Review

Vulnerability in Research: A Developmental Perspective on Research Risk

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THOMPSON, ROSS A. *Vulnerability in Research: A Developmental Perspective on Research Risk.* CHILD DEVELOPMENT, 1990, 61, 1–16. Assessing potential risks to children who participate in developmental research is a challenging task because children are a heterogeneous population, varying in developmental competencies and in background characteristics. This essay offers a developmental perspective on research risk, emphasizing that children's vulnerability to research risk changes in complex ways: some risks decrease with increasing age, some increase as the child matures, others change in a curvilinear fashion, while some remain essentially stable with development. Because vulnerability in research does not simply decline linearly with age, assessments of research risk must entail multidimensional considerations that vary over developmental time. In a similar manner, individual characteristics of children at any age (e.g., maltreatment, at-risk status, etc.) may also heighten their vulnerability to certain risks which require special consideration by researchers. Finally, this discussion of developmental vulnerability and the principles underlying research ethics suggests that in addition to the conventional risk/benefit analysis, researchers are in an optimal position to establish and maintain standards of decent treatment of children in research that safeguard their rights as research participants. Suggestions for fostering this process in the research community are outlined.

Consider the following research vignettes:

A 12-month-old infant and her mother are ushered into the research playroom by a smiling lab assistant. After a few minutes of instructions, the two are left alone for the beginning of a 21-min procedure designed to appraise the security of their attachment relationship. During this period, a female stranger enters the room on two occasions to play with the baby. The mother also leaves the room on two occasions—once leaving the baby in the company of the stranger, and a second time leaving the child alone—during which the baby becomes markedly distressed. During the second reunion, the mother is disturbed to find that her child is not soothing, but instead alternates clinging with pushing away and angry crying. The child is still fussing when the two leave the laboratory.

A 9-year-old boy enters the empty school classroom with the researcher who had been introduced to him just moments before. After a few minutes of getting acquainted, the researcher tells the boy that she is interested in his speed at completing jigsaw puzzles and gives him a puzzle to complete. He does so quickly, and receives her admiration and praise in return. She then gives him four more puzzles, and for each one he is surprised

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to find that he is unable to finish it in the time provided. The researcher then asks him some questions about how he evaluates his abilities and efforts in completing puzzles, in finishing schoolwork, and in other areas of achievement. Before he leaves, she notes that the four puzzles were designed to be difficult to solve, so he should not feel badly about his performance. He then returns to his classroom, where he is in a special group for slow learners, wondering whether she told him the truth.

A 13-year-old girl is observed from behind one-way windows while she plays with the young baby who had been presented to her when she arrived at the laboratory. After this 30-min observational session, she is then escorted (without the infant) to an adjoining room where she completes several self-report measures concerning her personality, background, interests, and other characteristics. Among these measures is one in which she is asked to indicate the development of her secondary sexual characteristics by marking which of a series of photographs is most similar to her own breast size, pubic hair growth, and other physical features. She leaves the room wondering whether the researchers regarded her as underdeveloped for her age.

Procedures like these are representative of widely used methods in developmental and educational research that provide valuable information concerning early attachment relationships, achievement motivation, psychosexual development, and other topics. Procedures like these are regularly approved by university Institutional Review Boards (IRBs) because the relative balance of potential risks and benefits is judged to be favorable to conducting the research. Yet these procedures are also representative of some of the thorny ethical dilemmas many researchers encounter in their efforts to design sound practices in social and behavioral research involving children. By its nature, of course, the research process entails inherent risks to subjects, even though these risks are frequently minimal. The research process also yields, at times, important discoveries of broad social benefit, and thus one of the ethical considerations involved in the research process is assessing and balancing relative risks and benefits. This is not an easy task: most researchers are not trained to conduct the kind of ethical analysis required for a sensitive risk benefit assessment, and they commonly experience ethical review as a procedural obstacle to research progress that is distally related to ethical responsibility. Furthermore, members of IRBs are often discouraged from conducting a fine-grained appraisal of risks and benefits because of their limited expertise in the specific research field, members' reluctance to question their colleagues' ethical competence, and a bias in favor of approval incorporated into IRB guidelines (Williams, 1984). As a consequence, while procedures for ensuring privacy, confidentiality, and informed consent can be relatively well defined, assessing the potential risks and benefits of a research procedure is inherently more ambiguous and difficult, and this difficulty can undermine the ethical review process.

The purpose of this essay is not to ease the difficulty; rather, it is to introduce into the discussion of risk/benefit analysis two additional considerations. First, I will argue that a more thoroughgoing developmental perspective is required in judging research risks with children because children are a heterogeneous population, varying in developmental competencies as well as in background characteristics. Research risks vary in complex ways with the age of the child: some decrease with increasing age, some increase as the child matures, and others remain essentially stable over development. Because vulnerability in research does not simply decline linearly with age, the analysis of research risk must encompass these diverse changes in developmental vulnerability, as well as differences in background characteristics of the child. Second, I will also argue that judgments of research risk must be increasingly focused on establishing and maintaining standards of decent treatment of minors who are research participants. This involves a shift in emphasis from a primarily prohibitive (and minimalist) ethics of risk/benefit assessment to a more prescriptive ethics of treatment norms governing research, and derives both from existing shortcomings in prevailing methods of risk/benefit assessment as well as the special vulnerabilities of children as research participants.

Although much of this discussion is potentially applicable to biomedical clinical studies and other forms of research coupled with therapeutic intervention, there are also important ethical differences in the analysis of clinical compared to nonclinical research, and for present purposes, the concern is exclusively with research that does not have a therapeutic component. Moreover, this analysis also focuses on research in the social and behavioral sciences and will address prevailing methods and procedures in this field, which includes developmental psychology but also research in educational psychology, social psychology, sociology, anthropology, and other fields that entail procedures involving direct contact with children.

Risk/Benefit Assessment in Social and Behavioral Research with Children

A sensitive appraisal of research risks in relation to potential benefits is well instituted in the ethical guidelines of developmental researchers. The Ethical Standards for Research with Children of the Society for Research in Child Development specify, for example, that researchers should use no procedure that "may harm the child either physically or psychologically," although defining this is left to the investigator in consultation with colleagues. Although the Ethical Principles of Psychologists of the American Psychological Association include no special provisions concerning research with children, psychologists are mandated not to use research procedures "likely to cause serious or lasting harm to a participant" unless the research has "great potential benefit" and informed and voluntary consent is obtained.

Following the guidelines recommended in 1978 by the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, the Department of Health and Human Services (DHHS) issued agency regulations in 1983 (45 CFR 46, Subparts A and D) specifically pertaining to research involving children. Various levels of research risk were established in these guidelines. "Minimal risk," for example, involves risk of harm not greater than that "ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests" (45 CFR 46.102[g]), and research studies involving only minimal risk can be supported by DHHS contingent on the permission of the child's parents and the child's own assent. Research involving greater than minimal risk that does not directly benefit the child can be approved only with the additional finding by an IRB that the risk represents a "minor increase" over minimal risk, the procedure involves experiences that are commensurate with those involved in "actual or expected medical, dental, psychological, social, or educational situations," and the research is likely to yield "generalizable knowledge" that is of "vital importance" for the understanding of the subjects' condition (45 CFR 46.406). The kinds of procedures that constitute a "minor increase" over minimal risk are not defined in the regulations, although the National Commission recommended four guidelines: a common-sense estimation of risk, the researcher's prior experience with similar procedures, statistical data concerning these procedures, and the conditions of the research participants. Finally, research procedures that do not satisfy "minimal risk" or "minor increase" provisions may nevertheless be approved through additional review procedures by DHHS.

On the whole, these DHHS guidelines reflect most of the recommendations of the National Commission, but one recommendation was not adopted in the final DHHS regulations: that a child's objection to research participation constitutes a *binding* restriction, except in extraordinary circumstances, and thus that the assent of children age 7 and older be required, along with parental permission, for research participation (see Recommendation 7). Moreover, it is important to note that these regulations do not apply at all to certain classes of research involving children, such as those occurring in educational settings concerning instructional techniques or classroom management methods. This has been criticized by some commentators (e.g., Holder, 1988).

Ethical Basis for Risk/Benefit Analysis

On the surface, these professional and regulatory guidelines appear to mandate an act-utilitarian approach to risk/benefit analysis: judging research in terms of the relative balance of benefits and risks of the specific protocol. But the ethical bases for this analysis are considerably more complex because the regulations also require heightened thresholds of review for risky research and imply that there are certain general, unimpeachable requirements on the research process related to the limits of acceptable risk, informed consent, privacy, and confidentiality. Thus, a blend of utilitarian and deontological (i.e., Kantian) views seems to shape many of the existing guidelines concerning research ethics (Macklin, 1982).

Although utilitarian and Kantian perspectives each lead the ethical analysis in somewhat different directions, research ethicists often begin from a common principle of respect for persons (a chief aspect of which is autonomy): treating persons as ends in themselves, never solely as means to an end. This principle finds expression in Kant's (1785) categorical imperative, but it can also be defended within a rule-utilitarian analysis. The principle of respect for persons mandates that researchers guarantee the right of individual self-determination in the research process, and this includes respecting the wishes and decisions of research participants, as well as their values and beliefs. This principle thus underlies research regulations concerning in-

formed consent, privacy, confidentiality, freedom to withdraw from participation, limits on deceptive research practices, and the importance of debriefing following research procedures.

A second principle underlying research ethics is the principle of nonmaleficence: that it is wrong to intentionally inflict harm on another. When considered together with the principle of beneficence—the positive obligation to remove existing harms and provide benefits to others—the ethical basis for the risk/benefit analysis becomes clear. Since researchers pursue their investigations with the general goal of improving human conditions through research knowledge (as well as advancing knowledge for its own sake), the principles of nonmaleficence and beneficence together incorporate into research ethics one overarching purpose of conducting research and apply them to the evaluation of specific research proposals. On a broad level, therefore, researchers must be able to justify their work in terms of the potential benefits it promises, especially when research entails risks to participants. Researchers are mandated to identify potential risks to research participation, describe potential benefits (direct, indirect, and societal) from the research, and struggle with their calculus.

Finally, a fourth ethical principle is commonly applied to research concerning justice: a fair distribution of goods, which entails the obligation to treat equally those who are equally situated and to treat differently those who differ in relevant ways. Distributive justice principles influence the research process concerning equitable subject selection and treatment, especially in studies evaluating potentially beneficial treatments, therapies, or social programs that may be denied control or placebo group members. Principles of justice mandate efforts to ensure that research participants suffer no undesirable consequences due to research involvement, and they also underlie efforts to treat research participants equitably in light of their backgrounds and characteristics. Finally, as we shall see below, distributive justice principles also figure into the risk/benefit assessment, especially concerning who benefits from the research process and who bears the risks. Many research ethicists would agree, for example, that a study whose benefits clearly outweighed its risks would nevertheless be morally impermissible if the risks were inequitably borne by individuals who enjoyed none of its benefits (e.g., MacIntyre, 1982).

An understanding of the ethical principles underlying the risk/benefit assessment in social and behavioral research does not contribute clarity to the specific considerations of researchers when planning a study. It does, however, provide a foundation for thinking consistently about researchers' ethical responsibilities toward subjects, the reasons for conducting an ethical review, and the general considerations entailed in that review. In a sense, by becoming cognizant of the broader ethical principles underlying their responsibilities, researchers can think more comprehensively about their roles (vis-à-vis subjects, the profession, and society) and their research, and can thus more thoughtfully evaluate their proposed studies from this perspective.

Special Considerations for Children

Principles of justice do not mandate, of course, that all research participants be treated uniformly; on the contrary, justice requires that participants who differ in relevant ways (e.g., due to need or merit) be treated differently. It is because of justice concerns, therefore, that researchers take special precautions when children are participants in social and behavioral research. This is because the characteristics of children introduce several unique vulnerabilities to their roles as research participants.

First, young children are likely to have greater difficulty than older children and adults in understanding the research process because of their more limited cognitive competencies and experiential background. Consequently, their capacities to make reasoned decisions concerning research participation, to understand the consent procedure and their freedom to withdraw, and to resist intrusions on their rights as research participants are likely to be limited prior to the middle school-age years, and may not reach adult-like levels before mid-adolescence (see generally Weithorn, 1982, 1983). Moreover, limitations in cognitive competencies and experiential background may also constrain young children's understanding of the role of research participant, and this may influence the validity of research findings as well as ethical considerations.

These factors have given rise to a spirited debate concerning whether children should become involved as participants in research at all. On one extreme, Paul Ramsay (1970, 1976, 1977) has argued that because infants and children cannot consent in a voluntary, informed manner to research participation, their involvement in research that has no

therapeutic benefit inevitably violates principles of respect for persons, and is thus morally wrong. Ramsay would prohibit children as research participants except when they might directly benefit from the research because, in his view, children are otherwise inevitably treated as means to an end (an object of research) rather than as ends in themselves (Kant's categorical imperative). To Ramsay, proxy consent does not alleviate these problems because this kind of consent procedure places children in the role of adults, freely volunteering (albeit through parental consent) to become research participants. At the other extreme, Richard McCormick (1974, 1976) has argued that when risk is minimal, children can become involved in research because, as humans, they possess a basic obligation to aid others by the knowledge gained through research, and thus their consent may be legitimately assumed. Arguing from a natural law perspective, McCormick notes that by their nature, humans desire the health and well-being of others as well as of themselves. Since research entailing minimal risk contributes to this goal and involves no personal harm, proxy consent simply affirms intrinsic values that are part of all human beings, including children. In a sense, because of their nature, humans *should* participate in research involving minimal risk because doing so is *right*, and thus it can be presumed that infants and young children would consent to do so. Ramsay (1976), by contrast, replies that this requires treating children as adults by assigning moral obligations to them. Other philosophers have tried to devise alternative positions between the extremes taken by Ramsay and McCormick, including Bartholome (1976), who has argued that research participation may further children's moral education, and thus parents may legitimately give proxy consent because of these benefits for offspring. Bartholome would still restrict nonclinical research to children over the age of 5 (i.e., when, he argues, they can reasonably benefit morally from participation). Thus, the issue of whether research participation for young children can be justified, in view of their limited reasoning abilities and the demands of ethical principles in relation to informed consent, remains essentially unresolved by moral philosophers.

A second reason young children are uniquely vulnerable as research participants is their limited social power, which has been noted both by classic (Piaget, 1932/1965) and contemporary developmental theorists. Parents and other adults exercise proxy consent for children, and children's institutionalization in extrafamilial care centers, schools, and other settings further reduces their power to exercise independent decision making concerning research participation. Although children's assent is encouraged by DHHS regulations, it may be difficult for children to dissent from participation because their invitation to participate typically occurs in a context of prior parental permission, institutional support, and researchers' interest in furthering the research enterprise. Indeed, consistent with the recommendation of the National Commission (although not adopted by DHHS), Pence (1980) has argued that because of the pressures to comply with the requests of social authorities like researchers, a child's dissent should be determinative in most research procedures. Even if this recommendation was adopted, however, it would remain true that in most situations children are more vulnerable to research risks because of their relative social powerlessness vis-à-vis adult authorities. These risks include not only coercion to participate but also pressures to act and respond in the research setting that may be inconsistent with the child's own wishes or desires, violative of the child's beliefs, or otherwise self-defeating.

Third, young children are uniquely vulnerable to research risks because of the special configuration of child, parental, and state interests relating to their research participation. Due to their legal status as minors, parents and other adults acting *in loco parentis* make fundamental decisions concerning children's health and welfare, including giving permission for their research participation and having access to research materials. It is unwise to assume that an identity between parental and child interests is always reflected in these decisions, but except in extreme circumstances the state is unlikely to intervene on behalf of children, and DHHS regulations include a number of provisions for waiving child assent requirements when parents consent to their participation. The reason for these circumstances is the ambiguous standing of children as "persons" before the law, a condition that fosters paternalistic interest in children's welfare but also undermines their independent decision making (see Baumrind, 1978; Melton, 1987). As a consequence, children have uniquely little control not only over their participation in research but also over the disposition of research materials, their withdrawal from research participation, and other decisions normally accompanying research participation.

Taken together, children are especially vulnerable as research participants because of both intrinsic and socially determined factors that make them unique social actors. As a consequence, the risk/benefit calculus must be determined differently for children than for adults, entailing a variety of considerations that normally are not applied to older populations.

Developmental Changes in Research Vulnerability

Of course, the term "children" encompasses a broad portion of the life span, and the risk-relevant capabilities and characteristics of children change markedly from infancy through adolescence. Research procedures that would be extremely stressful for an infant may have a negligible effect on an adolescent. As a consequence, it is necessary for researchers (and IRB members) to take a further step to consider how the children's *changing* characteristics alter their vulnerability to research risk (see Maccoby, 1983). The manner in which developmental changes in research vulnerability are portrayed can have a very significant influence on risk assessment in research involving minors.

The considerations outlined above reflect the prevailing portrayal of developmental changes in research vulnerability: infants and young children are the most vulnerable to research risks of various kinds, and with increasing age—and corollary increases in cognitive competencies, experiential background, and other changing capabilities—vulnerability to risk declines. From this developmental portrayal, there should be more stringent safeguards against research risk with younger subject populations, because young children are most susceptible to coerced consent, violations of confidentiality, research practices that are distressing, demeaning, or deceptive, and other risks that older individuals can better resist. Researchers are consequently mandated to think more carefully and conservatively in designing research procedures for younger participants. This portrayal of developmental changes in research vulnerability is essentially a linear one, with susceptibility to research risk declining in a uniform and straightforward fashion with increasing age.

However, alternative portrayals of developmental change in research vulnerability might also be proposed. Another linear model portrays research risk as *increasing*, rather than decreasing, with the child's growing maturity. Although this portrayal appears counterintuitive and contrary to the first, it is similarly based on some self-evident observations of the characteristics of children of various ages. For example, a very young child cannot easily be embarrassed or humiliated before she has acquired the cognitive capacities necessary for self-referent thinking. Threats to the self-concept are limited until the child has developed a coherent system of self-referent beliefs and can incorporate others' evaluations and social-comparison information into that system. Worries about what will happen next in a research procedure depend, to a great extent, on an ability to think within a past-present-future temporal context and on an experiential background that leads one to anticipate threatening future events in a research setting. Young children are unlikely to be stressed by a concern with the researcher's motives or intentions before they have acquired the ability to draw sophisticated psychological inferences about other people (although this also renders them more vulnerable to deceptive research practices). And, in general, the trust of infants and young children in their caregivers may reduce their vulnerability to certain stressors when those caregivers are present. Thus, an alternative portrayal of developmental vulnerability suggests that at younger ages, children are buffered against certain kinds of research risks because of limitations in their cognitive and experiential backgrounds, and that with increasing age (and corollary changes in self-understanding, inference processes, and other capabilities), vulnerability to these risks increases.

These alternative linear portrayals of developmental change in research vulnerability lead to very different guidelines concerning risk assessment in research with minors. The first model warrants greatest concern for research with young children, while the second model suggests that in some domains of risk, researchers should be most concerned with older children and adolescents. Taken together, they suggest that simple, straightforward linear models of uniform developmental changes in research vulnerability do not accurately portray the complex changes that occur with development and their implications for research risk. Nonlinear developmental models are necessary to more sensitively portray the kinds of risks to which children are likely to be vulnerable at different ages.

One kind of nonlinear developmental model is already instituted within DHHS guidelines. As noted above, regulations defin-

ing "minimal risk" and a "minor increase" over minimal risk comparably define these standards in relation to the child's everyday experiences. For example, minimal risk is evaluated in relation to the risk of harm ordinarily encountered in the child's daily life. From a developmental perspective, therefore, these regulations suggest that as a child's normative life experiences change with age—in accord with the child's growing competencies and experiential background—norms defining research risk must comparably be revised to encompass these changing experiences. By this guideline, research procedures that would ordinarily not be permitted at an early age (because they exceed the risk of harms which the child normally encounters at that age) might be permissible at a later age. For example, extended periods apart from parents with unfamiliar adults might be questionable in research with infants, but certainly not for older children and adolescents. Conversely, procedures that would be allowed with young children because they are part of that child's ordinary life experiences might not be permitted at later ages, when these experiences are not as typical.

The problem with this guideline is that it defends the use of research procedures that we might otherwise question on the basis of ethical principles (e.g., respect for persons, nonmaleficence, justice, etc.). For example, infants and toddlers commonly experience brief or prolonged separations from their caregivers (e.g., with a babysitter, in day-care, etc.), and they are often distressed by these experiences. By the "minimal risk" regulation, research involving infants' involuntary separations from their caregivers is permissible, even though some researchers are doubtful that this should be true (e.g., Rheingold, 1982). Young children regularly experience invasions of their bodily and personal privacy by parents, teachers, and other adults. It is unclear, however, whether this justifies privacy violations in the research context. Children and adolescents commonly encounter experiences at school that threaten their self-image, including unfavorable academic performance evaluations by teachers, teasing concerning personal or physical characteristics by peers, and spontaneous as well as elicited social comparison. But many would dispute whether these normative experiences provide a prima facie justification for considering comparable experiences to be "minimal risk" in a research context, because these experiences violate principles of nonmaleficence and respect for persons (e.g., autonomy). More generally, it is clearer that in studies with special populations of children and youth—such as those who are incarcerated, have been maltreated, or are substance abusers—researchers should not necessarily define standards of minimal risk in terms of the ordinary life experiences of children in these populations.

A portrayal of developmental change in research vulnerability that is based on the normative daily experiences of children at different ages fails because it does not adequately define standards of decent treatment of minors who are research participants. By defining what is permissible in terms of what is normative in the child's life experience, it potentially permits researchers to act in ways that undermine the child, even though these experiences may be familiar to the child. To put the issue somewhat differently, researchers should be hesitant to violate basic principles of respect for persons, autonomy, nonmaleficence, and justice in their treatment of the child, even though these principles may be regularly violated by others in the child's everyday life. In the search for alternative nonlinear portrayals of developmental change in research vulnerability, one must look elsewhere for guidelines that are sensitive to age-related changes in children's capabilities, experiences, and needs and that better define standards of decent treatment of children in research settings.

An Alternative Developmental Portrayal

A more adequate nonlinear portrayal must, unfortunately, be a more complex portrayal. In order to adequately describe the kinds of risks to which children are susceptible as research participants, different kinds of risks must be considered independently as well as developmentally. Because the changing competencies of children with increasing age provide new capacities for resiliency as well as vulnerability, it is no longer adequate to assume that vulnerability changes uniformly or linearly with developmental time. As noted earlier, some risks increase with the child's maturity, other risks decline, some remain stable, and others shift in a curvilinear fashion. Researchers (and IRB members) will benefit, therefore, from a more sensitive portrayal of developmental vulnerability to research risk in which different risks are considered independently along a developmental continuum.

This section offers the beginning to such a portrayal, albeit a limited one, by suggesting some general guidelines related to research

vulnerability that appear to be supported by the research literature. It draws upon an incisive analysis by Maccoby (1983) to suggest examples of how susceptibility to different research risks varies with the child's development, although it is certainly not an exhaustive portrayal. These guidelines (in some cases, working hypotheses) are framed in terms of broad propositions.

1. *In general, the younger the child, the greater the possibility of general behavioral and socioemotional disorganization accompanying stressful experiences; with increasing age, the child's growing repertoire of coping skills permits greater adaptive functioning in the face of stress.* Although the research literature on coping and emotional self-regulation is very limited (see Kopp, in press, and Thompson, in press, for reviews), it portrays a general developmental transition from a reliance on extrinsic supports for emotional regulatory processes (e.g., the assistance of caregivers and other adults, use of security objects, etc.) to the growth of independent, self-regulatory coping capacities. While the young infant cries inconsolably until a nurturant adult intervenes, the toddler can use a rudimentary repertoire of self-soothing behaviors, the preschooler can reflect on and talk about her feelings, the grade-school child can directly alter emotional arousal through strategic means (e.g., distracting mental imagery, altering goals, self-talk, etc.), and the adolescent has sufficient awareness of his own idiosyncratic emotional style to institute strategies that are well suited to regulating emotional experience. Because coping capacities change developmentally from a reliance on extrinsic supports to a growing repertoire of self-regulatory strategies, infants and young children are at greater risk for becoming overwhelmed with stressful research procedures at the moment they occur.

There are some corollary principles that follow from this general one. First, *at younger ages, the child's coping capacities depend more on the availability of trusted attachment figures than they do at later ages.* Thus, the presence and/or availability of the parent, relative, or surrogate caregiver in the research setting will provide greater support for a young child's coping with the demands of a research procedure than it will for an older child or adolescent. Second, *at younger ages, the child's coping capacities rely more on the familiarity of the setting and/or procedure, and on the availability of familiar objects, than they do at later ages.* Research procedures conducted at home or in the day-care center not only gain from ecological validity, but they also foster the child's coping with the demands of the research by permitting access to a structured environment with which the child is familiar (see Thompson & Limber [in press] for an example from studies of infant socioemotional development).

2. *Threats to a child's self-concept become more stressful with increasing age as children develop a more comprehensive, coherent, and integrated self-image, become more invested in an enduring identity, and acquire more sophisticated understandings of components of the self by which that self-concept becomes progressively modified and reshaped.* Although self-understanding exists in some form from shortly after birth, its content, organization, and structure change significantly from infancy through adolescence (see Damon & Hart [1982] and Harter [1983] for reviews of this research). Whereas the self-referent belief systems of preschoolers and young school-age children are predominantly physicalistic, concrete, and material—focusing on the child's physical or behavioral characteristics, activities, and possessions—the self-concepts of older school-age children and adolescents become more abstract, psychological, and integrated with increasing age. An important transition occurs between the ages of 7 and 9, according to researchers, when growing cognitive skills contribute to more characterological and personalistic self-referent belief systems, and when the evaluations of others become increasingly important to the child.

But these changes in the content of the self-concept are only part of the story. In addition, self-referent beliefs become increasingly more consolidated, differentiated, and hierarchically integrated with increasing age. Whereas the preschooler tends to provide self-evaluative judgments in an essentially all-or-none fashion and without integrating these judgments into a comprehensive self-concept, the older grade-school child attempts to find consistency among diverse self-attributes, and the adolescent begins to organize these self-referent beliefs into a broader, more abstract self-representational system (see Damon & Hart, 1982). The latter is, in some ways, a core component of the search for "identity," and it helps to explain both the importance of identity development for adolescents, as well as the self-consciousness of this period (Marcia, 1980). Moreover, with increasing age, the evaluations of others assume a greater role in shap-

ing the child's self-perceptions. As a consequence, older children and adolescents are likely to be significantly more sensitive to the evaluative comments of others than are younger children.

Why do these developmental changes come about? According to Damon and Hart (1982) and Harter (1983), researchers have attributed them to growing cognitive competencies (e.g., the transition from preoperational to concrete-operational thought permitting greater systematization among self-referent beliefs, and the transition to formal-operational thought introducing greater abstraction and self-reflection to the self-concept), declining egocentrism and increased role-taking skills (allowing children to increasingly consider what others are thinking about the self), the growth of social comparison processes (see below), and other developmental capabilities. They also derive from changes in children's understanding of specific components of the self-system. For example, there is some evidence that preschoolers and young school-age children perceive ability as a changing attribute that is under personal control (like personal effort), and it is not until later in the school-age years that ability becomes more appropriately perceived as a relatively enduring personal quality (Nicholls, 1978). As a consequence, the meaning of statements from others concerning one's ability is likely to be much different to younger than older children, and younger children are more likely to remain optimistic in the face of negative ability attributions (see Dweck & Elliot, 1983, for a review).

These changes in the nature and structure of the self-concept have profound implications for developmental changes in vulnerability to research risk. They suggest, for example, that research experiences that have unfavorable implications for the self-concept are likely to be more stressful to older children and adolescents because they are more likely to be internalized, provoke worried self-reflection, and threaten broader aspects of self-esteem. While younger children may be sensitive to researchers' comments about their appearance and/or physical abilities, their confidence in the malleability of personal attributes (like ability) and the less-integrated quality of their self-referent beliefs may render these comments less portentous than they are at older ages. By contrast, older school-age children and adolescents are constructing broader and more coherent self-referent belief systems that incorporate psychological attributes, and thus their sensitivity to researchers' comments about a broader range of personal attributes renders them more vulnerable to threats to self-esteem. Moreover, in contrast to the unrealistic self-confidence of younger children, their more accurate understanding of the nature of these attributes (e.g., many personal qualities *cannot* be changed), combined with their own critical self-evaluations, may further increase their vulnerability to threats to self-esteem in research contexts.

3. *Social comparison information becomes a more significant mode of self-evaluation with increasing age.* As suggested above, one of the catalysts for developmental changes in the self-concept is the increasing role of social comparison information in self-evaluation (Dweck & Elliot, 1983). Although preschoolers are often aware of how their performances compare with those of others, this knowledge plays comparatively little role in their general assessments of their skills and abilities. By contrast, older school-age children more regularly incorporate a comparative metric into their self-evaluations: performance is judged partly by the standards of others' performances (Ruble, 1983). As a consequence, older children may be more vulnerable to explicit or implied comparisons of their research performance with others, and may incorporate this information into their own evaluations of their abilities. Moreover, older children may also be more sensitive to the evaluations of others to whom their research performance is disseminated, such as parents and teachers.

4. *The capacity to make sophisticated psychological inferences of others' motives, attitudes, and feelings increases with age. This domain of psychological inferences includes inferences about others' reactions to oneself.* Of course, social comparison information may not be explicitly available to children but may be implicit in others' reactions. Although preschoolers exhibit a rudimentary awareness that others have psychological states that are different from their own, the capacity to draw accurate inferences of those psychological states increases significantly in breadth and scope throughout childhood and adolescence (Shantz, 1983). Most children in the late preschool years can offer simple psychological inferences concerning another's thoughts or feelings. But it is an especially difficult task conceptually for children to draw inferences about others' psychological judgments *about oneself* because doing so requires an ability to divorce one's own self-evaluation from the inferred evaluations of

oneself by others, and current research suggests that this capacity begins to emerge in middle to late childhood (between 8 and 12 years of age) (Shantz, 1983). Thus, whereas a preschooler may not react to the researcher's raised eyebrow and questioning tone of voice following his answer, and the younger grade-school child may notice it but not accurately infer what it means, the adolescent will correctly infer that he has provided an incorrect response and reevaluate her answer accordingly.

As this example suggests, the developing capacity to derive psychological inferences from others' behavior means that older children and adolescents are more vulnerable to implicit cues, demands, and judgments of their performance that may influence their behavior as research participants. While this is a concern for the validity of research findings, it also is an ethical concern insofar as they perceive researchers making unfavorable judgments of their performance or experience implicit pressures to act in a manner inconsistent with their wishes (e.g., to divulge confidential information). However, it is worth noting that this developing capacity is also a double-edged sword. In contrast to younger children, who are more likely to naively accept research tasks at face value, the older child's ability to speculate concerning another's motives and intentions may also contribute to greater skepticism concerning the true purposes of the research activity or the true intentions of the researcher. Thus, while older children may be somewhat more susceptible to implicit pressures and judgments, they may also approach the research task more skeptically than younger children do.

5. *Self-conscious emotional reactions—such as shame, guilt, embarrassment and pride—emerge later developmentally than do the primary emotions. But once they are acquired, young children may be more vulnerable to their arousal because of their limited understanding of these emotions.* In contrast to primary emotions such as happiness, sadness, fear and anger, self-conscious emotional reactions such as shame, guilt, embarrassment, and pride are not apparent in the first year of life but emerge early in the preschool years with the growth of self-understanding (Campos, Barrett, Lamb, Goldsmith, & Stenberg, 1983). But with their emergence in the early preschool years, there is evidence that young children overextend their meaning to apply to a broader range of circumstances than those for which they are appropriate. For example, preschoolers and young school-age children report feeling guilty in negative situations for which they are not responsible, perhaps because of exaggerated perceptions of personal agency, confusion concerning the nature of intentionality, or other social cognitive factors (Graham, Doubleday, & Guarino, 1984; Harter, 1983; Thompson, 1987). It is not until children are 7 or 8 years of age that they restrict feelings of guilt to more appropriate situations in which they are personally culpable for negative outcomes.

If this developmental transition applies also to other self-conscious emotions—such as shame and embarrassment—it suggests that once these emotions have emerged, young children may be especially vulnerable to their arousal in inappropriate or unexpected circumstances because of their immature understanding of the bases for these emotional experiences. However, there may also be another developmental resurgence in susceptibility to self-conscious emotional experiences—namely, in adolescence (Elkind, 1967)—which suggests that vulnerability to these emotions shows a curvilinear developmental trend. With respect to research participation, these findings suggest that when children experience negative outcomes for which they are not responsible, younger children may nevertheless be vulnerable to a variety of negative self-conscious emotions that reflect a negative self-assessment that may not be justified by the circumstances.

6. *Young children's understanding of authority renders them more vulnerable to coercive manipulations than older children, for whom authority relations are better balanced by an understanding of individual rights. Furthermore, young children's trust of authorities makes them more vulnerable to being deceived in research.* Students of social cognitive development have pointed out that children in the preschool and early grade-school years regard authorities as legitimate and powerful individuals, mandating obedience because of their intrinsically superior qualities (Damon, 1977; Piaget, 1932/1965; Shantz, 1983). It is not until the late grade-school years that children regard an authority's legitimacy as based in that person's training or experience, and obedience derives from respect for the authority rather than from unilateral reverence. Authority relations increasingly become viewed as a cooperative, consensual compact adopted for the welfare of all.

Younger children are thus more likely to respond to authorities—including researchers—with immediate respect and obedience, even if the researcher makes unreasonable or illegitimate demands on the child. By contrast, older children's perceptions of the researcher's legitimacy may be undermined by inappropriate demands or requests, and the child's motivation to comply may be reduced as a result. Furthermore, young children are likely to be more susceptible to deceptive research practices because of their unquestioning compliance with the researcher's requests. Older children may be more skeptical because their understanding of authority relations involves consensual cooperation, and also because of a more sophisticated capacity to speculate about another's intentions and motives, as noted earlier.

7. *Privacy interests and concerns increase and become more differentiated as children mature, and broaden from an initial focus on physical and possessional privacy to include concerns with informational privacy.* As noted in a review of the research by Melton (1983), developmental changes in children's privacy interests are partly a byproduct of how they are treated: preschoolers seldom have opportunities to exercise territorial or informational privacy rights, for example. However, the limited research evidence indicates that with increasing age, and especially with the transition to adolescence, privacy becomes increasingly important as a marker of independence and self-esteem. Children initially exercise greater concern with establishing a physical location of one's own (i.e., territorial privacy, such as one's bedroom) and the integrity of personal possessions (i.e., possessional privacy), but at later ages this concern extends to the control of others' knowledge of one's associations, activities, and interests (i.e., informational privacy) (e.g., Wolfe, 1978). In this sense, the transition from physical, material markers of personal privacy concerns to more psychologically oriented privacy interests reflects the child's developing self-representational system, as noted above. Importantly, however, these findings suggest that children may become increasingly vulnerable to privacy intrusions in research settings with increasing age. Whereas younger children may feel comfortable divulging personal information to a researcher upon request, older children and especially adolescents are likely to experience certain inquiries as unduly intrusive and threatening. Moreover, to the extent that researchers gain access to personal information about research participants without their consent (e.g., data from school records via parental permission), adolescents are especially likely to experience this as a breach of informational privacy.

8. *Owing to their more limited conceptual skills, younger children may benefit less from feedback during the research experience, including dehoaxing and debriefing procedures, than do older children and adolescents.* In some studies, children are provided with false feedback concerning their performance on a task, and are subsequently told during a dehoaxing procedure that the task had been designed to be difficult, and thus they should not feel badly about their performance. There are several reasons to doubt the efficacy of this procedure with young children. First, understanding deception tactics requires recursive reasoning (e.g., "I knew that you would think this way when I did . . ."), which is conceptually demanding for preschoolers and early grade-school children. Second, deception tactics may themselves be difficult for young children to understand because of their complexity, especially when they involve dehoaxing a set of convincing instructions or procedures instituted by the researcher that children trusted to be true. Finally, because young children often have difficulty reevaluating past performance in light of a subsequent standard, they may not spontaneously reevaluate their critical evaluations of earlier performance in light of what they are subsequently told about the nature of the study. For example, having been earlier convinced that they performed poorly on a task, a subsequent dehoaxing procedure may not fully change their earlier critical self-evaluation based on false performance feedback.

Taken together, these considerations suggest that young children may not benefit fully from the dehoaxing procedures that follow deceptive research practices. Insofar as these procedures are used to reduce the risks inherent in research deception, alternative approaches may be necessary. However, contrary to older children and adolescents, younger children may nevertheless be *less* vulnerable to heightened future sensitivity to deceit in research because of their continuing trust in authorities (see above). By contrast, older children may experience undermined trust in research authorities—and a questioning of their legitimacy—as a consequence of having been earlier deceived as a research participant. More generally, these considerations suggest that younger children are less

likely to understand postresearch debriefing as a whole following research participation, whether debriefing involves dehoaxing, a broader explanation of the research purposes and goals, or assurance that the child had performed satisfactorily. This is true, in part, because of their limited understanding of the research process and the purposes of research activity. As a consequence, young children are less likely to experience debriefing as a benefit from research participation.

9. *With increasing age, children are likely to become more sensitive to cultural and socioeconomic biases in research that reflect negatively on the child's background, family, or previous experiences.* With developmental changes in the breadth and coherence of the self-concept, children are likely to increasingly identify themselves as members of broader social groups, including racial, ethnic, and socioeconomic groups. As a consequence, their vulnerability (and sensitivity) to overt and subtle biases in the research process is likely to increase with age.

Taken together, these guidelines illustrate how the child's vulnerability to different domains of research risk vary in different ways in developmental analysis. For some kinds of risk, children become increasingly vulnerable as they mature, while for other risk factors, vulnerability decreases with increasing age, and for some kinds of risk (e.g., susceptibility to embarrassment) curvilinear developmental changes may be normative. These considerations thus mandate a more complex, but more sensitive, analysis of developmental vulnerability to research risk to guide ethical decision making in research with minors. In this approach, a somewhat different set of considerations may be preeminent in ethical analysis of research with children of one age compared to another. Moreover, in longitudinal studies, new research risks may emerge for consideration by researchers as the cohort under study increases in age. In general, while this developmental portrayal significantly increases the complexity of the analysis of research risk for studies involving children, it also promises a more acute analysis that is likely to ultimately benefit the children who participate.

Individual Differences

Just as the term "children" embraces a very heterogeneous developmental population, so also the term encompasses a diverse range of backgrounds, characteristics, and prior experiences for children of any age. Characteristics of the subject population must thus also shape ethical decision making, especially in social and behavioral research concerning children.

Consider, for example, the special ethical considerations involved in research with maltreated infants, children, and adolescents. Because maltreating parents may not be reliable advocates for their offspring's interests and may also seek to avoid detection of their abusive behavior, issues of proxy consent by parents must be reconsidered in studies focused on children who have been maltreated or who are at risk for abuse. Additional or substitute consent procedures may be necessary, involving other adults acting in the child's interests. In the research setting, the young child's coping with the demands of the research may be undermined rather than supported by the parent's presence because maltreated children are typically insecurely rather than securely attached to their parents and experience other difficulties in the parent-child relationship (Cicchetti, in press). Maltreated children also share other characteristics that are likely to make them more vulnerable to certain research procedures: they exhibit an acute sensitivity to aggressive stimuli and may be more prone to perceive ambiguous situations as threatening, they have diminished self-esteem and impaired perceptions of personal competence, and they respond atypically to novel adults, sometimes showing aloof disinterest, at other times exhibiting clingy dependency (see Cicchetti, in press, for a comprehensive review of this research). These characteristics suggest that maltreated children are likely to experience various aspects of the research process as more stressful than do nonmaltreated children. Moreover, just as the consequences of maltreatment change with increasing age, so also the research vulnerabilities of maltreated children vary with their developmental status (Aber & Cicchetti, 1984; Cicchetti, in press). As a consequence, researchers studying this special population must take care to safeguard against the more unique vulnerabilities these children experience.

Other kinds of research risks also merit special attention. When at-risk populations of children are identified for study (e.g., adolescent substance abusers, offspring of adults with emotional disturbances, etc.), researchers must ensure that the perceptions of these children by custodians from whom permission is sought (e.g., school personnel, daycare workers, etc.) are not biased by the description of the selection criteria. Children can be victimized by the research process

if they become labeled in disadvantageous ways. In some cases, children are enmeshed in a special web of power relations that can undermine obtaining truly voluntary consent to research participation. In Grisso's (1981) study of incarcerated juveniles, for example, most youth believed (despite disclaimers) that researchers were part of the juvenile justice system, and their assent to participate reflected, for some, a concern with potentially unfavorable reactions from the court should they decline. This research reveals how important it is for researchers to carefully examine subjects' implicit assumptions about the role of the researcher in the power network. Not only children but also families under stress must be considered in ethical decision making. Parents of special children (e.g., AIDS or cancer victims, children who have suffered traumatic experiences, etc.) may regard *any* contact with professionals as a means of helping the child, and this has important implications for the nature of informed consent as well as participants' implicit expectations concerning research benefits (see Fisher & Rosendahl, in press, for a discussion of these and related issues). Finally, special care must be taken with children experiencing intellectual deficits (e.g., Down syndrome children) to ensure that the child's assent is meaningfully obtained (if possible), the child's freedom to withdraw is fully understood, and that dehoaxing (when deception is used) and debriefing procedures are appropriate to the child's level of comprehension.

Thus, a developmental perspective to research vulnerability is additionally complicated by the necessity of considering seriously the special vulnerabilities (or, at times, unusual resiliency) of the populations of children under study. This is because what constitutes "minimal risk" or "decent treatment" of children from special populations is likely to vary from what is true of normative developmental populations, and this is especially true of social and behavioral research on sensitive issues. And as the study of maltreatment has indicated, these vulnerabilities may vary with developmental time. Clearly, doing a careful ethical analysis of research risk in studies with children is a difficult, demanding task.

Risks in Relation to Benefits

Professional and federal guidelines for social and behavioral research indicate, of course, that risk assessment must be considered in relation to the potential benefits of research findings. In contrast to the risks of physical harm, disability, or infection that may occur in biomedical research, potential threats of embarrassment, diminished self-esteem, or pressures to cooperate encountered in social and behavioral research seem benign by comparison, and this is especially so when these potential risks are weighed against possible research benefits (e.g., potential social utility, advancing knowledge, etc.). As a consequence, researchers are encouraged to approach the ethical review process as a threshold concern: can the level of risk to children be justified by the anticipated benefits of research results? Once a researcher (and an Institutional Review Board) can answer affirmatively, institutional requirements of ethical review are satisfied.

But this analysis of children's vulnerability in research suggests that developmental researchers are also uniquely sensitive to and responsible for establishing and maintaining standards of *decent treatment* of children alongside a risk/benefit calculus. That is, researchers should be concerned with minimizing stresses to children who participate, however minimal they may be, as part of their ethical obligations to subjects (i.e., respect for persons). One reason is that an emphasis on a prescriptive ethics of decent treatment underscores the researcher's obligation to consider diverse aspects of research risk to subjects, even if the study as a whole passes the threshold test. Even when research is considered minimal risk, for example, researchers should still exercise care to design procedures that reduce potential harm that could occur to children. A prescriptive ethics of decent treatment underscores this obligation by making ethical analysis a graded rather than a threshold concern.

Another reason for emphasizing standards of decent treatment of children in research is that the risk/benefit calculus is a problematic basis for the ethical analysis of research. The reason is that this calculus requires the comparison of things that are *not* comparable, and thus cannot be balanced against each other. Risks, for example, are borne largely by research participants, but in nonclinical research participants seldom benefit directly from their involvement, especially if they are children. Principles of justice mandate that a risk/benefit calculus is calibrated according to who are the bearers of risk and who enjoy its benefits (MacIntyre, 1982), and many research studies provide very few direct benefits to those who bear the risks. In most instances, in other words, risks are proxi-

mal to research participants, while benefits are distal.

Other factors also distinguish risks from benefits and complicate their comparison. One concerns their estimation: it is much easier to accurately predict the risks posed to research participants than to predict the benefits research will provide. To some extent, this is inherent in the research process. Risks to research participants can be estimated as soon as research procedures have been designed, but benefits are contingent on the outcome of the study, and thus involve a prediction of unknowns at the time the research is proposed. There are other reasons that potential benefits are difficult to predict. The social utility of behavioral research findings is often applied years after research insights have been generated, and is sometimes contingent on corollary research findings, trends in scholarly activity, and timing of social needs and concerns. Often research studies are conducted that yield essentially no identifiable social benefits because of unexpected methodological difficulties, resource constraints to continuing the research, and/or publication obstacles to the dissemination of findings. Finally, it must be acknowledged that many social and behavioral studies have no direct, foreseeable social applications, but are designed to advance knowledge on a topic of special interest and concern within the scholarly community. Although the latter is a valuable goal, it alters the assessment of benefits in significant ways.

For these reasons, comparing risks with benefits in ethical analysis is like comparing apples and oranges. To be sure, risk/benefit analysis is a useful heuristic when research of great social import must be conducted at some risk to participants. But in these instances, and increasingly when benefits are less clear and predictable, risk/benefit analysis must be combined with ethical principles of respect for persons and justice that underlie standards of decent treatment of children as research participants. And researchers are themselves in an optimal position for identifying and maintaining these treatment standards.

Conclusion

Two considerations in ethical decision making in nonclinical research involving children have been discussed in this essay. The first concerns the need for a more thoroughgoing developmental analysis of research risk that takes into account children's changing vulnerabilities with increasing age, as well as the special risks involved in their background characteristics. The second concerns the need for ethical guidelines to be increasingly framed around norms of decent treatment of children as research participants to supplement the prevailing risk/benefit analysis. Taken together, these considerations significantly complicate the ethical review of social and behavioral research involving children.

For various reasons, members of Institutional Review Boards are ill-equipped to conduct such a sensitive analysis: they are seldom trained in human development, and because many IRB members are from biomedical fields they are unacquainted with the domains of psychological risk commonly encountered by children in developmental, educational, social, and other fields of behavioral research. The professionals who *can* claim such expertise are researchers themselves, who are for that reason uniquely equipped to foster more creative and thoughtful collegial interaction on ethical research concerns. Instruction on the philosophical and professional ethical obligations of researchers in graduate curricula, discussions of methodological alternatives to prevailing research practices that might unduly stress the children who participate, and constructive critique of existing research protocols can easily be accommodated within this collegial dialogue. Moreover, the constructive contributions of behavioral researchers to the institutional review processes—as consultants and IRB members—might substantially inform this review procedure.

Research is, in many respects, a limited knowledge-gathering tool. It is limited by prevailing methodological alternatives, available data-gathering technology, data-analysis techniques, existing scientific theories, and, of course, the ethics of using humans as research subjects. Yet this final limitation is perhaps the most telling in light of the overarching goal of science to advance human welfare. The limitations that scientists accept on the research enterprise in the interests of safeguarding human rights are descriptive of the values underlying their efforts. When children are research participants, researchers' obligations are especially great.

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