself, but is best understood through its constant movement and communication to the individual who possesses it.

The essential difference intuition and knowing connaturally is that intuition does not carry epistemic weight. Nagel (2012) defends intuitions as having epistemic weight by equating them with perceptions. She argues that reliable judgments form the basis of sound evidence and that perceptions are reliable. She draws a connection between intuition and perceptions and concludes that intuitions, like perceptions, have epistemic weight. Weinberg (2007), however, argues the contrary. Although perceptions can be fallible, like intuitions, intuitions suffer from unmitigated fallibility—"a fallibility that uncompensated by a decent capacity for detecting and correcting errors that it entails" (Weinberg, 2007, p. 327). This seems to be the case for the intuitions as they are described by Haidt (2001). So, while the philosophical literature is robust, making the distinction between intuition and knowing connaturally is sufficient in this case to make the point.

The philosophical assumptions that attend to the nature and function of humans are valuable to moral psychology. The goal of the type of psychological work being advocated for in the present study is the measurement of psychological events. This requires understanding the nature of human psychology. The present study does not need are *a priori* assumptions from philosophy that confuse human nature. Haidt et al. (2000), researches deduced a hypothesis about feeling disgusted during judgments from a postulate that intuition was primarily driving moral decision making. This, as mentioned, was methodologically faulty since it never tested the postulate. The postulate was imported from an *a priori* philosophical assumption of David Hume's that said "morality is determined by sentiment" (Hume, 1751/1983). The quality of a postulate built on such an assumption is only as strong as the assumption itself. The assumption about sentiments taken from Hume launched Haidt et al. (2000) down an unfruitful path. Consequently, only those assumptions about human nature that lead to an appropriate methodological tool for the study of psychological events will be considered here.

Consciousness as Quantum Subjectivity

In distinguishing between intuition and connatural knowledge, two different conceptualizations of consciousness emerge. Intuition as instinct and gut response has at its core a very embodied notion of mind and cognition. In this view, the mind is seen as the totality of neurological responses to physical stimuli. In contrast, the mind that can know through connaturality is much more complex and requires an explanation apart from embodied cognition.

Issues with Classical Physics and Consciousness as Embodied Cognition

In a push to naturalize moral psychology, many in the field have been looking to science for answers. Science offers many researchers a way to dispense with the outdated traditionalism of folk morality and organized religion (Johnson, 2014). The goal of this sort of inquiry is to create a defensible naturalized ethic (Kristjánsson, 2009). In an effort to be free of any preconceived notions from philosophy or theology, the focus is explicitly materialistic and rejects any appeal to concepts of the mind that place consciousness to exist outside the natural world (Edel, 2001, p. 3). In some attempts at a purely naturalistic morality, there is even a rejection of any type of distinction between human nature and culture. Johnson (2014) denies such a distinction since his view of human nature has only to do with the bodily and physical aspects of a person, which he claims are inseparable from their cultural, i.e. social and moral, functions.

The advantages of a naturalistic approach are, theoretically, that what arises from experimentation comes without the stain of presupposition. When philosophical assumptions drive experimentation, the design is only as strong as the assumptions. Embracing philosophical assumptions is often deliberate like with Haidt (2001) and Kohlberg (1980); but it is often accidental, a fact demonstrated by those who are more careless in their adoption of prior moral psychological models. Sanderse (2012) is an example of this, since he thinks he is doing something along the lines of Aristotelian character modeling, but in essence he is burdened by the weight of accidental Kantian presuppositions.

If moral psychology ought not import too many philosophical assumptions at the start, it should not disregard those *a priori* assumptions that are valuable to the

development of methodology. The discussion of philosophical assumptions above shows that few presuppositions need to be made in moral psychology, but that slight variations in assumptions about human nature lead to huge impacts on research. Take for instance Johnson's (2014) rejection of the idea that moral conduct has to do with discerning ideal moral truths from human reason or some other transcendental source. This rejection is overly simplifies the potential origins of moral truth. First, discursive reasoning is not the only means of human knowledge (as mentioned above with knowing connaturally). Second, transcendental sources are not the only non-physical entities that exist (as will be seen shortly).

By demanding that consciousness be rejected apart from its embodied status is a faulty supposition for moral psychology. Again, slight variations in what is accepted about human nature result in big diversions in methodology as seen in the following idea about human nature:

> "Mind" and "body" are not two different, independent metaphysical entities or dimensions; rather, they are abstractions we make, for various purposes, from the embodied flow of human engagement with the environment. (Johnson, 2014, p. 24)

He is correct that "mind" is an abstraction that is made for various purposes. He is incorrect in stating that it is an abstraction from the embodied flow of human engagement. In saying this, Johnson articulates the irony of many models of naturalistic moral psychology: that they intend to fix what they consider to be outdated models of folk morality by using outdated science. Mind is an abstraction, but it is an abstraction of the implicate order of the universe.

The Implicate Quantum Nature of Human Consciousness

The concept of an implicate order comes from David Bohm's work in quantum mechanics. While a number of the advances in quantum physics and experimentation were computationally valuable, they did little to offer an explanation of the universe as a whole. Bohm and Einstein had a number of conversations about physics, and both shared the belief that the overall goal of their work was to say something meaningful about the reality that exists apart from oneself (Pylkkänen, 1989). Bohm was dissatisfied that quantum theory could provide algorithms for doing experimental work, but that it could not offer a physical account of individual quantum processes (Bohm & Hiley, 1993). A purely epistemological focus of quantum theory ignores reality and does not give an account of the ontology of the universe (p. 2).

To create an ontological interpretation of quantum theory, Bohm understood that describing reality is the key. By accepting both a wave function and a theory of particles, Bohm and Hiley (1993) are able to give "a coherent treatment of the entire domain covered by quantum theory" (p. 3) that leads to the same statistical results as other quantum theories that focus only on experimental calculations. In this interpretation, there is an undivided wholeness to the universe that has as a basic property the movement inherent in the wave function (Pylkkänen, 1989; Bohm & Hiley, 1993). The movement of the universe has in its motion the unfolding and enfolding the physical world. The external world that is perceived by humans is the unfolded, or explicate, order of the university (Pylkkänen, 1989; Bohm & Hiley, 1993). This is the physical reality from which proponents of embodied cognition draw their theory. For materialists, the

explicate order is the only order that exists in the universe. Therefore, mind is an abstraction of a physical phenomenon (Johnson, 2014).

For Bohm and Hiley (1993), it is not the explicate order that is primary; rather, it is the enfolded, or implicate, order that is key. The movement of the universe enfolds its information and then unfolds it in a constant process. Bohm (1990) describes it this way:

> The whole universe is in some way enfolded in everything and that each thing is enfolded in the whole. This implies that in some way, and to some degree, everything enfolds or implicates everything. However, this takes place is such a manner that under typical conditions of ordinary experience, there is a great deal of relative independence of things. (Bohm, 1990, p. 237)

Taking an example of a room, light waves of enfolded information present themselves to an observer's eyes. The information is unfolded through the process of perception and provides information about the explicate reality of the room (Pylkkänen, 2004).

What is both philosophically and methodologically important for the issue at hand is that mind is better represented as an abstraction of the implicate order than it is of the explicate order. Simply stated, consciousness and quantum theory have the implicate order in common (Bohm & Hiley, 1993). Just as physical bodies are enfolded and unfolded in the process of quantum movement, thoughts move into one's mind and fade, only to come back again. This mental movement from the implicate to the explicate order gives rise to the relative stability of thoughts over time (Bohm, 1990), and has implications for how one tries to measure the types of psychological events at play in the human mind.

An example of this that Bohm and Hiley (1993) give is that of listening to music. While a specific number of notes are being played at a given time, a number of previous notes are still "reverberating" (p. 382) in one's consciousness as he listens. The reverberation of individual and separate notes can account for the immediate sense of movement that one feels about the music as he works to apprehend the particular patterns and qualities of the music. To hear individual notes far enough apart in time would destroy this sense of an undivided whole altogether (Bohm & Hiley, 1993). So there are individual notes, which carry particular facts and pieces of information; but the flow of all of the notes brings a more valuable whole together—namely in this case, a particular song. The individual particles of sound as they are unfolded in time become the totality of the song as all of the information is enfolded. The enfolded and unfolded nature of the song has a particular complementary nature that is unable to be divided. The nature of consciousness, it is argued, has more to do with the implicate nature of a whole song than it does the explicate soundings of individual notes.

Human Subjectivity and its Communicability

The models of human thinking and morality adopted from classical physics treat the human mind as a mechanistic, albeit complex, structure; but it ignores the inward perception of the self (Pylkkänen, 1989). This has consequences for moral psychologists because the inward perception of self is functionally important in the creation and application of tools to measure psychological events. Consciousness as a construct can be rejected in the classical systems because it is seen as an abstraction of bodily processes (Johnson, 2014), which can be explained by non-subjective events such as reflex systems or reinforcement contingencies (Stephenson, 1968). Classical science can deal with the

non-subjective, but not with subjective events (Stephenson, 1968). What is being argued for from the quantum model, however, is that consciousness is the very "core and substance of psychology" and that a place can be found for it in subjectivity (Stephenson, 1968, p. 499). Consciousness as an entity itself is not needed, rather, individual subjectivity is retained (Stephenson, 1968; Stephenson, 1989).

Saying that consciousness does not need explained as an entity itself takes away the hold that embodied cognition has on it. What subjectivity takes as primary is not consciousness as a construct, but rather its ability to communicate. In this way, a theory of communication conjoins the only genuine, non-categorical, theory of self (Stephenson, 1980). This solves the issue of *a priori* mental categories becoming erroneous postulates within psychological investigations, and it reclaims an individual's ability to communicate his own self-referential perspectives. Although so much of the theoretical work up to this point has used the term "consciousness," it has now become clearer what is exactly meant by it. The fundamental concern is with subjectivity and one's ability to communicate self-referential perspectives. In the words of Stephenson (1968), "consciousness is dead: long live subjectivity" (p. 501).

Complementarity and the Need for a Quantum Approach to Subjectivity

Stephenson (1986) notes that the concept of complementarity was introduced by William James in 1891 and by Niels Bohr in 1927 as a phenomena experienced as "gaps" in thought, and "by the experiential observation that thought is divisible into transitive and substantive parts" (Stephenson, 1986, p.519). This is an important concept in understanding the need for a quantum explanation of subjectivity. Essentially, complementarity is the phenomenon that objects often have complementary properties

that canned be observed and measured at the same time. This is the case with trying to measure the substance and the transition of thoughts. Writing on this concept, James (1891) says:

> I have already said that the breach from one mind to another is perhaps the greatest breach in nature. The only other breaches that can well be conceived to occur within the limit of a single mind would be either *interruptions, time-gaps* during which the consciousness went out altogether to come into existence again at a later moment; or there would be breaks in the quality, or content, or the thought, so abrupt that the segment that followed had no connection whatever with the one that went before. (p. 237)

Consciousness is not actually fractured in the way that it often appears from human thinking; rather, it flows continuously in living human subjects. But people often perceive their own thinking as pausing and flowing at different times and so James identified these as the transitive and substantive parts of thought. These two concepts were central to his idea of complementarity as he noted the peculiarity of the human mind, "There is a gap therein; but no mere gap…it is a gap that is intensely active" (James, 1891, p. 251). This was seen in the example of listening to music above (Bohm & Hiley, 1993).

A thought or idea typed out and printed on paper has a particular substantive element—this element has a single meaning. James (1891) uses the sentence, "Columbus discovered America in 1492" (p. 275) to demonstrate the single meaning of a sentence. In its substantive form, it is a single fact that is either true or false. But this says nothing of the transitive meanings that come from the person saying the sentence. The emphasis

given to particular words or certain types of intonations could communicate more information than just the meanings of the words by themselves. So, the sentence has a substantive factual element; but it has a transitive element that contains the "whole gamut of human emotion, of skepticism, wonderment, and every other sentiment" (Stephenson, 1986, p. 523). The substantive aspect precludes the transitive aspect, but yet they are both contained in the same sentence: this is the nature of complementarity.

Although containing substantive and transitive elements, the above sentence about Columbus exists as a single undivided state. As Bohr (1950) noted, "any attempt at subdividing the phenomena will demand a change in the experimental arrangement, introducing new sources of uncontrollable interactions between objects and measuring instruments" (p. 52). This highlights the same issue that was noted between the assumptions of mind as an abstraction from the body or as an abstraction from the quantum realm. The different assumptions lead to different methodological arrangements. In the classical set up, the goal is for simple causality and generalized predictability about human behavior—it was already noted how unsuccessful this has been. Within the framework of quantum subjectivity, however, psychological events are "incompatible with psychological situations where causal analysis is reasonably attempted" (Bohr, 1950, p. 54).

What is at stake within an understanding of complementarity is a rejection of explanatory argumentation (Bohr, 1950) of "all methodologies in the classic form, of specifying causes, deducing effects, and making predictions in stepwise determinations" (Stephenson, 1986). What is needed, then, is the quantum view of consciousness, i.e. subjectivity, which has been argued. Once it is clearly understood, a tool can be

identified to measure it—in this case, the sorting of statements and the treatment of the data within Q methodology. The goal is not to measure the substantive properties of thought, but, the transitive properties that involve self-referentiality. Complementarity demonstrates the quantumization of communicability (Stephenson, 1989, p. 15). Operationalizing this self-referential communication is the goal, and its measurement will be the scientific exploration of subjectivity.

To solve the problems with embodied versions of consciousness, quantum theory needs to be applied to the communicability of human subjectivity (Stephenson, 1989). The need for communicability has been demonstrated in the philosophical and scientific foundations of human nature and consciousness. It was important that *a priori* categories of the mind were dispensed with. Dispensing of them allows for an unfettered psychological investigation into people's actual perspectives about their own lived experiences with only one single "category" being operationalized in the experimentation: self-referential, subjective communication (Stephenson, 1989).

Psychological Events

Humans, by nature, have a self-awareness that allows them to make choices about their own actions. The true value of conscious self-awareness is that people can conceptualize the life they want for themselves in the future, and can choose actions that meet these goals. Consciousness is not a physical entity, but an abstraction from the underlying implicate quantum order. Since it takes the self as its focus, consciousness is best understood as subjectivity, which has communicability as its core function. Consciousness is not understood by assuming *a priori* categories of the mind—like those proposed in ideas like dual-process theories—but rather it is best understood when it

communicates its own self-referential feelings and believes during psychological events. The goal of psychological experimentation is the measurement of these events.

Kantor's Psychological Events

Kantor (1959) had factors that served as guides to investigate behavioral segments. In each unique behavioral situation (*k*), he distinguished between a stimulus function (*sf*) and a response function (*sr*). In the system where *sf* and *sr* were generated, he also specified a the immediate setting (*st*) and a historical interbehavioral process (*hi*). The medium of interbehavior (*md*) is also included to account, which often exist as a context although not providing direct stimulus on the event. The psychological event (PE) is thus formulated by Kantor (1959) as:

$$PE = C(k, sf, sr, hi, st, md) \quad (1)$$

where C symbolizes that the psychological field consists of the entire system of factors in interaction.

The decision that Julie and Mark made to have sex together can be represented this way. First, the full vignette is as follows:

> Julie and Mark are brother and sister. They are traveling together in France on summer vacation from college. One night they are staying alone in a cabin near the beach. They decide that it would be interesting and fun if they tried making love. At the very least it would be a new experience for each of them. Julie was already taking birth control pills, but Mark uses a condom too, just to be safe. They both enjoy making love, but they decide not to do it again. They keep that night as a special secret, which makes them feel even closer to each other. (Haidt, 2001)

Here, during the decision to make love (*k*), they are in a unique setting (*st*) of being alone in a cabin near the beach. There must be some mitigating factors that precipitated a conversation about sex, but without details, the conversation itself serves as a sort of stimulus function (*sf*) which leads to a sexual act (*rf*). The medium (*md*) could be the whole special trip through France, which might serve as some sort of romantic force—different from what might have happened if they were just spending time back at their parents' house. The historical interbehavioral process (*hi*) has to do with their views on sex and the nature of their relationship together up to this point. So, all of these things interact within the psychological field in question, which lead to the ultimate decision that they both made to follow through on their idea. This all defines the psychological event. Formula (1) shows what needs to be measured to investigate psychological events, and will consequently be used again as a methodology becomes more clear.

Hilbert Spaces

There is an issue with Kantor's formulation of psychological events that makes it difficult to measure; that is, the empirical space is undefined, except "nominally as a place where factors are in interaction" (Stephenson, 1982, p.242). While the claim that mind is an abstraction from the implicate quantum order has not yet been operationally useful, it can now do the work of defining this empirical space. To investigate psychological events scientifically, which is the goal of this project, the quantum order can define the factor space as the Hilbertian space of mathematics and statistics (Stephenson, 1982).

A Hilbert space is a vector space with an inner product operation (Busemeyer & Bruza, 2012) that allows length and angle to be measured. The inner product operation

associates each pair of vectors with a scalar quantity—the inner product of the vectors. The inner product between vectors can be zero, and so it can define orthogonality between vectors. The orthogonal vector spaces will be important to later discussion of decision making. What is being proposed is that psychological events can be thought of as existing within a Hilbert space. The subsections below shows what this looks like.

System state. Before any psychological event that has a response stimulus, the person has a particular prior mental state. This mental state can be thought to exist as a vector with in the Hilbert Space. This is a unit-length (length 1) state vector $|S\rangle$ that can be projected down onto base vectors. The projection of the state vector onto a base vector is an example of a person moving from an indefinite state to a definite one. For example, if Julie asks Mark if he would like to make love, he would project his belief state onto either a subspace for *yes* or a subspace for *no*.

In thinking about measuring psychological events, this type of projection is important. The answers that come out of quantum systems are constructed from the interaction between an indefinite belief state and the question being asked (Bohr, 1958; Busemeyer & Bruza, 2012). This is understood by thinking of judgments creating mental states rather than describing them (Busemeyer & Bruza, 2012). When Mark decided that he wanted to make love to Julie, he created his belief at the time of his decision. That is to say, he was not walking around holding a permanent and definitive belief about making love to Julie inside of his mind at all times. When the question is asked, though, Mark can take into account all of the factors present at the time of a psychological event to make up his mind. When he does, he projects his mental state onto the belief state about sex with Julie.

The Hilbert vector space is spanned by an orthonomal set of basis vectors $V = \{ |V_i\rangle, i = 1, \ldots, N\}$ that form the basis for the space (Busemeyer & Bruza, 2012). A psychological event, PE, is a subspace spanned by a subset $V_{PE} \subseteq$ V of basis vectors, and the event corresponds to a projector $\mathbf{P}_{PE} = \sum_{i \in PE} |V_i\rangle\langle V_i|$. In the Julie asking Mark about making love example, Mark does not yet know that he will be asked about this, and so his mental state $|S\rangle$ is neutral to the question. When the concept of sex is introduced, Mark focuses on the vector space that contains his knowledge and beliefs about making love to Julie: $JulieLove = \{ |JulieLove_i\rangle, i = 1, N\}$. Within this feature space are the two possible answers to the question: *yes* and *no*. The subset for *yes* is spanned by the subset $JulieLove_{yes} \subset JulieLove = \{ |JulieLove_i\rangle, i = 1, N\}$ of the base vectors, and the answer *no* to the sex question is spanned by the orthogonal complement (Busemeyer & Bruza, 2012).

State revision. When Mark decides that it would be interesting and fun to make love to Julie, he projects his belief state onto the vector space for the yes. This updates his belief state to reflect his yes answer which is a projection to $|S_{julieLove}\rangle = \frac{\mathbf{P}_{JulieLove}\,|S\rangle}{\|\mathbf{P}_{JulieLove}\,|S\rangle\|}$ (Busemeyer & Bruza, 2012). This equation ensures that the belief projects remains at unit length, and the revised state can be used to calculate probabilities of future projections (Busemeyer & Bruza, 2012).

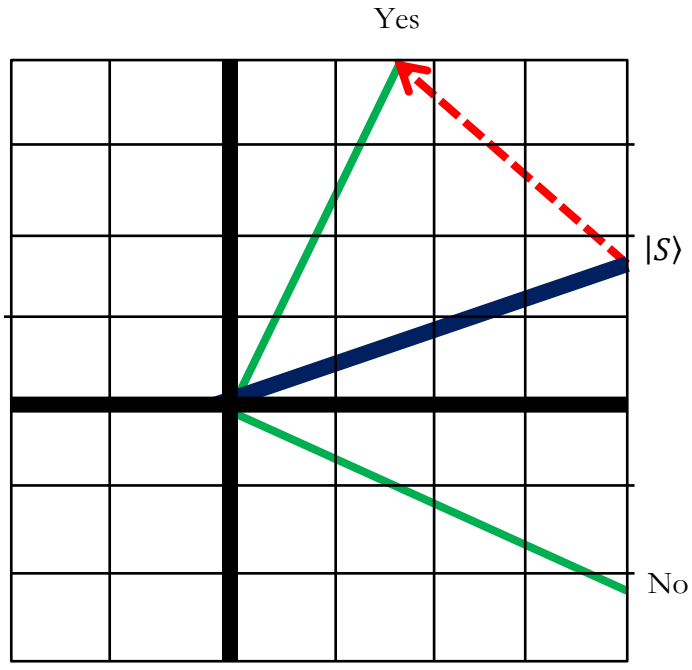
Probability. This quantum way of thinking about belief projection has as its start the state vector $|S\rangle$. For probability postulates, the probability of a psychological event PE spanned by $V_{PE} \subseteq$ V is defined by $qv(PE) = \|\mathbf{P}_{PE}\,|S\rangle\|^2$. In the Mark example, the subspace spanned by $JulieLove_{yes}$ has a corresponding projector $\mathbf{P}_{JulieLove}$ which projects

vectors onto this subspace, and a project for the complement, which is $\mathbf{P}_{\overline{JulieLove}} = \mathbf{I} - \mathbf{P}_{JulieLove}$ where **I** is the identity operator that projects on the entire Hilbert space (Busemeyer & Bruza, 2012). In this model, a person first "projects his belief state vector down onto the subspace for that response to the question, and the probability equals the square length of this projection" (Busemeyer & Bruza, 2012). Specifically, the probability of the Mark saying *yes* to Julie is found by projecting his belief state $|S\rangle$ onto the subspace for *yes*, which produces the projection $\mathbf{P}_{JulieLove}|S\rangle$, and then the probability of sayings *yes* equals the squared length. The probability of decisions can be calculated with specific values. Calculating specific probabilities is not important here, but the concept of probabilities is important and will be used in a distinct way from the idea of *prediction*.

Quantum Decision Making

Figure 1.

Representation of yes/no belief projections in Hilbert space



Mark deciding that he does want to make love to Julie can be seen as a straight forward decision. This can be represented on a two-dimensional Hilbert space where Mark's state vector is represented by the vector $|S\rangle$ which spans the space between possible responses before he makes a decision. The two-dimensional space does not represent all of Mark's mental activity; rather, it shows the decision space that he now focuses on when asked about love making. This space has the possibilities of *yes* and *no* represented by orthogonal rays, which are the mutually exclusive decision subspaces for his response. In the Julie and Mark story, Mark and Julie decide to follow through on making love, and so both of their decisions can be shown by the projection of the state vector onto the vector that spans the ray for the *yes* belief.

Single Belief Projections

The above diagram shows a very simple projection to a belief state from a previously uncommitted position. Taking this decision in isolation, one can wonder about the types of feelings, believes, desires, and commitments that operate within the *yes* and *no* subspaces. For example, the vignette says that Julie and Mark think that it would be "interesting and fun" to make love. Therefore, these concepts help inform the *yes* space. The vignette also states that making love makes them feel closer to each other, and so concepts like *connection* and *unity* (or broadly, relational concerns) might also define this space. In the story, Julie and Mark express a concern for pregnancy and other people finding out, and so these might be the concerns that inform the subset for *no* to the same question. The internal mental projection to the *yes* subset for Julie and Mark resulted in a concrete physical activity. One way of measuring Julie and Mark's perspectives on incest would be to record their behaviors. In this case, Julie and Mark

did have sex and so the presence of the behavior is a good indicator of which believe space they projected on to. The behavior alone does not give an indication of reasons why they might hold these believes, if they always hold these believes, or if they will continue to hold these believes in the future.

Without any context, the decision situation can be described relatively simply. For each mutually exclusive option—*yes* or *no*—there are base vectors which contain certain patterns and concepts. It could be possible to put concepts like interesting, fun, pleasurable in the *yes* subspace and concepts like fear of pregnancy or fear that others might find out in the *no* subspace. There might be a number of shared features as well, but the distinguishing features work to separate the two options.

In experiments involving this vignette, such as described in Haidt et al. (2000), participants are given the story and asked what they think about this and whether or not they did something wrong. This set up mimics the structure of the above decision, just from a third person point of view. Here, participants make a similar *yes* or *no* projection. This time, the frame of reference is not necessarily about Julie and Mark, but what the research participant thinks about the situation. Consequently, a participant might include aspects of Julie's or Mark's perspectives into consideration; but the features of the subspaces for *yes* and *no* will otherwise be defined by his own belief about sex, incest, etc. When asked if Julie and Mark did something wrong, most participants projected their belief state onto the vector space for *yes*, but when asked to explain why, many participants had a difficult time Haidt et al. (2000). Essentially, to answer this type of question, participants would have to articulate the features of the subspace for the *yes* projection. Since this was difficult for the participants, the researchers concluded that

moral dumbfounding had occurred and that intuition drove the decision. The argument here is that this is not the case. Essentially, the features of the subspace are difficult to articulate but they exist nonetheless. The projection onto a *yes* or *no* space might have more to do with knowing through connaturality. This is different than intuition, but is a difficult type of knowledge to articulate. Figuring out how to articulate the features of the subspace are important to a scientific exploration of people's viewpoints on the matter. The issue gets more complex, though, before this can happen.

Multiple Belief Projections

The simple two-dimensional model of the belief projection is an easy way to conceptualize of a single judgment. It is far too simple, though, to think that the decision that Julie and Mark made to have sex was the result of a single decision. The story simply says that "they decided" (Haidt, 2001, p. 1024) without offering any details. Perhaps this was the result of a long conversation. Regardless of the specific mechanism, though, the decision most likely played out as the final decision in a subsequent line of previous decisions. Looking back at Kantor's formulation of a psychological event is a good reminder of the multi ingredients at play: $PE = C(k, sf, sr, hi, st, md)$. A simple stimulus function (perhaps the final argument offered to each other in the discussion) resulted in a simple stimulus response (deciding to make love), but the psychological event also included a *historical* behavioral relationship, the unique setting of their action, and other mediating factors.

In the story, Julie and Mark are traveling in France together and find themselves alone in a cabin near the beach. Even if they have been to France together before, this is a trip away from their normal habitats and so offers a new context. France itself might

serve as a medium of interbehavior (*md*). Stephenson (1982) offers an appropriate example of this when he notes that darkness is not an active stimulus is starting a sexual act, but it can serves as a relevant medium in the behavior. Likewise, there is something particular romantic about France and this might have influenced a number of decisions leading up to that point.

Why is this important? It is important because the totality of the psychological event leading up to the final decision to make love is much more complex than what is explained by the simple projection model above. Julie and Mark most likely made a number of decisions leading up to the sexual act. For example, Mark might have decided that he did feel in a romantic mood on the trip and might have made a gesture to put his arm around Julie during a visit to the Eiffel Tower. This is purely speculative, but if he did make such a decision, it might have led to a series of other instances of physical contact which could have facilitated the final act. If the decision to make love came as a result of other prior decisions, then there are a number of items that need to be addressed to understand the final decision.

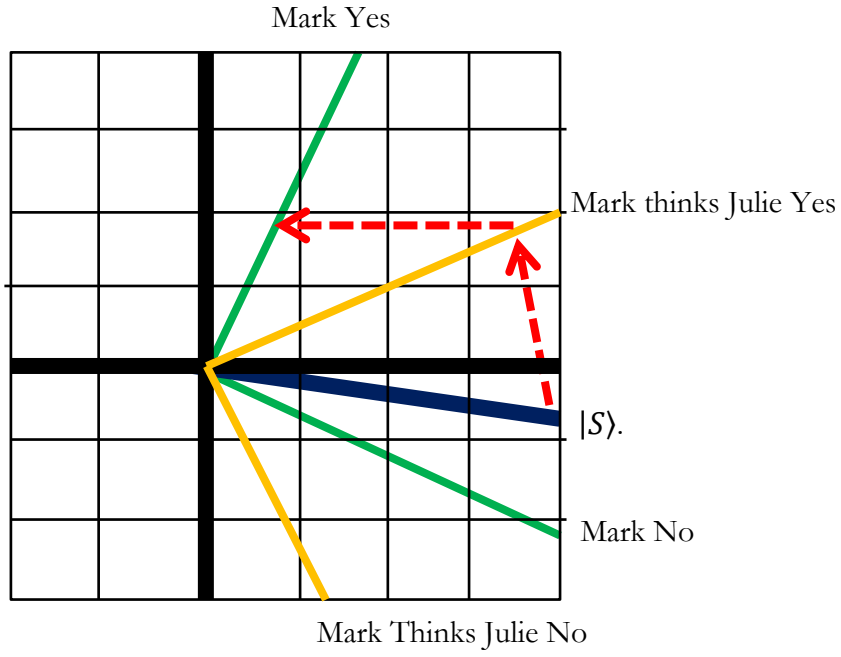
Uncertainty and Incompatibility. In the quantum model, judgments create rather than describe belief states. This does not mean that the answer to every question requires the creation of a new belief state. Busemeyer and Bruza (2012) note that for many questions, there is a "stored answer that is simply retrieved on demand (e.g., Have you ever read a certain book?)" (p. 3). But for more complex ones like the decision to make love to a sibling, one would have to create an answer "from [one's] current state and context" which requires "constructing a reality from the interaction between the person's indefinite state and the question being asked" (p. 4). This helps incorporate the totality of

Kantor's (1959) formulation of a psychological event by taking into account the structure and situation of the decision. It also has implications about how creations of belief state impacts subsequent decisions.

When Mark projected his belief state onto the vector space for *yes* to making love, it required an update to his state vector. In this case, it was the change of the uncommitted belief state $|S\rangle$ to the updated state $|S_{julieLove}\rangle = \frac{\mathbf{P}_{JulieLove}\,|S\rangle}{\|\mathbf{P}_{JulieLove}\,|S\rangle\|}$. This gives Mark a new starting point for subsequent decisions. If Julie asks Mark if he would like to make love and he projects into the above space, then his starting belief vector is in a new position. If she asks a follow up question of any sort, Mark would rotate onto the new believe from his projected state and not from his original $|S\rangle$ position.

Figure 2.

Representation of a possible belief decision for Mark in Hilbert space



The first question sets up a "context that changes the answer to the next question" (Busemeyer & Bruza, 2012, p. 4); this has implications for determining the probability of Mark's responses since a joint probability cannot be defined between the two questions. Rather, a probability can only be assigned to the sequence of answers to the first question followed by the second question.

If the two questions require projections onto two different orthogonal subspaces, the questions are incompatible with each other. Asking Mark what he feels about making love to Julie is a simple projection to his belief state. If he is asked about Julie's perspective on the same topic first, he can project a belief about what Julie thinks. If subsequently asked about his own perspective after having updated his belief state to account for what he thinks is Julie's belief, he would be moving to his new projection from the starting point of his updated state which accounts for Julie's belief. Thinking about Julie's perspective first creates uncertainty in his own perspectives. As Busemeyer and Bruza (2012) note, "it may be impossible to be in a definite state with respect to two different questions, because a definite state…for one is an indefinite state…for another" (p. 4). When events are incompatible like this, the order they are asked impacts judgments—this is the non-commutative nature of the quantum model.

Reframing the Julie and Mark Vignette

The sequence of decision making above can be represented again in a two-dimensional Hilbert Space. If Mark is starting to think about his desire to make love to Julie but does not yet have adequate information about Julie's perspective to know exactly how she is thinking, then the two decisions are not inherently compatible with

each other. In this case, he would make making projections to two different sets of base vectors.

In chart representing these two projections, it would be psychologically difficult for Mark to project to a belief that he would want to make love to Julie. However, if comes to the belief that Julie would like to make love to him, it becomes easier for him to think about it himself. The order of these projections becomes explicitly relevant. If this chart was expanded to account for a number of other prior decisions, the above idea of uncertainty becomes clearer and the complexity of the situation is more visible. Thinking about the decision that Mark made about sex with Julie as a single judgment projection neglects the other aspects of a psychological event.

For example, Julie and Mark could have considered the *relational*, *physical*, *cultural*, and *moral* issues relating to them making love. The decision can be seen as an inference situation involving the above variables as causal variables that independently influence the effect of how one thinks about what Julie and Mark did. This effect, *E*, can represent the question: will we make love? In this way, the effect variable along with the causal variables are binary and can be represented in a simple two-dimensional Hilbert space (see Figure 1) as vectors. The answer to the question effect question has two vector spaces: yes they will make love (E_1) and no they will not make love (E_2). Likewise, if Julie and Mark considered the relational, physical, cultural, and moral issues; these can be considered as similar base vectors. That is, there are *yes* and *no* vector spaces for whether or not they are attending to appropriate relational, physical, cultural, and moral concerns or not.

Since Julie and Mark have never made love before, they do not have a fully integrated mental model by which they can combine all of these variables in a compatible way. That is, they do not have a simple mechanism by which to consider all of the relevant variables together in a simple combined probability space. As such, thinking about each of these issues impacts how they think about the final decision. The order of how they think about these things impacts the overall decision as well. This forms part of the definition of an *incompatible event* discussed above. The quantum model is important here since each of the variables in the inferential task are incompatible with each other: that is, thinking about one creates uncertainty about the others.

Suppose Julie and Mark consider two casual variables, i.e. relationship and cultural norms. These variables *X* and *Y* are considered in their impact on the decision to make love, represented as the effect *E*. In thinking about their relationship, they might think about growing closer (X_1) or about hurting their relationship (X_2). For cultural norms, they might consider what is culturally permissible (Y_1) and what is taboo (Y_2). This model has three pairs of bases for the decision space corresponding to the three variables *X*, *Y*, and *E*: $\{ |X_1\rangle \ |X_2\rangle \}, \{ |Y_1\rangle \ |Y_2\rangle \}, and \{ |E_1\rangle \ |E_2\rangle \}$. Similarly, these would be expanded out for all other causal variables (such as physical and moral concerns) that are considered in this decision event (Trueblood et al., 2017).

Since thinking about each of these variables is incompatible with the others—that is, thinking about one causes uncertainty in another—then the order of projection is important. If Julie and Mark think about having sex, E_1, before they think about the relational implications; the outcome has a different probability than thinking about these items in the reverse order. A simple model such as this represents a quantum model

described in Trueblood et al. (2017). This model accounts for two unique features in addition to accounting for order effects. These are reciprocity and memorylessness. Reciprocity refers to Julie and Mark judging that the probability of a variable given another is the same as the reverse. For example, they might judge that the probability of relationship improvement given cultural permissibility is the same as the probability for cultural permissibility given relationship improvement. This phenomenon is linked to the inverse fallacy and could lead Julie and Mark to equate posterior and likelihood possibilities (Trueblood et al., 2017). In the example about relationship and culture, it is easy to see that the probability that a relationship improves given cultural permissibility might not carry the same probability of something being culturally permissible if it improves a relationship. Secondarily, the model shows that when there are three or more incompatible events (such as *X*, *Y*, and *E*), the conditional probability for two or more of those events demonstrates memorylessness. That is, the probability of an event *E* given *X* and *Y* only relies on the most recent information provided. So the probability of an event *E* given *X* then *Y* is the same is the probability of an event *E* given just *Y*. If Julie and Mark think about having sex given that they understand that it is culturally taboo, but then that they think it would bring them closer together; the probability of having sex is the same as if they had never thought about it being culturally taboo.

The Post-Facto Observer

If Julie and Mark thought about all variables (such as the relational, physical, cultural, and moral issues about making love), it shows how the decision becomes complicated. What if a third-person observer is to make a judgment about what they did? When Julie and Mark were in the moment, their decision projections about the issues

were part of an inferential task of determining whether or not they would make love from the available information and perspective available to them. In observing the event *post facto*, one already knows the conclusion—they did make love. In this case, the observer is making a judgment about what they did. As a simple binary choice, the observer would project to *yes* they did something wrong or *no* they did not do something wrong. Is represented identically to the situation where Mark decided if he wanted to make love or not. Here (see Figure 1), the yes projection represents that the observer thinks Julie and Mark did something wrong. It would also be possible to add the causal variables of relational, physical, cultural, and moral perspectives.

At this point, the exploration of projections has been to binary, mutually exclusive spaces (*yes* and *no*). This says nothing about the features of these subspaces, though, and therefor has limited information to communicate. This is essentially the issue in the Haidt (2001) study where participants could determine location of their state (that it projected to *yes* or *no),* but could say very little at all about the features of the subspace. The explanation that intuition made the decision is less tenable if particular casual variables are identified. In this simple case, the decision to say that Julie and Mark did something wrong is an effect that is caused by projecting beliefs about the causal variables in question. That is to say that someone who thinks Julie and Mark did something wrong thinks that way because he believes there are issues regarding the relational, physical, cultural, and moral aspects of the action.

What more can be said? Certainly, these individual variables incorporate very complex and robust concepts. In thinking about Julie and Mark, one can make a number of claims regarding the morality of making love than simply if it was a good or bad thing

to do. From this very basic delineation of the decision task, it is easy to see how features of the "yes they did something wrong" and the "not they did not do something wrong" subspaces exist. At this point, these are things like the casual variables in the inferential task above, i.e. things like *relational*, *physical*, *cultural*, and *moral* concerns. These features are not yet robust enough to fight off a claim of moral dumbfounding. In the Haidt (2001), he describes how in prior research with the vignette, researchers pushed back against simple claims like these by showing how the story already accounted for them. For example, if someone said Julie and Mark did something wrong because it would hurt their relationship and she might get pregnant; they were reminded that the story said it brought them closer together and that they used protection. These simple statements and retorts are not enough to undervalue the entire concept of relational and physical concerns, though. What is needed is a fuller articulation of subspace features to paint a clearer picture of someone's viewpoint about the action.

Summary

Individual human actions can represent mistakes and miscalculations, and so the totality of the self-reflective moral life is the true value of the human experience. The moral psychology of humans requires the study of the psychological events of actual people living out their lives. The human mind is an abstraction of the same quantum phenomena that makes the physical universe possible (Marshall, 1989): mind is not an abstraction of a bodily function directly. This means that the mind is more than the total of its embodied neurological responses. Instead, quantum theory and mind have the same common quality: the enfolded implicate order of the undivided universe (Pylkkänen, 2004). The implicate order takes as its most basic nature that of movement. This

movement is a type of active information that enfolds and unfolds the universe in a constant process (Bohm and Hiley, 1993). The human mind moves in this way as well. That mind extends beyond the explicate order of the physical body does not predicate any inherent transcendental implications necessarily. The mind as part of the implicate order is a matter of quantum theory and of the works of the physical universe—it is the proper application of modern science to the concept of mind. Knowledge that pierces to the heart of human nature represents knowing connaturally, which is a phenomena distinct from intuition, but which is also difficult to put into words.

The aspect of mind that is non-essential and non-measureable is the consciousness as a thing itself. The essential aspect of mind is its ability to share knowledge, which associates with a context that shapes the lived experience of those in a particular context (Watts & Stenner, 2003). What consciousness can communicate is the internal life of a person that is uniquely filtered through a fully self-referential perspective. This is consciousness as *subjectivity* and it has as its most basic quality that of communicability (Stephenson, 1989). Simple statements that people make have very basic substantive, factual meanings. The fullness of human communication, though, captures the transitive flow of the subjective enfolding and unfolding of meaning. The true richness of self-referential subjective communication is the phenomena of the mind that needs to be measured.

This quantum model of communicability allows the field in which a psychological event takes place to be defined within a Hilbert space. This helps provide a mathematical representation of belief projections within the space. Quantum theory applies to this type of psychological event, and it can be measured with a Q methodology

study which operates with the same principles. In the quantum model, the belief decisions are visualized as projections to vector spaces. These vector spaces have defining features that describe them. Although previous research with the Julie and Mark vignette have been unable to define the features of these subspaces, this chapter set up the parameters for the experiment in the present study to provide these descriptors.

CHAPTER III

METHODOLOGY

The specific purpose of this study was to identify empirically stable viewpoints that expert participants might have about what Julie and Mark did. These viewpoints are identified through Q methodology and its method of extracting factors and are defined in Chapter IV. The interpretation of factor arrays were used to define the features of the belief subspaces relating to the Julie and Mark vignette. The study approaches the Julie and Mark issue in a similar way that previous studies have done. That is, participants were given the vignette and were asked to consider various ways to think about it. What will be unique is that a Q methodology study will be performed so that participants can demonstrate their viewpoint from their own perspective and the perspectives of others in a way that specifically articulates well-defined believes about the issue. To do this, the study used a small group of participants who reviewed the Julie and Mark issue from a number of self-referential perspectives. This was done by sorting statements about the story on a distribution board that range from statements to which one most disagree to those they most agree from either their direct perspective or from their conceptualization of another person's perspective.

In this chapter, a specific methodology is described that builds on the concept of communicability outlined in the previous chapter. First, **Methodological Foundations** helps move from theory to practice by showing how the **Interaction of Variables** in decision making can help by **Adding Statements** to the experiment that participants can use in describing viewpoints. **Q Methodology** is defined and its application to the present study is detailed. This includes the **Instrument Development** with a discussion of **Concourse**. The **Procedure** used in this study will show how the selection of **Participants** was made. Understanding the **Data Analysis** will lead to a description of findings in the next chapter.

Methodological Foundations

In this section, a few concepts will be addressed to bridge the theoretical discussion from the literature review to the operationalized methodology that is implemented. Within the idea of a psychological event, there is the presence of *k* which is the unique field in which the event operates. Essentially, this can relate to the particular person under investigation and the uniqueness of the self-referential perspective that he brings. Since this investigation requires forced interaction—both between previously separated causal variables and between hypothesized perspectives and the individual participant—there is a level of noise (or error) introduced into the system (Trueblood et al. 2017). In asking someone about Julie and Mark, he might be asked to consider a number of things that could be said. In the previous section, the variables of relationship, physical impacts, cultural norms, and morality were introduced. But these are not the only variables in consideration. The uniqueness of the situation of each psychological event, represented as *k*, comes to bear on the event itself. Perhaps this

is the unique viewpoint of the person performing the psychological task. In that case, it is hard to isolate the event to only the variables under consideration. *K* becomes a form of noise which might have an impact on the event. For example, prior knowledge or experience might form a higher dimensional space around the variables.

Thinking about this type of noise operating within the quantum model outlined above changes the nature of the model in a few ways. The error operates as a free parameter since it is dependent on the particulars of each situation. The existence of this error operator still maintains the total incompatibility of each event within the system, but it takes away the special conditions of reciprocity and memorylessness defined above (Trueblood et al. 2017).

Interaction of Variables

In a simple quantum model, judgments about multiple variables are made by considering each variable sequentially (Trueblood, Yearsley, & Pothos, 2017). When thinking about what Julie and Mark did, a number of variables are interacting together to make a judgement. This increases the complexity by adding higher dimensional subspaces (represented as Positive Operator Valued Measures rather than projection operators, see Nielsen and Chuang, 2000). The casual variables are things like the *relational* and *cultural* questions that would impact the effect. For measurement, these variables are not considered one by one, but in interaction together. The variables in this experiment are represented by statements which are used together by a participant to express a viewpoint.

Adding Statements

A sampling of all the statements that someone could say about the Julie and Mark vignette creates a set of representative statements considered the concourse of communicability (Brown, 1980). These statements can be sorted by a participant to explain a viewpoint about what they did, or even to represent viewpoints from other people's perspectives. In Q methodology, a Q sort is operationalized by the self-referential viewpoint of a participant under a condition of instruction (such as, what do you think about what Julie and Mark did?). Experimentally, the psychological event formula is updated to account for the methodological procedure such that:

$$PE = C(k, Q - sort\ 1, 2, \dots, n) \tag{2}$$

where C "symbolizes Q sort conditions in interaction in a unique situation *k*" (Stephenson, 1982). These sorts are factored and formalized as:

$$PE = C(k, factor\ 1, factor\ 2, \dots, n) \tag{3}$$

Quantum theory applies to formula (3) where "cause-and-effect postulates in the classical style are not involved, where categorical constraints are eliminated, and where standard (not an absolutist) statistical unit of scores applies" to all of the Q sorts for all people in all cultures with a zero at the point of no feeling (Stephenson, 1982). The factors are viewpoints with a fully articulated array of statements that form the features of the belief space. In the quantum model, *k*—which signifies the uniqueness of the situation in which the psychological event operates—can be represented as an error term ε which represents the extent that this uniqueness can influence the other variables in question. One way of thinking about ε is as "a measure of the number of other events that can either cause, or be caused by, both the event and its negation" (Trueblood et al., p. 16). This helps

explain how even when participants are attempting to explain viewpoints from different perspectives, their own self-referential viewpoints interact with the variables. Performing Q sorts from different perspectives produces viewpoints that still communicate the self-referential subjectivity of the participant.

Q Methodology

The methodological structure under consideration is that of Q methodology. Q methodology was proposed by William Stephenson in a letter to the journal *Nature* in 1935. As a student of Charles Spearman, Stephenson was familiar with the formulation of factor analysis which is concerned with a selected population of *n* individuals each of whom has been measured in *m* tests: and the "(m)(m-1)/2 intercorrelations for these *m* variables are subject to either a Spearman or other factor analysis" (Stephenson, 1935, p. 297). The technique proposed by Stephenson inverted this practices such that a population of *n* tests are measured or scaled by *m* individuals. The (m)(m-1)/2 intercorrelations are then factorized according to the same procedures as above (Stephenson, 1935). In grouping individuals, the factors represent stabilized viewpoints that these people hold.

Instrument Development

The sorting is performed on a Q set of statements that represent possible statements about Julie and Mark's behavior. The most important aspect of the sampling procedure for the study was the combination of the four original causes that have been discussed (*relational*, *physical*, *cultural*, and *moral* concerns) into a single space where they interact together. Here the four causal variables retain their binary projection possibilities as interbehavioral consequences (effects). Also, a number of neutral

judgement statements are included so that participants are able to articulate viewpoints beyond the simple dichotomy. This is easy to see in a type of Fisherian block design (Stephenson, 1993). Now, the purpose is not simply to measure which projections are made. Rather, the goal is to say something about the features of these spaces. To do this, one must consider all of the possible things one might say regarding Julie and Mark making love.

Figure 3

Fisherian block design example

CAUSES	EFFECTS	
A. Relational	Connective (a)	destructive (b)
B. Physical	Safe (c)	Risky (d)
C. Cultural	Permissible (e)	Taboo (f)
D. Moral	Good (g)	Bad (h)

From all possible statements, a sample of 41 representative statements can be taken. Take for instance, a general statement about a sexual relationship such as: a husband and wife regularly have sex. For those with a relatively non-pessimistic view on marriage, the effects (a), (c), (e), and (g) might apply. This might lead one to have a relatively positive view of such a statement. If someone were to arrange a set of statements on an array from -5 to 5, this statement might have a positive value of a 4 or 5. For the same person, a statement about Julie and Mark having sex might register with effects (b), (d), (f), and (h) and be placed as a -4 or -5.

The specific association with the statements to their cause and effects is not important from a measurement standpoint. Rather, the statements interact with each other through the engagement by a participant reading them. In an experimental study, participants can be provided with a number of statements to interact with. The statements are derived from all statements that one can make about Julie and Mark as it relates to the causal variables under investigation and their effects. In a case of 41 statements, one can be asked to sort them as follows:

Figure 4

Sort Distribution

	Most Unlike									Most Like	
Score	-5	-4	-3	-2	-1	0	1	2	3	4	5
Frequency	2	3	4	4	5	5	5	4	4	3	2

The result is of each Q-sort is an array of statements that function as a singular whole. It has the qualities of the effects of the individual causal variables but it now contains descriptive statements that go along with it. The scoring is forced for theoretical reasons: "it should be compared to a physicist's action when he puts a certain voltage charge through an electrical circuit" (Stephenson, 1993, p. 10). That is, there is a theoretical value in forcing the distribution, for including a zero point, and for limiting the number of high value representations.

Concourse

A concourse is a collection of statements from which a Q set can be sampled. The total and exhaustive list of all things that can be said about a topic is a concourse. For example, Stephenson (1993) says that in a particular collection of quotes, there were

several hundred about old age. A "collection of self-referent statements about a behavioral segment provides the population or universe" (Stephenson, 1982, p. 239) of things to be said about an issue under investigation: these collections are concourses. Each of these concourses is relatively infinite and continuously expandable, but each statement included within a concourse are a matter of common knowledge. In creating a Q set of statements from a concourse, the goal is to sample a representative group of statements that explore the totality of the concourse. In the case of Julie and Mark, selecting items from the concourse of all things to be said was done with a theoretical sampling choosing representative statements from relational, physical, cultural, and moral concerns. This sampling procedure had permissibility, impermissibility, and neutral judgments in mind. The Q set does not need to be ideal in the sense that it becomes the defining tool for all future experimentation on the issue. In fact, any number of Q-sets could be created from the concourse of things to be said for future studies. For this study, a Q set of 41 statements was developed and was used by each participant under each of the ten conditions of instruction. The full list of statements and the conditions of instruction is included Table 1.

Table 1

Conditions of instruction

1 What do you think about what Julie and Mark did?
2 What was Julie thinking?
3 What would Julie and Mark's parents think about this?
4 What would you have thought about this situation when you were in college?
5 What might a person you look up to think about this?
6 What was Mark thinking?
7 What might someone who supports Julie and Mark's decision think about what they did?
8 What does the most impulsive side of you think about this?
9 What do you think about this from a purely practical perspective?

10 What do you think about what Julie and Mark did?

Procedures

When participants read the Julie and Mark vignette, they can think about what took place. Each condition of instruction is a perspective that can be analyzed to form generalized viewpoints about the vignette. To determine the features of these viewpoints, Q method was used to analyze the sorts. In this case, 41 statements representing four casual variables and their binary effects (with the addition of some neutral statements) were given to a participant to sort on a normalized distribution. Each Q-sort produces a single array of statements such that:

$$PE = C(k, Q - sort\ 1, 2, \dots, n) \quad (2)$$

These sorts are factored according to Q method to result in the stabilized perspectives regarding the Julie and Mark vignette. Each sort had a condition of instruction prompting the participant to think about the issue from a particular perspective. Each participant performed the ten Q sorts using the same Q set of statements. The conditions of instruction explore the issue from a number of different perspectives that are all self-referential to the sorter.

Participants

This study used a small group of four expert participants. Q Methodology does not generalize about populations of people, and so the selection of participants does not require sampling theory. Rather, the goal is that participants would be able to carefully and thoughtfully perform the Q sorts under each condition of instruction. As such, the selection of participants was done from those who have strongly considered issues of ethics and morality. Each of the four expert participants in this study had either taken or

taught graduate level courses in moral psychology or philosophy or has graduate education and experience in a field that utilizes highly specialized practical ethical considerations. All participants had advanced degrees in their field and the researcher served as a participant.

Data Analysis

The study involved four participants performing a Q sort under ten conditions of instruction. This provided 40 total sorts which were analyzed using an N X N correlation matrix. Thus, despite the small number of participants, there was a large number of data points to be analyzed. The data are the resulting z-scores that make possible the direct comparisons with scores for the same statements in all resulting factors (Brown, 1980). The sorts are factor analyzed to group like-minded viewpoints together. The stabilized factors emerged as unique belief spaces regarding the Julie and Mark issue. The interpretation of the factor arrays address the first research question by providing mathematically stable and qualitatively interpreted viewpoints represented by the generalized arrays of the z-scores of the statements. The number of stable factors was determined by the data, and so informed the question about which viewpoints exist.

Once the factors emerge, they were constructed by physically creating posters of the boards with the statements in their correct relative places. These posters were analyzed by reviewing the unique array of statements that each of them have. Through an abductive process, familiar to Q methodology, each factor was named and interpreted. This process leads to a narrative descriptor of each factor that can be explained by using the statements and concepts that define its unique perspective in contrast to the other

factors. These descriptions was compared across conditions of instruction to address the second research question.

Once these viewpoints were named and defined, were used to demonstrate how the findings relate to belief projections in Hilbert space. In the basic quantum model, there are two orthogonal options, these are *yes* Julie and Mark did something wrong or *no* Julie and Mark did not do something wrong. By taking into consideration that the self-referential subjectivity of the participant interacts with the variables under consideration, the resulting viewpoints are not explicitly orthogonal. Removing the requirement of orthogonal projections allows the emerging factors to move beyond the simple *yes/no* dichotomy. The relationship of the viewpoints to the simple projections in Hilbert space was determined in response to the third research question to see how the robust descriptions of the emerging viewpoints can be used as defining features of the belief subspaces.

CHAPTER IV

FINDINGS

The purpose of this research was to investigate the complex beliefs that expert participants might hold regarding the Julie and Mark story. The intention was to discover viewpoints that go beyond the *yes* they did something wrong, *no* they did not do something wrong dichotomy. Using Q methodology, participants operationalized various viewpoints about the Julie and Mark vignette, which were articulated by sorting statements multiple times according to a prescribed list of perspectives. The viewpoints that emerged define the features of beliefs in a way that is complex and highly descriptive. The data provide explanations of beliefs that go beyond the simple *yes/no* dichotomy, but which can nevertheless provide the features of those belief subspaces when represented as belief projections in Hilbert space. The following research questions were addressed by the study procedures:

1) What are the viewpoints that expert participants might express about the Julie and Mark vignette?
2) How do these viewpoints differ across multiple perspectives, which are sorted as various condition of instruction?

3) How do these viewpoints define the features of belief subspaces represented in Hilbert space?

This chapter presents the results from the factor analysis and the subsequent details of the interpretation as analyses for the first research question. It includes an analysis of how the beliefs that sorters defined (viewpoints) differ by condition of instruction (perspective) to address the second research question. The presentation of results and its analysis are used to respond to the third research question by showing how the viewpoints define the features of subspaces when representing believes as projections in Hilbert space. Each condition of instruction had the sorter consider the issue from his perspective and from the perspectives of other people. The term *perspective* will be used to describe a condition of instruction; the resulting interpretations of factor scores in arrays demonstrate the *viewpoints* associated with different perspectives.

Data Analysis

Q methodology includes three components: the Q sort technique, an associated statistical method, and the interpretation of the statistical results (Brown, 1980). The statistical method includes the correlation of all sorts to each other with an N x N correlation matrix, a factor analysis and any needed rotations of the correlation matrix, and the calculation of z-scores for each statement for each factor. The result makes it possible to compare the common set of statements within each of the resulting factors (Brown, 1980). To analyze the data, the sorts were inputted to the computer program PQMethod (Schmolck, 2013). Each participant created an array of all 41 statements for each of the ten conditions of instruction. These 40 sorts were entered into PQMethod for analysis. After attempting a centroid analysis and various hand rotations, a principal

component analysis was used to extract four factors, which was followed by a varimax rotation of these four extracted factors. The significance of factor loadings is calculated with the formula for zero-order correlation coefficients (Valenta & Ulrike, 1997), which is $SE = \frac{1}{\sqrt{N}}$ where N is the number of Q statements (Brown, 1980). Since there were 41 statements in this study, the standard error is $SE = \frac{1}{\sqrt{41}} = .1562$. Correlations or loadings of the sort to the factor are considered to be statistically significant at the .01 level when they exceed at least 2.58 standard errors regardless of sign (Brown, 1980), or at .40 which is $2.58(SE) = 2.58(.1562) = .40$. To reduce the number of confounding sorts, the threshold for significance was increased to .60 for this study. Then, in Q methodology, defining sorts are chosen for the final statistical procedure of calculating z-scores for each statement within each factor. A defining sort has a significant relationship to a single factor (see Table 2).

The four-factor solution with an increased significance was chosen because this solution limited the number of confounding sorts (those sorts that defined two or more factors) to best stabilize the extracted factors. Although factors 3 and 4 have only four defining sorts, the number is considered stable for interpretation (Brown, 1980). Table 2 shows the factor matrix, which is arranged by condition of instruction and sorter (row), and factor (column), with an X indicating a defining sort on the factor.

Table 2.

*Factor Matrix with an X Indicating a Defining Sort, and * Denoting Exemplar Sort*

Sort	Condition	Sorter	1	2	3	4
*25	2	3	**0.8243X**	-0.1281	-0.1597	-0.1058
13	6	1	**0.7929X**	-0.3138	-0.2501	0.0751
21	6	2	**0.7815X**	-0.2722	-0.0933	-0.1359

14	7	1	**0.7803X**	-0.3394	-0.1920	0.1723
37	6	4	**0.7763X**	-0.1827	-0.0854	-0.0453
39	8	4	**0.7747X**	-0.3101	0.0878	-0.0952
22	7	2	**0.7730X**	-0.2711	-0.0998	-0.0714
29	6	3	**0.7706X**	-0.3239	-0.1882	-0.0386
17	2	2	**0.7666X**	-0.2854	-0.1342	-0.1260
33	2	4	**0.7535X**	0.0266	0.0407	-0.1828
40	9	4	**0.7126X**	-0.1549	0.2258	-0.2092
38	7	4	**0.7068X**	-0.2862	0.0192	-0.0739
30	7	3	**0.6887X**	-0.4624	-0.1956	-0.0375
15	8	1	**0.6423X**	-0.4458	-0.3079	0.2535
32	9	3	**-0.6913X**	0.1632	0.4681	0.2017
11	4	1	**-0.6589X**	0.4943	0.0117	0.1422
*31	8	3	0.3015	**0.8203X**	0.0158	0.0399
5	1	3	-0.4097	**0.8126X**	0.0931	0.1320
7	1	4	-0.5095	**0.7684X**	0.1738	0.1368
8	10	4	-0.5196	**0.7491X**	0.0827	0.1756
20	5	2	-0.4155	**0.7474X**	0.2713	0.2430
3	1	2	-0.4155	**0.7474X**	0.2713	0.2430
4	10	2	-0.4155	**0.7474X**	0.2713	0.2430
36	5	4	-0.4870	0.**7206X**	0.1042	0.1671
6	10	3	-0.5269	**0.6901X**	0.2520	0.1878
19	4	2	-0.3674	**0.6860X**	0.4579	0.2719
28	5	3	-0.5554	**0.6838X**	0.1869	0.1737
27	4	3	-0.4939	**0.6740X**	0.1270	0.1978
26	3	3	-0.5223	**0.6037X**	0.3487	0.1888
*23	8	2	0.0935	0.1011	**0.9106X**	0.1407
24	9	2	0.1182	0.0132	**0.9039X**	0.1454
34	3	4	-0.1933	0.2889	**0.6935X**	0.0305
35	4	4	-0.2520	0.3620	**0.6088X**	0.1035
*12	5	1	-0.0947	-0.0455	-0.0015	**0.8990X**
2	10	1	-0.0663	0.3799	0.1926	**0.7616X**
16	9	1	-0.0673	0.3026	0.2783	**0.7371X**
1	1	1	0.0906	-0.2870	-0.1679	**-0.6916X**
18	3	1	-0.3724	0.1388	0.5079	0.3250
9	2	1	-0.5549	0.3875	0.3408	-0.0527
10	3	1	0.4892	-0.4522	-0.4251	-0.2758
Percent of explained variance			31	23	11	9
Number of defining sorts			16	13	4	4

Note: Defining sorts are determined to be at or higher than a correlation of .60 on only one factor.

With the solution demonstrated in Table 2, 37 of the 40 sorts defined a single factor at or above the .60 value (which was increased from the required minimum value of .40). While the sorts remain important to the solution matrix, three of the sorts did not achieve significance on any of the factors at the elevated level, and so were not used to define the statement array in the four-factor solution.

Within the initial exploration of the extracted factors, factor one had a large number of defining sorts with a split between positive and negative correlations. This type of association showed that it was a bipolar factor. By rotating four factors, most of the negative defining sorts were rotated to create a second factor. In this regard, there is a relatively high negative correlation between the factor scores for 1 and 2. Two negatively correlated defining sorts on the first factor show that the inverse viewpoint does exist, but that it is distinct from the factor 2. Table 3 shows the correlation between factor scores for the four rotated factors. These are the correlations of the z-scores, not the factor loadings.

Table 3.

Correlations between factor scores

	1	2	3	4
1	1.0000			
2	-.7105	1.0000		
3	-.1436	.3062	1.0000	
4	-.2349	.3863	.2478	1.0000

Using the same array that participants used to sort the statements under the ten conditions of instruction, the statements were arranged for each of the four factors according to the order of their associated z-scores. This produced a full array of the 41 statements according to their z-scores for each of the four factors. For each factor array,

distinguishing statements were identified. Distinguishing statements for a factor are those whose location in the array differs significantly from its location in the other factor arrays. This comparison is made possible by analyzing the z-scores of the statement for each of the factors. Distinguishing statements are highlighted in bold on the tables demonstrating the factor arrays (Tables 4, 5, 6, and 7). A consensus statement was also identified. This is a statement with similar z-scores across all four of the factors. The consensus statement across factors is:

Consensus Statement

		Personal Autonomy	Human Nature	Outcome	Individuals in Context
25	People should feel safe and free to have open conversations about their sexual desires	z = .41	z = .84	z = .67	z = 1.10
	Array Position	0	2	2	3

Each of the viewpoints positively associated this statement with their beliefs. For *Individuals in Context*, the statement had the highest position in the factor array and supported the viewpoint's idea that people need to determine if a particular action will be the right one for them within the broader context of their lives. The other viewpoints, regardless of how they felt about what Julie and Mark did, all accepted that people should feel free to have these types of conversations.

To analyze each viewpoint, statements were placed on boards according to the factor array so that each statement was put in place according to its z-score. This was done to create four physical boards with statements arranged in order for that array to be visually interpreted. On each board, the distinguishing statements and consensus statements were identified, but all statements were present. By reviewing all the

statements for each of the factor arrays in their proper position, a more comprehensive interpretation is possible (Watts & Stenner, 2005; 2012). This allowed for an analysis that considered the placement of distinguishing statements and the placement of other statements on the board. An initial focus was given to the statements on the ends of the board: those in the +5, +4, +3, -3, -4, and -5 positions. Thereafter, all statements were considered and comparisons of placement across viewpoints were made. Evaluating the statements in this way allowed themes to emerge that were unique to that factor array. These themes, when considered together, helped explain the factor arrays as unique viewpoints regarding the Julie and Mark vignette. The defining themes of each factor array were used to give a descriptive name to the factors. The names demonstrate how each viewpoint framed the vignette and were labeled *Personal Autonomy, Human Nature, Outcomes,* and *Individuals in Context.* Each of these viewpoints is analyzed below by giving specific reference to the statements that support the themes.

Research Question One: Defining Viewpoints

The first research question was: What are the viewpoints that expert participants might express about the Julie and Mark vignette?

Personal Autonomy: "It only matters that it's our decision."

The first factor is defined by 16 of the 40 sorts, and accounts for 31% of the variance among the four rotated factors. Of the 16 defining sorts, two had significant negative correlations with the factor; therefore, the inverse of this bipolar factor will be briefly described as well. In thinking about the Julie and Mark vignette, the beliefs that this viewpoint describes are focused on the autonomous decisions that people can make within their exploration of the moral life. The major themes are: 1. Julie and Mark can

make their own decision, 2. Julie and Mark can decide what is appropriate for their relationship, 3. Julie and Mark do not need to worry about what others might think, and 4. Julie and Mark's autonomy is more important than externally imposed expectations. In describing this viewpoint, one participant noted that all external concerns were ignored: essentially it amounted in them thinking something like, "It only matters that it's our decision."

Table 4 shows the statements that are most like and unlike framing what Julie and Mark did through *Personal Autonomy*. In the table, the higher the array position and z-score indicates those statements most like this viewpoint, and a higher negative array position and z-score indicates those statements most unlike this viewpoint.

Table 4.

Most like and most unlike statements for Personal Autonomy

#	Statement	Array Position	z-score
6	**Having sex is Julie's and Mark's personal choice and not a moral concern**	5	1.313
11	Trying a sexual experience once is different from doing it all of the time	5	1.295
2	**This was an opportunity for Julie and Mark to have a new experience together**	4	1.263
7	**Julie and Mark both think sex is fun and interesting**	4	1.132
29	Julie and Mark say sex brought them closer together	4	1.263
17	**Each sexual act needs to be evaluated in context**	3	1.029
26	**Some relationships are romantic and sexual, but some are just sexual**	3	.920
5	**What Julie and Mark di is OK because they are consenting adults**	3	.845
4	**No one will ever find out what Julie and Mark did**	3	.752
39	**Performing such a taboo sexual act could lead to more risky sexual behavior**	-3	-1.214
30	**Making short-term decisions about sex could impact long-term health and stability**	-3	-1.214
13	**The purpose of sex is for unity and procreation**	-3	-1.284

36	Sexual morality coms from understanding human nature and the purpose of sex	-3	-1.408
19	**Julie and Mark are wrong about feeling closer together because unity in sex is about long-term connection**	-4	-1.412
41	People who have incestuous relationships should not hold some jobs or positions within a civil society	-4	-1.428
22	**Julie and Mark should only have sex with the people they marry**	-4	-1.540
15	What Julie and Mark did was wrong because it goes against human nature	-5	-1.826
38	**Sex between a brother and a sister destroys the sibling relationship**	-5	-1.827

Note: Distinguishing statements are in bold.

Table 4 demonstrates the full array of statements in the -5 to -3 positions and in the 3 to 5 positions. The statements in bold in the table are those statements that particularly distinguish *Personal Autonomy* from the other viewpoints. A distinguishing statement shows that the statements in this factor array that are placed in a position distinctly different—at a significance of at least $p < .05$—than the position of the same statement in the other factor's arrays.

This viewpoint values personal decision-making of the Julie and Mark to make their own personal and private decision. The theme that Julie and Mark can make their own decision is supported by the following statements:

2	**This was an opportunity for Julie and Mark to have a new experience together**	5	1.295
7	**Julie and Mark both think sex is fun and interesting**	4	1.132
5	**What Julie and Mark di is OK because they are consenting adults**	3	.845
8	Julie and Mark are using the college years as a time of sexual experimentation	2	.678
25	People should feel safe and free to have open conversations about their sexual desires	1	.414

The *Personal Autonomy* is a viewpoint that gives the people involved the freedom to decide what to do for themselves regardless of what others might think. Julie and

Mark are consenting adults who came to a decision together. In discussing sex, Julie and Mark agree that it is fun and interesting and that having sex would be an opportunity to have a new experience together. If they decide to use their college years as a time of sexual experimentation in this way; it does not matter if friends, family, or anyone else have a different opinion.

The second theme of *Personal Autonomy* is that Julie and Mark can decide for themselves what impact this might have on their relationship.

29	Julie and Mark say sex brought them closer together	4	1.263
9	**The sexual secret that Julie and Mark hold can draw them closer together**	1	.326
20	**Julie and Mark's experience could make them more well-rounded, compassionate, and self-assured people**	1	.378
19	**Julie and Mark are wrong about feeling closer together because unity in sex is about long-term connection**	-2	-1.412
38	**Sex between a brother and a sister destroys the sibling relationship**	-5	-1.827

In the vignette, Julie and Mark say that sex brought them closer together. From this viewpoint, this conclusion is accepted. .

In the vignette, Julie and Mark decide not to tell anyone else about what happened. This viewpoint believes that this is true. *Personal Autonomy* frames the decision as being between Julie and Mark and no one else. This was seen in the position of the following statement within the array:

4	**No one would ever find out about what Julie and Mark did**	3	.752

Consequently, what others might think did not influence how their behavior should be interpreted. This is demonstrated with the following statements being very unlike this viewpoint:

35	Julie and Mark did something wrong because the culture they live in says so	-1	-.525
40	**Julie and Mark's friends and family would think differently about them**	-1	-.817

A final theme that emerged is that Julie and Mark's independence to make their own decisions was more important than limiting what they did because of external expectations.

6	**Having sex is Julie's and Mark's personal choice and not a moral concern**	5	1.313
33	As long as no one gets hurt, there is no such thing as immoral sex	2	.699
18	**There are no universal moral rules about sex**	1	.523
24	**Any restrictions on sex are pointless and cruel**	0	.408
16	What Julie and Mark did was wrong because it broke the law	-2	-.941
13	**The purpose of sex is for unity and procreation**	-3	-1.284
36	Sexual morality comes from understanding human nature and the purpose of sex	-3	-1.408
41	People who have incestuous relationships should not hold some jobs or positions within a civil society	-4	-1.428
22	**Julie and Mark should only have sex with the people they marry**	-4	-1.540
15	What Julie and Mark did was wrong because it goes against nature	-5	-1.826

Since *Personal Autonomy* accepts that Julie and Mark are consenting adults who have a positive response to their decision, external concerns such as the law, morality, and conceptualizations of human nature were very unlike the viewpoint.

Inverse of this Viewpoint. *Personal Autonomy* is defined by two sorts with a strong negative correlation indicating that the inverse of this viewpoint is a distinct, although singular, viewpoint. The inverse of this viewpoint is distinguished from *Personal Autonomy* by being more concerned with what all people ought to do based on external standards rather than on what they want to do for themselves. This is seen from the placement of the following statements in the array:

15	What Julie and Mark did was wrong because it goes against human nature	5	1.827
22	Julie and Mark should only have sex with the people they are married to	4	1.540
36	Sexual morality comes from understanding human nature and the purpose of sex	3	1.408

Human Nature: "Human nature and human dignity is common to all people."

The second array is defined by 13 of the 40 sorts and accounts for 23% of the variance among the four rotated factors. In thinking about the Julie and Mark vignette, the beliefs that this viewpoint describes are focused on how human nature can inform how people work out their moral lives. The major themes are: 1. a concern for human nature and the purpose of sex, 2. a focus on long-term decision making, 3. a generalized understanding of sexual relationships, and 4. a belief that consequences should not influence Julie and Mark's decision. In describing this viewpoint, one participant noted that while Julie and Mark are their own people, they are part of the larger essence of humanity. He said, "human nature and human dignity is common to all people."

Table 5 shows the statements that are most like and unlike framing what happened through a *Human Nature*. In the table, the higher the array position and z-score indicates those statements most like this viewpoint, and a lower array position and z-score indicates those statements most unlike this viewpoint.

Table 5.

Most like and most unlike statements for Human Nature

#	Statement	Array Position	z-score
15	**What Julie and Mark did was wrong because it goes against human nature**	5	1.798
36	Sexual morality comes from understanding human nature and the purpose of sex	5	1.696

40	Julie and Mark's friends and family would think differently of them if they found out	4	1.393
13	The purpose of sex is for unity and procreation	4	1.360
38	**Sex between a brother and a sister destroys the sibling relationship**	4	1.322
30	Making short-term decisions about sex could impact long-term health and stability	3	1.295
19	Julie and Mark are wrong about feeling closer together because unity in sex is about long-term connection	3	1.066
22	**Julie and Mark should only have sex with the people they marry**	3	1.063
31	People should refrain from immediate sexual gratification if it could impact their future goals	3	.930
14	The purpose of sex is pleasure	-3	-.961
20	Julie and Mark's experience could make them more well-rounded, compassionate, and self-assured people	-3	-.990
34	**Abortion and medication could fix any consequences to Julie and Mark's actions**	-3	-1.048
32	**Sexual experiences in the present should not be limited by worrying about the future**	-3	-1.248
9	The sexual secret that Julie and Mark hold can draw them closer together	-4	-1.251
24	Any restrictions on sex are pointless and cruel	-4	-1.293
33	As long as no one gets hurt, there is no such thing as immoral sex	-4	-1.545
6	**Having sex is Julie and Mark's personal choice and not a moral concern**	-5	-1.660
18	**There are no universal moral rules about sex**	-5	-2.029

Table 5 demonstrates the full array of statements in the -5 to -3 positions and in the 3 to 5 positions. The statements in bold in the table are those statements that particularly distinguish *Human Nature* from the other viewpoints. A distinguishing statement shows that the statements in this factor array that are placed in a position distinctly different—at a significance of at least $p < .05$—than the position of the same statement in the other factor's arrays.

This viewpoint focuses on what are viewed as universally applicable expectations for people based a concept of human nature. *Human Nature* connects expectations of people based on human nature with the purpose of sex. In this viewpoint, the purpose of

sex is for creating unity and for procreating in long-term relationships (specifically within a marriage). The ability for consenting adults to make their own decisions does not supersede the universal considerations of their nature and the purpose of sex. This is seen in the following statements that correlate with the viewpoint:

15	**What Julie and Mark did was wrong because it goes against human nature**	5	1.798
36	Sexual morality comes from understanding human nature and the purpose of sex	5	1.696
13	The purpose of sex is for unity and procreation	4	1.360
22	Julie and Mark should only have sex with the people they are married to	3	1.063
6	**Having sex is Julie and Mark's personal choice and not a moral concern**	-5	-1.660
17	**Each sexual act needs to be evaluated in context**	-1	-.336
5	What Julie and Mark did is OK because they are consenting adults	-2	-.961
18	**There are no universal moral rules about sex**	-5	-2.029

A second theme that is supported by the factor array is a concern for long-term decision planning over short-term gratification. The view of decision making that emerges in the *Human Nature* viewpoint is more concerned more with the future self than with the desires of the present self. It believes that actions in the present might have future impacts not immediately seen in the present. Statements that demonstrate this theme are:

30	Making short-term decisions about sex could impact long-term health and stability	3	1.295
31	People should refrain from immediate sexual gratification if it could impact their future goals	3	.930
28	There can be negative consequences to sex other than unwanted pregnancy and STIs	2	.833
39	Performing such a taboo sexual act could lead to more risky sexual behavior	2	.782
32	**Sexual experiences in the present should not be limited by worrying about the future**	-3	-1.248

A third theme supported by the statement positions is that the nature of relationships is generalizable: particular situations and circumstances do not change what these relationships should be like. Although Julie and Mark say that their decision brought them closer together, a *Human Nature* does not take this evaluation into consideration. Rather, it articulates a more general view of relationships that applies to all people:

38	**Sex between a brother and a sister destroys the sibling relationship**	4	1.322
19	Julie and Mark are wrong about feeling closer together because unity in sex is about long-term connection	3	1.066
29	Julie and Mark say sex brought them closer together	-1	-.262
26	Some relationships are romantic and sexual, but some are just sexual	-1	-.393
27	Julie and Mark could learn a lot about themselves from having sex	-2	-.893
20	Julie and Mark's experience could make them more well-rounded, compassionate, and self-assured people	-3	-.990
9	The sexual secret that Julie and Mark hold can draw them closer together	-4	-1.251

These statements evaluate Julie and Mark's relationship according to a generalized nature despite what they have to say about it. The statements that are most unlike this viewpoint show that a *Human Nature* does not belief that Julie and Mark could be better people or better siblings as a result of what they did.

A final theme that informs this viewpoint has to do with the consequences of actions. From a *Human Nature* viewpoint, consequences—whether positive or negative—do not change how Julie and Mark's decision is viewed. The nature of sex and of the relationship are more important than the outcomes of the action. The most interesting statement that supports this theme deals is that this viewpoint does not think that the purpose of sex is for pleasure. Even if a sexual experience is pleasurable, it does

not define the nature of sex. Also, the avoidance of negative consequences does not change the belief about what sex is about. Other statements that support this theme include:

37	No form of sex is 100% safe from pregnancy and risk of disease	2	.590
14	The purpose of sex is pleasure	-3	-.961
34	**Abortion and medication could fix any consequences to Julie and Mark's actions**	-3	-1.048
33	As long as no one gets hurt, there is no such thing as immoral sex	-4	-1.545

Focus on Outcomes: "What if someone found out?"

The third factor is defined by four of the 40 sorts and accounts for 11% of the variance among the four rotated factors. Although defined by a small number of sorts, it is a stable viewpoint that emerged from the analysis. In thinking about the Julie and Mark vignette, the beliefs that this viewpoint describes are focused on the potential consequences of what Julie and Mark did. The major themes are: 1. a concern that Julie and Mark might produce unintended outcomes, and 2. a focus on what other people within Julie and Mark's social circles might think if they found out. In describing this viewpoint, one participant expressed a concern about "what if someone found out?"

Table 6 shows the statements that are most like and unlike framing what happened through a *Outcomes*. In the table, the higher the array position and z-score indicates those statements most like this viewpoint, and a lower array position and z-score indicates those statements most unlike this viewpoint.

Table 6.

Most like and most unlike statements for Outcomes

#	Statement	Array Position	z-score
38	**Sex between a brother and a sister destroys the sibling**	5	1.940

	relationship		
30	Making short-term decisions about sex could impact long-term health and stability	5	1.754
40	Julie and Mark's friends and family would think differently of them if they found out	4	1.576
39	**Performing such a taboo sexual act could lead to more risky sexual behavior**	4	1.557
21	**Mark is using protection which will prevent against the spread of STIs**	4	1.288
28	There can be negative consequences to sex other than unwanted pregnancy and STIs	3	1.243
11	Trying a sexual experience once is different from doing it all of the time	3	1.182
37	No form of sex is 100% safe from pregnancy and risk of disease	3	1.243
3	Julie is on birth control, so she most likely won't get pregnant	3	1.182
5	What Julie and Mark did is OK because they are consenting adults	-3	-.811
4	No one will ever find out about what Julie and Mark did	-3	-.883
24	Any restrictions on sex are pointless and cruel	-3	-1.307
9	The sexual secret that Julie and Mark hold can draw them closer together	-3	-1.330
20	Julie and Mark's experience could make them more well-rounded, compassionate, and self-assured people	-4	-1.391
18	There are no universal moral rules about sex	-4	-1.439
15	What Julie and Mark did was wrong because it goes against human nature	-4	-1.492
36	Sexual morality comes from understanding human nature and the purpose of sex	-5	-1.629
13	**The purpose of sex is for unity and procreation**	-5	-1.87

Table 6 demonstrates the full array of statements in the -5 to -3 positions and in the 3 to 5 positions. The statements in bold in the table are those statements that particularly distinguish *Outcomes* from the other viewpoint. A distinguishing statement shows that the statements in this factor array that are placed in a position distinctly different—at a significance of at least $p < .05$—than the position of the same statement in the other factor's arrays.

The viewpoint described by *Outcomes* is defined by its concern for what happens as a result of an action. When thinking about what Julie and Mark did, this viewpoint focuses on how successfully they can avoid negative consequences and produce positive outcomes. In this regard, this viewpoint thinks seriously about the protections that Julie and Mark put in place to avoid unintended consequences.

21	**Mark is using protection which will prevent against the spread of STIs**	4	1.288
3	Julie is on birth control, so she most likely won't get pregnant	3	1.182
11	Trying a sexual experience once is different from doing it all of the time	3	1.068
10	Julie and Mark say that they won't ever do it again	1	.065

With Mark using protection and Julie using birth control, there is a potential to avoid negative consequences such as the spread of disease or an unwanted pregnancy. Also, since Julie and Mark will not be doing this again, the chances of repeated exposure to these consequences ends after this single event. Nevertheless, *Outcomes* has some conceptual concerns such as:

38	**Sex between a brother and a sister destroys the sibling relationship**	5	1.940
30	Making short-term decisions about sex could impact long-term health and stability	5	1.754
39	**Performing such a taboo sexual act could lead to more risky sexual behavior**	4	1.557
28	There can be negative consequences to sex other than unwanted pregnancy and STIs	3	1.243
37	No form of sex is 100% safe from pregnancy and risk of disease	3	1.24
34	Abortion and medication could fix any consequences to Julie and Mark's action	-1	-.138

The concern demonstrated by placement of these statements for this factor array show a concern for a disruption in their relationship, future risky behavior, and the fact that infection and pregnancy cannot always be prevented or fixed.

A second major theme from the factor array for *Outcomes* deals with what other people might think about what Julie and Mark did. This includes those people who know Julie and Mark, but also the society within which they live.

40	Julie and Mark's friends and family would think differently of them if they found out	4	1.576
35	Julie and Mark did something wrong because the culture they live in says so	2	.538
16	What Julie and Mark did was wrong because it broke the law	1	.424
41	People who have incestuous relationships should not hold certain positions in a civil society	0	-.033

Statement 41, in the zero position but with a negative z-score, in combination with statement 35, shows that the focus is on evaluating what they did based on what other's think. Just because Julie and Mark had sex, it does not mean they are unqualified to engage in society; but, since there could be a risk of others finding out, it could produce a negative consequence. In this viewpoint, other people finding out what they did would produce a negative outcome since it would change the way people think about them. Also, there is a particular concern for breaking the law, which could result in punitive outcomes from society itself.

Focus on Individuals in Context: "It's not just about you."

The fourth factor is defined by four of the 40 sorts and accounts for 9% of the variance among the four rotated factors. Of the four defining sorts, one of them had significant negative correlations with the factor; therefore, the inverse of this bipolar factor will be briefly described as well. Although this factor array accounts for a small amount of the variance, it defines a stable viewpoint about the Julie and Mark story. In thinking about the Julie and Mark vignette, the beliefs that this viewpoint represent are focused the particular situation in a particular context. In this viewpoint, the major

themes are a framing the vignette with principles to then understand 1. a particular behavior (sex between Julie and Mark) within 2. a particular context (the relationship between a brother and sister). In describing this viewpoint, one participant understood the autonomy that Julie and Mark had but explained that their relationship with each other was also interwoven with the web of their other relationships. Even if no one found out this particular secret, "it's not just about you" he said out of concern for how this interaction might have a ripple effect on the wider circle of relational entanglement.

Table 7 shows the statements that are most like and unlike framing what happened through *Individuals in Context*. In the table, the higher the array position and z-score indicates those statements most like this viewpoint, and a lower array position and z-score indicates those statements most unlike this viewpoint.

Table 7.

Most like and most unlike statements for Individuals in Context

#	Statement	Array Position	z-score
23	**Sexual morality is about how you treat the people you're with**	5	1.313
30	Making short-term decisions about sex could impact long-term health and stability	5	1.295
36	Sexual morality comes from understanding human nature and the purpose of sex	4	1.263
17	**Each sexual act needs to be evaluated in context**	4	1.132
31	People should refrain from immediate sexual gratification if it could impact their future goals	4	1.263
28	There can be negative consequences to sex other than unwanted pregnancy and STIs	3	1.029
25	People should feel safe and free to have open conversations about their sexual desires	3	.920
13	The purpose of sex is for unity and procreation	3	.845
14	The purpose of sex is pleasure	3	.752
3	**Julie is on birth control, so she most likely won't get pregnant**	-3	-1.214
18	There are no universal moral rules about sex	-3	-1.214

29	Julie and Mark say sex brought them closer together	-3	-1.284
35	Julie and Mark did something wrong because the culture they live in says so	-3	-1.408
24	Any restrictions on sex are pointless and cruel	-4	-1.412
33	As long as no one gets hurt, there is no such thing as immoral sex	-4	-1.428
41	People who have incestuous relationships should not hold some jobs or positions within a civil society	-4	-1.540
16	What Julie and Mark did was wrong because it broke the law	-5	-1.826
15	What Julie and Mark did was wrong because it goes against human nature	-5	-1.827

Table 7 demonstrates the full array of statements in the -5 to -3 positions and in the 3 to 5 positions. The statements in bold in the table are those statements that particularly distinguish *Individuals in Context* from the other viewpoints. A distinguishing statement shows that the statements in this factor array that are placed in a position distinctly different—at a significance of at least $p < .05$—than the position of the same statement in the other factor's arrays.

The first theme for *Individuals in Context* is to understand the particular behavior. First, this viewpoint identifies a principle to help frame its belief about what specifically happened. These are:

23	**Sexual morality is about how you treat the people you're with**	5	2.084

The principle acts as a starting point to frame the particular action between Julie and Mark. If sexual morality is about how people are treated, what does this viewpoint think about what Julie and Mark did? From the *Individuals in Context* viewpoint, Julie and Mark are focusing on the following when making their decision:

8	**Julie and Mark are using the college years as a time of sexual experimentation**	1	.303

The vignette does not explicitly discuss *how* Julie and Mark treated each other. It does say that they decide together to have sex. This was potentially decided after having a conversation together that took into account what Julie and Mark both wanted. The ability to have this conversation was very like this viewpoint:

25	People should feel safe and free to have open conversations about their sexual desires	3	1.102

But in terms of using their college time as a time of sexual experimentation shows an intent different from one of care. That is, the primary concern has to do with Julie and Mark having a new sexual experience rather than treating each other the way they ought to be treated. As such, this viewpoint does not agree that Julie and Mark are better off as a result:

19	Julie and Mark are wrong about feeling closer together because unity in sex is about long-term connection	2	.855
20	**Julie and Mark's experience could make them more well-rounded, compassionate, and self-assured people**	-1	-4.58
9	**The sexual secret that Julie and Mark hold can draw them closer together**	-1	-.497
29	Julie and Mark say sex brought them closer together	-3	-.936

The second theme is a focus on the particular context in which the action takes place. This theme, like the first, is seen first from a principle and then from the particulars. The general principle is:

17	**Each sexual act needs to be evaluated in context**	4	1.680

The particular context here is that Julie and Mark are on vacation together in France. But, the context also needs to account for interconnected relationships that Julie and Mark have with others. In evaluating the particulars of this vignette, *Individuals in*

Context does not believe that the romantic potential of the vacation is a sufficient cause for the behavior. Also, simply being alone with no one else around is not a sufficient context for doing a particular action:

1	Julie and Mark were in a romantic location so they naturally felt more connected than usual	0	-.291
4	No one will ever find out about what Julie and Mark did	-1	-.637
10	Julie and Mark say they won't ever do it again	-2	-.809

Individuals in Context start with principles that frame its viewpoint of what Julie and Mark did. It is the evaluation of the particular behavior in a particular context that define what the viewpoint believes. People have the autonomy to make decisions according to their own principles, but they need to reference these principles and put the situations within context of their whole lived experiences.

Inverse of this Viewpoint. *Individuals in Context* is defined by a sort with a strong negative correlation indicating that the inverse of this viewpoint is also a distinct viewpoint. The inverse of *Individuals in Context* is easily distinguished from the viewpoint on its focus on principles only. With *Individuals in Context,* there were principles that initially framed the viewpoint, but it was the attention to the particular behavior of Julie and Mark in a particular context that defined it. The inverse is highly principled, much more so than the *Individuals in Context,* but lacked addressing the unique circumstances of Julie and Mark in figuring out what to believe about the vignette. This is demonstrated by the placement following principled statements within the array:

15	What Julie and Mark did was wrong because it goes against human nature	5	1.550
16	What Julie and Mark did was wrong because it broke the law	5	1.438
41	People who have incestuous relationships should not hold some	4	1.250

	jobs or positions within a civil society		
35	Julie and Mark did something wrong because the culture they live in says so	3	.948

Research Question 2: Differences by Condition of Instruction

The second research question was: How do the viewpoints differ by condition of instruction? This study used a small sample of four expert participants, but collected a large amount of data by having each participant sort the same 47 statements 10 times under different conditions of instruction. These conditions of instruction allowed the participants to sort according to their own perspective, but also required them to sort according to other perspectives. Table 1 above shows each of the 40 sorts labeled by sorter and condition of instruction. Table 8 represents this data as a tally mark under the viewpoints when a sort defined the viewpoint for that condition of instruction.

Table 8.

Number of defining sorts by condition of instruction

	Personal Autonomy	Human Nature	Outcomes	Individuals in Context
1. What do you think about what Julie and Mark Did?		3		1
2. What was Julie Thinking	3			
3. What would Julie and Mark's parents think about this?		1	1	
4. What would you have thought about this situation when you were in college	1	2	1	
5. What might a person you look up to think about this?		3		1
6. What was Mark thinking?	4			
7. What might someone who supports Julie and Mark's decision think about what they did?	4			
8. What does the most impulsive side of you think about this?	2	1	1	

9. What do you think about this from a purely practical perspective?	2		1	1
10. What do you think about what Julie and Mark did?		3		1

This table shows three times that a condition of instruction resulted in sorts that defined a single factor, showing consensus across sorters: condition 2, condition 6, and condition 7. The chart below shows the sorts for these three conditions of instruction.

Sorts for Condition 3, 6, and 7

Sort	Sorter	Personal Autonomy	Human Nature	Outcomes	Individuals in Context
	2 What was Julie Thinking				
25	3	**0.8243X**	-0.1281	-0.1597	-0.1058
17	2	**0.7666X**	-0.2854	-0.1342	-0.1260
33	4	**0.7535X**	0.0266	0.0407	-0.1828
9	1	-0.5549	0.3875	0.3408	-0.0527
	6 What was Mark thinking?				
13	1	**0.7929X**	-0.3138	-0.2501	0.0751
21	2	**0.7815X**	-0.2722	-0.0933	-0.1359
37	4	**0.7763X**	-0.1827	-0.0854	-0.0453
29	3	**0.7706X**	-0.3239	-0.1882	-0.0386
	7 What might someone who supports Julie and Mark's decision think about what they did?				
14	1	**0.7803X**	-0.3394	-0.1920	0.1723
22	2	**0.7730X**	-0.2711	-0.0998	-0.0714
38	4	**0.7068X**	-0.2862	0.0192	-0.0739
30	2	**0.6887X**	-0.4624	-0.1956	-0.0375

These three conditions of instruction were explicitly provided to give each sorter the opportunity to express what they think Julie and Mark were thinking that led them to make the decision that they did (conditions 2 and 6). Condition 7 was used to incite a third party perspective of someone who is not Julie and Mark but who might think like them or support their action. These 11 sorts account for nearly 70% of all the sorts that

defined *Personal Autonomy.* The sorts within these conditions of instruction had strong positive correlations with *Personal Autonomy,* but negative correlations with *Human Nature.* This is particularly true for the conditions about Mark's perspective and the condition about the perspective of someone who supports them (conditions 6 and 7 respectively).

Human Nature had conditions of instruction whose sorts strongly defined the viewpoint. Three conditions of instruction had three of the four sorts defining it. These were conditions 1, 5, and 10. The chart below shows the sorts for these conditions of instruction.

Sorts for Condition 1, 5, and 10

Sort	Sorter	Personal Autonomy	Human Nature	Outcomes	Individuals in Context
	1 What do you think about what Julie and Mark Did?				
5	3	-0.4097	**0.8126X**	0.0931	0.1320
7	4	-0.5095	**0.7684X**	0.1738	0.1368
3	2	-0.4155	**0.7474X**	0.2713	0.2430
1	1	0.0906	-0.2870	-0.1679	**-0.6916X**
	5 What might a person you look up to think about this?				
20	2	-0.4155	**0.7474X**	0.2713	0.2430
36	4	-0.4870	0.**7206X**	0.1042	0.1671
28	3	-0.5554	**0.6838X**	0.1869	0.1737
12	1	-0.0947	-0.0455	-0.0015	**0.8990X**
	10 What do you think about what Julie and Mark did?				
8	4	-0.5196	**0.7491X**	0.0827	0.1756
4	2	-0.4155	**0.7474X**	0.2713	0.2430
6	3	-0.5269	**0.6901X**	0.2520	0.1878
2	1	-0.0663	0.3799	0.1926	**0.7616X**

. The sort for each condition of instruction that did not define *Human Nature* defined *Individuals in Context.* This sort for condition 1 had a negative correlation with the viewpoint, but helps demonstrate a similar pattern: that participants represented their own perspective in a similar way that they represented the perspective of someone they

look up to. Interestingly, the correlations for condition 5 more closely represent the correlations for condition 10. After participants sorted from the perspective of someone they looked up to, their own perspective more closely matched that perspective than it did their original perspective. This is most evident for *Individuals in Context*.

Conditions of instruction that asked participants to sort from their perspective or from a perspective of someone they looked up to defined different factors than conditions that asked participants to sort according to the perspective of Julie, Mark, or someone that supports them. Conditions 2, 6, and 7 define a factor that is different from what conditions 1, 5, and 10 defined. The consensus among participants was high for these conditions. For one participant, sorts 1, 5, and 10 defined a different factor than the other three, but the pattern was similar. Other conditions of instruction showed more divergence among participants and among the conditions themselves.

Outcomes was fully defined by different conditions of instruction than those already discussed. Interestingly, each of the four defining sorts for this viewpoint came for four different conditions of instruction and different participants. There is also no real relationship between this viewpoint and the others. Referring above to Table 2, the correlations between factor scores shows very little overlap between this viewpoint and the others. Different conditions of instruction (3, 4, 8, and 9) led participants to articulate this viewpoint, but there was not agreement between any two or more participants about this viewpoint on the same condition of instruction.

Sorts that define Outcomes

Sort	Sorter	Personal Autonomy	Human Nature	Outcomes	Individuals in Context
3 What would Julie and Mark's parents think about this?					

34	4	-0.1933	0.2889	**0.6935X**	0.0305
	4 What would you have thought about this when you were in college				
35	4	-0.2520	0.3620	**0.6088X**	0.1035
	8 What does the most impulsive side of you think about this?				
23	2	0.0935	0.1011	**0.9106X**	0.1407
	9 What do you think about this from a purely practical perspective				
24	2	0.1182	0.0132	**0.9039X**	0.1454

Research Question 3: Defining the Features of Belief Subspaces

Each of the four factor arrays demonstrated within the first two research questions are interpreted as stable viewpoints regarding the Julie and Mark vignette without reference to a *yes*/*no* dichotomy. Each of these viewpoints was given a descriptive name that synthesized the major themes that defined them. The viewpoints share a common set of statements that were used to express particular beliefs about Julie and Mark did, but each viewpoint is unique in that it arranges the statements in a different way. Although the viewpoints are complex and highly descriptive, they can be used to provide the defining features of the *yes* and *no* belief projections (Figure 1). Providing the features of these belief projections resolves the issue from Haidt et al. (2000) in which the researchers conclude that people can make the *yes* and *no* belief projections but that the beliefs have no defining features.

In the original research with the Julie and Mark vignette, Haidt et al. (2000) first asked participants if they thought what Julie and Mark did was wrong before asking them to explain why. This belief projection can be visualized by representing these two mutually exclusive options as vector spaces within Hilbert Space. In the visualization, the belief that *yes* what they was wrong is orthogonal to the belief that *no* what they did was not wrong. Before being asked the question, the belief state of participants is not

committed to either option. To answer the question, they project a belief onto the *yes* vector space or the *no* vector space. In the Haidt et al. (2000) study, participants were able to make this belief projection. They were not, however, able to define the features of their belief projection. Haidt et al. (2000) conclude that defining features of these belief spaces do not exist. The findings of the Q study presented herein show that defining features of the beliefs do exist.

In performing the 10 sorts about the Julie and Mark dilemma, participants were not asked whether or not they believed that Julie and Mark did something right or wrong. The explicit answer to this question was not needed in order for the participants to sort their perspective and the perspective of others as required by the specific condition of instruction. Nevertheless, the data can explicitly show defining features of these two subspaces.

Selection of statements

	Relational	Physical	Cultural	Moral	**TOTAL**
Yes, what they did was wrong	2	3	3	5	**13**
No, what they did was not wrong	3	5	5	5	**18**
Neutral judgment	6	0	2	2	**11**
TOTAL	**11**	**8**	**10**	**12**	

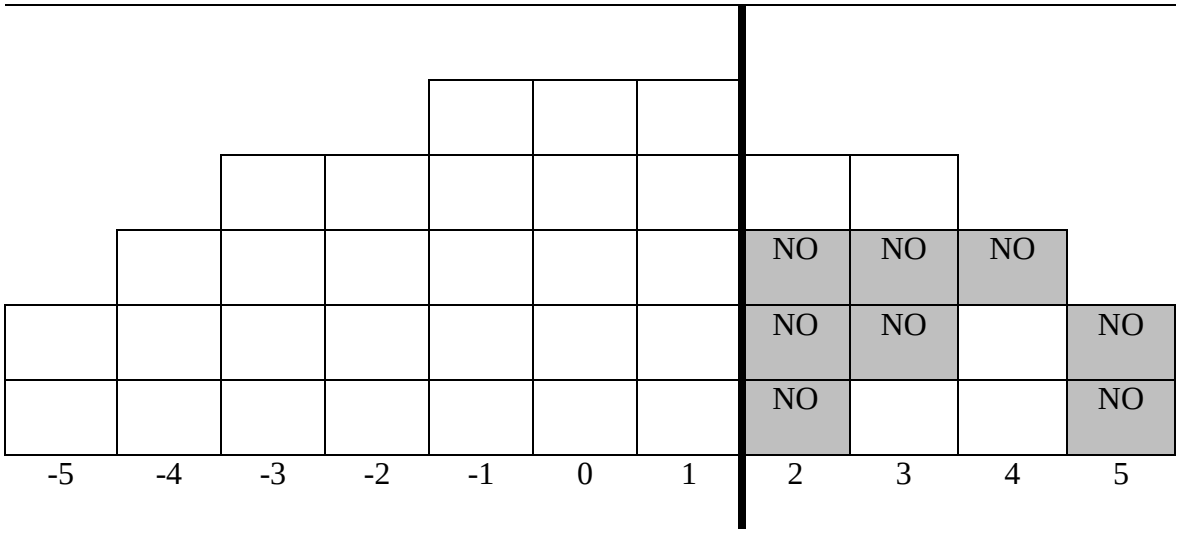
In populating the set of statements for the study, careful attention was made to identify a set of statements from the concourse of all possible statements that was representative of diverse viewpoints about the story. That is, the statements were selected to provide participants with the tools they needed to represent their viewpoint, regardless of what that viewpoint was, without being limited in their outlook by the finite set of statements to sort. To do this, the 4 x 3 design shown above was implemented to

select statements. Often times in Q research, focus groups are used to generate statements; but due to the sensitive nature of the vignette, a selection of statements from current literature in the field was chosen.

While not equal across all categories, the statements came from a distribution of all of the categories. These categories were a tool to help in the selection of statements and do not represent definitive divisions in viewpoint that all people would agree with. These categories were unknown to the participants during the sort.

Figure 5.

A representation of Personal Autonomy by yes/no coding for +2 to +5



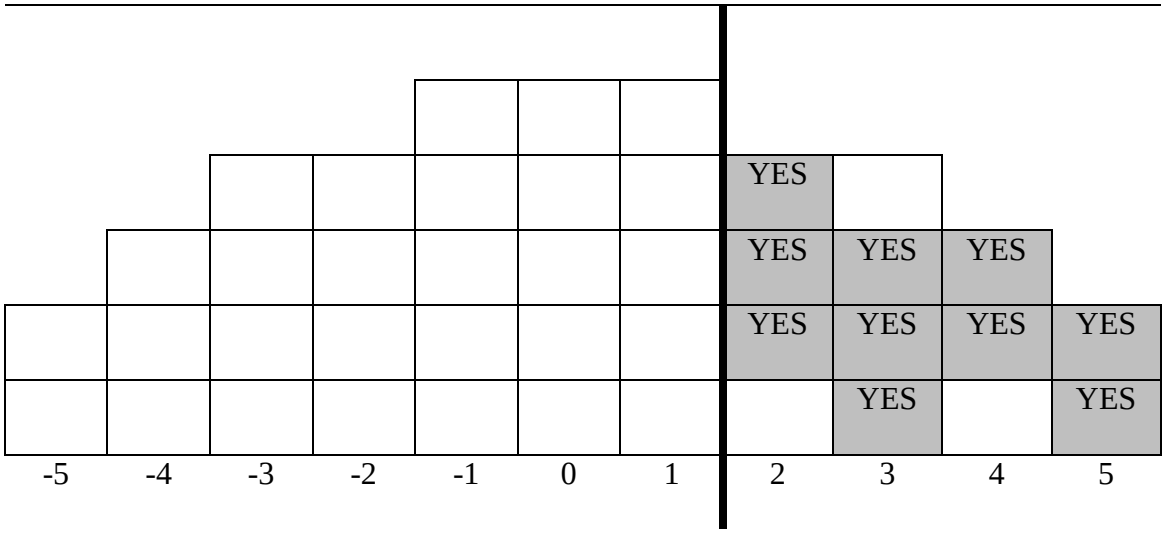
Blank spaces in the +2 to +5 columns represent neutral judgment statements

Each of the factor arrays places statements from these categories in different places. The viewpoint defined by *Personal Autonomy*, for example, places *no* what they did was not wrong and neutral judgment statements in all of the positions from +2 to +5. Blank boxes represent statements of neutral judgment. In contrast, *Human Nature* has relatively strong negative correlation with a *Focus on Personal Autonomy* (-.7015). This

viewpoint has *yes* what they did was wrong or neutral judgment statements in all of the positions from +2 to +5. Blank boxes again represent statements of neutral judgment.

Figure 6.

A representation of Human Nature by yes/no coding for +2 to +5



Blank spaces in the +2 to +5 columns represent neutral judgment statements

These charts can be represented as the mutually exclusive belief projections visualized as the vectors in the Hilbert space model. In this way, the statements associated with the *yes* and *no* boxes above can define the features of the belief subspace. In the As Haidt et al. (2000) study, participants answered the *yes/no* question, but could not explain why. Using a Q study, participants are able to provide statements that define these beliefs. One example of the features of these beliefs can be show by statements associated with the *yes* and *no* boxes in the charts above. Here, the belief projections for *yes* and *no* can be thought of as subspaces in Hilbert space having features that are defined by the statements associated with viewpoints. Table 9 represents an example of defining features that come from the viewpoints that were articulated from the Q study.

Table 9.

Features of the belief subspaces for YES they did something wrong and NO they did not

$\boldsymbol{JulieandMark = \{\,\lvert JulieandMark_i\rangle, i = 1, N\}}$	
Yes: it was wrong	**No: it was not wrong**
$JulieandMark_{yes} \subset JulieandMark = \{\,\lvert JulieandMark_i\rangle, i = 1, N\}$	$JulieandMark_{no} \subset JulieandMark = \{\,\lvert JulieandMark_i\rangle, i = 1, N\}$
Sexual morality comes from understanding human nature and the purpose of sex	Having sex is their personal choice and not a moral concern
What they did was wrong because it goes against human nature	Trying a sexual experience once is different from doing it all of the time
The purpose of sex is for unity and procreation	Sex brings them closer together
Sex between a brother and a sister destroys the sibling relationship	What they did is OK because they are consenting adults
Making short-term decisions about sex could impact long-term health and stability	Some relationships are romantic and sexual, but some are just sexual
They are wrong about feeling closer together because unity in sex is about long-term connection	The purpose of sex is pleasure
They should only have sex with the people they marry	Abortion and medication could fix any consequences to their actions

Summary

In this chapter, the data from a Q study were presented. Four participants sorted 41 statements on a board according to ten different perspectives. Without being asked directly if what Julie and Mark did was wrong, each participant operationalized a viewpoint according the perspective under consideration in each condition of instruction. What emerged were four viewpoints defined by the placement of statements in a

particular order. These viewpoints are complex and richly descriptive; they move beyond a simple *yes* or *no* belief about what Julie and Mark did. Since the *yes* and *no* belief projections were important to the Haidt et al. (2000) study on the Julie and Mark vignette, the data from viewpoints of the Q study were shown in those terms.

For an example of how this could be done, the statements placed in the +2, +3, +4, and +5 columns from *Personal Autonomy* and *Human Nature* were shown on a board according to how they were coded: *yes* it was wrong, *no* it was not wrong, and neutral judgment. *Personal Autonomy* had *no* and neutral statements in these columns while *Human Nature* had *yes* or neutral statements in these positions.

To visualize this, the *yes* and *no* beliefs were represented as vector spaces in Hilbert space. In this visualization, participants from the Haidt et al. (2000) study were seen as having a belief state that projected onto the subspaces for either *yes* or *no* depending on how they responded to the question. In the Haidt et al. (2000) study, participants were able to make these belief projections, but were unable to define the features of these beliefs. By replacing the *yes* and *no* beliefs with the corresponding statements from the Q sort, the data from Q study was able to provide features to the subspace that define these beliefs. This could be done for each of the factor arrays, and an example was provided using two of them. The results presented in response to the third research question provide a correction to the Haidt et al. (2000) study in which the researchers concluded that participants could not articulate the features of their beliefs.

The complex beliefs that people might have about the Julie and Mark vignette were demonstrated in part by the viewpoints presented in response to the first research question. The viewpoints that emerged are empirically stable and definable beliefs about

a moral dilemma. No normative claims or expectations were imported into the study. Also, no normative claims are extrapolated from the data. Rather, the results of the study defined a complex set of viewpoints held by the participants at the time of the study. In this way, no *a priori* expectations were made regarding what people ought to think, and no judgments were made about what people did think. It remains neutral to both schools of thought.

In the next chapter—which was never possible in the Haidt et al. (2000) study—the normative moral principles from philosophy will be put into conversation with the data. Now that features of some particular beliefs are defined in complex terms and with robust information, viewpoints can engage with the normative arguments of philosophy and cultural expectations of society. In chapter 5, a discussion of data will show the value of this approach to moral psychology.

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

The purpose of this research was to investigate the complex beliefs that expert participants might hold regarding the Julie and Mark vignette. To do this, a quantum model of decision making was articulated and a corresponding methodology was identified to perform the research. The first aspect of the quantum model involved representing the *yes* or *no* believes of participants regarding the Julie and Mark vignette as described in Haidt et al. (2000) as belief projections in Hilbert space. In their study, participants answered the question, "Did Julie and Mark do something wrong?" by giving a *yes* or *no* response. This was visualized by orthogonal arrays that served as belief subspaces that participants projected onto. In this model, participants create a belief when they answer the question and project onto the corresponding belief state. These belief states have features. Haidt et al. (2000) could not provide the defining features of these subspaces. To investigate the beliefs that people might have about the Julie and Mark vignette, an appropriate methodology needed to be put in place. Q methodology provided the tools and techniques needed. The use of Q sorts provided the second aspect of the quantum model.

During Q sorting, participants operationalize their perspectives to create a viewpoint as an array of statements. The goal here was to measure the transitive properties that involve self-referentiality. Utilizing the concept of complementarity from quantum theory, the sorting procedure demonstrated the "quantumization" of communicability (Stephenson, 1989, p. 15). Measuring the operationalized self-referential viewpoints of participants served as the scientific exploration of subjectivity. This process ignored the *yes/no* dichotomy of the original Haidt et al. (2000) study in order to define viewpoints that were complex and highly descriptive. The study brought together the two concepts by representing beliefs within the frame of the *yes* and *no* Hilbert space representations. The features of the viewpoints from the Q study were able to give defining features to these belief projections in a way that the original study was unable to do.

Summary of Findings

The findings of this study were presented as four unique viewpoints about what Julie and Mark did. These viewpoints were interpreted as *Personal Autonomy, Human Nature, Outcomes,* and *Individuals in Context.* The *Personal Autonomy* viewpoint was created when participants sorted under conditions of instruction that related to taking Julie and Mark's perspective. It focused on the ability of Julie and Mark to make a choice together without concern for external expectations. Regardless of what society or moral standards might expect, if Julie and Mark consented to the act, it was their personal choice.

Human Nature is concerned about the universal principles that apply to all people. It expressed human sexuality as having a particular purpose and meaning that all people

need to consider. It also expressed a belief that long-term goals are more important than short-term gratification. The focus was on the future self rather than the desires of the immediate self in the present.

Outcomes is worried about what might happen if someone found out or if some other unintended outcome occurred. So long as there were no negative consequences, Julie and Mark might very well make any decision they want. But given the taboo nature of the act and the beliefs help by society, there was a concern that if someone found out it might have a negative impact on their relationships and ability to hold certain jobs in society. Moreover, despite using protection, there is always a chance of pregnancy or transmission of illness.

Individuals in Context accepted that the internal standards that Julie and Mark carry give them some amount of independence, but they do not exist in isolation. That is, Julie and Mark need to think about the context of their actions and how they are interwoven in a wider web of relationships. While this perspective was not worried someone would find out, it articulated a concern that the action could have future impacts on their lives and on the lives of those other people they also have relationships with.

The conditions of instruction were instrumental in creating these viewpoints. Many of the viewpoints were stabilized by conditions of instruction that had the sorters see the story through similar perspectives. For example, taking the perspective of Julie, Mark, and someone who supports them (conditions 2, 6, and 7) defined *Personal Autonomy*, with nearly unanimous consensus by the sorters.

The dichotomy of *yes* and *no* was not fundamental to the articulation of these viewpoints. This question was never specifically asked to the participants about their

own perspectives or about the perspectives of others given in the conditions of instruction. Presumably, the participants were thinking about this question during their sort, and the data, is able to represent the dichotomy as it was presented in Haidt et al. (2000). In representing the data with *yes* or *no* coding, the corresponding statements were able to provide an example of the features of these beliefs as represented by the participants in this study.

Conclusions

There are several important conclusions to be made after analyzing the data from the study. First, people can give descriptive explanations of their viewpoints about the Julie and Mark vignette. In previous studies, people could say that what Julie and Mark did was right or wrong, but they were unable to articulate what defined such a conclusion. By providing participants with statements, sampled from a concourse of all possible statements, they could arrange them according to their self-referential believes on the subject. The sampling of statements was done theoretically to account for a wide range of concepts about what they did and to account for diversity in viewpoint. While the participants were limited to the statements presented to them, the statements were simple, easy to communicate thoughts that any person would understand. Q methodology provided participants with a tool to use in expressing what they believed. Collectively, the participants communicated viewpoints that were stabilized by having multiple participants and/or multiple conditions of instruction defining it. The factor analysis technique used by Q methodology allowed these to emerge. The beliefs that people have about the Julie and Mark vignette can described. Not only do people have

viewpoints on the vignette, but these viewpoints can be defined by themes. The themes of the viewpoints led to the descriptive names given to them.

This creates significant doubt that people are morally dumbfounded about their decisions as Haidt et al. (2000) concluded. The conclusion of moral dumbfounding has gained a lot of traction in the field and has even become the interest of more popular psychology discussions in places such as Psychology Today (Sommers, 2008). By being able to describe the complex viewpoints of participants in such a descriptive way, a conclusion of dumbfounding is not valid. There have been a number of responses to the idea of moral dumbfounding along philosophical and psychological grounds. Royzman, Kim, and Leeman (2015) provide three studies using the Julie and Mark vignette that support a rationalist view of moral decision making that contradicts the idea of moral dumbfounding. Specifically, they note the "need for a lucid and thoughtful discussion *on what may or may not count as supporting reasons* in the context of a moral judgment task" (p. 311). The present research study supports the work that others are doing to show that moral dumbfounding might not be a valid conclusion. What is unique to this study, though, is that a robust description of actual viewpoints is made available using Q methodology which satisfy the requirements of what does count as supporting reasons for a belief.

This is the second conclusion, that the descriptions of the viewpoints provide good reasons for the belief. The features of the belief subspaces for *yes* and *no* as provided by the statements of the Q sorts demonstrate a complex and articulate viewpoint. Moral dumbfounding was offered as an explanation from why participants in the Haidt et al. (2000) could answer *yes* and *no* but could not give a good reason for

holding the belief. This study shows that people can provide a description of a complex and well thought-out viewpoint. The viewpoints that emerged in this study do not represent post-hoc justifications for belief projections because they were articulated by participants who never answered the *yes* or *no* question. The viewpoints are not rationalizations for an intuitive and emotional reaction to the Julie and Mark vignette. Rather, they show a stable structure of belief that has clear and defining features. *Human Nature*, for example, articulates a very clear perspective on the purpose of sex and the importance of future-focused decision making. The themes that define the viewpoint are articulations of an underlying worldview that was used to understand the vignette. Likewise, *Individuals in Context* describes an understanding of the complex web of human relationships that can even be impacted by the private actions of just a few individuals. When these themes were used to define the features of the belief projections in Hilbert space, it showed that participants have very good reasons to project to one space or the other.

Dwyer (2009) agrees that moral dumbfounding has implications for moral psychology, but thinks that the lessons that one ought to draw from it are different than what is currently being proposed. To do this, she advances the Linguistic Analogy theory in moral psychology which proposes that "human moral and linguistic capacities are normative capacities of biological creatures" (Dwyer, 2009, p. 275). The theory draws on the work in generative linguistics to describe the mental structures and "computations that implement the ubiquitous and apparently unbounded human capacity for making moral judgements (Dwyer, Huebner, & Hauser, 2010, p. 487). Within this frame, Dwyer, Huebner, and Hauser (2010) note that what is "apparently deliberative" reasoning in

humans is often subject to "irrelevant effects of context" (p. 499). If moral psychology is trying to show that people are making rational moral computations rather than relying on more general processes like deliberation and reflection, one would need to show that moral judgement does "not rely on the same heuristic strategies for reducing uncertainty" that others claim are in use (p. 499). This research study rejected heuristic models of decision making in favor of a quantum one. Dwyer et al. (2010) claim that if one could show that heuristic strategies are not at play in these moral decisions, one might be able to show that domain-specific computational principles are in play for judgments in conditions of uncertainty (p. 499). This was explicitly demonstrated in this study through the quantum conceptualization of consciousness, through an understanding of connatural knowledge, and through the use of Q methodology—to which quantum theory also applies.

Third, the self-referential viewpoints of participants were relatively stable throughout the experiment. The first and last condition of instruction had participants sort the board according to their own perspectives. For all participants, the final sort came during a second session, many days after the first. The participants had to engage with the other conditions of instruction before returning to their own perspective. Nevertheless, each participant defined the same viewpoint at the start and finish of the experiment. This gives support for the above conclusion that the viewpoints are good stable reasons for holding a belief about Julie and Mark. Moreover, the stability in the individual viewpoints shows a level of rationality that would make future engagement with the viewpoint possible.

If explanations of beliefs are *post-hoc* rationalizations, they would not be stable enough to engage with. These viewpoints, however, are stable reasons for holding a belief and they are consequently robust enough to engage with. Dwyer et al. (2010) note that people often neglect the importance of situational factors when looking a decisions, and instead rely on assumptions about character (p. 499). This study, through its focus on psychological events, took not only situational factors seriously but also historical interbehavioral contexts. At the same time, it relied on the communication of operant subjectivity to define viewpoints; it did not resort to claims on a person's character. Behavior is both subjective and operant: subjective since it is a person's viewpoint, and operant because it exists naturally within a particular setting (Brown, 1980). Hence, the emergence of viewpoints in this study took situational factors seriously but in a way that was removed from constructed effects. The stability of viewpoint was observed from the findings without reference *a priori* claims of enduring character qualities of the participants. Nevertheless, consciousness as communication of connatural knowledge provided an argument for why one would expect such stability over time.

Implications

The debate about how to do moral psychology is largely about what to do with normative moral claims. The first issue is whether or not one ought important any normative philosophical principles at all. The influential work Kohlberg had imported the normative expectations of Kantian philosophy into the realm of moral psychology, something that the field has struggled with in recent decades (Kristjansson, 2009). If someone were to want to integrate moral philosophy so explicitly at the start of psychological research, it still begs the question of whether or not Kantian moral

philosophy is the right type of philosophy to be doing. In the Kohlbergian model, normative moral philosophy is used as a guide to the research itself, a type of moralized psychology (Kristjansson, 2009). In contrast, some have disregarded moral philosophy in favor of a psychologized morality (Kristjansson, 2009). Both approaches attempt to answer the fundamental question of which discipline is supposed to take the lead when doing work at the intersection of moral philosophy and psychology.

The present research addressed the issue by accepting the need for *a priori* philosophical assumptions. At the same time, the *a priori* assumptions did not come from moral philosophy and did not attempt to create a moralized psychology. Rather, the *a priori* assumptions from philosophy where those that defined the nature of human subjectivity in order to find a methodology appropriate to measure psychological events. In keeping with the Kohlberg model, the present study accepted that morality needs to be defined in terms of the formal character of a moral judgement or a moral viewpoint, which is best seen in "the reason given for a moral judgement" (Kohlberg, 1980, p.53). In keeping with the psychologized morality model, it did not adopt expectations about what would constitute a proper moral viewpoint from the start. The research made no hypothesis about the types of viewpoints he expected to find, nor were any judgments made regarding the quality of the viewpoints once they were interpreted.

In the model implemented for this research, concern was given to accurately defining and measuring self-referential subjectivity. With the quantum model, subjectivity was seen as an individual's ability to communicate his viewpoint by operationalizing it during a Q sort. By providing participants a large number of statements that were philosophically diverse, there were no *a priori* judgments that

loaded the research. Moreover, the quantum model seen in Q methodology accounts for an operationalized perspective at the time of the sort. While participants demonstrated consistency in perspective across the study, it makes no conclusion that the sorts represent an unchanging belief. That model accepts that future sorts with the same statements could be different and reflect a specific belief at the time. That is to say, it is not meant to predict future viewpoints or future actions. As such, it could not be used to define expected future behaviors. What it does provide is a generalized understanding of a participant's beliefs that could be useful in future engagement.

Theoretical Implications

Kristjansson (2009) explains how those doing psychologized morality often focus on method while those doing moralized psychology often focus on "problems at hand" (p. 833). The present research addresses both method and the need to engage with moral problems. The research presented here has implications for moral psychology's ability to have conversations with normative ethics and moral philosophy. Understanding someone's viewpoint in such a descriptive way provides an immensely useful tool for someone doing normative work. The viewpoints expressed in this study about the Julie and Mark vignette were presented by description of their features and without judgment from any normative standards. While the factor arrays required interpretation, this was done through engagement with the statements and their placements, and through follow-up interviews. Interpretations were neutral against judgements that would render them good or bad viewpoints.

The *a priori* assumptions about the nature of consciousness and subjectivity were required to find the methodological tools for study. Kristjansson (2009) argues that

"there cannot be a 'philosophically neutral' or 'value free' social-science account of the self or if its constitutive elements" (p. 832). At the same time he acknowledges that there cannot be a "reasonably developed philosophical theory of the self without grounding in the empirical knowledge of how people actually think about the self" (p. 832). The present study satisfies both of these concerns. It also accepts that moral psychology cannot produce prescriptive expectations even though it can be evaluative (Kristjansson, 2009).

Education and Practice

With the interpretation of the factor arrays, any form of normative moral philosophy can be put into conversation with the viewpoints. Someone doing work in natural law theory, for example, could hold as a normative standard that incest is wrong, and can conclude that *Personal Autonomy* is a wrong view to hold about what Julie and Mark did. He could use the principles from his normative view of morality to not simply conclude that *Personal Autonomy* is an incorrect moral viewpoint, but he could engage very intricately with all of the themes of the viewpoint. Since such a robust analysis of the viewpoint is possible with Q methodology, it provides a rich set of data to engage with.

There are important implications of the conclusions for moral education. In the theoretical implications, one could interact with the viewpoints without reference to particular individuals. From a practical aspect, though, follow up work could be done with the individual participants. The correlation to an individual's sort to the stabilized viewpoints can serve as a tool for further engagement. Someone doing work in moral education could use the data provided during the Q study as a guide to future work with

the participant who sorted the boards. In this case, one could have engage with the participant about his personal beliefs with the aid of the Q data. In the Haidt et al. (2000) study, participants were unable to provide an explanation for their decisions. This gives essentially no information to someone who would like to further engage with the participant on his beliefs.

In this study, short follow up interviews were used as a means to analyze some aspects of the viewpoints. Participants were given the opportunity to explain how they defined terms and concepts as it related to different perspectives. This was part of the descriptive work with the data. In the process of moral education, though, one could perform a similar interview to engage individual perspectives with normative moral claims and expectations. In moral education, knowing that someone believes that what Julie and Mark did was not wrong gives some information to engage with. It lacks the nuance of the Q data, though, as it simply articulates a complicated issue as a simple dichotomy. Perhaps the real viewpoint has something to do with believing that it what Julie and Mark did this one time was not wrong, but that following through with it again would be? In this case, the practical engagement with the person would be different. This research provides data regarding the nuances of the perspectives so that the practical engagement with the perspectives can be deeply explored.

Quantum Cognition and Decision Making

The use of Hilbert space was important for this study in that it helped visualize the setup of the original experiment with the Julie and Mark vignette. It visualized participant's beliefs as subspaces that had features. The data from this study could be used to define those subspaces. This has implications for the work being done in

quantum cognition and decision making where people are often asked to project to mutually exclusive spaces.

For example, studies have been done on participant's beliefs regarding the innocence or guilt of a defendant when provided with particular information. McKenzie, Lee, and Chen (2002) examined how participants changed their confidence of guilt as participants were given evidence on both sides of a criminal case. Trueblood and Busemeyer (2011) reinvestigated the experiment within the framework of a quantum model of cognition and decision making. Mathematically, they used the quantum model to model order effects in "terms of the change of viewpoints produced by evaluating different sources of information" (p. 1548). In reviewing information from the perspective of the prosecution and from the perspective of the defense had implications for belief projects. It was understood that the belief projections of *guilty* or *innocent* have features (presumably informed by the evidence provided). It is not always necessary to know exactly why someone projected a belief, which was the case for their work. In the example of the Julie and Mark research, though, the features of these subspaces is extremely important to understanding why someone would choose one projection over another. If one were interested in fully understanding the features of the belief subspaces, the present research provides an interesting way to do so.

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APPENDICES

APPENDIX A

Oklahoma State University Institutional Review Board

Date:	Friday, January 12, 2018
IRB Application No	ED17160
Proposal Title:	Defining Perspectives on the Julie and Mark Moral Dilemma
Reviewed and Processed as:	Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 1/11/2021

Principal Investigator(s):

Daniel J. Marangoni
1701 W Will Rogers Blvd
Claremore, OK 74017

Diane Montgomery
424 Willard
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☐ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of the research; and
4Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Scott Hall (phone: 405-744-5700, dawnett.watkins@okstate.edu).

Sincerely,

Hugh Crethar, Chair
Institutional Review Board

APPENDIX B

Q Set

#	Statement	z-scores by factor 1	2	3	4
1	Julie and Mark were in a romantic location so they naturally felt more connected than usual	0.60	0.03	-0.57	-0.29
2	This was an opportunity for Julie and Mark to have a new experience together	1.26	-0.50	-0.59	-0.26
3	Julie is on birth control, so she most likely won't get pregnant	0.65	0.14	0.86	-0.86
4	No one will ever find out about what Julie and Mark did	0.75	-0.09	-0.88	-0.64
5	What Julie and Mark did is OK because they are consenting adults	0.84	-0.96	-0.81	0.07
6	Having sex is Julie and Mark's personal choice and not a moral concern	1.31	-1.66	-0.08	-0.65
7	Julie and Mark both think sex is fun and interesting	1.13	0.18	-0.21	0.11
8	Julie and Mark are using the college years as a time of sexual exploration	0.68	0.13	0.20	0.30
9	The sexual secret that Julie and Mark hold can draw them closer together	0.33	-1.25	-1.33	-0.50
10	Julie and Mark say they won't ever do it again	0.56	0.18	0.06	-0.81
11	Trying a sexual experience once is different from doing it all of the time	1.30	0.57	1.07	0.54
12	From a scientific perspective, Julie and Mark did nothing wrong	0.52	-0.25	-0.48	-0.66
13	The purpose of sex is for unity and procreation	-1.28	1.36	-1.88	1.07
14	The purpose of sex is pleasure	0.70	-0.99	0.04	0.94
15	What Julie and Mark did was wrong because it goes against human nature	-1.83	1.80	-1.49	-1.55
16	What Julie and Mark did was wrong because it broke the law	-0.94	-0.08	0.42	-1.44
17	Each sexual act needs to be evaluated in context	1.03	-0.34	0.45	1.68
18	There are no universal moral rules about sex	0.52	-2.03	-1.44	-0.93
19	Julie and Mark are wrong about feeling closer together because united in sex is about long-term connection	-1.41	1.07	-0.39	0.86
20	Julie and Mark's experience could make them a more well-rounded, compassionate, and self-assured people	0.38	-1.05	-1.39	-0.48
21	Mark is using protection which will prevent against the spread of STIs	0.56	0.22	1.29	-0.75
22	Julie and Mark should only have sex with the people they marry	-1.54	1.06	-0.78	0.31

23	Sexual morality is about how you treat the people	-0.19	-0.74	0.29	2.08
24	Any restrictions on sex are pointless and cruel	0.41	-1.29	-1.31	-0.99
25	People should feel safe and free to have open conversations about their sexual desires	0.41	0.84	0.67	1.10
26	Some relationships are romantic and sexual, but some are just sexual	0.92	-0.39	-0.01	-0.72
27	Julie and Mark could learn a lot about themselves	0.55	-0.89	-0.66	-0.26
28	There can be negative consequences to sex other than unwanted pregnancy and STIs	-0.97	0.83	1.18	1.11
29	Julie and Mark say sex brought them closer together	1.13	-0.26	-0.30	-0.94
30	Making short-term decisions about sex could impact	-1.22	1.29	1.75	1.87
31	People should refrain from immediate sexual gratification if it could impact their future goals	-1.02	0.93	1.24	1.67
32	Sexual experiences in the present should not be limited by worrying about the future	0.49	-1.25	-0.04	-0.46
33	As long as no one gets hurt, there is no such thing as immoral sex	0.70	-1.55	0.40	-1.10
34	Abortion and medication could fix any consequences	0.72	-1.25	-0.14	-0.42
35	Julie and Mark did something wrong because the culture they live in says so	-0.53	0.11	0.54	-0.95
36	Sexual morality comes from understanding human nature and the purpose of sex	-1.41	1.70	-1.63	1.81
37	No form of sex is 100% safe from pregnancy and risk of disease	-0.83	0.59	0.88	0.89
38	Sex between a brother and a sister destroys the sibling relationship	-1.83	1.32	1.94	-0.66
39	Performing such a taboo sexual act could lead to more risky sexual behavior	-1.21	0.78	1.56	0.61
40	Julie and Mark's friends and family would think differently about them if they found out	-0.82	1.39	1.58	0.54
41	People who have incestuous relationships should not hold some jobs within a civil society	-1.43	0.29	-0.03	-1.25

VITA

Type Full Name Here

Candidate for the Degree of

Doctor of Philosophy

Thesis: A QUANTUM MODEL OF HUMAN SUBJECTIVITY FOR MORAL PSYCHOLOGY: USING Q METHODOLOGY TO DEFINE FEATURES OF JUDGMENTS IN HILBERT SPACE

Major Field: Educational Psychology

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in Educational Psychology at Oklahoma State University, Stillwater, Oklahoma in May, 2018.

Completed the requirements for the Master of Science in Educational Leadership at Oklahoma State University, Stillwater, Oklahoma 2013.

Completed the requirements for the Bachelor of Arts in Philosophy at John Carroll University, University Heights, Ohio in 2005.

Experience: Currently, Director of Research and Sponsored Programs and Instructor of Psychology at Rogers State University. Previously, Grant Writer and Adjunct Instruction at Tulsa Community College; English Teacher, Pleasant Grove Christian Academy

Professional Memberships: Association for Moral Education, American Psychological Association, National Council for University Research Administrators