

# Relationship among measures within the social and moral development domain

Eva Yujia Li<sup>1</sup>, Michael Lampion Commons<sup>2</sup>, Jonas Gensaku Miller<sup>3</sup>, Terri Lee Robbinet<sup>4</sup>, Helena Marchand<sup>5</sup>, Carrie Melissa Ost<sup>6</sup>, and Sara Nora Ross<sup>7</sup>

<sup>1</sup> Harvard Graduate School of Education

<sup>2</sup> Harvard Medical School

<sup>3</sup> University of California at Davis

<sup>4</sup> University of Phoenix

<sup>5</sup> University of Lisbon

<sup>6</sup> Dare Institute

<sup>7</sup> Antioch University Midwest McGregor

ABSTRACT

This paper investigates using the Model of Hierarchical Complexity (MHC) as a framework to study individual's stages of moral understanding. As an improvement from traditional stages of moral development, 15 stages of moral understanding were generated using the Model of Hierarchical Complexity. Data were collected in four separate studies on how participants make choices in specific moral dilemmas. Each study presented five or six vignettes of arguments, each constructed to have different Orders of Hierarchical Complexity. Participants rated the quality of arguments on a 1 to 6 scale. A Rasch analysis produced stage scores for each of the stories. The Rasch scores were regressed against the Order of Hierarchical Complexity of each vignette. These were Counselor-Patient:  $r(3) = .992$ ; Anti-Death-Penalty:  $r(3) = .919$ ; Incest – No Report:  $r(3) = .916$ ; Incest – Report:  $r(3) = .624$ . The result showed that Rasch scores of vignettes were predicted by their Orders of Hierarchical Complexity, suggesting that the Model of Hierarchical Complexity was a good framework to study stage of moral understanding.

**KEYWORDS:** moral developmental, model of hierarchical complexity, developmental stage, instruments to measure stage, preference

In the modern era of multi-cultural societies, international relations, and the “War on Terror”, it is more important than ever to understand how clashes between moral belief systems can be reconciled. In order to understand the interaction between belief systems, however, we must attain a better understanding of how moral reasoning develops in each individual. Just as each individual passes through stages of other forms of development, a person's performance in reasoning about moral issues develops in a series of stages.

In this study, we investigate moral development as it relates to three very complicated and controversial issues. We designed each of these dilemmas to strike at the core of participants' moral sense. This should make it more likely for each participant to seriously consider and reflect on the reasoning that backs their often firmly held beliefs. The issues we investigated were: whether or not to report incestuous rape; the acceptability of capital punishment,

and informed consent between a counselor and a patient. In investigating these three topics, we hope to determine the stages of moral development with which people reason about these issues and how well the Model of Hierarchical Complexity accounts for their performance. We also expect to compare how groups of individuals reasoned on each of the three issues.

## Theories of moral development

Piaget's studies of moral judgment can be summarized by a two-stage theory, with a transition of the form of moral reasoning occurring typically around age 10 and 11. Consistent with Piaget's notion of what consists of a development stage, Kohlberg outlined six stages of moral development, including two stages at the Pre-conventional level, two at the Conventional level, and two at the Post-conventional level. These stages describe the cognitive development of moral reasoning and have been the mainstream of moral development studies. He explained that development happens through socialization and thinking about moral issues, not through unfolding of genetic blueprints (Crain, 1985).

Author note: Correspondence regarding this article should be directed to Michael Lampion Commons, Harvard Medical School, 234 Huron Avenue, Cambridge, MA 02138. E-mail: [commons@tiac.net](mailto:commons@tiac.net)

**Table 1.** Orders of hierarchical complexity

Order	Name complexity	Order	Name complexity
0	Calculatory	8	Concrete
1	Sensory & motor	9	Abstract
2	Circular sensory-motor	10	Formal
3	Sensory-motor	11	Systematic
4	Nominal	12	Metasystematic
5	Sentential	13	Paradigmatic
6	Preoperational	14	Crossparadigmatic
7	Primary	15	Metacrossparadigmatic

Note. MHC stages and order numbers have not been revised in this version.

Kohlberg's model of moral development emphasized the structural differences between each stage of development: Every two stages have qualitative differences; every stage is a structured whole; there is an invariant sequence of development. A higher stage is a hierarchical integration of lower stages; and there is universal sequence. The most notable criterion is the hierarchical structure of the model, which stated that the higher stages were integration of lower stages. This depicted the structure of the model and explained the sequence (Crain, 1985).

There have been several streams of criticism on Kohlberg's model of moral development. Some authors question the cross-cultural validity of the model of moral developmental stages, arguing while the trend toward maturity is universal, high stages in Kohlberg's model may be culturally specific (Gibbs, Basinger, Grime & Snarey, 2007).

Some argued that there are gender differences in moral developmental processes, as women are socialized in a different way from men. Caring and Justice may be somewhat different domains (Bill, 1994). Robbinet (2008) argued that the methods of measuring moral development may be biased, as past studies found high correlations between high moral stages and liberal political ideology. This shows a possible political bias in the Kohlberg scoring of dilemmas. Robbinet (2008) used carefully constructed moral vignettes to assess moral development and did not find any relationship to political affiliation.

The arguments call into question the potential for content bias of moral developmental stages. This paper is an effort to provide more objective and less content dependent measures to assess the stages of moral development. The vignettes to assess moral development were based on Model of Hierarchical Complexity, an analytical framework which focuses on the structure of moral reasoning. Items were constructed to address moral reasoning at different stages. Rasch Analysis was used to check that the item difficulties were consistent with their subjective stage of moral reasoning. Three instruments were constructed using the model, all of which have the same structure and some variation in content form.

Another potential shortcoming of both Piaget and Kohlberg's models was that they were not detailed enough to capture development accurately. Kohlberg's stages started at some indeterminate point in childhood, rather than starting from birth. The Model of Hierarchical Complexity addresses developmental stages starting from birth and throughout the lifespan.

## The model of hierarchical complexity:

### A developmental stage theory

The Model of Hierarchical Complexity (Commons & Pekker, 2008; Commons, Trudeau, Stein, Richards, & Krause, 1998) forms the basis for a stage theory that is applied to explain development in multiple domains. According to the theory, development can be measured by the hierarchical complexity of tasks that an individual successfully addresses. The complexity of tasks is measured by applying three axioms.

1. First, a more hierarchically complex task is defined in terms of two or less hierarchically complex ones from the next order below.
  2. Second, the more hierarchically complex task organizes or coordinates two or more less complex ones. That is, the more complex task specifies the way in which the less complex ones combine.
  3. Third, the coordination of tasks that occurs must be non-arbitrary.
- Figure.1 illustrates the relationship between higher order tasks and lower order tasks. Past research has identified 16 orders of Hierarchical Complexity, as shown in Table 1. The person's performance in completing the task is called the Stage of Performance. For example, reasoning about complex moral issues is a task. The Order of Hierarchical Complexity at which the individual reasons about the moral issue reflects the person's Stage of Performance on that task.

What sets the Model of Hierarchical Complexity (Commons & Pekker, 2008; Commons, Trudeau, Stein, Richards, & Krause, 1998) apart from other theories of moral development is its focus on the general structure of development rather than development within a specific domain. For example, it can be applied to studying development of math and science knowledge, social perspective taking, etc. Tasks of different domains can be scored (Commons, Danaher – Gilpin, Miller & Goodheart 2002). The core of the model is the idea that as development occurs, individuals become increasingly able to accomplish complex tasks that coordinate and are defined by lower order tasks. Therefore, it does not depend on content, culture or context in formulating stages. When the model is applied to a specific domain, stages of development have to be generated within the domain, using the three axioms of tasks stated above. Many empirical studies have been done to test the validity of the developmental stages generalized by the Model of Hierarchical Complexity (Commons, Goodheart, Dawson, Draney, Adams & Marie, 2008; Commons, Rodriguez, Adams, Goodheart, Thomas & Ellen, 2006). In particular, analytic work has been done to explain the relationship between the Model of Hierarchical Complexity and Kohlberg Moral Development Stages.

### Using model of hierarchal complexity to build a suggested sequence of moral developmental stages

The Model of Hierarchical Complexity will be used initially in this paper to generate a proposed complete sequence of moral developmental stages, including the precursors to Kohlberg's stages of moral development. To do this, we began with the most elemental actions and perceptions, at Stage 1. We then build them up stage by stage. Each new stage's actions are defined in terms of the lower stage actions, and the actions organize themselves in a non-arbitrary way. The stages below have not incorporated the new revisions made to the MHC stages and order numbers.

**Stage 1.** Sensory or Motor: Infants have basic feelings of pain and pleasure. There may be early expressions of reflexive empathy, which is seen in that young infants will cry when other infants are also crying. Infants can either actively perceive things or emotionally or motorically act. However, they cannot coordinate the two except in a reflexive way.

**Stage 2.** Circular Sensory Motor: Infants begin to coordinate their parent's perceived emotions with their own behaviors. They look for preferred caregivers and reach for them. They may protest over loss and show joy over such things as reunion. Through interactions, infants share pleasure with caregivers, which can form a basis for caring. Caring for others is necessary of developing empathy later on, which is necessary but not sufficient action for moral judgment and action. Operant imitation, or imitative behavior that is a function of its consequence, develops. For example, an infant may imitate a parent's speech. This takes the form of babbling in which the phonemes match the phonemes in the parents' speech. The babbling may be reinforced as the parent smiles at the child's babbling. This forms the basis of modeling and identification of moral behaviors later on.

**Stage 3.** Sensory-Motor: Infants develop vague concept of right or wrong. The emotions shown by their attachment figures serves as a reinforcer for the behavior that pleases those adults. They show understanding of fairness and prefer equal distribution of resources to unequal distribution (Sloane, Baillargeon & Premack, 2012; Geraci & Surian, 2011). Infants displays consoling type (or empathic) responses when someone else is upset. These responses involve only the infant's own body. Pats another person, hugs them, or looks concerned.

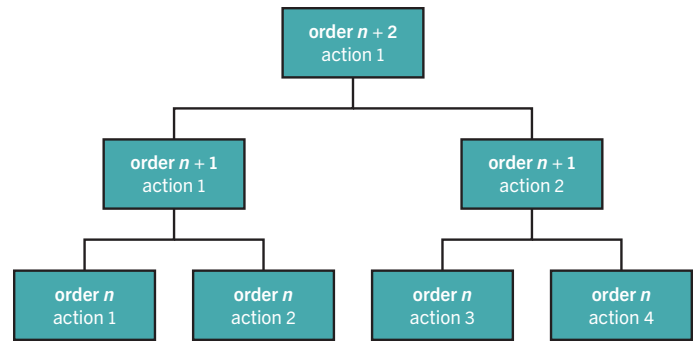
**Stage 4.** Nominal stage: Infants understand "no." They may slowly push something to the edge of table and watch the mother's reaction. They show pride when they do things right without requiring approval. They demonstrate that they may inhibit behavior. They reflect on "greater than" and "less than" from the previous stage. They may reflect upon whether or not a portion was fair. This is necessary to see injustice. They recognize self-versus-other but cannot make comparisons.

**Stage 5.** Sentential (Stage 1 Kohlberg): Toddler says "I good". They form simple sentences by putting two words in an order together. One is "I" and the other is "good" yielding "I good." Each word is from the nominal stage. They also develop a sense of shame.

**Stage 6.** Preoperational (Stage 1 / 2 Kohlberg): Children coordinate multiple sentences and are may tell a whole story about good or bad – such as a part of a fairy tale, I was bad and am now good.

**Stage 7.** Primary (Stage 2 Kohlberg): Children take their own perspectives. They know what they like and value. They look for "what's in it for me." They follow rules to avoid punishment. They understand power relations. They know that the rules of authorities should be followed and they may attempt to impose rules on others. They also know what someone else likes and values, but they do not yet coordinate their own perspective and those of others.

**Stage 8.** Concrete (Stage 2/3 Kohlberg): Individuals take the perspective of another and integrate it with their own perspectives. By integrating both perspectives, individuals make fair deals between the two people. However, fairness is understood only among two or a few people. Individuals obey authority.



**Figure 1.** Order of hierarchical complexity of tasks

**Stage 9.** Abstract (Stage 3, Kohlberg): Children take perspective of a group. They understand social norms, such as what is being "good" or "bad". Quantification words like "everyone in my group" appear. Children may reason about what others think. Children understand personalities, traits and other variables. The dimensionalized qualities may be used to express preferences.

**Stage 10.** Formal (Stage 3/4 Kohlberg): Discussions are logical and empirical support is logically brought. Words like "if ...then," "in every case, it turned out the same," "the reasons were" occur. This is the stage with univariate and linear explanations. There can be multiple outcomes however. The different outcomes are generally unrelated so they do not form systems.

**Stage 11.** Systematic (Stage 4, Kohlberg): The simple linear relationships from formal operations are inter-coordinated into systems. Words like bureaucratic, capitalist, functional, and structural that describe systems of relationships appear. The logical structure of this stage coordinates multiple aspects of two or more abstractions, as in: "relationships are built on trust and though we cannot always keep them, making promises is one way we build trust, so it's generally better to make promises than not to make them." Here, the importance of trust to relationships, building trust, and the possibility that promises can be broken, are all taken into account while formulating the conclusion that promises are desirable. Each system consists of multivariate inputs or multiple relations. For example, A or B causes C can be decomposed into two causal relations, A causes C or B causes C. A and B causes C is the cross product of two independent variables. Think of systems as a two or more way ANOVA or a regression equation with cross products and multiple inputs.

**Stage 12.** Metasystematic (Stage 5, Kohlberg): the new concepts are referred to as 1st order principles. These coordinate formal systems. Words like autonomy, parallelism, heteronomy, and proportionality are common. The metasystematic stage concept of parallelism, for example, can be employed to compare the structures of the military and of camp as institutions. The logical structure of this stage identifies one aspect of a principle or an axiom that coordinates several systems, as in: "contracts and promises are articulations of a unique human quality, mutual trust, which coordinates human relations." Here, contracts and promises are seen as the instantiation of a broader principle coordinating human interactions.

**Table 2.** General description of sequence

MHC	Kohlberg & descendants	Discriminations
0	-1	Calculatory
1	0/-1	Sensory & motor actions
2	0	Circular sensory-motor actions
3	0/1	Sensory-motor
4	—	Nominal
5	1	Sentential
6	1/2	Preoperational
7	2	Primary
8	2/3	Concrete
9	3	Abstract
10	3/4	Formal
11	4	Systematic
12	5	Meta-systematic
13	6	Paradigmatic
14	7	Cross-paradigmatic

Note. MHC stages and order numbers have not been revised in this version.

Few individuals perform at stages above formal operations. Only 20% of the people perform at Systematic stage and 1.5% at Metasystematic stage (Kallio, 1995; Kallio & Helkama, 1991). Some adults are said to develop alternative to, and perspectives on, formal operations. They use formal operations within a “higher” system of operations and transcend the limitations of formal operations. In any case, these are all ways in which these theories argue and present converging evidence that adults are using forms of reasoning that are more complex than formal operations.

The MHC accounts for all of Kohlberg’s stages except for Moral stage 4/5 which the model asserts is just a transition between Kohlberg’s stage 4 and 5. As with Piaget, following Pascual-Leone (1970), all the half stages are shown to be full stages. Table 2 illustrates the relationship between Moral Developmental Stages of Model of Hierarchical Complexity and Kohlberg’s stages of moral development.

### Current study

In this study, it will be investigated as to how well the Orders of Hierarchical Complexity accounts for the difficulty of performance on moral reasoning tasks. To better understand how people think about moral issues we constructed a dilemma for each issue, followed by a series of arguments and lines of reasoning that evaluate the issue at hand. Each argument was constructed at a given Order of Hierarchical Complexity. Each participant rated the quality of all of the arguments.

The Order of Hierarchical Complexity should predict the difficulty of lines of reasoning in the instruments. The line of Reasoning with the highest Order of Hierarchical Complexity should be the most difficult, and vice versa. Rasch Analysis will be used to estimate the difficulty of items (1960/1980). If the results of this study support this prediction, this will validate the stages of moral development based on Model of Hierarchical Complexity.

## » METHOD

### Participants

There were four samples of participants, all of whom were obtained on-line. One sample of 103 participants completed the *Counselor Patient Instrument*, which was sent to various e-mail lists. In the second sample: 96 participants completed *Anti-Death Penalty Dilemma*. In the third sample: 77 participants completed *Incest Rape Dilemma – No Report*. In the last sample: 58 participants completed *Incest Rape Dilemma – Report*. The instrument did not collect demographics information of these participants.

### Instrument

**Counselor patient instrument.** The Counselor Patient Instrument presented five stories, each of which describes how a counselor consults a patient with regard to choosing a treatment to improve the patients’ life. In each story, the method in which the counselor consults the patient is of a different Order of Hierarchical Complexity. The methods improved in their coordination of different perspectives. For example: in the concrete order vignette the counselor recommended a method that is recommended by colleagues. The counselor then called in a few colleagues to talk to the patient about the method. In the metasystematic order vignette, counselor explained all aspects of the treatment and describes at length the pros and cons of alternatives, including doing nothing. The counselor asked the patient to consider the discussion they had (the informing system) before making a decision (the consent system).

Participants were asked to a) rate the method of offering the plan of this counselor; b) rate the degree to which this counselor informed their person; c) rate how likely you would be to accept the plan offered by this counselor. Participants answered these questions by rating them the vignettes on a 1 to 6 scale.

**Death penalty dilemma.** The death penalty dilemma presents five attorneys’ arguments *against* capital punishment, ranging from concrete to metasystematic stages. As the order of complexity of the reasoning presented increased, the lines of reasoning improved in their coordination of rights and duties, universality, and the possibility of innocence. For example, the concrete argument simply states, “We do not have the right to take away this person’s life,” without any support, while the metasystematic argument reasons, “Human rights apply to the worst of us, as well as to the best of us. We are saying that killing another human being is a punishable act, yet we use execution (which is also killing a human being) to condemn murder. Such an act by the government is the mirror image of the criminal’s willingness to use physical violence against a victim and should not be condoned.”

Participants were asked to a) rate how well each of the attorneys argued the rights and duties of all concerned in this death penalty case; b) rate how likely you are to vote for the death penalty in this case based solely on the arguments of each of the following lawyers; and c) rate how likely you are to vote for mitigation of the death penalty to life in prison with no chance of parole, based solely on the arguments of each of the following lawyers. Participants answered these questions by rating the vignettes on a 1 to 6 scale.



**Incest rape dilemma.** The incest rape dilemma presents the following problem: “An 18 year old woman has been repeatedly raped by a member of her family since she was 10 years old. The rapist has said that if she reports it, he will rape her sister. Several times she has thought about revealing the situation, but she has not done so yet.”

We constructed five lines of reasoning arguing that she should not report the rape, and five lines of reasoning arguing that she should report the rape. Each set of arguments range from concrete 8 to metacognitive stage 12. As the stage of reasoning increases, the lines of reasoning improved in the coordination of rights and duties, concerns of reputation, and the possibility of further harm. For example, the concrete arguments simply argue for one side, while the metacognitive arguments consider the complicated nature of the decision and consider both possibilities before choosing one outcome.

Participants were asked to a) rate each friend’s argument, b) rate how well each friend informed the woman, and c) rate how likely you would be to take the advice of the friend. Participants answered these questions by rating the vignettes on a 1 to 6 scale.

### Procedure

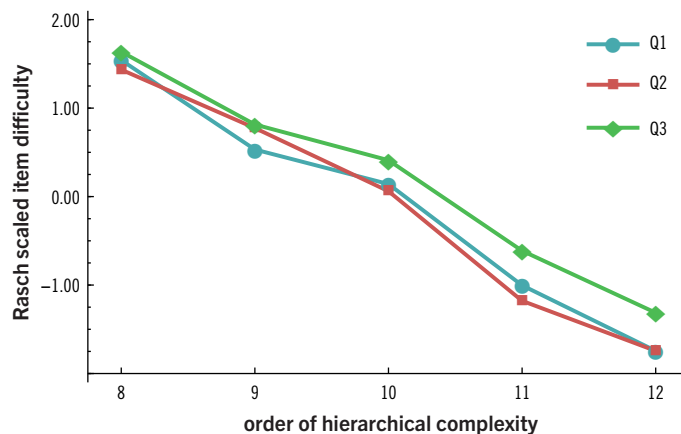
Each of these instruments was administered online separately.

### Data analysis

In this study, we used Rasch Analysis to estimate the difficulty of each item in each vignette. A Rasch Analysis uses probabilistic equations to produce an additive, equal interval scale based on the relationships between how different participants rate particular items on a continuous scale (Rasch, 1980; Wright & Linacre, 2001). Each item on the scale is coded into continuous numeric values (generally between -4 and +4), according to an order of magnitude, which shows the severity of the property of the item. The scale indicates a latent property of items and participants. In the context of this study, items fall on a Rasch scale that indicates difficulty of the items. Rasch scores are called *Rasch Scaled Item Difficulty*.

After analyzing data with a Rasch model, a number of questions can be answered. First, where on the scale does each independent variable fall (e.g. in this case, at what stage is each item). Second, what is the range of scaled values between all variables for all participants? The answer to this question defines the meaning of the difference between scores. For a small range of scaled perceived bias scores, a difference of 1 unit would indicate a big difference, whereas for a large range it would indicate a small difference. Third, what is the scaled value for each participant with regard to hierarchical complexity?

It is also important to examine the extent to which the actual measured items fit the model. This can be determined by infit and outfit MNSQ values, or mean squared residuals (Wright & Linacre, 2001). A large residual indicates a large difference between the model and the actual score. The infit and outfit statistics adopt slightly different techniques for assessing an item’s fit to the Rasch model. The infit statistic gives relatively more weight to the performances of persons closer to the item value. The argument is that persons whose ability is close to the item’s difficulty should



**Figure 2.** Counselor patient study. The lower (negative) measures indicate a higher rating of difficulty, while higher (positive) measures indicate a lower rating. MHC order numbers have not been revised in this version.

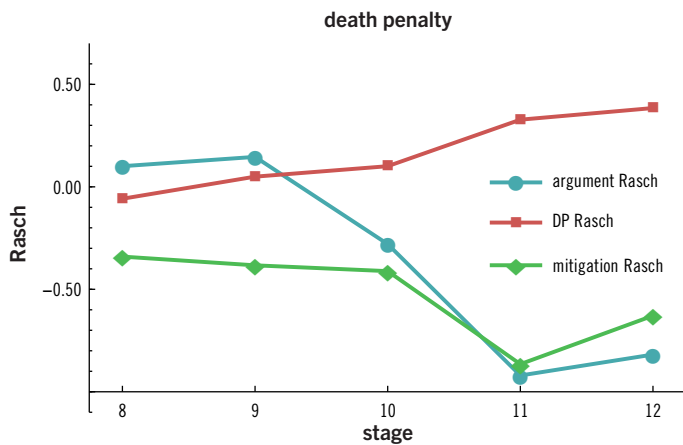
provide a more sensitive insight into the item’s performance. The outfit statistic is not weighted, and therefore is more sensitive to the influence of outlying scores. Aberrant infit scores usually cause more concern than large outfit statistics (Bond & Fox, 2001; Linacre, 2002). Nevertheless, both types of scores are presented here. Linacre (personal communication, January, 2003) developed a criterion of rejecting items with infit errors larger than 2.00. He suggested that it is possible that items with an infit score of greater than 2.00 have characteristics that are sensitive to factors not reflected in the scale and may not fit because they are too extreme for the scale or lie on another dimension.

Second, we conducted simple linear regressions of the Rasch Scaled Item Difficulty of items against their Orders of Hierarchical Complexity. In each instrument, there are three questions after each vignette. The items of each question was grouped together and their Rasch Scaled Item Difficulties were used as dependent variables. The independent variables were the Order of Hierarchical Complexity of the same items. This analysis allows us to test whether the Order of Hierarchical Complexity of vignettes predicted their Rasch Scaled Item Difficulties. If the items’ Orders of Hierarchical Complexity predicted their Rasch Scaled Item Difficulty, then the result support our theory that moral reasoning fits in the Model of Hierarchical Complexity framework. In the results section, we present the simple correlation between OHC and RSID to show the strength of association, the  $R^2$  of the model to show how much variation in the outcome variable is explained by OHC, and the result of  $F$  test, to show the statistical significance of the regression model.

## » RESULTS

### Counselor patient

Participants’ response to the counselor patient questionnaire showed that the Order of Hierarchical Complexity of the arguments predicted Rasch Scaled Item Difficulty of the arguments. Figure 2 illustrates the relationship between Rasch Scaled Item Difficulty and Order of Hierarchical Complexity. The regression analysis found that the a priori difficulty of the items predicted the participants’ ratings of the method of offering the plan to this counselor with a very high  $r$ :  $r(3) = 0.992$ ,  $F(1, 3) = 188.97$ ,  $p = 0.01$ ,  $r^2 = 0.984$ . When

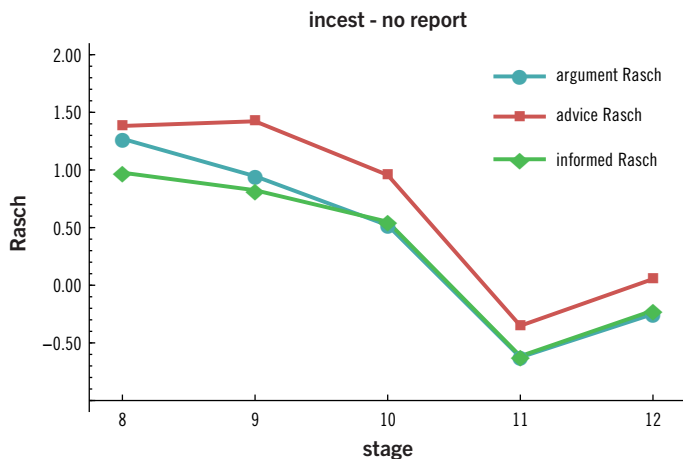


**Figure 3.** Death penalty dilemma. The lower (negative) measures indicate a higher rating, while higher (positive) measures indicate a lower rating. MHC stages and order numbers have not been revised in this version.

asked to rate the degree to which this counselor informed their person,  $r(3) = 0.993$ ,  $F(1, 3) = 203.14$ ,  $p = 0.01$ ,  $r^2 = 0.985$ . When asked to rate “how likely you would be to accept the plan offered by this counselor”,  $r(3) = 0.994$ ,  $F(1, 3) = 259$ ,  $p = 0.01$ ,  $r^2 = 0.989$ . The overall regression of the Rasch Scaled Item Difficulty of all items shows that  $r(13) = 0.982$ ,  $F(1, 13) = 203.14$ ,  $p = 0.00$ ,  $r^2 = 0.965$ .

**Anti-death penalty**

As shown in Figure 3, when asked to rate how good each argument was, the hierarchical complexity of each line of reasoning predicted the Rasch scaled score,  $r(3) = .919$ ,  $F(1,3) = 16.247$ ,  $p = .027$ ,  $r^2 = .844$ . Interestingly, the question that yielded the highest correlation to hierarchical complexity in all of the studies was, “How likely are you to vote for the death penalty in this case based solely on the arguments of each of the lawyers?”,  $r(3) = .921$ ,  $F(1, 3) = 76.226$ ,  $p = .003$ ,  $r^2 = .962$ . Yet, the reverse was not true. When asked “How likely are you to vote for mitigation of the death penalty to life in prison with no chance of parole, based solely on the arguments of each of the lawyers?” The correlation between hierarchical complexity and Rasch score,  $r(3) = -.764$ ,  $F(1, 3) = 4.199$ ,  $p = .133$ ,  $r^2 = .583$ .



**Figure 4.** Incest dilemma with result of no report. The lower (negative) measures indicate a higher rating of difficulty, while higher (positive) measures indicate a lower rating. MHC stages and order numbers have not been revised in this version.

**Incest—No report**

As shown in Figure 4, the Order of Hierarchical Complexity of a line of reasoning strongly predicted its Rasch scaled score in each question. When asked to rate how good each argument not to report was,  $r(3) = .916$ ,  $F(1, 3) = 15.676$ ,  $p = .029$ ,  $r^2 = .838$ . When asked how well each argument informed the woman,  $r(3) = .877$ ,  $F(1, 3) = 10.028$ ,  $p = .051$ ,  $r^2 = .770$ . When asked how likely the participant would be to take the advice not to report,  $r(3) = -.868$ ,  $F(1,3) = 9.138$ ,  $p = .057$ ,  $r^2 = .753$ .

**Incest—Report**

As shown in Figure 5, the Order of Hierarchical Complexity of a line of reasoning did not predict its Rasch scaled score in each question. When asked to rate how good each argument to report was,  $r(3) = .624$ ,  $F(1,3) = 1.918$ ,  $p = .260$ ,  $r^2 = .390$ . When asked how well each argument informed the woman,  $r(3) = .708$ ,  $F(1, 3) = 3.023$ ,  $p = .180$ ,  $r^2 = .502$ . When asked how likely the participant would be to take the advice not to report,  $r(3) = .670$ ,  $F(1, 3) = 2.439$ ,  $p = .216$ ,  $r^2 = .448$ .

**» DISCUSSION**

The correlations between Orders of Hierarchical Complexity of the items and the corresponding Rasch scores differed depending on the dilemma. The Counselor Patient instrument yielded the highest predictability. All three questions’ Rasch scaled item difficulty were predicted by their Orders of Hierarchical Complexity with  $r$  higher than 0.9. This indicates that the Orders of Hierarchical Complexity of the lines of moral reasoning predicted the difficulty of carrying out the task. Therefore, we could say that moral reasoning is a type of task that can be described by the Model of Hierarchical Complexity. The more complex the task, the more difficult it is to carry out. As individuals become capable of accomplishing more and more complex moral reasoning, their moral development occurs.

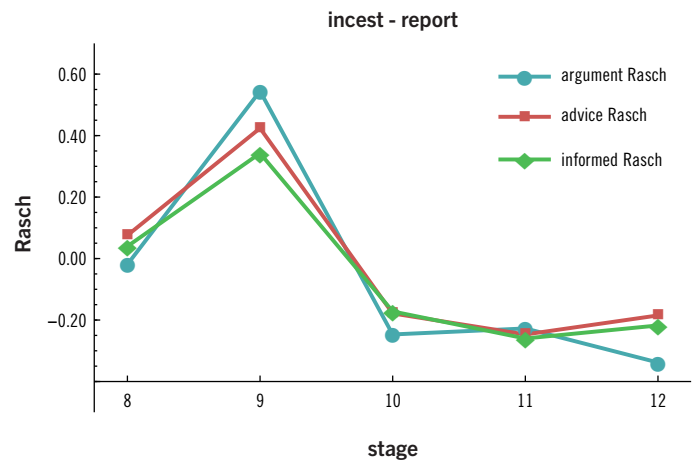
The death penalty yielded similarly high correlations, particularly on the question that asks the participant whether the argument is compelling enough to sentence someone to death. A flaw in the instrument, however, might have produced the high correlation, however, because the lengths of the arguments varied according to stage. Because the higher stage arguments tended to be longer, participants might have based their choices on length, rather than the vignettes.

When considering the dilemmas together it becomes apparent that variables other than the stage of the argument may have influenced Rasch Scaled Item difficulty somewhat. These differences might have occurred because the nature of the dilemmas and the questions demand different levels of consideration of hierarchical complexity. In the Incest Rape Dilemma and Death Penalty Dilemma, Rasch scores were lower when the question asked if the participant would be willing to act on the line of reasoning, as opposed to when they were just asked to rate the quality of the argument. In other words, participants were more likely to rate vignettes at a higher order of complexity as preferred when the issue being asked about was simply how good the arguments appeared to them. When they were asked to become more in-

volved and were asked about their own actions, they appeared to rate vignettes at a lower level of complexity as more preferred. Alternatively, these discrepancies might suggest that participants were not only basing their choices on the quality of the argument, but brought other factors into their choices such as following low stage beliefs taught to them by their cultures.

In general, the results of incest dilemma, while still showing very high  $r$ 's, showed less clear patterns than questions pertaining to the death penalty. The Orders of Hierarchical Complexity of arguments in Incest dilemma had less predictability to their Rasch Scaled Item Difficulty than those in Death Penalty Dilemma. This suggests that individuals may think about different situations differently. Although we asked participants to set aside their pre-existing beliefs about these issues, it is likely that these their preconceived notions contributed to how they made their decisions.

The results show that the Order of Hierarchical Complexity accounts for the differences in understanding all of these moral issues. Because the  $r$ 's are so high, it suggests that order of hierarchical complexity is the major factor that accounts for the moral reasoning shown. So moral action, to the extent to which a choice depends on being at a stage may be determined by three things: a) values as describe by George P. Lakoff (as cited in Robinett, 2006); b) attachment in the classical sense (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1982); and c) also social perspective taking with attachment stage (Commons, 1991). For those decisions, moral stage is necessary but not sufficient.



**Figure 5.** Incest dilemma with result of report. The lower (negative) measures indicate a higher rating, while higher (positive) measures indicate a lower rating. MHC stages and order numbers have not been revised in this version.

To further investigate the correlation between Order of Hierarchical Complexity of tasks and moral reasoning on those tasks, studies similar to this one presenting similar dilemmas might shed light on the trends shown here. Future instruments might try to approach dilemmas that are new to most participants to avoid participants answering according their previous held beliefs. ■

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