Preface

MORAL DEVELOPMENT

Children are proficient integrators of stimulus information. They have followed the three mathematical laws of information integration in several areas of psychology, especially in moral cognition (e.g., Anderson, 1980, 1983, 1991c, 1996a, Chapters 6 and 8).

These integration laws provide effective theory for studying cognitive processes through their development. These laws not only mirror the processes of integration but, of no less importance, they can also provide true measurement of the values that are integrated for each individual child. These nomothetic–idiographic laws provide unique power for developmental analysis.

These integration laws disagree sharply with stage theories of development. Stage theories are attractive because development exhibits temporal evolution and stage frameworks promise to uncover regularity and order in this evolution.

But stage theories cannot handle integration. Hence stage theories are inadequate empirically and misguided conceptually. A different conceptual approach is needed.

An alternative approach rests on the laws of information integration. These laws revealed that young children have high cognitive capabilities that were obscured or denied in previous approaches. These laws can help unify developmental psychology with person science, social attitudes, judgment–decision, and learning (Chapter 8). These laws of information integration open a new conceptual direction for studying development across the life span.

Chapter 5

MORAL DEVELOPMENT

Information integration is important in studying moral development. The prominent role of information integration in adult morality was documented in previous chapters. These moral systems begin early in life as children learn about good–bad and right–wrong. Understanding developmental beginnings is important for understanding—and improving—moral functioning in later life.

Information integration tasks can be simple, suitable for very young children, yet meaningful at older ages. Such tasks can embody basic moral concepts such as bad–good, unfairness–fairness, apology, getting even, truthfulness, and other pro/antisociality. Age comparisons can then provide direct portrayal of development.

A second advantage is that response measures can also be simple. Graphic rating of "how much," as with deserved amount of reward or punishment, has been the standby. This functional rating method requires minimal verbal facility. It is usable down to at least 4 years of age. It is easily understood across cultures. And it can provide true measurement for each individual child.

Not least important, functional rating avoids the well-criticized confounding with verbal facility that undercuts the reliance on verbal reports in some research programs. Indeed, the method of functional rating can provide a validity criteria for verbal reports.

LAWS OF INFORMATION INTEGRATION

The laws of information integration provide an effective foundation for studying moral development. Contrary to earlier beliefs, young children are proficient information integrators. Indeed, they follow the same integration laws found at older ages. This age-invariance of the integration laws is a useful tool for studying development of moral values and structure of moral knowledge systems.

INTEGRATION DIAGRAM

The conceptual theme of Information Integration Theory (IIT) is shown
in the Integration Diagram of Figure 5.1, repeated here from Chapter 1.

INTEGRATION   DIAGRAM

VALUATION   INTEGRATION   ACTION
V OPERATOR   I OPERATOR   A OPERATOR
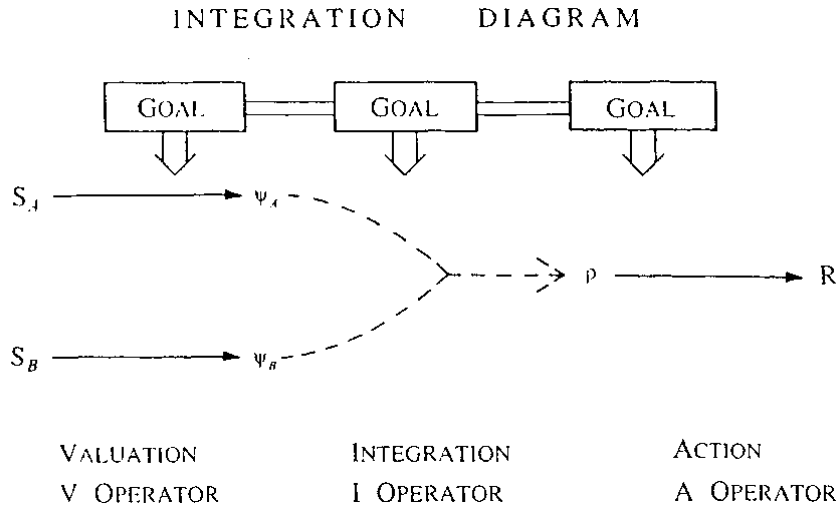
Figure 5.1. Information integration diagram. Chain of three operators, $\mathbf{V} - \mathbf{I} - \mathbf{A}$,
leads from observable stimulus field, $\{S\}$, to observable response, R.
Valuation operator, $\mathbf{V}$, transmutes stimuli, S, into subjective representations, ψ_i.
Integration operator, $\mathbf{I}$, transforms subjective field, $\{\psi\}$, into internal response, ρ.
Action operator, $\mathbf{A}$, transforms internal response, ρ, into observable response, R.
(After N. H. Anderson, *Foundations of information integration theory*, 1981a.)

Objective stimuli, S, impinge on the person and are valuated to con-
struct their psychological values, ψ. These ψ values are then integrated
into a subjective response, ρ, which is externalized to become the ob-
servable response, R.

Purposiveness is indicated by the threefold appearance of GOAL in
the Integration Diagram. Valuation especially is goal-oriented; the same
stimulus S may be transmuted into different ψ's for different goals.

MULTIPLE DETERMINATION

Multiple determination is a key problem for all attempts to develop psy-
chological theory. Some workers seek to slide by this problem with the

common tactic of showing that some variable does or does not have an effect. Judgment of intent or responsibility of a harmdoer, for example, may be studied for developmental trend of this important attribution process. This one-variable tactic is severely limited, however, because most thought and action depend on integration of multiple variables, even in young children. Developmental analysis depends on capability to analyze integration processes.

Standard factorial analysis of variance has often been used in attempts to study multiple determination. This can be useful but serious pitfalls have been widely ignored. One pitfall is that statistical interactions may be meaningless unless the response measure is a linear (equal interval) scale (see *Understanding "Interactions,"* Chapter 6). Another pitfall is that the common practice of treating main effects of variables as measures of their importance is often invalid and requires explicit justification (see *Concept-Instance Confounding*, Chapter 6).

An effective foothold on multiple determination was provided by findings that the integration operation, **I** in the Integration Diagram, exhibits simple algebraic laws for much thought and action. These laws can also be used to measure true subjective values for individual persons. Furthermore, the treacherous problem of comparing importance of different variables can be resolved in some cases.

These integration laws are found at all ages down to at least 4 years. The age invariance of this basic cognitive process facilitates cross-age comparison. Empirical illustrations with fairness and with blame are discussed below.

TWO DEVELOPMENTAL INTEGRATION THEORIES

Besides IIT, one other theory has taken information integration as an experimental base for child development, namely, that of Jean Piaget. Piaget's *integration choice methodology* was introduced in his pioneering experiments on moral development (Piaget, 1932/1965), with a subsequent shift to intuitive physics—the base for his genetic epistemology.

Piaget's fascinating discoveries about children's naïve physics make him one of the great psychologists. Best-known is that conservation of quantity (of liquid in glasses), which seems self-evident to adults, is not present in young children (see Anderson, 1980, 1983, 1996a, Chapter 8; Anderson & Cuneo, 1978a,b; Anderson & Wilkening, 1991; Hommers & Anderson, 1985; Schlottmann, 2000, 2001; Schlottmann & Anderson, 1991, 2007; Surber & Haines, 1987; Wilkening, 1982, 1988, 2007;

Wilkening & Anderson, 1982, 1991; see also Note 1, *Homage to Piaget*; see also Notes 2a,b,c).

This discussion considers only moral development, comparing IIT with Piaget's integration choice methodology which had extensive influence on later investigators. Functional measurement methodology, however, leads to very different understanding of development (see also Bogartz, 1994; Cuneo, 1982; Surber, 1982, 1985).

PIAGET'S INTEGRATION CHOICE METHODOLOGY

Piaget's integration choice methodology presents two objects, A and B, A > B on one dimension, A < B on a second dimension. People choose which is larger overall. A fully appropriate choice depends on integration of the two dimensions for each object and choice of the larger integral.

Piaget's choice methodology has been used extensively throughout the developmental field. This methodology and these results underlie much current belief, not only about children's cognition, but also about choice of research issues and experimental procedure. Unfortunately, this choice methodology suffers confoundings that invalidate many applications, nonmoral as well as moral (see *How not to study child development*, pp. 230ff in *Empirical Direction*).

PIAGET'S STUDIES OF BLAME: CENTRATION HYPOTHESIS

Piaget introduced his integration choice methodology with his work on blame. The two following stories were intended to vary both intention and harm as determinants of blame. Children are to choose who is naughtier, Marie or Margaret.

> There was a little girl who was called Marie. She wanted to give her mother a nice surprise, and cut out a piece of sewing for her. But she didn't know how to use the scissors properly and cut a big hole in her dress.

> A little girl called Margaret went and took her mother's scissors one day when her mother was out. She played with them for a bit. Then as she didn't know how to use them properly she made a little hole in her dress. (p. 122)

Piaget then questioned them about their reasons for their choice, a desirable practice but with a deadly confound (Leon, 1980).

Piaget's major claim was that younger children cannot integrate. Instead, they *center* on a single variable, either intent or harm, and judge on that alone. They understand that intent and harm are both relevant; given only one, they make sensible judgments. But, claimed Piaget, they

cannot combine the two into a unified judgment. *Centration* became a basic premise throughout Piaget's studies of intuitive physics. Centration is still believed by some workers despite massive contrary evidence.

Piaget's evidence for centration came from verbal justifications for the choice. Children who chose Marie as naughtier naturally justified their choice by appeal to physical damage (the "big hole in her dress"). Such verbal response may seem direct insight into children's thinking.

But this verbal justification is undercut by the all-or-none character of the choice task itself. Having chosen the story with the greater harm, the child's justification will naturally appeal to that harm. Marie's intent ("nice surprise") argues against the choice. Intent will hardly be mentioned, therefore, even though it may have been integrated (Leon, 1980).

Piaget, however, considered *centration* a major discovery. He relied on it systematically in his voluminous studies of intuitive physics, in which he continued to employ his integration choice methodology.

But when functional measurement methodology was applied, centration was quickly seen to be an artifact of Piaget's choice methodology. Integration graphs provide simple, critical tests of centration. Integration graphs are theoretically neutral. Had centration occurred, this would have been transparently clear in the graphical pattern. Instead, this pattern showed integration—as in Figure 5.2 below (see also Anderson & Cuneo, 1978; Leon, 1980; Schlottmann, 2000; Shanteau, Pringle, & Andrews, 2007; Singh, 2011; Surber, 1977, 1985; Wilkening, 1979, 1982, 1988, 2007; Wilkening & Anderson, 1982, 1991; Notes 2a,b,c).

FUNCTIONAL MEASUREMENT METHODOLOGY

The functional measurement methodology of IIT was applied to blame theory in the landmark thesis of Manuel Leon (1976, 1980) and in impressive work by Colleen Surber (1977, 1982, 1985). Children even younger than those studied by Piaget integrate very nicely in diverse tasks. Piaget's centration hypothesis predicts that only one variable will show an effect in an integration task. This prediction was clearly disproved in the cited integration experiments, some of which were discussed in Chapter 3 (e.g., Figure 3.1).

Advantages of functional measurement methodology are illustrated by these studies. Foremost is capability to uncover the underlying law of information integration. No less important, the metric response allows simple quantification of developmental trends, an effective tool for developmental analysis.

This functional measurement methodology is far more informative than Piaget's choice methodology. And simpler to boot. Applications to some developmental issues are given next.

COMPARING THE TWO INTEGRATION THEORIES

PREFERENCE INTEGRATION

The following experiment seems the first to establish an integration law in children. At that time, Piaget's claim that young children cannot integrate but *center* and judge on the basis of one stimulus alone was widely accepted (e.g., Flavell, 1967, p. 157; Siegler, 1976). Piaget's integration choice methodology, however, gives only crude information about age trends and has little capability with single child analysis. Application of IIT was expected to help in both respects.
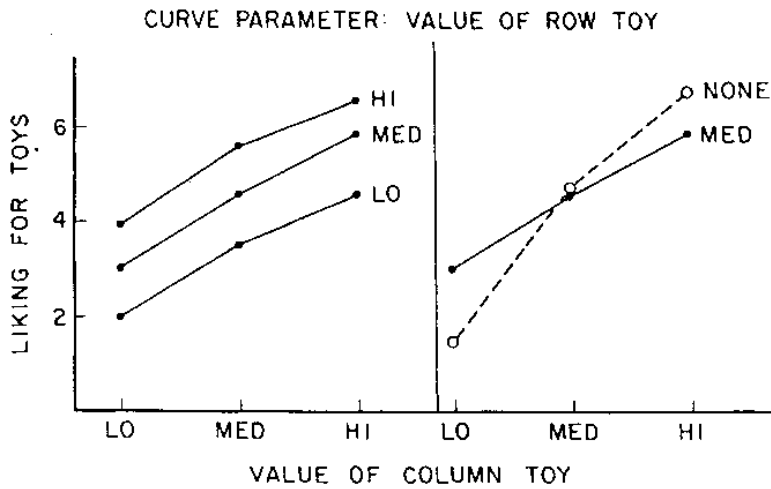
Figure 5.2. Parallelism in left panel supports adding-type model; crossover in right panel eliminates adding model and supports averaging model. Children judge liking for one or two toys in factorial integration design. (After Butzin & Anderson, 1973.)

Experimental Procedure. On each trial, children rated how much they would like to play with one or two toys shown to them. These toys had been preselected to be Lo, Med, or Hi in attractiveness and were presented in a 3 x 3, row x column integration design. The six single toys were rated similarly. These 9 + 6 trials were presented twice to each child with

careful randomization. 30 children were recruited from the surrounding community and paid $1 for being tested in their own homes.

Two Results: Integration and Proportional Metric Thinking. The parallelism in the left panel of Figure 5.2 implies an adding-type integration model, either adding or averaging (benefit 1 of parallelism theorem in Chapter 1). The crossover of the dashed single-toy curve in the right panel of Figure 5.2 shows *opposite effects*: adding the Med row toy averages *up* the Lo column toy, averages *down* the Hi column toy.

Little sign of developmental trend was found. The younger and older children (mean ages of 6–2 and 9–7 years) showed similar integration graphs (Figure 1 of Butzin & Anderson, 1973).

Two claims of Piagetian theory are disproved by Figure 5.2. First, children did not center. A glance at the integration graphs shows that both toys influenced the preference (Note 3).

Piaget also claimed that children younger than 10–12 years of age cannot use proportional metric thinking; the parallelism of Figure 5.2 shows quite the opposite (benefits 2 and 3 of the parallelism theorem). Proportional metric thinking holds true for preoperational children even younger than 4 years of age (Cuneo, 1982). IIT thus provides a powerful metric methodology for developmental analysis (Note 4).

DESERVING AND FAIRNESS

Deserving and fairness, both important in social–moral practice and theory, obeyed exact algebraic laws in extensive experiments on information integration with adults (Chapter 2). Understanding how these concepts develop and function can help build a better society. The experiment summarized here found the same integration laws with children even younger than 5 years.

Participant children in 4 age groups, from 4[+] to 8[+] years, played Santa Claus in two tasks. In the equity task, they made fair division of 20 symbolic toys between two story children based on *deed* (how much they had cleaned up the campground or helped their mother) and *need* (how many toys they already had). In the deserving task, they assigned a fair share of the 20 symbolic toys to a single child based on both deed and need of that child. These judgments were made by sliding a chosen fraction of the 20 symbolic toys along a rod, a graphic rating scale (Anderson & Butzin, 1978).

The children's fair divisions are shown in Figure 5.3. The wealth of information obtainable from a single integration experiment may be illustrated with the following list of nine implications.

1. Equity Schema. Fair shares division between two story children followed the decision averaging law of Chapter 2. Deed–deed division in the left panel of Figure 5.3 shows the slanted barrel pattern predicted by this law. This same pattern is predicted for the need–need division in the center panel although this barrel shape fell short of being statsig. No reliable trends across the four ages were found; even the 4[+]–year-olds divided very nicely—they understood fairness (Note 5).

2. Deserving Schema. Deserving of single story children followed an adding-type rule. This rule is observable in the parallelism of the need-deed integration for a single child in the right panel of Figure 5.3.
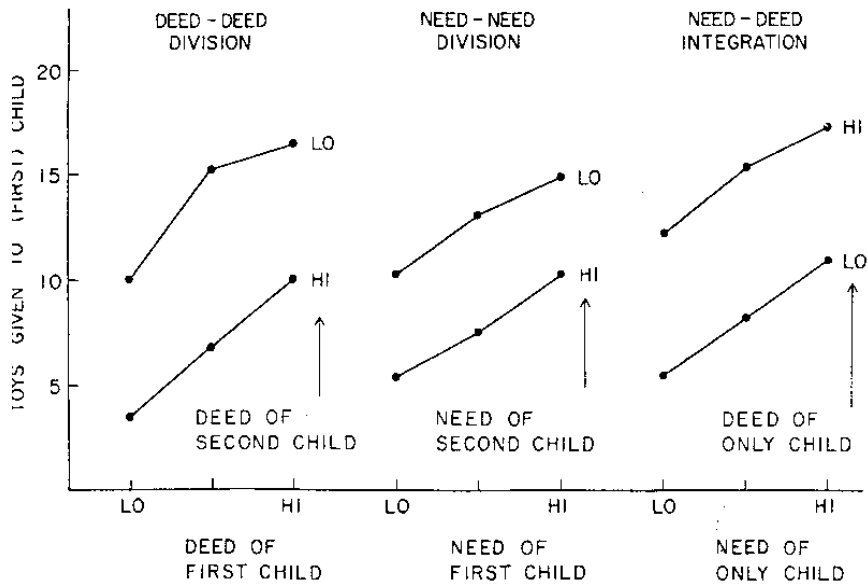
Figure 5.3. Mean number of toys given to child as a function of information about performance and need: Experiment 2. Left and center panels show equity division between two children as a function of performance and need, respectively; right panel shows deservingness reward for single child as a function of its performance and need. (After Anderson & Butzin, 1978, Experiment 2.)

3. Social Comparison: Need Versus Deed. Piaget's claim of a developmental trend of importance from objective factors at younger ages to subjective factors at older ages has been widely accepted. The present

data, however, showed nearly equal effects of subjective need and objective deed and little age trend. Of course, this like nearly all other reports of objective–subjective trend, is problematic owing to concept–instance confounding (Chapter 6).

4. Multidimensional Input. In Experiment 3, each of two story children was characterized by both need and deed, each at low or high levels. Participant children were told to make fair division of 20 toys between them. These judgments exhibited parallelism in the Need × Deed integration graph at every age, in accord with integration theory.

5. Integrational Capacity. Capacity to integrate multiple stimulus informers is important everywhere in life. Integrational capacity was studied with individual analyses in Experiment 3, which was feasible because two replications were given each child. All four main effects were statsig for every 8–year-old, with a steady decline at younger ages. But 2 of 10 4–year-olds had four statsig main effects and another 2 had three. Further study of this cognitive capability might avoid the complication of fairness division and instead study judged deserving of single story children (Note 6).

6. Social Comparison: Input Integration vs. Fairness Integration. Equity theorists have taken *input integration* for granted—that multiple input dimensions (need and deed in the experiment of Figure 5.3) are integrated to form a unitary value of input. This unitary value is then used in the equity division. *Fairness integration* is an alternative hypothesis: people make an implicit fairness division for each dimension of input and then integrate these partial fairness values.

A definite test between these two hypotheses was possible following the logic of Equations 3 and 4 of Chapter 2. Fairness integration did better than input integration, just as with adults. This evidence on flow of information processing in young children illustrates potential of this integration-theoretical approach.

7. Proportional Thinking: Measurement of Internal Response, ρ. The response measure in these experiments was a true linear scale (benefit 2 of parallelism theorem). Even at 4^+ years of age, the *observable* response was a faithful measure of the children's *unobservable feeling*, R and ρ, respectively, in the Integration Diagram. This finding contrasts sharply with Piaget's claim that such proportional thinking does not occur until his stage of formal operations, at 10-12 years of age (Note 1). This capability of functional measurement is a notable advantage for developmental analysis.

8. True Personal Measurement of Internal Stimulus Values, ψ. True measures of psychological values of each stimulus informer may also be obtained. This is simple—benefit 3 of the parallelism theorem.

Most graphs present group means. However, parallelism analysis may be applied in exactly the same way to single persons, child or adult. This idiographic capability can be useful for longitudinal study.

9. Internal World. The method of functional rating provides a faithful image of the internal world as early as age 4 years. Functional rating may also be used when no algebraic law applies, a powerful new method for analysis (see *Response Generality*, Chapter 6).

RECOMPENSE

Recompense for harmful acts is important for social healing. This issue, discussed in Chapter 3, has also been investigated for developmental trends using integration tasks.

Paradoxically Large Effect of Recompense. Recompense for damage may have much larger effect than the damage itself. This paradoxical result, found with adults (Chapter 3), has also been found with children. Indeed, this disproportion may be larger at younger ages.

In the study of Figure 5.4, preschoolers (left panel) and 9–year-olds (right panel) were instructed to role-play a victim some of whose stamp collection had been ruined by another child who made specified recompense—*full, half,* or *none* of replacement stamps as listed by each curve. They judged amount of deserved spanking on a graphic rating scale.

Effect of recompense is shown by the vertical spread between the three curves in Figure 5.4; effect of damage is shown by the slope of each separate curve. Recompense has far larger effects than the damage for which it is made. This paradoxical effect is larger at the younger age. Similar results were obtained in all three experiments in this article (Note 7). Similar results, although less extreme, were also obtained in four experiments with adults by Hommers and Anderson (1991).

Age Invariance. Similar integration laws were shown by children as young as 4^+ years of age in several experiments on material recompense by Hommers (see references in Hommers, 1997, and Hommers & Anderson, 1991). The extended blame law of Chapter 3, Blame = Responsibility + Consequences − Recompense, was supported at every age.

The main developmental trend was an apparently larger paradoxical effect of recompense at younger ages. This result deserves further study,

especially with populations other than the middle class children common to so many developmental studies.

These results on material recompense indicate early development of adult moral concepts, much as was seen with apology. This line of inquiry is outside the horizon of popular stage theories of moral development (Hommers, 2010; see *Moral Stage Theories* below).
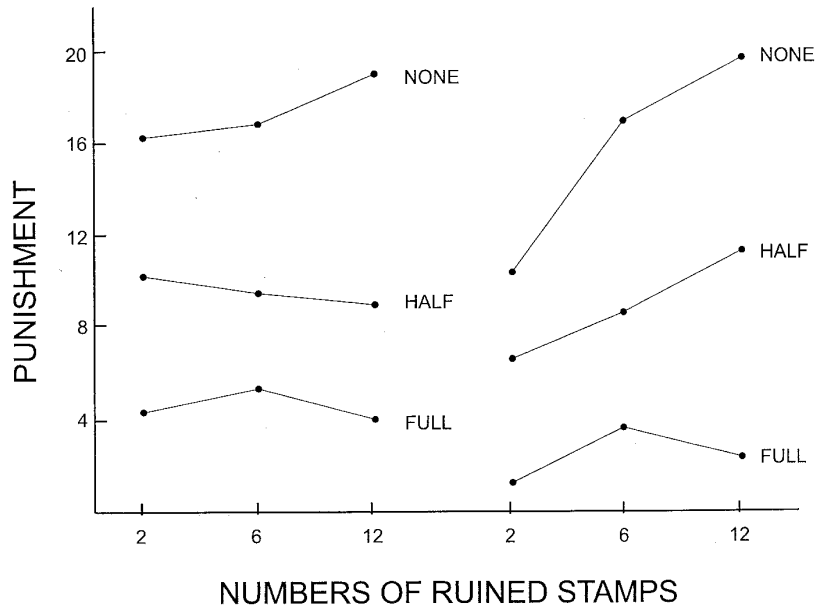
Figure 5.4. Punishment assigned by preschoolers (left panel) and 9–year-olds (right panel) as a function of damage (horizontal axis) and recompense (curve parameter). (After Hommers & Anderson, 1985, Experiment 3. Note 7 below.)

Extended Blame Law. Considerable work with children and adults has supported the basic blame law:

Blame = Intent + Harm.

These experiments, reported in Chapter 3, found that apology had effects similar to recompense. Taken together, these experiments indicate that apology and recompense both operate as subtractive averaging in the extended blame law:

Blame = Intent + Harm − Recompense (Apology).

Similar algebra would be expected with extenuation and provocation.

DEVELOPMENTAL COGNITIVE ALGEBRA IN INDIA

Cross-cultural generality of Information Integration Theory was demonstrated in impressive studies in India by Ramadhar Singh (1991, 2011a, b) in several different substantive areas. Three studies with young school children, among the first on developmental integration theory, are summarized here. All conversations were in Hindi.

Happiness With Praise-Blame. In this experiment, the child strung 7 beads on a shoelace as fast as possible. Regardless of their actual performance, they were told their performance on each trial was "Very Good" or "Very Bad" and given 1 or 5 balloons. There were 16 boys between 5 and 6 years of age who received two trials in each cell of this 2 × 2 between person design (Singh, Sidana, & Saluja, 1978a). Happiness was rated on a 9-point scale after each trial.

Children integrated the two stimulus informers according to an adding-type rule. This was shown by parallelism in the integration graph. Both main effects were statsig whereas the interaction was not, which supports the graphical parallelism (Note 8).

Happiness With Playgroups. Play means a lot to children. Playgroup desirability typically depends on valuation/integration of multiple variables. How causal analysis could replace the widely used correlations was shown by Singh, Sidana, & Saluja (1978b).

Playgroups in the first experiment were represented by 3 clay dolls, individually characterized as good or bad, together with the number of toys the group had to play with. Children between 6 and 7 years of age were urged to consider each group as real and judge how much they would like to play with this group.

An adding-type rule is indicated by the near-parallelism of the four curves of Figure 5.5. A neat qualitative test in a second experiment infirmed adding and supported averaging: adding two mildly good (bad) children to a group of two very good (bad) children lowered (raised) the judged goodness of the group (see similarly Anderson & Alexander, 1971; Oden & Anderson 1971).

The authors point up need for extension to real groups. An attractive alternative would be to work toward a general-purpose battery of TV cartoon groups. Such cartoons could also be useful in moral education.

Happiness With Parents. Parental treatment is central in children's lives. Some parents act as positive informers; others seem always finding
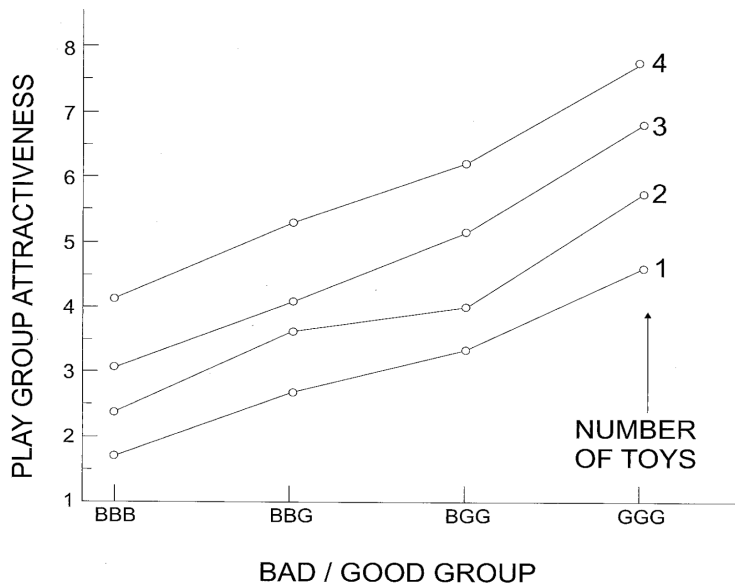
Figure 5.5. Indian children judge attractiveness of playgroups of 3 children characterized as good (G) or bad (B) on horizontal axis and number of toys the group has to play with. (After Singh, Sidana, & Saluja, 1978b.)

fault. Singh, Sidana, and Srivastava (1978) varied goodness of mother and father in 5 steps from very good to very bad. Children between 6 and 7 years of age judged happiness of hypothetical children for all 25 mother–father combinations. Happiness was hypothesized to be an average of goodness of mother and goodness of father.

A qualitative test like that of the previous subsection supported averaging and ruled out adding. However, their integration graph, although roughly parallel, was constricted in the middle and diverged toward both ends. This does not seem to be unequal weighting; greater weighting of more extreme levels has been found, as with the negativity and positivity effects, but such weighting would tend to produce convergence rather than the divergence. Perhaps the divergence resulted from lack of end anchors to prevent end bias.

Overall, these three early experiments from India provided timely support for the usefulness of IIT in developmental analysis. They were also promising evidence for cross-cultural generality of basic processes of information integration. Moreover, they were promising early evidence for cross-cultural generality of basic moral concepts.

ATTRIBUTION PROCESSES

Attribution is an inference, often about cause of some action, but also about some characteristic of an actor. In Blame = Intent + Harm, for example, valuation of Intent by the blamer generally involves some inference about the blamee. This attribution may be extended beyond the act in question to blamee's general personality, such as thoughtlessness.

Experimental Analysis. A more complex class of attributions appeared in the experiment of Figure 5.6 based on Clifford Butzin's (1978) PhD thesis. Participant children were told how much money an actor child had been promised for helping his mother (curve parameter) and how much help the actor child had actually given (listed on horizontal). They judged goodness of the actor child.
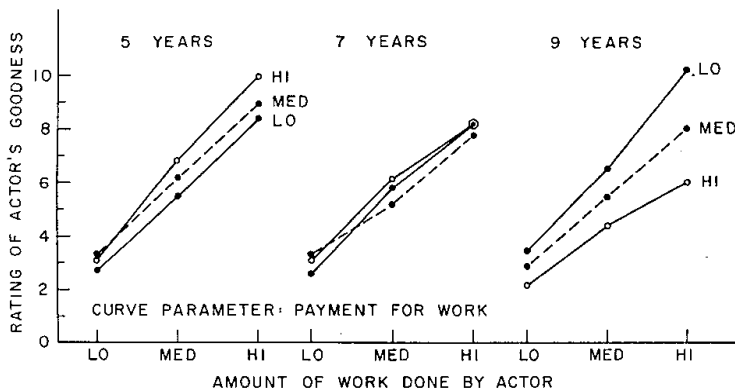
Figure 5.6. Development of causal attribution schema. Children of three age groups judge goodness of story child as a function of how much he helped his mother (horizontal axis) and how much money his mother had promised him for helping (curve parameter). (After Butzin, 1978; see Butzin & Dozier, 1986.)

The three successive panels of Figure 5.6 show a notable developmental trend. Judged goodness of the actor child is a direct function of the promised money for 5–year-olds, null function for 7–year olds, and inverse function for 9–year-olds.

The data patterns for all three ages may be interpreted in terms of valuation of Money in the qualitative attribution schema

$$\text{Goodness} = \text{Work} * \text{Money}.$$

The 9–year-olds exhibit adult cognition for they valuate Money negatively: the more the promised Money, the less the actor's Goodness. This valuation process involves attribution about actor's motivations.

The 5–year-olds, in sharp contrast, valuate Money positively relative to the operative goal: the more the promised Money, the greater the actor's Goodness. This rationale seems simple: those who do better get more reward; so getting more signifies being better.

A longitudinal extension was studied by Dozier and Butzin (1988), who presented two tasks that required inverse compensation in the fall and again in the spring. The social task used just the money variable of Figure 5.6. The physical task had comparable structure but with a simple physical standard of correctness. The social task was never solved before the physical task (see also Anderson & Wilkening, 1991, p. 30).

These results, as Dozier and Butzin emphasize, imply that development of concepts or abilities cannot be studied with just one or two tasks. A battery tasks is essential.

Attribution Theory. Attribution processes pervade thought and action. They have been much studied in social psychology and also in judgment–decision. Much of this work, however, suffers from reliance on makeshift measurement. Functional measurement has resolved some of these problems and should be similarly useful for studying attributions in the moral realm (see Anderson, 1991a, pp. 58-73, 1996a, pp. 157-168, 2008, pp. 293-301; Anderson & Wilkening, 1991, pp. 24-30).

MORAL STAGE THEORIES

The dominant conceptual framework in psychological approaches to morality has been the stage theory of Kohlberg (Colby, Kohlberg, Gibbs, & Lieberman, 1983; Modgil & Modgil, 1986; Rest, 1983). Moral development is postulated to be a sequence of distinct cognitive stages that begin with morality of obedience to authority and culminate in the principled morality of rational, equalitarian cooperation. Each successive stage develops by qualitative reorganization of the present stage to form a structured whole that governs all moral cognition. A person's stage is diagnosed by complex coding of verbal justifications of yes-no choices in standard moral dilemmas, most famously whether Heinz should steal the drug that might save the life of his wife (Note 9).

Kohlberg's theory suffers two problems: *narrowness* and *invalidity*. Stage theory has no relevance to much of morality as detailed in the next several sections. Even within its own domain, stage theory rests on face validity that has failed strong experimental tests cited below.

MORAL DEVELOPMENT

Kohlberg's stage theory does not apply below about 12 years of age. Younger persons have little appreciation of the standard dilemmas and lack verbal facility to justify any choice. Although stage theories claim to be developmental theories, they are blind to moral development across preteen years, illustrated with fairness and blame in Chapters 2, 3, and 5. Preteen influences of family, schools, and peers are neglected in stage theory.

MORAL NARROWNESS

Stage theory is narrow. It is limited to justice and ignores the moral domain of beneficence (see e.g., Eisenberg, 1995, p. 401; Frankena, 1962; Gilligan, 1982). Moreover, basic moral concepts such as apology, although part of justice, are not recognized in stage theory (see below).

MORAL VALUES

Moral *values* are central in moral thought and action. But moral values lie outside stage theory. This exclusion stems from Kohlberg's principled elimination of content from stage analysis. Moral theory without moral values is impossible.

INTEGRATION

Kohlberg recognizes the importance of integration. He treats justice as "balancing or weighing of conflicting claims" (Colby, et al., p. 7)—this is integration. But nothing is said about how this is done. Indeed, Kohlberg's theory is inherently unable to study integration—it ignores values, which are what are integrated.

   IIT, in contrast, has revealed many moral integration laws.

SOCIAL COGNITION

Social cognition is foreign to moral stage theory. The moral and social–cognitive domains are considered fundamentally distinct (Colby, et al., p. 6). To many developmental and social psychologists, however, moral cognition *is* social cognition.

   Moral attitudes underlie most moral thought and action. But moral attitudes embody value and so lie outside stage theory.

VALIDITY

Do the verbal protocols of stage theory give valid evidence about the moral cognition that underlies the dilemma choice? Or are these verbalizations inextricably confounded with post hoc rationalization, as various writers have suggested? Stage theories merely assume validity; they give slight evidence about underlying cognitive processes.

Invalidity of verbal reports had been revealed in the initial studies of IIT. In the standard personality adjective task, people give plausible, detailed reports about interactions between adjective meanings as they judge the person on likableness. If valid, these reports would predict specific deviations from parallelism in their integration graphs. The many findings of meaning invariance (benefit 4 of the parallelism theorem; Note 6 of Chapter 1) showed that these verbal reports were invalid. Treacherousness of verbal reports also seems to have vitiated Damon's (1977) work on fair sharing (Note 10).

REST'S STAGE THEORY

Rest (1983; Narváez & Rest, 1995) sought to simplify Kohlberg's stage theory and make it more flexible. Rest's Defining Issues Test is much simpler than the coding complexities of Kohlberg's verbal protocols. But most of the foregoing criticisms also undercut Rest's theory. The 12-year age limit still applies and moral considerations are still considered qualitatively different from social considerations.

Rest recognizes the importance of integration. Indeed, he claims that the major contribution of stage theory has been to provide "a framework for prioritizing and integrating considerations to formulate what one's rights and duties are in a particular situation" (1983, p. 563). Neither then nor later, however, does Rest give the slightest indication about how such integration is accomplished. Rest's theory, like Kohlberg's, is roadblocked by this central problem of moral cognition.

ITT COMPARED WITH STAGE THEORY

Stage theory has no place for valuation, no means to handle integration. But valuation and integration are both basic in moral cognition. An effective alternative is available with the integration laws; they handle valuation as well as integration. Of special importance, these laws operate during preteen years, a basic period of moral development, but a period that is systematically ignored in the stage theories. These same laws,

moreover, operate throughout life, a base to study moral development from infancy to old age.

STAGE THEORY FAILS STRONG EXPERIMENTAL TESTS

Strong tests of stage theory were obtained with ingenious designs by Martin Kaplan and by Wilfried Hommers. Both showed how integration theory could yield penetrating tests of basic stage assumptions.

Kaplan's Test of Stage Theory. Kaplan (1989) devised a critical test of stage theory based on Information Integration Theory (Anderson, 1991c, pp.173ff). Participants classified as preconventional, conventional, or postconventional with Rest's Defining Issues Test were presented dilemmas that represented three moral stages (preconventional, conventional, and postconventional), each with Hi or Lo probability in an integration design. They judged how strongly the protagonist should prefer the normative, more moral action.

Results disagreed sharply with stage theory.

To see this, note that preconventional persons should place high importance weight on any given preconventional consideration; hence their response should change substantially as its probability increases. Postconventional persons, in contrast, should place low weight on this preconventional consideration; hence their response should change little as its probability increases. These two response curves should thus be quite nonparallel—contrary to observed parallelism. Similar parallelism held for persons at all three stages and for all three stage dilemmas.

Hommers' Tests of Stage Theory. Hommers' (1997) thought paradigm used the Heinz dilemma but stated that Heinz had already stolen the drug that might save his wife's life. Participants were told of Heinz' thoughts during his theft; different thoughts represented different stages. Thoughts about risk of punishment, for example, represented Kohlberg's stage 1; thoughts about danger to social structure from law breaking represented Kohlberg's stage 4. Each was presented at low and high levels in an integration design. Participants judged badness of Heinz' theft, taking account of his thoughts.

Stage theory makes a clear prediction. Participants should place high importance weight on a thought from their own moral stage; that stage variable will have a large effect on their judgment. And they should place low importance weight on a thought from a different moral stage; that stage variable will have a small effect on their judgments.

Correlations between main effects of any two stages will thus be negative—if Kohlberg's theory is correct. Instead, these stage correlations were positive (see similarly Hommers, 2012).

Furthermore, factor analysis will reveal each stage as a separate factor if Kohlberg's theory is correct. Instead, there was only a single factor. The stages were not distinct—they were homogeneous.

Neat validational support came from Hommers' inclusion of recompense information representing Heinz' thoughts about making anonymous payments to the druggist to repay his theft. This was revealed as a separate factor, distinct from the Kohlberg factor, as it should since recompense is one of many variables that have no place in stage theory.

Very similar results were obtained with German and Korean children 8 to 12 years of age (Hommers & Lee, 2010). The three Kohlbergian stages were again positively correlated. Again they yielded a single factor. Again recompense was a distinct factor.

Kohlberg's basic claim —independent, nonoverlapping stages—is basically wrong. Hommers' positive correlations show the contrary.

Lesson From History. Has the immense amount of work on stage theory accomplished anything at all? This work was grounded on two premises: (1) that moral development proceeds upward by qualitatively distinct stages; and (2) that these stages could be revealed from verbal rationales for choices in moral dilemmas. Both premises failed the strong tests by Kaplan (1989) and by Hommers (1997) cited above.

At bottom, the choice/verbal rationale method, on which stage theory was grounded, is severely inadequate and misleading. Much moral cognition is not verbalizable. And much verbalization is invalid. Such invalidity had already been seen in the foregoing tests of Piaget's theory. Much earnest, dedicated effort has been wasted. Stage theory is a lesson from history that illustrates the importance of choice of research problem (see *Achievement*, pp. 365-373 in Anderson, 2008).

One approach to unifying IIT and stage theory would present an act together with a list of reasons for and against that act. Participants would rate relevance of each reason as well as personal value/weight. Such metric judgments represent rationalized moral cognitions with minimal demands on verbal expressiveness. This approach can be extended to study the verbal rationales (Hommers, 2011).

The list of reasons could include those based on the stage principles. A broader view is needed, however, in which the acts and reasons represent everyday moral issues including beneficence, self-interest, and

recompense that seem outside the scope of stage theories. Integration designs of reasons would allow deeper analysis.

Respect Phenomena. *Respect phenomena* should be the first principle of moral science. The stage theories failed because they sought to force an a priori framework on the phenomena. This a priori framework led to ignoral of moral development that occurs before 12 years of age. It led to ignoral of basic moral phenomena, such as apology, recompense, and beneficence. The problem of integration was sloughed off. Above all, moral values were officially out of bounds.

Integration theory gives first place to phenomena. Had the stage theories been correct, the cited integration experiments would have provided strong support. Instead, a very different theoretical outlook has emerged—mathematical laws with demonstrated social–moral validity (Note 11).

Respect for phenomena also underlies the position of Krebs and Denton (2005), who argue for replacing stage theory with a pragmatic approach based on morality of everyday life. Just such a pragmatic approach underlies the inductive framework of Information Integration Theory. Morality of everyday life was the focus of the early studies of deserving and of blame by Butzin, Hommers, Leon, Singh, and Surber that were cited in the text (see also Chapters 2 and 3). Besides demonstrating mathematical laws of moral judgment, IIT has gone further to help unify the moral realm with the rest of psychological science (see Chapters 7 and 8).

The stage principles have attractive face relevance to social morality. They deserve to be unified with social cognition and moral development (Anderson, 1996a, pp. 207f). Such unification was the goal of Kaplan and of Hommers. Although their results disagreed with stage theory, they were definite. Stage theories need liberation to become cognizant of moral–cognitive phenomena, moral values especially (Note 12).

Developmental broadening of knowledge systems about social–moral–legal systems is an important class of moral phenomena. Young children need to develop understanding of context variables as illustrated by their perplexity when first confronted with white lies. This broadening of social–moral knowledge systems continues during elementary school, secondary school, and adult life. Mapping this broadening is an important goal for developmental psychology. Amplifying this broadening should be a main goal of social–moral education (Note 13).

MORAL DEVELOPMENT: LOOKING FORWARD

The influence of childhood experience on moral thought and action has been studied by many developmentalists and much has been learned. Their work has also raised many issues that deserve further study. Two major classes of issues—*cognitive theory* and *societal betterment*—are discussed briefly here.

The main theme in these comments is the value and the need for a framework, both conceptual and empirical, based on facts and laws of information integration. Previous approaches lacked effective capabilities to study integration of moral variables. Seeking progress, they adopted other methods, sometimes useful, sometimes blind alleys. One useful direction is available with Information Integration Theory.

UNIFIED COGNITIVE THEORY

How are moral values and attitudes learned? How do moral values and attitudes function? What is the structure of moral knowledge systems? What is the developmental course of capabilities with judgment–decision processes involved in moral thought and action? Does functional theory require a paradigm shift in developmental learning theory?

These questions argue for a unified approach to moral development. Person cognition, attitudes, judgment–decision, and learning/memory are all important in moral thought and action. These areas have had little interaction with one another, even less with morality (Chapter 8).

Theoretical unification is available with the psychological integration laws; they have done well in nearly every area of human psychology. These laws show nomothetic generality of integration processes across diverse areas; they can measure personal, idiographic values which are necessary for psychological theory. These laws have substantial age-invariance which is useful for developmental analysis.

Substantive unification may be found in person cognition. Most studies of moral issues in this and previous chapters involve person cognition. Thus, praise and blame are typically moral judgments about another person. Much felt unfairness is a moral judgment about self and other persons.

Person cognition functions in many other social areas, attitudes most prominently. The integration laws revived functional theory of attitudes together with a basic conceptual shift to person-centered theory (see *Functional Theory of Attitudes*, Chapter 8). Person cognition is the heart of family life, a basic moral domain.

IMPROVING PERSONS AND SOCIETY

Family life is basic for improving persons and society. The family is a major source of moral attitudes about self, self-respect, and respect for others, about obligation, duty, honesty, deceit, and so on. Also, of course, family life is a source of happiness/unhappiness throughout life.

Much improvement is desirable, as all will agree. But social inertia is high, hard to overcome. One obstacle is that many parents have low socio–moral levels. Even parents with good intentions generally lack training to instill morality in their children.

Schools are a second base for improving the moral level of society. Courses in history and civics have basic relevance, but moral considerations should be infused into every school subject. Education for family life—spouse–spouse, parent–child, and child–child, is astonishly neglected. Further discussion of this basic societal problem is given in *Education* in Chapter 7.

NOTES

Note 1. *Homage to Piaget*. Piaget was the first developmental psychologist to focus squarely on stimulus integration. He recognized that this required measurement capability, to which he gave detailed attention in his treatment of conservation. This meritorious concern was undone by extreme logical confusion as he tried to force the data into his theoretical preconceptions (Note 2, p. 37, in Anderson & Wilkening, 1991).

Nevertheless, Piaget is one of the great psychologists. He went directly to the children with many clever tasks of intuitive physics. This focus on the phenomena led to fascinating empirical findings, nonconservation most famously (but see next three notes), that earned him a high place in psychology. Detailed discussion of Piaget's theory is given in Anderson (1996, Chapter 6).

Note 2a. Apparent nonconservation of quantity by children up to 5-6 years of age may be dramatically demonstrated by presenting two identical glasses filled equally with liquid. When asked which glass has more or are both the same, children say both the same.

Now, while the child watches, the liquid from one glass is poured into a wider glass so the liquid level is lower. Now the child says the wider glass has less liquid. This may be solidified by pouring the liquid from the wider glass into a narrower glass in which case the child says the narrower glass has more liquid. At this age, it would seem, children lack the idea that quantity is conserved.

But Piaget's collateral conclusion that young children cannot integrate (height and diameter of a glass) is incorrect. This mistake became clear as soon as integration methodology was applied in place of Piaget's choice methodology. This work also led to a new theory of how conservation develops (Anderson, 1996a, pp. 200-257, 257-261).

Note 2b. Piaget's demonstration of nonconservation in young children may be peculiar to liquids in glasses. Although Anderson and Cuneo (1978) replicated Piaget's Height-only

rule for liquids in glasses by 5-6–year-olds, these same children integrated both height and width in judging rectangular cookies—following a Height + Width rule.

This inconsistency between non-integration for liquids in glasses and integration for area of rectangles was initially thought to be some shortcoming in our experimental procedure. But seven follow-up experiments indicated that Piaget's result was peculiar to contents of glasses.

This Height-only rule for liquids in glasses was interpreted to result from drinking from glasses and cups in everyday life. For children especially, liquid height is a cue to avoid dribbling on yourself.

This interpretation was supported by judgments of amount of wax in wax cylinders. Inside glasses, these cylinders were judged by a Height-only rule. But outside glasses they were judged by an additive, Height + Width rule (Anderson, 1996a, pp. 251-257).

Note 2c. A general-purpose adding-type rule was also implicated by these studies of conservation (Anderson & Cuneo, 1978). This rule first appeared in finding that young children judge area of rectangles by a Height + Width rule. This adding-type rule has also appeared in other tasks. It is considered to have an innate base.

Good evidence for this general purpose adding-type rule was given in Cuneo's 1982 PhD thesis on judgments of numerosity in linear arrays of similar objects varied in length and density. Judgments followed a Length + Density rule except when the total number was small; in this case, subitizing yielded an as-if Length × Density rule. Her results also supported linearity of the method of functional rating (Anderson, 1996a, p. 97).

Note 3. Parallel integration graphs for a group can result if some participants center on one variable, others on the other. This possibility may be ruled out with single person analysis, as in Leon (1980). Alternatively, centration implies that a High and Low combination will yield a bimodal distribution (Anderson & Cuneo, 1978).

Note 4. Siegler (e.g., 1978, 1998) attempted to improve Piaget's method by including a group of choices that would identify children's knowledge without requiring verbalization. Unfortunately, Siegler's method systematically misrepresents children's knowledge (Wilkening & Anderson, 1982, 1991, pp. 64-71, 75-77). As Wilkening (2007) observes, how this myth that young children cannot integrate persists in the face of all the evidence is hard to understand.

Note 5. The weak barreling of the two left graphs of Figure 5.3 suggests that some children may have followed a subtraction rule. Single child experiments with not too few replications would be needed to study this question since the amount of nonparallelism is theoretically small. Use of practice trials incongenial to the subtraction rule may be desirable (see *Subtraction Model* in Chapter 2).

Note 6. *Integrational capacity.* Excellent integrational capacity of Indian school children from 4 to 10 years was found by Singh and Singh (1994). Virtually every child showed statsig effects for all 4 variables, even at 4^+ years of age. This high integrational capacity may have resulted because Singh and Singh required the child to reproduce the given information in the given order before they predicted exam performance.

Integrational capacity may be unlimited in principle in tasks that allow each successive stimulus informer to be integrated into a single cumulative response. Each successive trial requires only memory of the previous integrated response to be integrated with

the present informer. The previous integrated response implicitly includes effects of all previous trials even with no separate memory of previous informers (e.g., Figure 8.2).

An important issue in integrational capacity concerns written or spoken material. These require the participant to identify stimulus informers to be valuated/integrated. This issue appeared with the witness testimony in the Hoag bigamy trial, as with the testimony of Catherine Secor quoted in Chapter 4, and in studies of president attitudes, as with the two biographical paragaphs on Theodore Roosevelt listed under *Batteries of Stimulus Materials* in Chapter 6. This problem was finessed with Cognitive Unitization. More detailed analysis is desirable by constructing stimulus materials using integration designs.

However, developmental similarity of attitudes among family members may be amenable to analysis with the relative range index of Chapter 6. Wife–husband similarity was measured with this index by Armstrong (1984) (see pp. 214-218 in *Family Life and Personal Design*, Chapter 6 of Anderson, 1991c).

It may be repeated that the mother–son similarity of integration *rules* reported by Leon (1984) was not supported in the careful PhD thesis of Arlene Young (1990; see Note 4, p. 79).

Note 7. The small effect of damage for the preschoolers in Figure 5.4 is puzzling. Experimental procedure was careful, with an experienced female experimenter. The children were instructed about stamp collecting using an introductory guide from the U. S. post office. Even with the 9–year-olds, damage had little effect with full recompense. The stamp scenario was developed to allow direct comparison of recompense and damage. However, replication with more familiar kinds of damage and with some other response than spanking are certainly desirable.

Note 8. A fascinating early study of praise–blame reinforcement with children by Thompson and Hunnicut (1944) is discussed in *Empirical Direction*, pp. 146f.

Note 9. Stage conceptions of development can be extremely attractive. They promise simple order underneath surface complexity. But each such promise imposes a framework on investigation that may yield wasted work if the promise fails. Two failures of Piagetian theory were noted above (see Figure 5.2).

Both of Piaget's claims have also been repeatedly disproved with intuitive physics, the prime concern of Piaget's theory and an area in which several workers have applied IIT. Here it suffices to note that young children show the same integration laws in both areas (e.g., Anderson, 1980, 1983; Anderson & Wilkening, 1991; Cuneo, 1982; Schlottmann, 2000; Surber, 1985b; Wilkening, 1982; Wilkening & Anderson, 1982, 1991). An overview is given in Wilkening & Huber (2002).

Note 10. The treacherousness of verbal justification of moral choice may be illustrated with the impressively careful work on fair sharing by Damon (1977), who used Piaget's integration choice methodology and relied on childrens' verbalization. Damon's claims disagree totally with the integration experiments of Figure 5.3.

Damon's level 1-A, predominant at age 5, specifies equal shares for all. This is "so overridingly consistent that 1-A reasoning often takes on a quality of inflexibility and absolutism . . . and no mitigating circumstances or reasons are allowed or recognized" (pp. 81f). In absolute contrast, the 4– and 5–year-olds represented in Figure 5.3 not only shared unequally but followed an algebraic law.

The "new notion of need" (p. 84) does not enter until age 8, at Damon's level 2. In absolute contrast, 4– and 5–year-olds in the cited integration experiments were not only sensitive to need but integrated this with deed (see further *Moral–Social Development*, Chapter 5, pp. 166f, in Anderson, 1991c).

This issue was also pursued by Moore, Hembree, and Enright (1983) in their ingenious analysis of stage theory. They point out (p. 199) that the experiment of Figure 5.3 above provides "evidence that an understanding of the reward allocation principles that are designated as the highest stage in Damon's theory may occur quite early."

Damon's work was done very carefully, yet it yielded seriously incorrect conclusions about children's moral sense. The main outcome was demonstration of the flaws in Piaget's integration choice methodology noted above.

An about-face appears in Damon's (1988) later views on equality and need. Although Damon presents no evidence for his about-face, his later views are quite consistent with those in Figure 5.3 and of Moore, et al. (1983) just cited.

Note 11. *Behavior-Analytic Approach*. Respect for phenomena is shown by Peláez–Nogueras and Gewirtz (1995) and Gewirtz and Peláez–Nogueras (1992), who take a "behavior-analytic" approach to moral development, with emphasis on observable *action* and denial of unobservables. But this behaviorist emphasis is blind to the first two operations, *valuation* and *integration*, of the Integration Diagram, for these are unobservable. The psychological laws can make unobservables part of psychological science.

This need for unobservables may be illustrated with Herrnstein's behavioral matching law, that the relative rate of observed response equals its relative rate of observed reinforcement. To take account of different reinforcement *quality*, such as food preferences, however, requires allowance for unobservable psychological *values*. Some writers argued that such a psychological matching law was tautological, that values could always be found to make it hold—and that such tautology affirmed the necessity of behaviorist theory. But their argument is incorrect (see *The Matching Law* in Chapter 6)..

Functional measurement analysis can liberate behaviorism to study the internal world (see *The Two Worlds: Internal and External* in Chapter 7).

Note 12. Stage theories have also been criticized by Haidt (e.g., 2001), but his intuitionist argument disagrees with much previous work on Information Integration Theory. Haidt argued that people cannot give satisfactory verbal accounts of how they make a moral judgment—and hence that these judgments are "intuitive." Such lack of satisfactory verbal accounts had already been shown in repeated disproofs of the change-of-meaning hypothesis in person cognition (Anderson, 1981a; see also Note 6 in Chapter 1).

But this work also revealed that these judgments were governed by mathematical laws, not "intuition." These same mathematical laws are prominent in moral cognition as shown in this and previous chapters (see further *Algebraic Intuition* in Chapter 7).

Note 13. The reasoning protocols studied in stage theory are important aspects of cognition. Suggestions for unification are in Anderson (1991i, pp. 171ff; 1996a, pp. 207f).