

Leadership, cross-cultural contact, socio-economic status, and formal operational reasoning about moral dilemmas among Mexican non-literate adults and high school students

Michael Lamport Commons^{*a}, Jesus Francisco Galaz-Fontes^b
and Stanley Jay Morse^a

^aHarvard Medical School, USA; ^bUniversidad Autonoma de Baja California, Mexico

Kohlberg proposed that various cultural, social and educational factors may influence moral reasoning. As far as the authors know, participants in previous studies of moral reasoning have been, largely, educated persons, irrespective of their culture. Two studies on moral reasoning were conducted in a Mexican–United States border city. The first study found that even some unschooled, non-literate adults reason at a high stage (formal operations, Moral 3/4). Exposure to different cultural and organizational contexts, in addition to assumption of leadership roles, was associated with such reasoning. Likewise, the second study found that high school students who were identified as leaders, especially those with cross-cultural contact and those who were of high socio-economic status, reasoned at higher stages than those who were not. Overall, stage of reasoning increased with age.

Cross-cultural studies have consistently demonstrated that higher reasoning stages among adolescents and adults positively correlate with the amount of formal education a person has (Harkness *et al.*, 1981; Snarey, 1985; Boyes & Walker, 1988; Snarey & Keljo, 1991; Eckensberger & Zimba, 1997; Walker & Pitts, 1998). Studies using literate participants have confirmed that the sequence of reasoning-stage acquisition is cross-culturally invariant (Boyes & Walker, 1988; Snarey, 1985; Snarey & Keljo, 1991; Eckensberger & Zimba, 1997; Walker & Pitts, 1998), and stage development proceeds throughout childhood and adulthood (Dawson-Tunik *et al.*, 2005). Although researchers have confirmed the invariance of the stage acquisition sequence among *non-literate* (non-educated) participants from other

* Department of Psychiatry, Beth Israel Deaconess Medical Center, Harvard Medical School, 234 Huron Avenue, Cambridge, MA 02138-1328, USA. Email: Commons@tiac.net

cultures, they have rarely found higher stages, i.e., formal stage of reasoning or beyond, in this group (Dasen *et al.*, 1979; Dasen, 1982; Snarey, 1985; Ure & Colinvaux, 1985; Eckensberger & Zimba, 1997). However, there may be methodological reasons for not finding higher reasoning stages among non-literate adults. In particular, the method of assessing participants from other cultures may not have allowed for them to exhibit higher stages of reasoning. Researchers have not sufficiently examined those non-literate persons who face non-educational task demands that nevertheless require formal stages of reasoning.

Although formal education spurs transition to higher stages of reasoning (Boyes & Walker, 1988; Snarey, 1985; Snarey & Keljo, 1991; Walker & Pitts, 1998), its exclusive effectiveness remains unclear. Other task demands may also stimulate stage transition among persons lacking any formal (school) education. Kohlberg (1987), for example, suggested that the adoption of multiple roles or multiple perspectives requires more complex reasoning and can constitute another type of task demand, spurring stage transition. Edwards (1975, 1981, 1986) likewise discusses social experience and its relationship to moral judgement. It is these other factors of social experience and status that will be examined here.

Studies have been conducted to investigate the influence of adopting multiple perspective-taking on reasoning-stage transition among literate participants. Walker, deVries and Trevethan (1987), for example, found that participation in family decision-making predicted increases in stages of reasoning. Candee, Graham and Kohlberg (1978) examined adults' work roles and argued that individuals who reasoned at higher stages tended to have greater responsibilities for others' welfare, engaging in tasks that encourage taking multiple perspectives.

Researchers have suggested that a number of different factors may likewise encourage the understanding of multiple perspectives. Both leaders and people with extensive cross-cultural experiences may be more likely to practise multiple perspective-taking (Tietjen & Walker, 1985). By definition, leaders are the persons with power and influence over others, those who coordinate and organize the activities of others. To be successful, leaders must examine each issue from the perspectives of those over whom they exert influence and of those to whom they are accountable.

Extensive cross-cultural contact and interaction serves as another means of carrying out the task demand of taking multiple perspectives. This task demand is associated with the formal operational stage (Commons & Rodriguez, 1990). Cross-cultural contact is defined as the interaction, communication or other social processes among people or entities from two or more different cultures. Interacting cross-culturally also means dealing with two or more cultures (<http://www.wordreference.com/>). Individuals exposed to meaningful contact with persons whose cultural views are known or perceived to be different from their own often must reason at higher stages to reconcile the divergent viewpoints.

Other factors have also been shown to relate to higher-stage reasoning. For example, numerous studies demonstrate a link between higher socio-economic status and higher-stage reasoning (e.g., Devos, 1983; Mentkowski and Associates,

2000). However, this relationship may, in fact, be attributable to individual components of socio-economic status, such as income or education.

Though it remains unclear whether specific non-educational demands facilitate transition to higher reasoning stages, or whether reasoning at such stages enables individuals to carry out certain task demands, it is important to investigate social and cultural variables related to the development of higher reasoning stages (i.e., formal). This is extremely important in the debate on how the environment interacts with genetics to produce development, especially stage of development.

The present research used a two-step approach to investigate these issues. First, we examined non-literate adults in a rapidly changing Mexican–United States border society to try to identify higher reasoning stages within this group. In such an environment, some persons would be expected to have a wider range of perspective-taking experiences than others. It was hypothesized that non-literate individuals who have leadership or cross-cultural experience would be more likely to show higher-stage reasoning (Walker, 1986; Walker *et al.*, 1995; Walker & Pitts, 1998).

In the second study we evaluated three variables possibly associated with higher reasoning stages, specifically: (a) leadership; (b) cross-cultural contact; and (c) socio-economic status. The participants were high school students living in the vicinity of the border between Mexico and the United States, who were classified at different levels for these three variables. It was hypothesized that each of these variables would be related to higher-stage reasoning in these participants.

As described by Eckensberger and Zimba (1997), there has been a great deal of concern about the most effective way to carry out and interpret cross-cultural research on reasoning. One of the concerns has to do with what types of measures to use, especially with non-literate individuals. Previous research (e.g., Dasen, 1977, 1982, 1984) suggests that even concrete operational stage tasks, if they use content that is not familiar to participants, may elicit lower-stage performances in non-literate participants. When participants are tested on material they are familiar with (and in their native language), they may show the expected level of competence (e.g., Jahoda, 1983). As a result, most standard tasks designed to measure stage of reasoning, such as Piaget and Inhelder's pendulum problem, or Commons' higher-stage reasoning measures (Commons *et al.*, 1982) seemed inappropriate for this study. Instead, stages of reasoning were quantified based on each participant's performance in solving tasks in the moral domain, that is, in reasoning about various moral dilemmas used by many other researchers (e.g., Kohlberg, 1984, 1990). Moral dilemmas exist in all societies. Therefore, all people have experience in dealing with them. The dilemmas chosen, a slightly modified Heinz dilemma and the Joe dilemma, involved issues that would not be completely unfamiliar to the participants.

Although it uses Kohlberg's tasks, the approach taken here makes fewer assumptions about the notion of stages than does Piaget or Kohlberg's approach (Commons *et al.*, 1998). There are no traditional ties to either Piaget or Kohlberg's definitions of stage, theories of stage, or methods of measuring stage. The largest major difference is that tasks and stage of performance on tasks are seen as different

notions. Tasks are considered first, then hierarchical complexity and, lastly, stage of performance on inferred moral tasks of different hierarchical complexity.

Tasks are defined as sequences of contingent events. Each set of contingent events consists of situations in which stimuli are presented and required behaviours or a sequence of behaviours must occur in some non-arbitrary fashion. In the present use of task analysis, the complexity of behaviours necessary to complete a task can be specified using the complexity definitions described next. One examines behaviour with respect to the analytically known complexity of the task. In dealing with an interview, one may infer what task the participant is doing. One can assess the hierarchical complexity of that task. One may check whether that inference is accurate by looking at the reliability of the scoring.

Tasks are shown to be ordered according to their hierarchical complexity. *Order of hierarchical complexity* of performance is measured by the number of recursions that the coordinating actions must perform on a set of primary elements. A recursive procedure or *routine* is one that has the ability to call itself. This usually means that it has the capability to save the condition it was in or the particular process it was serving when it called itself (otherwise, any variable values that have been developed in executing the code are overlaid by the next iteration or go-through). Here, process is higher-order actions that coordinate two or more lower-order actions. In this case, the output from coordinating the lower-order task actions becomes the input actions of the next order of complexity actions. Primary elemental actions are at the base of the hierarchy. These are simple actions that do not coordinate other actions.

Actions at a *higher order of hierarchical complexity* (1) are defined in terms of the lower-order actions; (2) organize and transform the lower-order actions; and (3) produce non-arbitrary organizations of these lower-order actions that solve new, more complex tasks. Because hierarchical complexity of tasks is an analytic, mathematical measure, the order of hierarchical complexity is independent of task content, the domain in which tasks are found, and the culture of participants performing such tasks. There is one and only one sequence of orders of hierarchical complexity of tasks.

Stage of performance is defined as the most hierarchically complex task (or inferred task) that a participant completes correctly; there is a correct performance for each order of hierarchical complexity of a task. There are no 'cognitive stages' or 'moral stages' in the present theory, just stages of performance on different kinds of tasks, whether they be logico/mathematical tasks or moral judgement tasks. There is also no general stage of performance. Performance may vary according to a number of factors, including: (a) task characteristics, such as content, form, method of measurement or domain, on the one hand; and (b) performer characteristics, such as socioeconomic class, culture or educational level, on the other hand. More statements may be scored using the Hierarchical Complexity Scoring Scheme (HCSS, Commons *et al.*, 1992, 2002) because there does not have to be a match to content-laden examples. This would raise the chance of finding participants who would reason at higher stages such as formal.

The non-arbitrary organization of several lower-order actions constitutes one action of a higher order of complexity. For example, completing the entire operation $3 \times (4+1)$ constitutes a task requiring the distributive act. That act non-arbitrarily orders adding and multiplying to coordinate them. The distributive act is therefore one order more hierarchically complex than the acts of adding and multiplying alone and it indicates the singular proper sequence of the simpler actions. Although someone who simply adds can arrive at the same answer, people who can do both display a greater freedom of mental functioning. Therefore, the order of complexity of the task is determined through analyzing the demands of each task by breaking it down into its constituent parts. The hierarchical complexity of any complex task is thus mathematically determined. The subject's performance is scored at this stage when he successfully completes the task using the integrated approach of coordinated combination of lower-order actions.

In this study we examined reasoning stages among non-literate adults in Mexicali, Mexico. We then investigated characteristics of individuals reasoning at higher stages in order to identify factors that might be associated with higher-stage reasoning. The site for both studies was Mexicali, Baja California, Mexico. The second author is a professor at Universidad Autonoma de Baja California in Mexicali, Mexico. By using a convenience sample, it was still possible to find participants who had little or no formal education. Also, in Study 2, some of the participants would have extensive cross-cultural experience by living in Mexicali, Baja California, and attending high school in Calexico, California.

Study 1: non-literate adults

Method

Research participants. There were 34 adults (12 males, 22 females), aged 23–70 (M age=49.6 years, $S.D.$ =14.7) who participated in Study 1. Although very difficult to find in modern Mexico, 31 participants had no education at all; the remaining three participants had from one to three years of elementary school. All participants had resided in urban sections of Mexicali, Mexico for at least ten years. The mean number of siblings per family of each participant was 5.5 ($S.D.$ 2.4). In almost all cases, both parents of each participant had not attended school and were non-literate. Most participants (29) were married or lived with adults of the opposite sex. Most female participants were housekeepers. Most male participants were unskilled or semi-skilled workers.

Procedure. As a class requirement, 34 students in a developmental psychology course at a university in Mexicali were trained in the administration of tasks to the participants. In order to establish a good rapport, students interviewed participants in Spanish, whom they got to know fairly well and who met the criteria mentioned above. This approach was used to promote cooperation with the investigation because Mexican investigators judged that their respondents would tend to be reticent while talking to strangers. We felt that establishing good rapport would

increase the likelihood of identifying higher stages of reasoning among non-educated respondents completing the tasks.

Two commonly used moral dilemmas, the 'Heinz Dilemma III' and the "Joe" Dilemma I' (Colby & Kohlberg, 1987a), were read to each participant and responses were elicited. Each dilemma presents a situation in which a conflict exists between two or more principles. To help the respondents feel more at ease with experimental procedures we changed the title of the Heinz Dilemma, instead calling it the 'Juan Dilemma'. This task was presented in a question format: 'After unsuccessfully trying all legal means of obtaining a drug that may save his wife's life, Juan must decide whether or not to steal the drug, thereby clearly violating the law.' In the second task, Dilemma I, a scenario was presented: 'A boy saves his money to buy a bicycle or to attend summer camp. Friends of his father suddenly show up. The father wants to go fishing with them but he does not have the money. The question is whether or not the boy should give his father the money he had saved for his own needs.'

To assess whether or not participants held leadership positions, participants were asked the following open-ended questions about their history and current activities: (a) 'What do you do in your job?' (b) 'Do you organize the activities of other people, at home and/or at work?' (c) 'Do people come to you when they have problems?' and (d) 'Do people take your advice?' Those respondents who were involved in supervising or organizing the activities of others, those who were involved in helping others solve problems, as well as those whose advice was accepted by others, were categorized as leaders. We assume that these questions are face valid.

Most interviews took several hours, not including the considerable time spent establishing rapport with the respondents. The interviews were long and contained many probes, such as 'Tell me more,' 'Why do you think that is fair?' and so on. Students taped and then transcribed the interviews in Spanish.

Scoring. Each participant's analysis and discussion of the conflicts and related principles were evaluated using two different methods to assess the stage of reasoning.

One method used the traditional moral development scoring. Weighted Average Moral Judgment Scores (WAS) were computed according to Colby and Kohlberg's (1987a, 1987b) scoring system. The WAS is one way of measuring stages of moral reasoning (Colby & Kohlberg, 1987a). The process was as follows. Each statement was matched to a criterion judgment outlined in the Colby and Kohlberg manual. The percentage of statements at each stage was found for each participant. From these scores, a weighted average score (WAS) was computed (Conley *et al.*, 1997). This score is the sum of the products of the percent usage at each stage multiplied by the stage number (range=100–500). Therefore, a score of 200, for example, indicates that a person is reasoning predominantly at Stage 2, whereas a score of 400 indicates that the person is reasoning predominantly at Stage 4.

The WAS, however, may sometimes underestimate the stage score because this method assigns more numerical weight to the overall score if particular issues listed by the scoring manual are specifically discussed by the participant (Dawson, 2000,

2002a, 2002b, 2003). Lower-stage answers that are later integrated into a higher-stage answer lower the weighted average. Therefore, using just WAS scores that tend to underscore the participants would have made it unlikely to find formal stage reasoning.

Scoring using the Hierarchical Complexity Scoring Scheme (HCSS; Commons *et al.*, 1992, 2002) will be compared now to scoring obtained using Colby and Kohlberg's moral reasoning scoring system (Colby & Kohlberg, 1987a, 1987b). The Colby-Kohlberg method is designed specifically to measure stages of moral reasoning. The General Stage Scoring Scheme states that there is a common underlying hierarchical complexity to all tasks solved at each stage (Commons *et al.*, 2002). Commons and colleagues assert that the resultant stages obtained when scoring using this method are applicable within any domain of reasoning and, in fact, that there is only one hierarchy of complexity that underlies all stage systems (see Commons *et al.*, 1998 for a correspondence table between different stage schemes). According to the Model of Hierarchical Complexity (MHC; Commons *et al.*, 1998), it therefore does not make sense to discuss 'moral' reasoning in juxtaposition to other 'kinds' of reasoning. The only difference between moral reasoning and other kinds of reasoning is the kind of task used for assessment. The orders of hierarchical complexity of moral reasoning tasks are isomorphic to those of all other tasks despite differences in task content. All tasks are defined in terms of the same system of hierarchical complexity whether their content involves moral or justice reasoning (Kohlberg, 1984, 1990), mathematics and physics (Inhelder & Piaget, 1958), the Good Life (Armon, 1984a, 1984b) or other kinds of content. Even Kohlberg himself has argued that his stages and the MHC stages measure the same construct and that the stages of the MHC correspond to the moral stages of reasoning (the correspondence is presented below). Kohlberg (1990, p. 264) states 'There is a ceiling on how many stage models can be generated. The theme of uniqueness in each is dropping out, using the Model of Hierarchical Complexity narrows down and simplifies the kinds of explanations that one is going to be able to offer about the processes of development'. The Model of Hierarchical Complexity is very similar to Kohlberg's model; a main difference is that the MHC is systematized, and it ends up making more accurate predictions than Kohlberg's model (Dawson, 2002a, 2002b), with reliabilities of .95. These were calculated using Rasch scores in a method equivalent to Cronbach's alpha (Linacre, 2004). These reliabilities were assessed using Moral Judgment stage scores (Colby & Kohlberg, 1987a) and HCSS stage scores.

Dawson (2002a, 2002b, 2003) carried out empirical validation studies using the Model of Hierarchical Complexity scoring and Kohlbergian (Colby & Kohlberg, 1987b) stage scoring. Dawson (2002a, 2002b) showed that the results from the two methods were highly correlated (.97 for the early formal (abstract) through the meta-systematic stage). The same set of statements was scored by a number of scorers, each using the system in which they were best trained.

In scoring according to Commons *et al.*'s (1998) Model of Hierarchical Complexity, the stage of reasoning is assessed from the order of hierarchical

complexity of the task that the participant's performance successfully addresses. Performance on tasks is analysed in terms of the hierarchical complexities of abstract concepts required at each stage, as well as the logical structures of these concepts (Dawson, 2002a, 2002b; Dawson-Tunik *et al.*, 2005). Only the hierarchical complexity of the participant's attempted solution, and not the content-dependent variables, is used to assess the stage of reasoning. Unlike the calculation of WAS scores, the scoring methods of the Model of Hierarchical Complexity do not give differential weight to any issues. Instead, only the complexity of the discussion, based on a hierarchical scheme of organization, is quantitatively analysed to produce stage scores (Commons *et al.*, 2002).

Relationship of stages of reasoning obtained using each method. The names of the stages used in these studies are derived from the Model of Hierarchical Complexity of development (Commons & Richards, 1984; Commons *et al.*, 1998). Pre-operational stage is called Stage 6, primary stage is Stage 7, concrete operations is Stage 8, abstract (early formal) is Stage 9, and formal operations is Stage 10. These respectively correspond to Colby and Kohlberg's Justice Reasoning stages 1/2, 2, 2/3, 3 and 3/4. A WAS score of 250 is indicative of concrete operations; a WAS score of 300 is indicative of abstract operations; a WAS score of 360 is indicative of formal operations. Each paragraph below describes the concepts of a stage in terms of the hierarchical complexity of the reasoning that it represents.

At the primary stage (Stage 7 – Justice Reasoning Stage 2), actions coordinate or modify the concepts of the previous stage. Words like *favourite*, *happier* or *better* are common. The primary stage concept *better*, for example, can be employed to compare a fishing trip to a camping trip. The logical structure of this stage coordinates one aspect of two or more representations, as in 'Juan's dad says he can't go to camp, he will have to stay home', in which Dad's authority coordinated going to camp versus staying at home (Dawson-Tunik *et al.*, 2005). In terms of leadership, an individual at this stage can understand his own perspective and others' perspectives but cannot coordinate the two.

At the concrete stage (Stage 8 – Justice Reasoning Stage 2/3), people respond to the particulars of the situation without references to the generalities embodied in variables or abstract concepts. A particular person may, for example, be considered *good* merely if the person's actions yield particular *good outcomes* for the target of the person's actions. The particular outcomes are crucial; not the process or the principles in a general situation (Dawson-Tunik *et al.*, 2005). In terms of leadership, an individual at this stage can understand both his and others' perspectives; moreover, he can coordinate the two and can therefore negotiate and make deals.

At the abstract stage (Stage 9 – Justice Reasoning 3), people make references to general propositions, but each proposition is considered in isolation from other propositions or concepts. People use variables, such as stereotypes, or social norms. A person might, for example, be considered *good* if their actions meet abstract criteria defining *goodness*. Goodness represents a value of a variable whose range includes badness and goodness. A good person does not, for instance, harm others

but instead generates harmony with others. Persons performing at Stage 3 do not, however, reason logically about the *abstract propositions* or *variables* involved (Dawson-Tunik *et al.*, 2005).

At the formal operational stage (Stage 10 – Justice Reasoning 3/4), people think logically and empirically about *abstractions*, such as variables and propositions, considering these variables and propositions simultaneously, in terms of inter-relationships based upon such organizing principles as logic or linear causal chains. The person also brings empirical evidence to bear upon the propositions (Dawson-Tunik *et al.*, 2005). We give examples below.

In this paper we do not consider stages beyond formal operations. These require a societal orientation, with society consisting of systems of rights, obligations and laws. Few even highly educated individuals reason at the stages above Stage 10 (Commons *et al.*, 1982).

Scoring procedures. Without knowledge of respondents’ backgrounds, the second author scored each interview using the Standard Issue Scoring System developed by Colby and Kohlberg (1987b). Interviews were then independently scored by a second, bilingual researcher. A third researcher scored the same interviews using the Model of Hierarchical Complexity scoring scheme (Commons *et al.*, 1992, 2002). Reliability based on agreement between the scorers was calculated to be 95%. A fourth researcher also independently read the answers to questions about leadership and categorized respondents as leaders or non-leaders.

Results

Table 1 shows the distribution of reasoning stages across both studies. The left section pertains to Study 1. Here we see that two respondents were scored at the pre-operational actions stage and two at the primary operations stage. The largest number (15) was scored at the concrete operations stage. The second largest number (12) was scored at the abstract operations stage. Finally, three participants’ performances were scored at the formal stage.

Table 1. Percentage of respondents in Study 1 (non-educated adults) and Study 2 (high school students) reasoning at each stage

| MHC Stage | Stage name | Colby-Kohlberg Stage | Study 1 (N=34) | | Study 2 (N=30) | |
|-----------|---------------------|----------------------|----------------|------|----------------|------|
| | | | Percentage | (n) | Percentage | (n) |
| 6 | Preoperational | 1/2 | 5.9 | (2) | 0.0 | (0) |
| 7 | Primary operations | 2 | 5.9 | (2) | 13.3 | (4) |
| 8 | Concrete operations | 2/3 | 44.1 | (15) | 60.0 | (18) |
| 9 | Abstract operations | 3 | 35.3 | (12) | 23.3 | (7) |
| 10 | Formal operations | 3/4 | 8.8 | (3) | 3.3 | (1) |

Seven respondents (four males and three females) were categorized as leaders. That is, leadership status was assigned in about one out of every five cases. Two leaders were involved with political organizations or parties. The average age of leaders was 49 years, while that of non-leaders was 52 years.

Leaders were more likely to reason at higher stages than were non-leaders. Furthermore, three out of seven leaders reasoned at the stage of formal operations. That is, all of the participants who were scored at the formal operations stage were leaders from the participant pool of non-educated adults. None of the non-leaders demonstrated this high stage of reasoning. The highest stage attained by any participant who was not a leader was Stage 9 (abstract) – Stage 3 according to Kohlberg.

The mean WAS score for leaders in this study was 314.4, while that for non-leaders was 262.96. A t-test indicated that the scores for leaders were significantly higher than those for non-leaders ($t(32)=7.65, p<.0001$). Even with the small and unequal sample sizes and possible differences in variances, this is a very statistically significant result. Moreover, most of the variance was accounted for, which is indicated by the large effect size, $r=.804$ ($d=2.705$). Effect size was calculated using $r_{Y\lambda} = t^2 / \sqrt{(t^2 + df)}$, $d = 2t / \sqrt{df}$ (Becker, 1999). That is, the task demands and experiences associated with leadership duties were significantly related to higher stages of reasoning among non-literate adults.

Thinking at formal Stage 10 (Kohlberg 3/4)

In order to more clearly illustrate the complexity of the participant reasoning, it will be useful to provide some indication of the nature of reasoning at the stage of formal operations. Excerpts from translated interviews with the three participants who were determined to be leaders and scored at Stage 10 are offered below. These interviews are followed by an elaboration of the analysis of each answer's logical structure on which the stage score is based according to the MHC. In addition to helping comprehension of the concept of reasoning at the stage of formal operations, these passages provide valuable insights into the levels of reasoning complexity that can be identified even among non-educated adults. 'Q' indicates a question and 'R' indicates an answer.

Respondent 1:

Q: Should people do whatever they can to obey the law?

R: Necessarily, necessarily.

Q: Why?

R: Because all of us who want to live in an orderly way have to obey the law.

This response was scored at the formal operations stage because it employed a logical argument involving a universal ('all of us') and two propositions (wanting to live in an orderly way and obeying the law) connected by necessity (must). The action of obeying was applied to the abstract collection of propositions that constituted 'the law'. A logical relationship was asserted between obeying the law and living in an orderly way. As a result of obeying the law, everyone would 'live in an orderly way'. We interpreted 'orderly' in 'live in an orderly way' to mean logically

ordered manner rather than harmonious way, the former would be the case at the stage of formal operations.

The same respondent also stated:

When you have situations such as what happened to Juan, the person who was going against the law was the pharmacist. Every man has to do something to help others. But this man discovered something with the sole purpose of being the only one to benefit from it. Because he told Juan that he had discovered it and that he was going to make money from it, he was thinking solely of himself. And thus he was being unjust and even going against the law. So in this case, the person who should be punished is the pharmacist, because of acting unjustly and providing no service to anyone. What he did with the discovery was only on his own behalf, for his own enrichment.

Formal operational stage of reasoning was shown by use of the universal proposition that 'every man', particularly the pharmacist, 'should provide service to' others and must consider their welfare and needs. Doing so would promote a proper way of living and not behaving in this way would not help 'anyone live in an orderly way'. That is, the respondent indicated that he considered not providing services to others as operating outside the law because such actions subsequently undermine the 'orderly way' and the welfare of others. These replies indicate that the participant possessed 'the conception of the extended social good' that is indicative of the stage of formal operations (Kohlberg, 1990; Commons *et al.*, 1992).

Respondent 2:

Q: Should people do whatever they can to obey the law?

R: Yes.

Q: Why?

R: Because we must respect the law by all means. Even though sometimes we know that it is against us, we must obey the law.

Q: How does this apply to what Juan should do?

R: Well, the law has to be followed anyway. He stole and it is his obligation to pay the punishment that the law is going to extract.

Formal operations reasoning was evident here because the respondent had identified an abstract 'duty to obey the law'. The law must always be obeyed, even if 'we know that it is against us'. By stating that one's obligation is *not* influenced by whether or not the law benefits the person directly involved, the respondent showed that she had considered alternative values, such as benefits from breaking the law. The participant has rejected this possibility, instead indicating that Juan should 'be willing to accept the negative sanctions that exist for violation of the standards of society' (Colby & Kohlberg, 1987b, p. 166; Kohlberg, 1990; Commons, *et al.*, 1992).

Q: Thinking in terms of society, should people who break the law be punished?

R: Yes.

Q: Why?

R: Because if those who commit a crime are not punished, the law wouldn't be useful.

Once again, the argument used in support of the evidence is a logical one. There is implied empirical evidence for the asserted causal relationship between two abstract stage propositions: letting people break the law and making the law useless. Also, the respondent used universals: 'anyone', 'the law, in a universal sense'. The participant

logically asserted that anyone who breaks the law, an abstract stage statement, even if for a good reason, should expect punishment. Otherwise, the law, in a universal sense, would be useless.

Respondent 3:

Q: Should people do everything they can to obey the law?

R: Well, yes. Yes, they should. But as I told you ... many times you see yourself obligated to break the law and the government proceeds as it should, with jail or whatever done according to the damage done. The government has the obligation to investigate why someone broke the law, and to make sure that the person really couldn't do anything else; that he had to ... steal. In that situation, practically the government should set him free, because they themselves would be convinced that he stole out of necessity, and that he is not going to do it again. He's not going to do it for pleasure.

Formal operational reasoning follows from a consideration of the government as an instrument that punishes. The participant asserted that 'jail or whatever is done according to the damage done'. This punishment, from the respondent's view, should be accorded to anyone (a universal quantifier) who commits a real crime. Again, the participant has demonstrated recognition of an implicit set of rules termed 'law'. These rules should apply, with certain qualifications, to everyone. Also, 'good intentions' begin 'to be formalized as a legitimate, semi-legal consideration in assigning punishment' (Colby & Kohlberg, 1987b, p.124; Kohlberg, 1990; Commons *et al.*, 1992).

Discussion

There were a number of non-literate individuals found to reason with the complexity of formal operations (3/4 participants). All of the non-literate individuals reasoning at Stage 10 (formal operations, Kohlberg, 3/4) had been categorized as leaders. Two of these three leaders had extensive cross-cultural experiences. On the other hand, none of the non-leaders (with or without cross-cultural experiences) reasoned at Stage 10. Abstract operations was the highest stage attained by any non-leader.

Though we do not assert the direction of causality between reasoning stage acquisition and the practice of multiple perspective-taking tasks such as leadership duties, it is important to identify the specific task demands of leaders that may have required higher stages of reasoning, particularly Stage 10. To accomplish this we compared the characteristics of leaders at Stage 10 with those of individuals, both leaders and non-leaders, who scored at lower stages. Using this method of analysis we tried to identify other factors in addition to leadership that may be related to higher reasoning stages.

For instance, one participant was a 55-year-old leader who supervised a crew of construction workers and had participated in organizing people to petition the government for benefits. This participant also had several other opportunities to assume multiple roles, responsibilities and perspectives throughout his lifetime. This person had an extensive and varied employment history, including work as a construction and railroad worker, a farm worker, a food vendor and a cooler

repairman. In addition, he had resided in several different cultural settings including a small rural town, México City, Chicago and Mexicali. That is, in addition to leadership qualifications, this participant possessed significant cross-cultural experiences. For this participant, task demands other than formal education were related to reasoning at Stage 10.

Another respondent reasoning at Stage 10 was a 53-year-old woman. She qualified as a leader, but had virtually no cross-cultural experiences, unlike the participant described above. Aside from a brief period during which she had been making homemade candies for sale, she had not worked outside of the home. From a very early age she had devoted herself to activities within the home. However, she shared the responsibility of raising her younger siblings. She showed great concern for the welfare of other family members in the extended family, and often participated in the resolution of diverse conflicts. As a result, she gained a high status in family circles and was frequently asked for advice. Her opinions as a family leader were well respected.

The last respondent we shall consider here was a 29-year-old man who reasoned at Stage 9 (abstract). He assumed no leadership roles. However, he had lived in three different cultural contexts during his lifetime. In addition to residing in Michoacan and Mexicali, he had also worked in the United States on an undocumented basis. Despite his apparent lack of leadership qualifications, this man had extensive cross-cultural exposure, which may have reinforced his acquisition of Stage 9.

The results of this study *undermine* the generally unpublished and possibly unstated assertion that formal education is the only factor that can lead to formal operational reasoning. Although formal education is normally associated with higher stages of reasoning, other situational demands and experiences may also facilitate such reasoning (Vygotsky, 1981a, 1981b). The correlation between (a) playing a leadership role, or possessing significant cross-cultural experiences and (b) reasoning at higher stages may be due to the additional task demands associated with taking on leadership roles or having cross-cultural experiences. It may also be the case that individuals who, for some as yet unknown reason, solve problems that are more complex are more likely to assume leadership roles or cross-cultural experiences.

Study 2: Mexican high school students

By having high school student participants from Mexicali, Baja California in Study 2, we were able to add two additional variables to our study but did not include the characteristic of being non-literate. We evaluated the relationship among three variables – leadership status, cross-cultural exposure and socio-economic status – to stages of reasoning among Mexican high school students.

Method

Research participants. Participants were a convenience sample of 30 adolescents from Mexicali, each attending either a private high school in Mexicali, Baja California or a public high school in Calexico, California. Regardless of socio-economic

backgrounds, Mexicans with relatives in the United States often attended the English-speaking public school in Calexico even though they spoke Spanish at home. Otherwise, individuals of higher socio-economic backgrounds usually attended the private school in Mexicali, whereas those from lower socio-economic backgrounds usually attended the public schools.

The participants were selected in the following manner. The second author and his research assistant spoke with the principals of each school. The principals suggested which teachers to approach to recruit possible participants. The team approached one or more teachers at each school, explaining in general terms what the study was about. The teachers who agreed to participate in recruiting students were also the teachers who gave the research team information on the actual participants' profiles. The teachers identified participants as being leaders or non-leaders and of having high or low SES. No precise definitions were given. Three types of information were used to define the independent variable upon which socio-economic status was based. One, as already stated, was teacher judgements of the socio-economic status of the students. A second variable was type of school (public or private), with those attending private school being considered as of higher socio-economic status. The other source of information about socio-economic status was from interviews undertaken with the participants in Spanish.

Procedure. The population of Mexicali is about 1,000,000, whereas that of Calexico is about 27,000. Students from each city had similar levels of performance in school. The research site thus presents a high potential for variability in levels of cross-cultural experiences among participants. The setting constitutes a 'natural laboratory' for studying the factors mentioned above.

Respondents in this study completed biographical questionnaires. They were also interviewed in Spanish using Kohlberg's Moral Judgment Interview, Form A (Colby & Kohlberg, 1987a). As in the first study, scoring was performed using both Colby and Kohlberg's (1987b) scoring system as well as the methods of the Model of Hierarchical Complexity (Commons & Richards, 1984; Commons *et. al.*, 1996). As in the first study, there was 95% reliability between the two scoring methods. To help students feel at ease during Study 2, interviews in Spanish took place in school libraries, in familiar classrooms or in the participants' homes.

There were there two separate scorers for Kohlberg's Moral Judgment Interview (MJI), Form A and two separate scorers for the Model of Hierarchical Complexity (HCSS) scoring, as in Study 1. Dawson (2003) found a very strong relation between traditional MJI scoring and HCSS. Note that the HCSS provides absolute scaling because it is independent of content – there is only one roughly equally spaced natural numbered stages for all content in all domains (Commons & Pekker, submitted). It scores moral dilemmas as well as anything else, as Dawson (2002a, 2002b) has shown.

Results

The right-hand section of Table 1 shows stages of reasoning found in the second study. Results indicate that only 3.3% of the respondents (one participant) reasoned

at the stage of formal operations. This student had high socio-economic status, cross-cultural experiences, as well as leadership responsibilities.

Table 2 shows mean WAS scores by (a) leadership; (b) level of cross-cultural contact; and (c) socio-economic status. An analysis of variance indicated that respondents of high socio-economic status had higher WAS mean scores than did respondents of lower socio-economic status: 281 vs. 240, $F(1,28)=27.37, p<.001$. There was a very large effect size with much of the variance accounted for, as indicated by the large Cohen's $d, d=2.025$. The formula used to calculate Cohen's d was $d=\sqrt{F(n_t+n_c/n_t n_c)(n_t+n_c/n_t+n_c-2)}$, where F =F statistic, n =number of subjects, t refers to the treatment condition, and c refers to the comparison or control group (Thalheimer & Cook, 2002). In addition, there was a tendency for leaders to have WAS scores higher than non-leaders: 269 vs. 250, $F(1,28)=3.95, p<.06$. This alpha was just over .05 because of the small sample size. This can be seen from the large effect size shown by the large Cohen's $d, d=2.096$. The main effect of cross-cultural contact on reasoning stages was not statistically significant, $F(1,28)=1.84$.

Leaders with high cross-cultural contact had higher WAS scores than leaders with low cross-cultural contact, as shown by the two-way interaction between cross-cultural contact and leadership interaction effect: $F(1,28)=5.08, p<.025$. Again, much of the variance is explained by the large Cohen's $d, d=1.397$. There was no such difference among non-leaders.

Discussion

In Study 2, we found that higher socio-economic status was associated with higher stages of reasoning. As mentioned earlier, some of the components of socio-economic status, such as income, need to be explicated in order to properly understand the role of this variable. Among high school students, neither leadership nor cross-cultural exposure, by themselves, had a significant relationship with higher reasoning stages. The effect of these two variables combined, however, did produce a statistically significant correlation with higher reasoning stages. In particular, leaders who had more cross-cultural contact showed higher reasoning scores.

Table 2. Mean WAS score and () number of high school students by leadership, socio-economic status and cross-cultural contact for Study 2

| SES | Cross-cultural contact | | | |
|------------|------------------------|---------|---------|---------|
| | Low | | High | |
| Leadership | Low | High | Low | High |
| Leaders | 239 (6) | 272 (2) | 293 (2) | 309 (3) |
| Non-leader | 238 (5) | 221 (3) | 268 (5) | 268 (3) |
| Total | (11) | (5) | (7) | (6) |

Results across both studies

These are very different samples. Next we combine data sets. Please attend to the usual caveats as to the lack of representativeness, randomness of either sample as well as the small *N*. The main problem with a small *N* is that the power of finding a significant β is reduced. That means that if a significant β is found, its significance may be underestimated. The size of the true β might be more than if *N* were larger. The first study had older non-literate participants. The second study had younger, educated and some higher socio-economic status participants. Both groups came from and lived in the same city of Mexicali and both spoke Spanish. But we can exploit those differences as well, remembering the sample limitations. In order to measure the effect of leadership and age, we combined the results from both studies in multiple regression analyses ($N=64$), using (a) leadership status and (b) age of respondent (adult vs. adolescents) to separately predict the stage of reasoning as well as the WAS score. Remember that leadership was associated with higher stage performance for each of the adolescents and adults separately in Study 1 and Study 2. Unsurprisingly, leadership in the combined group had a statistically significant effect on both stage, $\beta=.1867$ ($p<.0001$), and WAS, $\beta=.0997$ ($p<.0041$). What would be the effects of age? If age did not make a difference, one would expect that the adolescents with education would have higher WAS scores. Also, they were as a group economically better off. Because only 3.3% of the adolescent participants reasoned at Stage 10 in the second study compared to 9% of non-literate adults in the first, it is likely that age also plays some role in the development of higher reasoning stages. But age had a statistically significant effect on both criterion variables: for stage, $\beta=.2654$ ($p<.008$); for WAS $\beta=.1864$ ($p<.007$). Even though they were unschooled, older respondents tended to demonstrate higher stages of reasoning than younger respondents. Leadership was also more strongly related to higher reasoning stages among non-literate adults than among high school students. This may be because older respondents had had more time to experience any kind of reinforcement by task demands or experiences facilitating the acquisition of higher reasoning stages.

Summary

Cross-cultural studies of reasoning stages find evidence to support an invariant sequence of transition from lower to higher stages of reasoning among both educated and non-educated participants. In previous studies, however, functioning at higher stages, such as formal operations, was usually only found among educated individuals from either Western or non-Western societies (Lei, 1984; Gielen & Markoulis, 2001). But there are essentially no non-schooled people in Western societies now.

In the first study we found three out of 34 non-literate adults who reasoned at the formal stage. All of these participants were leaders; two possessed cross-cultural experiences. The results of Study 1 demonstrated the existence of reasoning at the stage of formal operations among non-literate individuals, which had been rarely

found if at all in previous studies. It was also found that such reasoning may be associated with participation in leadership duties or cross-cultural experiences.

In the second study we more systematically investigated the effect of these two factors, as well as socio-economic status, among high school students from Mexicali and Calexico. Students of higher socio-economic backgrounds were more likely to demonstrate higher stage reasoning. Cross-cultural experiences and leadership, in interaction, were also related to higher stages of reasoning.

Comparison of results from both studies indicated that age plays a significant role in reasoning-stage development, perhaps extending the period during which stage transition is possible.

These studies are preliminary. The samples were small and situated in a particular cultural context (Mexicali, Mexico). Results do suggest several avenues for future researchers to pursue. For instance, direction of causality needs to be investigated. Does leadership facilitate reasoning at higher stages or does reasoning in this way facilitate the assumption of leadership positions? One might appoint some people as leaders of activities for an extended period of time to see if that altered their stage of performance. There are also some questions pertaining to the methodological assumptions employed in the studies. Is attending school in the United States an adequate criterion for cross-cultural contact among Mexican high school students? In Calexico, we know that people in such schools tend to self-segregate. But they are taught in English and the pedagogy consists less of lectures and memorization. Are Mexicans of high socio-economic status who attend schools in the United States really of the same relative socio-economic status as those who remain in Mexico? And if so, do they differ in other ways such as 'cosmopolitanism' or exposure to US media? Are the educational task demands offered through private schools equivalent to those offered through public schools, or are other components of socio-economic status influencing stage transition? Individual components of socio-economic status, such as wealth and education, must also be elucidated. The relationships of all of these factors to stages of reasoning need to be independently examined. In addition, these studies suggest yet another approach to discerning external trends affecting stages of reasoning. Instead of looking for factors facilitating reasoning at higher stages, perhaps researchers should examine factors inhibiting acquisition of higher stage reasoning. All of these questions suggest that searching for cultural, social structural and social psychological factors associated with reasoning at higher stages in the moral as well as other domains is a worthwhile pursuit.

Acknowledgements

These studies were supported in part by grants from the Dare Association Inc, 'A cross-cultural study of intellectual development of Mexicans' to the Department of Psychiatry at Harvard Medical School and from grants from Universidad Autónoma en Baja California.

We dedicate this study to Lawrence Kohlberg and Robert A. LeVine, who inspired and supported our work in this area. We also want to thank Sara Harkness

and Charles Super for helping us to understand the problems of measuring stage cross-culturally. We thank the following colleagues for their extensive help in conducting the studies: Blanca Estela Miranda-Romero, Isidra Guadalupe Hernández-Morelos. We also want to thank Fernando Cerón-Esquivel, Thomas G. Gutheil, and Mark J. Hauser, who helped prepare grant applications and papers and who helped with institutional arrangements.

Portions of the study appeared in the BA theses of Blanca Estela Miranda-Romero and Isidra Guadalupe Hernández-Morelos at the Facultad de Ciencias Humanas, Universidad Autónoma en Baja California. Guadalupe Hernández-Morelos translated the subjects' interviews reported in this paper.

Partial results were presented as follows:

- Galaz-Fontes, J. F., Cerón-Esquivel, F., Commons, M. L., Richard, D.C., Hauser, M. J. & Gutheil, T. G. (1988) Life based demands and development of moral reasoning among Mexicans, paper presented at the *18th Symposium of the Jean Piaget Society*, Philadelphia, Pennsylvania, 2 June.
- Galaz-Fontes, J. F., Commons, M. L., Morse, S. J. & Hernández-Morelos, I. G. (1994) The relationship of leadership to moral development, paper presented at the *Association for Behavior Analysis*, Atlanta, GA, May.
- Galaz-Fontes J. F, Hernández-Morelos, I. G., Miranda-Romero, B. E., Commons, M. L., Gutheil, T. G., Hauser, M. J. & Morse S. J. (1991) Leadership may provide the means of moving up in adult moral and political-developmental stages, paper presented at *International Society for Political Psychology*, Helsinki, July.
- Galaz-Fontes, J. F., Miranda-Romero, B. E. & Commons, M. L. (1989) Razonamiento moral en adolescentes de la frontera norte de México (Moral reasoning in adolescents from Mexico's Northern border), manuscrito presentado en el (paper presented at the) *Fourth Annual Interuniversity Symposium*, Tijuana, BC, 12–14 October.
- Galaz-Fontes, J. F., Miranda-Romero, B. E. & Commons, M. L. (1989) Adolescents' moral reasoning in a Mexican border city, paper presented at the *35th Annual Meeting of the Pacific Coast Council on Latin American Studies*, Sacramento, CA, 26–29 October.
- Galaz-Fontes, F. A., Miranda-Romero, B. A. & Commons, M. L. (1990) Moral reasoning in Mexican adolescents from a border city, paper presented at the *6th Symposium of the Society for Research in Adult Development*, Cambridge, MA, 7–8 July.
- Hernández-Morelos, I. G., Miranda-Romero, B. E., Galaz-Fontes J. F., Commons, M. L., Gutheil, T. G. & Hauser, M. J. (1991) Leadership may provide the means of moving up in adult moral developmental stages, paper presented at the *6th Symposium Adult Development*, Boston, MA, 12–14 July.

References

- Armon, C. (1984a) Ideals of the good life and moral judgment: ethical reasoning across the life span, in: M. L. Commons, F. A. Richards & C. Armon (Eds) *Beyond formal operations: Vol. 1. Late adolescent and adult cognitive development* (New York, Praeger), 357–380.

- Armon, C. (1984b) Ideals of the good life and moral judgment: evaluative reasoning in children and adults, *Moral Education Forum*, 9(2).
- Becker, L. A. (1999) Effect size calculators: calculating d and r using t values and df (separate groups t -test). Available online at: [http://web.uccs.edu/lbecker/Psy590/escalc3.htm#Calculate%20d%20and%20r%20using%20t%20values%20\(separate%20groups\)](http://web.uccs.edu/lbecker/Psy590/escalc3.htm#Calculate%20d%20and%20r%20using%20t%20values%20(separate%20groups)) (accessed 29 November 2005).
- Boyes, M. C. & Walker, L. J. (1988) Implications of cultural diversity for the universality claims of Kohlberg's theory of moral reasoning, *Journal of Human Development*, 31(1), 44–59.
- Candee, D., Graham, R. & Kohlberg, L. (1978) Moral development and life outcomes. Final report to NIE Grant #NIE-6-74-0096.
- Colby, A. & Kohlberg, L. (1987a) *The measurement of moral judgement: Vol. 2. Standard issues scoring manual* (Cambridge, Cambridge University Press).
- Colby, A. & Kohlberg, L. (Eds) (1987b) *The measurement of moral judgment: standard form scoring manuals* (New York, Cambridge University Press).
- Commons, M. L. & Pekker, A. (submitted) Hierarchical complexity: a formal theory, *Journal of Mathematical Psychology*.
- Commons, M. L. & Richards, F. A. (1984) A general model of stage theory, in: M. L. Commons, F. A. Richards & C. Armon (Eds) *Beyond formal operations: Vol. 1 Late adolescent and adult cognitive development* (New York, Praeger), 120–140.
- Commons, M. L. & Rodriguez, J. A. (1990) 'Equal access' without 'establishing' religion: the necessity for assessing social perspective-taking skills and institutional atmosphere, *Developmental Review*, 10(4), 323–340.
- Commons, M. L., Danaher-Gilpin, D., Miller, P. M. & Goodheart, E. A. (2002) Hierarchical complexity scoring system: how to score anything., Unpublished Scoring Manual. Available from the Dare Institute, Commons@tiac.net.
- Commons, M. L., Johnstone, J., Straughn, J. B., Meaney, M., Weaver, J. H., Lichtenbaum, E. & Krause, S. (1992) Measuring stage of development across domains: a universal scoring scheme., Available from the Dare Institute, 234 Huron Avenue, Cambridge, MA 02128, Commons@tiac.net.
- Commons, M. L., Richards, F. A. & Kuhn, D. (1982) Systematic and metacognitive reasoning: a case for a level of reasoning beyond Piaget's formal operations, *Child Development*, 53(4), 1058–1069.
- Commons, M. L., Trudeau, E. J., Stein, S. A., Richards, F. A. & Krause, S. R. (1998) The existence of developmental stages as shown by the hierarchical complexity of tasks, *Developmental Review*, 8(3), 237–278.
- Conley, T. D., Jadack, R. A. & Hyde, J. S. (1997) Moral dilemmas, moral reasoning, and genital herpes, *Journal of Sex Research*, 34, 274–293.
- Dasen, P. R. (Ed.) (1977) *Piagetian psychology: cross-cultural contributions* (New York, Gardner Press).
- Dasen, P. R. (1982) Cross-cultural data on operational development: asymptotic development curves, in: T. G. Bever (Ed.) *Regressions in development* (Hillsdale, NJ, Erlbaum).
- Dasen, R. R. (1984) The cross-cultural study of intelligence: Piaget and the Baoule, *International Journal of Psychology*, 19(4–5), 407–434.
- Dasen, P. R., Ngini, L. & Lavalley, M. (1979) Cross-cultural training studies of concrete operations, in: L. H. Eckensberger, W. J. Lonner & Y. H. Poortinga (Eds) *Cross-cultural contributions to psychology* (Amsterdam, Swets & Zeitlinger).
- Dawson, T. L. (2000) Moral reasoning and evaluative reasoning about the good life, *Journal of Applied Measurement*, 1, 372–397.
- Dawson, T. L. (2002a) A comparison of three developmental stage scoring systems, *Journal of Applied Measurement*, 3(2), 146–189.
- Dawson, T. L. (2002b) New tools, new insights: Kohlberg's moral reasoning stages revisited, *International Journal of Behavioral Development*, 26(2), 154–166.

- Dawson, T. L. (2003) A stage is a stage is a stage: a direct comparison of two scoring systems, *Journal of Genetic Psychology*, 164(3), 335–364.
- Dawson-Tunik, T., Commons, M. L., Wilson, M. & Fischer, K. W. (2005) The shape of development, *European Journal of Developmental Psychology*, 2(2), 163–195.
- Devos, E. (1983) Socio-economic influences on moral reasoning: a structural-developmental perspective., Unpublished doctoral dissertation, Harvard Graduate School of Education.
- Eckensberger, L. H. & Zimba, R. F. (1997) The development of moral judgment, in: J. W. Berry, P. R. Dasen & T. S. Saraswathi (Eds) *Handbook of cross-cultural psychology, Vol. 2: basic processes and human development* (2nd edn) (Boston, MA, Allyn & Bacon, Inc), 299–338.
- Edwards, C. P. (1975) Societal complexity and moral development: a Kenyan study, *Ethos*, 3(4), 505–528.
- Edwards, C. P. (1981) The comparative study of the development of moral judgment and reasoning, in: D. A. Wagner & H. W. Stevenson (Eds) *Handbook of cross-cultural human development* (San Francisco, CA, W. H. Freeman Press), 248–279.
- Edwards, C. P. (1986) Cross-cultural research on Kohlberg's stages: the basis for consensus, in: S. Modgil & C. Modgil (Eds) *Lawrence Kohlberg: consensus and controversy* (London, Falmer Press), 419–430.
- Harkness, S., Edwards, C. P. & Super, C. M. (1981) Social roles and moral reasoning: a case study in a rural African community, *Developmental Psychology*, 17(5), 595–603.
- Gielen, U. P. & Markoulis, D. C. (2001) Preference for principled moral reasoning: a developmental and cross-cultural perspective, in: L. L. Adler & U. P. Gielen (Eds). *Cross-cultural topics in psychology* (2nd edn) (Westport, CT, Praeger), 81–101.
- Inhelder, B. & Piaget, J. (1958) *The growth of logical thinking from childhood to adolescence: an essay on the development of formal operational structures* (A. Parsons & S. Seagram, trans.) (New York, Basic Books) (originally published 1955).
- Jahoda, G. (1983) European 'lag' in the development of an economic concept: a study in Zimbabwe, *British Journal of Developmental Psychology*, 1, 113–120.
- Kohlberg, L. (1984) *Essays on moral development: Vol. 2. The psychology of moral development: the nature and validity of moral stages* (San Francisco, CA, Harper & Row).
- Kohlberg, L. (1987) *Child psychology and childhood education: a cognitive-developmental view* (New York, Longman).
- Kohlberg, L. (1990) Which post-formal levels are stages? in: M. L. Commons, C. Armon, L. Kohlberg, F. A. Richards, T. A. Grotzer & J. D. Sinnott (Eds) *Adult development: Vol. 2. Models and methods in the study of adolescent and adult thought* (New York, Praeger), 263–268.
- Lei, T. (1984) Being and becoming moral in a Chinese culture: unique or universal? *Cross-cultural Research*, 28(1), 58–91.
- Linacre, J. M. (2004) *Winsteps: multiple-choice, rating scale and partial credit Rasch Analysis* [computer program] (Chicago, IL, MESA Press).
- Mentkowski, M. & Associates, (2000) *Learning that lasts: integrating learning, development and performance in college and beyond* (San Francisco, CA, Jossey-Bass Publishers).
- Snarey, J. R. (1985) Cross-cultural universality of social-moral development: a critical review of Kohlbergian research, *Psychological Bulletin*, 97(2), 202–232.
- Snarey, J. & Keljo, K. (1991) In a Gemeinschaft voice: the cross-cultural expansion of moral development theory, in: W. M. Kurtines & J. L. Gewirtz (Eds) *Handbook of moral behavior and development: application* (Hillsdale, NJ, Lawrence Erlbaum Associates), 395–424.
- Thalheimer, W. & Cook, S. (2002) *How to calculate effect sizes from published research: a simplified methodology* Available online at: http://www.work-learning.com/white_papers/effect_sizes/Effect_Sizes_pdf5.pdf (accessed 29 November 2005).
- Tietjen, A. M. & Walker, L. J. (1985) Moral Reasoning and leadership among men in a Papua New Guinea society, *Developmental Psychology*, 2(6), 982–992.
- Ure, M. C. D. & Colinvaux, D. (1985) New results on the reasoning of unschooled adults, *The Quarterly Newsletter of the Laboratory of Comparative Human Cognition*, 7(1), 27–29.

- Vygotsky, L. S. (1981a) The instrumental method in psychology, in: J. V. Wertsch (Ed.) *The concept of activity in Soviet psychology* (Armonk, NY, Sharpe).
- Vygotsky, L. S. (1981b) The genesis of higher mental functions, in: J. V. Wertsch (Ed.) *The concept of activity in Soviet psychology* (Armonk, NY, Sharpe).
- Walker, L. J. (1986) Experiential and cognitive sources of moral development in adulthood, *Human Development*, 29(2), 113–124.
- Walker, L. J. & Pitts, R. C. (1998) Data can inform the theoretical skew in moral psychology: a rejoinder to Hart, *Developmental Psychology*, 34(3), 424–425.
- Walker, L., deVries, B. & Trevethan, S. (1987) Moral stages and moral orientations in real-life and hypothetical dilemmas, *Child Development*, 58(3), 842–858.
- Walker, L. J., Pitts, R. C., Hennig, K. H. & Matsuba, M. K. (1995) Reasoning about morality and real-life moral problems, in: M. Killen & D. Hart (Eds) *Morality in everyday life: developmental perspectives. Cambridge studies in social and emotional development* (New York, NY, Cambridge University Press), 371–407.