Peer Models and Children's Behavioral Change

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Schunk, D. H. (1987). Peer models and children's behavioral change. *Review of Educational Research, 57*, 149-174.

Abstract:

This article critically reviews the research literature on peer modeling among children as a function of model attributes. Peer modeling is hypothesized to depend in part on perceived similarity between model and observer. Similarity serves as an important source of information for gauging behavioral appropriateness, formulating outcome expectations, and assessing one's self-efficacy for learning or performing tasks. Research is reviewed on the effects of model age, model sex, model competence, number of models, and model background. Peer models can foster diverse types of behavioral change in children, but attribute similarity does not automatically enhance modeling. The conditions under which similarity promotes behavioral change are discussed. Future research needs to assess children's self-perceptions, as well as maintenance and generalization of behavioral changes. It is suggested that classroom peers can help train social skills, enhance self-efficacy, and remedy skill deficiencies.

Article:

Modeling is an important means of acquiring skills, beliefs, and novel behaviors (Bandura, 1986; Rosenthal & Zimmerman, 1978). In school, teachers serve as powerful models for children, but children also are exposed to many peers who are the same age and who often are similar in other ways (e.g., sex, competence). Peer models can affect many aspects of children's lives (Hartup & Lougee, 1975).

The purpose of this article is to critically review the literature on peer modeling among children as a function of various model attributes. As used throughout this article, *peer* denotes a child who is roughly equivalent in development to the observer, *model* is an individual whose behaviors, verbalizations, and expressions are attended to by the observer and serve as cues for subsequent modeling, and *modeling* refers to behavioral change that derives from observing others (Berger, 1977; Field, 198 1; Hartup, 1978).

From a theoretical perspective, peer modeling depends in part on *perceived similarity* between model and observer. Modeling is a form of *social comparison* (Berger, 1977). Festinger (1954) hypothesized that, where objective standards of behavior are unclear or unavailable, observers evaluate themselves through comparisons with others, and that the most accurate self-evaluations derive from comparisons with those who are similar in the ability or characteristic being evaluated. Given these considerations, peer models should be especially influential in situations where perceived similarity conveys information about one's abilities or the appropriateness of behaviors.

This review addresses three major questions. First, how does model-observer similarity affect children's behaviors? A theoretical explanation of modeling processes and of the operation of model-observer similarity is given in the next section, after which studies are reviewed that explore the effects of age and sex of model, model competence, number of models, and background experiences. Second, what types of research are needed to better understand the role that model-observer similarity plays in children's behavioral change? An important goal of this review is to identify methodological concerns involving experimental designs, outcome measures, and maintenance and generalization of behavioral changes. Third, what are the implications of research findings

for educational practices? Suggestions will be made for ways of employing peer models to promote educational outcomes.

Observational Learning and Model-Observer Similarity

The value of modeling has been recognized as far back as the ancient Greeks, who used *mimesis* to refer to observational learning from others' behaviors and from abstract models exemplifying literary styles (Rosenthal & Zimmerman, 1978). Early in this century, psychologists debated whether modeling was instinctual or could be described in associationist principles. Miller and Dollard (1941) described modeling as a process whereby observers were provided with behavioral cues, performed matching responses, and were positively reinforced. With repeated reinforcement of imitative behavior, imitation could become a secondary drive.

Bandura (1969) postulated that modeling may reflect acquisition of new behavioral patterns (observational learning), strengthening or weakening of behavioral inhibitions (inhibition-disinhibition), or performance of previously learned behaviors due to prompting (response facilitation). Observational learning through modeling occurs when observers display new patterns of behavior that prior to modeling had a zero probability of occurrence even with motivational inducements in effect. Modeling also can strengthen or weaken inhibitions for performing behaviors that previously have been learned. Observing models perform threatening or prohibited activities without experiencing negative consequences can lead observers to perform the behaviors themselves, whereas observing models punished for performing certain actions may inhibit observers' responding. There also are numerous behaviors that people have learned but do not usually perform because of insufficient motivational inducements rather than because of prohibitions. Modeled actions can serve as social prompts, such as when one emulates the behaviors of high-status models to obtain approval from others.

Observational learning through modeling is hypothesized to comprise four subprocesses: attention, retention, production, and motivation (Bandura, 1986). Observer *attention* to relevant environmental events is necessary for them to be meaningfully perceived. *Retention* activities include coding and transforming modeled information for storage in memory, as well as cognitively rehearsing information. *Production* involves translating visual and symbolic conceptions of modeled events into overt behaviors. *Motivational* inducements for action can result from direct, vicarious, and self-produced experiences.

The *functional value of behavior—whether* it results in success or failure, reward or punishment—exerts strong motivational effects on observer modeling. Modeled behaviors are more likely to be performed if they have previously led to rewarding outcomes than if they have resulted in punishment, regardless of whether individuals have experienced the consequences directly or vicariously. People also act in accordance with their internal standards of conduct; they behave in ways they find acceptable and shun dissatisfying activities.

Children's abilities to learn from models depend on developmental factors (Bandura, 1986). Young children have difficulty attending to modeled events for long periods and distinguishing relevant from irrelevant cues. The ability to process information effectively also improves with development. Children develop a more extensive knowledge base to help them comprehend new information, and they become more capable of using memory strategies. Young children may encode modeled events in terms of physical properties, whereas older children often represent information symbolically (e.g., language). Information acquired through observation cannot be performed if children lack the requisite physical capabilities. Production also requires translating into action information stored in memory, comparing performance with memorial representation, and correcting performance as necessary. The ability to self-regulate one's actions improves with development. With respect to motivational inducements for action, young children are highly motivated by the immediate consequences of their actions. As children mature, they are more likely to perform modeled actions that they find personally satisfying.

The observed consequences of modeled actions can inform and motivate (Bandura, 1986). Vicarious consequences convey information to observers about the functional value of behaviors. Observing competent models perform actions that result in success conveys information to observers about the sequence of actions

one should use to succeed. Most social situations are structured so that the appropriateness of behaviors depends on such factors as age, sex, or status. By observing modeled behaviors and their consequences, people formulate *outcome expectations,* or beliefs about the outcomes of one's actions. Vicarious consequences create outcome expectations concerning which behaviors are likely to be rewarded and which may be punished.

Similarity to models is hypothesized to be an important source of information for gauging *behavioral appropriateness* and formulating *outcome expectations.* In general, the more alike observers are to models, the greater is the probability that similar actions by observers are socially appropriate and will produce comparable results. Model attributes often are predictive of the functional value of behaviors. Similarity ought to be especially influential in situations where observers have little information about functional value. For example, modeled behaviors on tasks with which observers are unfamiliar or those that are not immediately followed by consequences may be highly susceptible to influence by similarity in model attributes (Akamatsu & Thelen, 1974).

Vicarious consequences also exert motivational effects on observers. Observing others' successes, failures, rewards, and punishments creates outcome expectations in observers that they are likely to experience similar outcomes for performing the same behaviors. People are more likely to perform behaviors when they believe they will be successful or rewarded than when they expect to fail or be punished. These motivational effects are hypothesized to depend in part on perceptions of *self-efficacy,* or personal beliefs about one's capabilities to organize and implement actions necessary to attain designated levels of performance (Bandura, 1986).

Similarity to models constitutes an important source of information for gauging one's *self-efficacy.* Observing similar others succeed at a task can raise observers' self-efficacy and motivate them to try the task themselves, because they are apt to believe that if others can succeed, they can as well. Conversely, observing similar others fail can lead people to believe that they lack the competencies to succeed, which can dissuade them from attempting the behavior. Model attributes often are predictive of performance capabilities. Similarity may be especially influential in situations where individuals are uncertain about their performance capabilities, such as when they lack task familiarity and have little information on which to base self-efficacy judgments or when they have previously experienced difficulties and possess self-doubts about performing well (Bandura, 1986).

Literature Review

The 29 studies reviewed in this section are grouped according to the type of model attribute investigated: age of model, sex of model, model competence, number of models, background experiences. Studies that addressed more than one attribute are discussed in the appropriate areas. Studies were included in this review if they systematically employed one or more peer models presented live or symbolically (e.g., on videotape, film, TV) for the purpose of determining their effects on children's behaviors. Investigations were excluded if they: (a) employed only character, doll, or cartoon models; (b) studied natural peer interactions; (c) explored the effects of tutoring or peer teaching; or (d) examined only symbolically tangential modeled influences (verbal instructions, social comparative information on how others performed). This review is comprehensive but by no means exhaustive; interested readers should consult other reviews (Bandura, 1986; Bourdon, 1970; Cicirelli, 1976; Feldman, Devin-Sheehan, & Allen, 1976; Flanders, 1968; Gresham, 1981; Johnson & Melamed, 1979; Maccoby & Jacklin, 1974; Peck, Cooke, & Apolloni, 1981; Rachman, 1972; Rosenthal & Zimmerman, 1978; Thelen, Fry, Fehrenbach, & Frautschi, 1979).

Model Age

Eighteen studies compared the effects of observing same-age peers with those due to observing adults, older children, or younger children. Based on the preceding theoretical considerations, we might expect model-observer similarity in age to be important in those situations where children perceive the actions of same-age peers to be more appropriate for themselves than the actions of dissimilar others; that is, children believe that peers' actions have greater functional value in that they are more likely to lead to success or rewards. In situations where children may be uncertain about their performance capabilities, similarity in age may be an important means of raising children's self-efficacy.

In 9 of these 18 studies, peer models exerted beneficial effects compared with dissimilar-age models; the remaining studies are approximately equally split between those showing benefits of dissimilar-age (adult) models and those showing no differences between peer and other models. These findings must be qualified, however, because in many instances where peer models were beneficial they influenced some measures but not others. Furthermore, most studies did not assess the hypothesized underlying mechanisms discussed in the preceding section (i.e., perceived self-efficacy, outcome expectations, behavioral appropriateness). In the research conducted to date, therefore, the evidence suggests that, under certain conditions, peer models may be more beneficial than dissimilar-age models.

Two studies addressed children's conservation skills (Robert, 1983; Robert & Charbonneau, 1977). Second graders who had demonstrated liquid conservation on a pretest observed a peer, older child, or adult model fail similar problems (Robert & Charbonneau). Extinction of conservation occurred among some children during the posttest when the adult model was present. This result seems to represent an instance of response facilitation due to implicit social influence brought about by the adult's presence. Maintenance of the behavior over time or generalization to other contexts was not assessed, but there is no reason to expect that either effect would have been obtained.

Robert (1983) identified nonconserving first graders and administered an opinion task involving preferences and general information. Children then observed a peer or adult model correctly perform liquid conservation problems and verbalize a rationale involving compensation. Subjects also were told that their opinions differed from those of the model. Children showed improved conservation scores on the posttest, which did not differ as a function of model age or of model presence/absence during the posttest; regardless of model age, model presence led to greater compliance with the model's opinion. Improved conservation scores were maintained on a 7-week follow-up test. That comparable learning occurred from observing peer or adult models suggests that children's perceptions of the functional value of the modeled behaviors (i.e., successful performance) was the critical variable. Greater compliance with the model's opinions when the model was present likely represents response facilitation; opinions were not assessed on the follow-up test, but it seems unlikely that they would have been maintained.

Schunk and Hanson (1985) showed that peer models can enhance children's self-efficacy for learning cognitive skills better than adult models. Elementary school children who had experienced difficulties learning to subtract observed a peer learn subtraction with regrouping operations, observed an adult model demonstrate the operations, or did not observe a model. Children judged self-efficacy for learning to subtract and participated in an instructional program. Peer models led to higher self-efficacy for learning, as well as higher posttest self-efficacy and subtraction skill, compared with the teacher and no model conditions. Observing a teacher model facilitated these outcomes better than no model.

These results suggest that model-observer similarity in age may be an important variable in raising self-efficacy for learning among low-achieving children. Higher self-efficacy brought about by observing a peer likely was substantiated by children's actual successes during the instructional program, and led to higher posttest skill. Observation of the adult model may have led children to wonder whether they were capable of becoming as competent as the model. With low-achieving children, teachers may want to supplement their regular instruction with demonstrations by peer models to help enhance children's self-efficacy for learning.

Sonnenschein and Whitehurst (1980) explored the effects of model age and competence on children's communication skills. Six-year-olds heard a tape recording of a child or adult describing a series of triangles. Within each model condition, communications were informative, uninformative, or both. Subjects then participated in the task as speakers. Children exposed to informative models (child or adult) or to the child uninformative model communicated more informative messages than did children exposed to uninformative adults or to mixed models.

Children also judged the communication performance of the uninformative adult higher than that of the uninformative peer.

This study supports the idea that competent (informative) models—peers or adults—promote modeling. Although children's perceptions of poor peer performance led to countermodeling (learning what not to do), this type of teaching strategy is generally not recommended because children may learn incorrect skills.

Children exposed to uninformative adults may have wondered how competent the adults' communications were, but children apparently assumed that they, rather than the adults, were largely responsible for the communication failure. These results suggest that children perceive adults' communication skills to be more highly developed than those of peers, and believe that modeling adults' skills will lead to more successful communications.

Two studies explored the effect of similarity in model age on children's novel task responses (Hayes, 1973; Strauss, 1978). Strauss exposed third graders to a peer or adult model performing two tasks (object assembly, sticker designs). Children's performances improved following observation, but there was no effect of model age. Hayes presented children with a peer or adult demonstrating expressive or instrumental behaviors while working on a guessing game. There was no effect of model age on instrumental behaviors, but subjects exposed to the peer expressive model displayed greater frequency and variety of expressive responses than did those who observed an adult expressive model. Collectively, these results suggest that children viewed peers' and adults' behaviors as equally competent and likely to lead to task success. The Hayes results suggest that children viewed the peer expressive behaviors as more appropriate for themselves than the adult expressive behaviors.

Jakubczak and Walters (1959) exposed boys classified as high or low in dependency to judgments by a peer and an adult about a moving light (autokinetic effect) that were contrary to their own. Children's judgments were modified more by the adult model; high-dependent subjects' judgments showed greater change. Given that children were unfamiliar with this task, they may have assumed that the adult was the more competent model and that adopting the adult's judgments would prove successful more often. This explanation is suggestive, because children's perceptions of model competence were not assessed.

Two studies by Brody and Stoneman (1981, 1985) investigated the effect of similarity in age on children's preferences. Second graders observed a kindergartner, second grader, or fourth grader indicate food preferences, after which children indicated their preferences (Brody & Stoneman, 1981). Children who had observed peer or older models adopted a higher proportion of modeled preferences compared with children exposed to a younger model; however, model age did not affect learning of the model's preferences. In a second experiment, children observed paired child models who were the same age and older, the same age and younger, or younger and older. Within the latter two pairings, children imitated the choices of the older model more often; there was no difference in the same-age and older pairings. These results indicate that children judge the preferences of younger children as inappropriate for themselves.

Brody and Stoneman (1985) compared the effects of age and competence on children's preferences. Second graders were given Raven's Progressive Matrices and were informed that they performed as well as a typical second grader, after which they observed a kindergarten or second-grade model indicate food preferences. Within each of these two conditions, the model was attributed with kindergarten or second-grade competence on the matrices task, or subjects were given no competency information. In the absence of competency information, subjects subsequently imitated the food preferences of peer models more than those of younger models. When competency information was provided, both same-age and younger models were imitated more when they were attributed with second-grade competence than when they were attributed with kindergarten competence. Similarity in age was important only when children lacked competency information. That peers whom children judge to be lower in competence do not serve as important models has implications for classrooms, where children continually receive information concerning their classmates' competence.

Two studies found advantages of peer models with educable mentally retarded children (Barry & Overmann, 1977; Becker & Glidden, 1979). Barry and Overmann assigned children to a peer model, adult model, or no model condition. The model played a game with blocks, after which children attempted to reproduce the model's actions. Peer models led to the highest immediate performance; on the following day, the peer group outperformed controls but did not differ from the adult model condition. Children seemed more motivated initially to imitate the peer's responses, although the mechanism responsible for this effect is unclear. Possibly children felt that the peer was the more appropriate model for this task. It also is possible that children's perceived capabilities to perform the matching responses were enhanced more by observing the peer model.

Becker and Glidden (1979) found that model age and competence influence imitation. Children observed a peer or adult play a game with high or low competence. Both models displayed identical off-task prosocial behaviors (e.g., requesting assistance, offering help). Regardless of model age, task behaviors of high-competent models were performed more than those of low-competent models. Social behaviors of high-competent and peer models were performed more than those of low-competent and adult models. Subjects may have perceived peers' social behaviors to be more appropriate for themselves than adults' behaviors. That competent peers are good models for social skills has potential usefulness in the field of special education. With the present emphasis on mainstreaming, pairing handicapped children with peers in regular classes may prove effective in inculcating classroom social skills (Peck et al., 1981).

The effect of model age on children's self-reward standards were investigated in three studies (Akamatsu & Farudi, 1978; Bandura & Kupers, 1964; Davidson & Smith, 1982). The methodologies in these studies followed a similar format. Subjects observed a model perform a task with varying success over trials; subjects performed the same task with similar feedback. The model adopted a self-reward criterion (e.g., stringent, lenient), and children were allowed to reward themselves.

Bandura and Kupers (1964) exposed children to a peer or adult demonstrating stringent or lenient standards while playing a bowling game. Children exposed to high-standard models were more likely to reward themselves for high scores and less likely to reward themselves for lower scores compared with subjects assigned to the low-standard condition. Adult models produced stronger effects than peer models. Subjects in the Davidson and Smith (1982) study observed a superior adult, equal peer, or inferior younger child set stringent or lenient standards while performing a pursuit-rotor task. Children who observed a lenient model rewarded themselves for lower scores than those who observed a stringent model. Children's self-reward standards were lower than those of the adult, equal to those of the peer, and higher than those of the younger child. Akamatsu and Farudi (1978) used juvenile delinquent boys classified as immature-inadequate (e.g., unable to cope in a complex world, incompetent) or as socialized-subcultural (having bad companions, engaged in gang activities). Subjects exposed to stringent models performing an arm coordination task took fewer rewards as they worked at the task. Immature-inadequate boys showed greater modeling of adults, whereas socialized-subcultural subjects were influenced more by peers.

Model-observer similarity in age might influence children's adoption of self-reward standards when children believe that what is appropriate for peers is appropriate for them as well, such as when children are unfamiliar with the task and objective standards of evaluation are unavailable. The results of these studies do not support the idea that peer models are better conveyors of self-reward standards. Unfortunately, none of these studies included such measures as children's perceptions of the appropriateness of different standards or their expectations concerning the potential reward value of adopting various standards. The topic of performance standards has educational importance. Children may be likely to adopt the modeled standards of their teachers, but the Davidson and Smith (1982) study showed that children may take relative estimates of ability into account in formulating standards. With ability-related tasks, therefore, peers could be more influential models than teachers.

Hicks (1965) explored the effect of model age on children's aggression. Children viewed a same- or opposite-sex peer or adult engage in aggressive acts with toys. Subjects then were mildly frustrated and allowed to play

with toys, some of which had been used by the model. Viewing a male peer model led to the highest level of aggression; on a follow-up test after 6 months, however, children who had viewed the adult male model displayed the most aggression. These results were not due to differences in learning, because subjects' retention scores of the modeled behaviors did not differ as a function of experimental condition. Given that the models experienced no negative consequences for their aggression, children may have perceived the peer aggression to be more appropriate—or less inappropriate—for themselves than the adult aggression. Research is needed on children's perceptions of the functional value of aggression to explain the greater disinhibiting effect over time of adult aggression.

One study assessed the effect of peer and adult models on children's coping with snakes (Kornhaber & Schroeder, 1975). Girls afraid of snakes observed a peer or adult interact fearfully (coping model) or fearlessly (mastery model) with a snake. Fearful models appeared anxious and verbalized negative statements (e.g., "I don't know if I can do that"), but completed all tasks. Fearless models showed no reluctance and verbalized positive statements. Subjects who have experienced difficulties coping with situations may perceive themselves to be more similar to coping models than to mastery models. (The rationale underlying the use of coping models is explained more fully in the Model Competence section.) Subjects exposed to fearful or fearless peers demonstrated greater changes in approach behaviors compared with a no-treatment control group. Subjects assigned to the fearful peer condition exhibited the greatest positive change in attitudes toward snakes.

There are methodological concerns about this study. First, self-efficacy was not assessed. It is possible that observing a peer—especially a fearful one—led to higher self-efficacy for coping compared with observing an adult. Second, the outcome measure was performance on a behavioral avoidance test that included progressively more threatening interactions with a snake. Some investigators have questioned the use of behavioral avoidance tests, because subjects' performances may be due in part to perceived incentives for engaging in the threatening activities (Kirsch, 1982). At a minimum, research on coping behaviors ought to include self-report or physiological measures of anxiety.

Two studies compared the effects of peer and adult models on children's moral judgments (Brody & Henderson, 1977; McManis, 1974). Both studies showed that children model more mature judgments regardless of model age. In the McManis study, children giving nonintentional judgments were paired with adults or peers and received intentionality training. Modeling produced greater judged intentionality compared with a no-model control condition, but modeling conditions did not differ. Maintenance of gains was demonstrated 3.5 months later. Brody and Henderson had children giving immature damage judgments observe an adult and peer express mature judgments, mixed judgments (one model made mature judgments, the other gave immature judgments), or inconsistent judgments (each model gave mature and immature judgments). Within each condition, half of the subjects heard models provide a rationale for judgments. Observing adults and peers consistently display mature judgments and give supporting rationales best enhanced children's mature judgments and explanations. The next most effective combination was the adult mature-child immature with rationales. Children focused their attention on adults more than on peers when the adult was consistent and supplied a rationale; in the absence of a rationale, the adult was not more effective than the peer.

From a social learning perspective, moral judgments represent instances of rule-governed behaviors that children learn from observation of models in their culture (Bandura, 1986). Children's beliefs concerning models' competence and the appropriateness of judgments ought to override any influence of model age. In the absence of competency or appropriateness information, children might be more likely to attempt to determine adults' rules to the extent that they believe that adults are more knowledgeable about moral issues. Research is needed that assesses children's beliefs of model competence and the appropriateness of judgments.

Summary. Collectively, the studies reviewed in this section show that children are not generally more inclined to model either peers' or adults' behaviors. Rather, this research provides indirect support for Bandura's (1986) contention that the functional value of behavior outweighs any effect of model age. Children are likely to perform modeled behaviors that they believe are successful or that will lead to rewarding outcomes. This

conclusion is necessarily suggestive, because investigators have not assessed children's perceptions of the functional value of behaviors.

Model-observer similarity in age may be most influential in situations where age is a salient cue for behavioral appropriateness. Social behaviors constitute one example. Children may be more likely to model peers' social behaviors than those of adults to the extent that children believe that the former are more appropriate for themselves. Peers also may prove more influential when children have encountered prior difficulties and are uncertain about their capabilities. Presumably this effect is mediated in part through perceptions of self-efficacy. Age becomes a salient cue on tasks where peers generally are less competent than adults. With ability-related tasks, peers may lead to greater modeling if children judge relative ability. Research is needed that assesses children's perceptions of such variables as model competence and the appropriateness of modeled behaviors.

There are other methodological concerns that need to be addressed. Maintenance of behavioral change was assessed in only four studies in periods ranging from 1 day to 6 months. Interestingly, two of these four studies obtained different results on the posttest and follow-up assessments (Barry & Overmann, 1977; Hicks, 1965). No study assessed generalization of behavioral changes to new situations (e.g., classrooms). In the absence of evidence for durability and generality of behavioral changes, the long-term importance of model-observer similarity in age cannot be gauged.

Given these limitations, educational implications of this research must be viewed cautiously. One suggestion is that peer models may be quite effective with students who have encountered difficulties in learning or coping with academic demands (Schunk & Hanson, 1985). Observation of peers successfully dealing with trouble-some situations may instill a sense of self-efficacy in students for performing well. Remedial students and children who receive instruction in resource rooms may especially benefit from observing peers. Another suggestion is that peer models may play a valuable role in helping students develop better social skills (Peck et al., 1981). Although peer models often are included as one component in social skills training programs (Gresham, 1981), research has not systematically examined the effects of age similarity. It is possible that observing peers successfully cope with difficult social situations conveys to students the functional value of the modeled behaviors and promotes their self-efficacy for acting accordingly. Additional re-search is needed on the effects of model age on achievement and social behaviors to include the mechanisms underlying behavioral change.

Model Sex

Seven studies addressed whether peer modeling varied as a function of model sex. Overall, the findings appear inconclusive: Three studies found advantages to same-sex models, whereas the remaining four investigations obtained no differences due to model sex. Some psychological theories postulate that children are more likely to attend to and learn from models of their own sex; more recently, investigators have suggested that sex of model affects the performance of behaviors more than learning (Perry & Bussey, 1979; Spence, 1984). Children learn behaviors from models of both sexes and categorize behaviors as appropriate for both sexes or as more appropriate for members of one sex. To the extent that children perform behaviors that are appropriate for members of either sex or for members of their sex, they may do so because they believe that those behaviors have greater functional value than sex-inappropriate behaviors; that is, they believe that the former behaviors are more likely to lead to rewarding outcomes. Model sex, therefore, seems important as a conveyor of information about task appropriateness (Zimmerman & Koussa, 1975). When children are uncertain about the sex-appropriateness of a modeled behavior, they may model same-sex peers because they have often been rewarded for doing so in the past.

Two studies found that sex of peer model did not influence the children's learning of cognitive skills. In a paired-associate learning experiment (Simon, Ditrichs, & Speckhart, 1975), children learned lists following a study-test cycle. Between the study and test phases, some subjects were exposed to an audiotaped male or female peer who they had been led to believe was high or low in competence. Other children received either a test or a stimulus familiarization trial. Modeling subjects performed better on items answered correctly by the

model, but not on incorrect items. Among modeling subjects, perceived model competence promoted learning, but sex of model had no effect. Schunk, Hanson, and Cox (1987) identified elementary school children who were low achievers in mathematics and who had little, if any, prior success with fractions. Children observed a same- or opposite-sex peer model learn to add and subtract fractions, after which they judged their perceived similarity in competence to the model and their self-efficacy for learning to add and subtract fractions. All subjects then received instruction and practice on fractions, and were posttested on self-efficacy and skill. No differences due to sex of model were obtained on any measure.

The findings from these two studies suggest that children perceived the tasks to be appropriate for models of both sexes. Based on the preceding considerations, we should not expect model sex to influence cognitive skill learning, nor should model sex affect performance of such skills unless children believe that the skills are more appropriate for members of one sex. The Schunk et al. (1987) findings are especially interesting in light of research showing that boys often do expect to perform better in mathematics than girls (Fennema & Sherman, 1977); however, consistent differences typically do not emerge until junior high school (Meece, Parsons, Kaczala, Goff, & Futterman, 1982). The Schunk et al. study needs to be replicated with older students to determine whether male and female models differentially affect self-efficacy for learning.

In the Hicks (1965) study on modeling of aggression, children observed an aggressive male or female peer or adult. Subsequent aggression was higher among children who had viewed the male peer compared with subjects who had observed the female peer or male adult. Boys generally displayed greater aggression than did girls to all models. On the follow-up test, subjects who had observed the male adult displayed the highest level of aggression. There was no difference in the number of behaviors subjects learned from observing male or female models. These results suggest that subjects perceived the aggressive behaviors of the male peer to be the most appropriate for themselves. The perception of appropriateness may have been heightened because the models' aggression was not followed by negative consequences, which can induce disinhibition. Replication of this study is needed in which subjects' perceptions of the appropriateness of modeled aggression are assessed.

Three studies investigated whether model sex influenced peer modeling of sex role behaviors (Kobasigawa, 1968; Maccoby & Wilson, 1957; Wolf, 1973). In the Wolf study, boys and girls observed a male or female peer play with a sex-inappropriate toy. Children played with sex-inappropriate toys longer following exposure to a same-sex model compared with an opposite-sex model. Boys rated the male model higher than the female model on attractiveness; there was no difference for girls. Kobasigawa showed that boys exposed to a same-sex peer playing with feminine toys played with the toys more frequently than boys who observed an opposite-sex model. Sex of model did not affect girls' play with sex-inappropriate toys.

The results of these two studies offer indirect support for the notion that sex of model can convey information about task appropriateness. Observing a same-sex model play with a sex-inappropriate toy may have led children to alter their beliefs about the sex appropriateness of the task to include members of both sexes. Future research needs to assess subjects' perceptions of appropriateness. Collectively, these results suggest that teachers may be able to help break gender stereotypes by enlisting the aid of peers to model behaviors that students may link with members of the opposite sex (e.g., have boys model classroom housekeeping chores).

Maccoby and Wilson (1957) had seventh graders watch a film portraying male and female adolescent models. On a 1-week delayed recall test, boys remembered more male aggression content, whereas girls remembered more female model content; the latter result, however, did not include female aggression content. Although this study shows that sex of model influenced students' learning, the responsible mechanism is unclear. It is possible that children's differential attention to the male and female characters in the film produced unequal learning. Given that the recall test was 1 week after the film, it also is possible that children mentally rehearsed the content of the same-sex model during that week.

In the Bandura and Kupers (1964) study exploring the effects of peer and adult models on children's self-reward standards, half of the children assigned to the adult and peer conditions observed same-sex models, whereas the

remaining children in each condition observed opposite-sex models. No differences were obtained due to sex of model, which suggests that the subjects, who ranged in age from 7 to 9 years, viewed the miniature bowling game as appropriate for both boys and girls.

Summary. Although this research generally supports the idea that sex of model influences children's performances more than their learning, none of these studies assessed children's perceptions of task appropriateness. To clarify the mechanisms involved, future research needs to address the conditions under which children prefer same-sex models and how children form and alter perceptions of appropriateness.

Research also needs to explore developmental changes in children's beliefs concerning the sex appropriateness of behaviors. Research on gender schemas, for example, shows that by the third grade children adopt a categorical view of gender stereotypes as expressed in the statement, "She is a girl, so she must behave like a girl" (Berndt & Heller, 1986). Gender stereotypes become more flexible with development; adolescents and adults do not automatically assume that boys (girls) always prefer stereotypically male (female) activities; rather, they adopt a dimensional view of gender as evidenced by the statement, "She is a girl, but I can only tell how feminine she is by observing her behavior." In this view, model sex is less important than behaviors in determining the masculinity or femininity of the model. We might expect that model sex would predict young children's beliefs concerning the sex appropriateness of modeled behaviors; with development, children may not automatically assume that same-sex models are displaying sex-appropriate behaviors.

None of the studies in this section were conducted in actual classrooms. Such research is needed because children's perceptions of the sex appropriateness of tasks undoubtedly stems in part from interactions with teachers (Licht & Dweck, 1983). Another shortcoming of this research is the lack of data on maintenance and generalization. Whether boys' play with feminine toys maintains itself over time or generalizes outside of the experimental context is unknown.

Despite these shortcomings, the present results have implications for education. Teachers who employ peer models of both sexes to portray classroom learning activities may help to alter students' preconceived ideas on sex role appropriateness. Systematically arranging learning environments to convey to children that tasks are appropriate for members of both sexes seems a worthwhile educational goal.

Model Competence

Twelve studies investigated how variations in the competence of models affects children's behaviors. Seven of these studies involved comparisons of models high and low in competence, whereas the remaining five studies investigated the effects of mastery and coping models. These two groups of studies will be discussed separately, because they involve different hypothesized effects of model competence on children's behaviors.

High versus low competence. The functional value of modeled behavior is a powerful determinant of modeling (Bandura, 1986). Children should be more likely to pattern their behaviors after models who perform successfully than to emulate less-competent models. In other words, models who are *dissimilar* in competence to observers exert more powerful effects on children's behaviors. Similarity in competence may be more important in contexts where children cannot readily discern the functional value of behavior; for example, when they lack task familiarity, when there is no objective standard of performance, or when modeled actions are followed by neutral consequences. Similarity in competence also may serve as an important source of self-efficacy information, especially in situations where children lack task familiarity and have little information on which to base self-efficacy judgments.

Four of the seven studies involved observational learning of cognitive skills or novel responses (Becker & Glidden, 1979; Simon et al., 1975; Sonnenschein & Whitehurst, 1980; Strichart, 1974). Each of these studies supports the idea that model competence enhances observational learning. The first three studies were reviewed in earlier sections of this article. To briefly recap these findings, the studies by Becker and Glidden and by Simon et al. found that model competence led to higher performance. Sonnenschein and Whitehurst found that

model competence interacted with model age: Children's communication skills improved following exposure to competent peers, competent adults, and incompetent peers, but not after observing incompetent adults. Strichart paired educable mentally retarded children ranging in age from 12 to 20 years with nonretarded peers whom subjects either liked or disliked. Models and observers were led to believe that they were high or low in competence on a motor coordination task, after which they alternated performing the task. Observation of competent models led to higher performance compared with noncompetent models.

Not surprisingly, models whom children perceive as competent make the best teachers. When adults model poorly, children may be swayed by status and assume that the adults are not entirely at fault. In school, children may be more likely to detect errors by their peers than by their teachers, especially if children are less familiar with the content being demonstrated by their teachers than that modeled by peers. Classroom-based research on the effects of model competence is needed.

In the remaining three studies, model competence served as a source of information for purposes of self-evaluation (Brody & Stoneman, 1985; Davidson & Smith, 1982; France-Kaatrude & Smith, 1985). Collectively, these results show that children are influenced by models of similar (same-age) competence. Brody and Stoneman found that in the absence of competence information, children were more likely to model the actions of same-age peers. When children were provided with competence information, modeling was enhanced by similar competence regardless of model age. Davidson and Smith showed that children adopted the self-reward standards of a peer of similar competence rather than those of a superior adult or an inferior peer. In the France-Kaatrude and Smith study, first and fourth graders performed a pursuit-rotor task and could compare their performances with a peer of higher, lower, or equal competence. Compared with children offered comparisons with superior or inferior peers, those allowed to compare their performances with a similarly performing peer compared more often, demonstrated greater task persistence, and took fewer self-rewards. Younger children compared more often with a similar peer than did the older children.

In forming self-evaluations, children routinely compare their performances with those of their classroom peers. Social comparisons with peers whom children judge to be similar in ability can be highly motivating. When model age and competence conflict (e.g., same age but lower competence), children are swayed more by competence information, which suggests that teachers could use younger children to model skills so long as students believed that the models were competent. The use of younger child models also could enhance students' self-efficacy, because they might believe that if younger children can learn, they can as well.

Mastery versus coping models. The use of mastery and coping models derives from therapeutic contexts in which modeling is used to reduce avoidance behaviors in fearful clients (Meichenbaum, 1971; Thelen et al., 1979). Whereas mastery models demonstrate faultless performance from the outset, coping models initially demonstrate the typical fears and deficiencies of observers (e.g., inability to approach a snake), but gradually improve their performances and gain self-confidence. Coping models illustrate how determined effort and positive self-thoughts can overcome difficulties, as when they inhibit or reinterpret negative thoughts and display such coping behaviors as taking deep breaths.

Coping models may be especially beneficial with children who previously have encountered difficulties in learning or coping with stressful situations. The benefits of coping models are hypothesized to occur in part through increases in self-efficacy. To the extent that children view a coping model's initial difficulties but gradual progress as more similar to their typical performances than rapid mastery, observation of a coping model might raise self-efficacy more than a mastery model.

Of the five studies investigating the effects of mastery and coping models, three found benefits of coping models (Kornhaber & Schroeder, 1975; Schunk et al., 1987; Vernon, 1974), whereas two found mastery and coping models equally effective (Klorman, Hilpert, Michael, LaGana, & Sveen, 1980; Schunk & Hanson, 1985). In the Schunk and Hanson study, children observed a peer mastery model, a peer coping model, a teacher model, or no model. The mastery model easily

grasped subtraction with regrouping operations and verbalized statements reflecting positive achievement beliefs stressing high self-efficacy (e.g., "I can do that one"), high ability ("I'm good at this"), low task difficulty ("That looks easy"), and positive attitudes ("I like doing these"). The coping model initially was hesitant, made errors, and verbalized statements reflecting negative achievement beliefs, but gradually performed better and began to verbalize coping statements (e.g., "I'll have to work hard on this one"). Eventually, the coping model's problem-solving behaviors and verbalizations matched those of the mastery model.

No differences were obtained between the mastery and coping conditions on any measure (perceived similarity in competence to the model, self-efficacy for learning, posttest self-efficacy, posttest skill). Observing either type of peer enhanced self-efficacy and skill better than observing a teacher or not observing a model; the teacher model treatment promoted these outcomes better than no model. Although the mastery and coping models acquired regrouping skills at different rates, they both succeeded. Subjects' prior successes in subtraction were limited to problems without regrouping; nonetheless, children had these experiences to draw on and may have concluded that if the model could learn to regroup, they also could improve their skills. Students may have focused on what the models had in common (task success) rather than on their differences (rate of learning, number of errors, type of achievement beliefs).

In follow-up research consisting of two experiments (Schunk et al., 1987), low achievers who had experienced few, if any, classroom successes with fractions observed a peer mastery or coping model learn to solve fraction problems. In the first experiment, viewing a coping model led to greater perceived similarity in competence to the model, higher self-efficacy for learning, and higher posttest self-efficacy and skill. (The second experiment is described in the next section.) These results strongly suggest that coping models are beneficial in raising self-efficacy and achievement among children who have little familiarity with the task and who possess self-doubts about their learning capabilities because of previous difficulties with similar content.

The other three studies involved anxiety-provoking situations. Kornhaber and Schroeder (1975) found equal benefits of coping and mastery models in changing children's approach behaviors to snakes; observing a coping peer, however, led to the greatest positive change in attitude toward snakes. Subjects in the Vernon (1974) study were children hospitalized for minor operations. Children observed a film in which peers received injections fearlessly or fearfully (said "ouch" and frowned). When subjects subsequently received injections, those who had viewed the fearful (coping) model were rated as less upset. Klorman et al. (1980) had children judged as fearful of dental treatment observe a peer mastery or coping model being administered a filling; control subjects viewed an unrelated film. The peer mastery model was interested in the procedures and well behaved; the coping model was initially anxious but gradually became less apprehensive. The two forms of modeling were equally effective with children lacking dental experience. Modeling had little effect on experienced dental patients, who cooperated more than inexperienced patients during subsequent dental treatment.

It is difficult to reconcile the findings of these latter three studies. None assessed subjects' self-efficacy for successfully coping with the situations. Another methodological concern is how subjects were identified. Kornhaber and Schroeder gave subjects a behavioral avoidance test and selected those who could not touch a snake with a gloved hand. Vernon's subjects were rated on mood by an observer; subjects in the Klorman et al. study were rated by their dentists or mothers on fear of dental treatment. It is likely that some subjects in the latter two studies were not highly anxious. None of these three studies included physiological measures; only Kornhaber and Schroeder administered a self-rating measure (attitudes). Research needs to address these concerns. For example, therapeutic advantages of coping models have been obtained with fearful subjects in threatening situations that have been fraught with failures (Meichenbaum, 1971). If subjects do not perceive situations as threatening, there is no reason to expect that coping models will raise self-efficacy more than mastery models. Observation of a peer having difficulty coping may lead children to conclude that the task is difficult, which will not raise self-efficacy. In the absence of perceived threat, subjects may benefit more by observing mastery models.

Summary. In situations involving the learning of skills or new behaviors, children tend to emulate competent peers, which supports Bandura's (1986) contention that the functional value of behavior promotes modeling. Where social comparisons are employed to help form self-evaluations, children are most interested in the capabilities or performances of others who are similar in ability. In the absence of competence information, children may infer similar competence on the basis of (same) age.

The effects of the mastery-coping variable are complex. Among children who have experienced difficulties learning skills, observation of coping models can enhance self-efficacy and skills better than mastery models. Children may perceive themselves as similar in competence to coping models and believe that if the models can learn, they, too, can improve their performances. As Meichenbaum (1971) notes, however, benefits of coping models also may occur due to explicit modeling of coping techniques to overcome difficulties. Subjects in the Schunk et al. (1987) study may have acquired some coping mechanisms (e.g., concentration, hard work) by observing the coping models. Future research might disentangle the effects of increased perceived similarity from those due to modeling of coping techniques by including a treatment in which peers use coping techniques but demonstrate the skillful performances of mastery models.

There are several methodological concerns that need to be addressed. None of the studies assessed maintenance of effects over time, and none included measures of generalization to other contexts. The three studies investigating coping models in therapeutic contexts used behavioral avoidance tests or observations by others to identify subjects. It is not clear that all of the subjects were highly anxious. None of these studies included measures of self-efficacy, self-reports of anxiety, or physiological measures.

Drawing implications for education from the research in this section is somewhat speculative. This research suggests, however, that competent peer models can teach skills and that in situations involving social comparisons, modeling is facilitated by comparisons with peers of similar abilities. Coping models seem especially useful with students who have encountered difficulties acquiring skills, such as remedial students and those receiving resource room instruction. Classroom-based research is clearly needed. For example, it is possible that modeling of coping behaviors would prove useful with difficult tasks to promote students' perseverance and self-efficacy. Research also needs to explore the effectiveness of teacher modeling of coping skills. To the extent that coping models are effective in part because they teach coping skills, teachers could incorporate demonstrations of coping skills into their instruction where appropriate.

Number of Models

The effects of single and multiple peer models were compared in two studies (Bandura & Menlove, 1968; Schunk et al., 1987), both of which found advantages for multiple models. Multiple models presumably increase the probability that observers will perceive themselves as similar in competence to at least one of the models (Thelen et al., 1979). Especially when subjects doubt their capabilities for learning or performing well, they may discount the successes of a single peer. Observation of diverse instances of peer success may better promote subjects' self-efficacy (Bandura, 1986). We might also expect multiple models to prove useful in situations where children have little information concerning task appropriateness. Observing several peers engaging in the same behaviors may lead children to conclude that the activities are appropriate for them to perform.

In the Bandura and Menlove (1968) study, preschoolers identified as fearful of dogs based on a behavioral avoidance test were assigned to one of three conditions. Single-model subjects viewed a fearless peer display progressively more threatening interactions with a dog; multiple-model subjects viewed the same behaviors portrayed by several children; control subjects observed nonrelevant films. Children were tested following treatment and one month later using both the experimental dog and an unfamiliar dog. Single and multiple models led to significant increases in approach behaviors that were maintained over time, but twice as many multiple model subjects completed the terminal task on the follow-up assessment. Although self-efficacy was not assessed, it is possible that observing multiple models enhanced children's efficacy for successfully engaging in the threatening activities better than observing a single model.

In the second experiment of the Schunk et al. (1987) study, children observed a single peer or multiple peers display mastery or coping behaviors while learning to solve fractions. Children who observed a single coping model, multiple coping models, or multiple mastery models judged self-efficacy for learning higher, and demonstrated higher posttest self-efficacy and skill, compared with subjects who observed a single mastery model. Surprisingly, these effects did not depend on perceptions of similarity in competence to the models. Children exposed to coping models—single or multiple—judged themselves more similar in competence to the models compared with subjects who observed mastery models (single or multiple). Observation of several models learning to solve fractions—rapidly or gradually—led children to believe that they were capable of improving their skills. Perceived similarity in competence to models may be more important in situations where children have fewer cues to use in judging self-efficacy for learning.

Model Background

One study found that similarity in background influenced children's behaviors (Rosekrans, 1967). Based on the earlier theoretical considerations, we might expect that the perception of similarity could lead children to judge modeled behaviors as appropriate for themselves. These effects might be most pronounced when children have little information concerning task appropriateness.

Boys viewed a film of a peer playing a war strategy game; subjects were led to believe that they were similar or dissimilar to the model in background (e.g., home town, interests, type of school attended). At the end of the film the model was rewarded, punished, or received no consequences for his performance. Subjects in the high similarity condition judged themselves more similar to the model, produced more modeled behaviors, and recalled more of the model's actions, compared with low similarity subjects.

Why high similarity fostered learning is a matter of conjecture. Subjects may have attended more closely to the similar model's actions, or engaged in more mental rehearsal, than subjects in the low-similarity condition. That high-similarity subjects performed more modeled behaviors might have resulted from perceptions of appropriateness of behaviors; among high-similarity subjects, punishment de-pressed performance of those modeled actions that occurred immediately prior to punishment. It also is possible that high-similarity subjects felt more capable about playing the game. Similarity in model attributes can enhance self-efficacy in observers, even when the attributes have little bearing on one's ability to perform the task (Bandura, 1986).

Conclusions and Future Directions

The preceding review makes it clear that peers can foster diverse behavioral changes in children. At the same time, model-observer similarity on various attributes does not automatically enhance peer modeling. In this section I summarize the principal findings of the research, raise conceptual and methodological issues to provide directions for future research, and discuss educational implications.

Summary of Research

Studies addressing the effects of model age show that children are generally not more inclined to model the behaviors of peers or adults. Model-observer similarity in age functions as a cue for behavioral appropriateness. Age similarity seems less important with the learning of skills, rules, and novel responses than the functional value of behaviors—whether they lead to successes or failures. Children pattern their actions after competent models. To the extent that peers are viewed as equally competent as adults, the behaviors of each are likely to be modeled. When children question the competence of peers, children tend to model the behaviors of adults.

Peers may be more effective models when children hold self-doubts about their learning or performance capabilities. Viewing a peer successfully perform a task may raise children's self-efficacy for performing well more than observing an adult. Children may wonder if the adult possesses a level of competence that they are unlikely to attain. We might also expect that peers would be more influential models for social behaviors if children perceived peer social behaviors as more appropriate for themselves than those of adults. These conclusions are necessarily tentative, because few studies have assessed children's perceptions of such variables

as model competence, self-efficacy, and behavioral appropriateness. Such measures need to be incorporated into future studies to test the hypothesized mediating variables involved in peer modeling.

The research suggests that model sex can influence children's behaviors by conveying information about task appropriateness. Observing a same-sex model perform a behavior without negative consequences may lead observers to act in similar fashion. Sex of model seems less important in learning contexts. Children learn from models of either sex, but may perform behaviors displayed by models who they believe are good examples of their sex role.

Studies assessing model competence provide convincing evidence that children pattern their behaviors after competent rather than incompetent peers. Especially in situations involving learning, the functional value of behavior bears a strong relationship to subsequent modeling. When information on competence and age do not match, children are more inclined to model equally competent but younger children rather than age-mates of lower competence than themselves. Similarity in competence becomes important when children make social comparisons with peers for purposes of self-evaluation. In these situations, children are influenced by peers who they believe are similar in abilities.

Whether coping models promote behavioral changes better than mastery models seems to depend on subjects' prior experiences with and perceptions of the task. Coping models may better enhance self-efficacy and achievement behaviors among children who have encountered previous difficulties and doubt their capabilities to learn or perform well. The beneficial effects on self-efficacy presumably occur because children perceive coping models' performances as more similar to their own efforts than the faultless behaviors of mastery models. At the same time, observing multiple mastery models can raise self-efficacy and achievement behaviors as well as observing coping models even when children perceive themselves as more similar in competence to coping models. Similarity in competence may be important in situations where children have few other cues to use in assessing their capabilities for learning.

Conceptual and Methodological Issues

The studies reviewed in this article have highlighted several concerns that need to be addressed in future research. First, research should explore the mechanisms whereby peer model attributes influence children's behaviors by including such measures as perceived self-efficacy, model competence, outcome expectations, and behavioral appropriateness. With ability-related tasks, for example, perceived similarity in competence to successful models may heighten children's efficacy for learning. Children ought to perceive themselves as more similar to peers than to adults. One might hypothesize that observing peers learn skills that children believe are difficult would raise self-efficacy better than observing adult teachers model those skills, because children might believe that they are not capable of attaining the performance level demonstrated by the teacher. With less difficult tasks, children might feel highly efficacious after observing a competent teacher. Such research would have important implications for teaching, because it would suggest when using peers for instructional purposes is likely to benefit students.

Second, the literature reveals an urgent need for developmental research, because developmental factors are hypothesized to affect the processes of attention, retention, production, and motivation involved in observational learning. Although young children's behaviors are affected by observations of peers, peer model influences may become more important in late childhood and early adolescence (Hartup & Lougee, 1975). There is evidence that the use of social comparison as a basis for self-evaluation increases with development (Ruble, Feldman, & Boggiano, 1976). Young children may become more motivated by direct teacher feedback (e.g., "You can do better") than by observing the successes of their peers (Schunk, 1985). These considerations suggest that, with development, children may attend more carefully to the actions of their peers and better retain modeled information, which should promote learning.

Research also is needed on the role of model attributes among children with developmental disabilities. With the present emphasis on mainstreaming in schools, teachers routinely work with students possessing learning

problems. It is important to know, for example, whether regular students make acceptable models or whether students with learning problems benefit more by observing other students with learning problems (Peck et al., 1981). Although much social skills research has used peer models, evidence is lacking on the effects of various model attributes on children's social interactions. Such research would have important implications for how teachers might profitably group students to work on projects in classrooms.

Third, future research needs to incorporate more elaborate experimental designs and lengthier interventions. Most of the studies summarized included only two levels of a model attribute (e.g., peers vs. adults). Studies that include additional levels (younger or older children) are needed, along with research that addresses variations within a particular level. With respect to the latter point, benefits of coping models may be due to increased model-observer similarity or to portrayal of techniques for coping with difficulties (Meichenbaum, 1971). Research needs to disentangle these influences, such as by having models portray coping skills but still perform flawlessly.

Research studies typically have employed brief (one session) experimental interventions. Research is needed that uses more extensive interventions, preferably with school tasks. Brief interventions may be appropriate with behaviors that are easy to learn, but they are inadequate when complex skills are involved. Classroom teachers work on such tasks as mathematics learning and reading comprehension over the course of the school year. There is evidence that these skills depend in part on students' self-efficacy (Schunk, 1985). Just as brief interventions are unlikely to have a profound effect on complex skill learning, neither should they have a great impact on students' self-efficacy for learning those skills.

A fourth recommendation comprises several concerns about outcome measures. For one, research should include multiple measures to better address the hypothesized effects of peer models. As noted previously, there is a clear need for assessing self-efficacy, outcome expectations, and behavioral appropriateness. Research on the effects of similarity in model attributes on subjects' fears and coping behaviors should include not only such measures as ratings by others or performance on a behavioral avoidance test but also self-report or physiological indexes.

Second, few of the studies reported reliability data, even though many used nonstandardized measures. Reliability assessments need to be conducted and the results reported. A third point of concern is the relevance of many of the outcome measures to school learning. Although a few studies used school-related content (e.g., mathematics, communication skills), none of these studies was conducted in conjunction with the regular classroom curriculum. Measures that are experimentally devised to assess the effects of an intervention may have little overlap with the content taught to students at the time of the intervention. Researchers are advised to use outcome measures that fit naturally with aspects of the school's regular curriculum.

Finally, there is urgent need for researchers to address maintenance and generalization of behavioral changes. The few studies reporting maintenance data used follow-up periods ranging from 1 day to 6 months. There is no reason to expect that the effects of a brief exposure to peer models would maintain themselves for lengthy periods. Research should vary the amount of exposure to peer models and assess the effects over longer time periods.

None of the studies addressed generalization of behavioral changes to other settings. There is no evidence to indicate that cognitive skill learning brought about by exposure to peer models leads to higher achievement in school. Generalization cannot be routinely expected but rather needs to be actively programmed (Gresham, 1981). Follow-up exposures to peer models in classrooms may be needed to promote generalization.
One also can question the generality of the experimental methodologies used in these research studies, which required children to attend to live or symbolic models for varying periods of time. Studies using forced exposure to models raise the question of whether children would naturally attend to such models when not constrained to do so. In school, for example, children generally do not devote much attention to incompetent

peers. Some naturalistic observations of children in classrooms could determine the types of models to which children attend.

Implications for Education

Given the present lack of classroom-based research, drawing implications for educational practices is a speculative venture. Nonetheless, the present findings suggest some promising applications. Readers are advised to view what follows with some caution. Additional research on the effects of model-observer similarity in these domains is warranted.

Social skills training. The social skills training literature shows that peer models can promote social interaction rates of withdrawn children and can facilitate mainstreaming efforts by enhancing handicapped children's acceptance by their peers (Gresham, 1981; Peck et al., 1981). Social skill training programs typically combine modeling with other components (e.g., coaching, behavioral rehearsal of skills). Videotapes or live models are used to portray peers in different play and work situations (Gresham). Studies that include school situations in the training scenarios and have students practice skills in actual school situations should help to promote maintenance and generalization of prosocial behaviors. Future research might systematically examine the effects on positive changes in children's social interactions due to various dimensions of model-observer similarity.

One classroom application of peer models involves selecting some children as the targets of teacher reinforcement for prosocial behaviors. Strain, Kerr, and Ragland (1981) note that "spillover" effects, or generalization to other children, may occur. Even though the latter are not participating in the intervention, their social behaviors may improve. These spillover effects may occur in part because observers formulate outcome expectations based on the vicarious consequences to models; children may believe that they, too, will receive teacher reinforcement for behaving well in class. Research needs to examine children's beliefs in spillover situations.

Other applications involve training peers to initiate social interactions with students. In research by Strain and his colleagues (Strain et al., 1981), peers are trained to initiate social play with withdrawn children by using verbal signals (e.g., "Let's play blocks") and motor responses (handing child a toy). Studies have shown that initiations increase subjects' subsequent social initiations and gains often generalize to classrooms, but that amount of gain typically relates to children's entry-level social repertoires. Although training of peer initiators is time-consuming, it seems minimal compared with teacher methods of remedying social withdrawal (prompting, reinforcement) requiring near-continuous teacher involvement. A less formal application involves pairing a socially competent peer with a less competent child to work on a task. The opportunity for social interaction within the dyad can help to promote the less competent child's social skills (Mize, Ladd, & Price, 1985). Future research might examine the model-observer similarity dimension within the framework of a peer initiation program.

Self-efficacy enhancement. Peer models may be especially helpful with students who hold self-doubts about their capabilities for learning or performing well. Self-doubts typically arise when students have encountered prior difficulties learning academic material or coping with stressful situations. Observing similar peers successfully perform a task can raise self-efficacy in students because they may believe that if the peers can learn, they also can improve their skills. Self-efficacy for learning can enhance motivation and is subsequently validated as students succeed at the task (Schunk, 1985).

Teachers often apply these ideas by selecting one or more students to demonstrate a skill to other class members. The typical practice is to choose peers who master skills readily (i.e., mastery models). This arrangement may help teach skills to learners but may not have much impact on the self-efficacy of students who are experiencing difficulty learning. For these students, low achievers who have mastered skills may be excellent models. Peers also could model such coping strategies as increased concentration and hard work. During seatwork activities when teachers monitor students' work, teachers can provide learners with social

comparative information (e.g., "See how well Kevin is doing? I'm sure that you can do just as well"). Teachers who provide such information need to ensure that learners will view the comparative performance as one that they can attain. Judicious selection of referent students is necessary.

Peers also can be used to enhance observers' self-efficacy in the context of small-group work. Research shows that successful groups in which each member has some responsibility and members share rewards based on their collective performance can reduce negative ability-related social comparisons by low achievers (Ames, 1984). Teachers need to carefully select tasks, because unsuccessful groups will not raise efficacy.
Remedial instruction. Competent models promote students' learning of skills, rules, and concepts. Although teachers are competent models, they find it difficult to continually attend to the instructional needs of each student. Students with learning or other handicaps benefit most from one-to-one or small-group instruction (Young, 1981). Peers may serve as useful adjuncts to the regular classroom instructional program.

A common use of peers as instructional agents involves tutoring. Despite some tutoring studies' being marred by methodological problems, research demonstrates that tutoring can lead to academic and social gains among tutors and tutees (Feldman et al., 1976). There is evidence that a greater age differential may lead to higher tutee performance, but the nature of the interaction may be better when tutor and tutee are peers.

Using peers to help correct skill deficiencies also seems appropriate where peer teaching strategies fit well with learners' capabilities or the skills being taught. Whereas child teachers tend to use modeling and nonverbal demonstrations and to link instruction to specific items, adults typically employ more verbal instruction and relate information to be learned to other material (Ellis & Rogoff, 1982). Peer instruction may be quite beneficial with learning disabled students and other learners who do not process verbal material particularly well, as well as for any student on tasks that do not require teaching of superordinate rules or concepts.

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