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Peer Contagion in Child and Adolescent Social and Emotional Development

Thomas J. Dishion and **Jessica M. Tipsord**
Child and Family Center, University of Oregon, Eugene, Oregon 97401

Thomas J. Dishion: dishion@uoregon.edu

Abstract

In this article, we examine the construct of peer contagion in childhood and adolescence and review studies of child and adolescent development that have identified peer contagion influences. Evidence suggests that children's interactions with peers are tied to increases in aggression in early and middle childhood and amplification of problem behaviors such as drug use, delinquency, and violence in early to late adolescence. Deviancy training is one mechanism that accounts for peer contagion effects on problem behaviors from age 5 through adolescence. In addition, we discuss peer contagion relevant to depression in adolescence, and corumination as an interactive process that may account for these effects. Social network analyses suggest that peer contagion underlies the influence of friendship on obesity, unhealthy body images, and expectations. Literature is reviewed that suggests how peer contagion effects can undermine the goals of public education from elementary school through college and impair the goals of juvenile corrections systems. In particular, programs that “select” adolescents at risk for aggregated preventive interventions are particularly vulnerable to peer contagion effects. It appears that a history of peer rejection is a vulnerability factor for influence by peers, and adult monitoring, supervision, positive parenting, structure, and self-regulation serve as protective factors.

Keywords

social development; intervention; deviant peers; deviancy training; aggression; problem behavior; social network; corumination

Introduction

The term peer contagion describes a mutual influence process that occurs between an individual and a peer and includes behaviors and emotions that potentially undermine one's own development or cause harm to others. Examples of peer contagion include aggression, bullying, weapon carrying, disordered eating, drug use, and depression. The influence process often occurs outside of awareness; participants may not intend to influence their peers, but they engage in relationship behaviors that satisfy immediate needs for an audience or companionship, and these behaviors inadvertently influence themselves or others. Peer contagion occurs in natural settings involving peer interaction and can also be an outcome of intervention and educational programs that aggregate children and adolescents. Several mechanisms of peer contagion have been proposed. Among them is deviancy training, which involves the interpersonal dynamic of mutual influence during which youth respond

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positively to deviant talk and behavior. As applied to peer contagion, the deviancy training process is characterized by give-and-take exchanges between friends that promote deviant actions (e.g., past stories of deviant acts, suggestions for future behavior, what ifs) and elicit positive responses, such as laughter.

The study of peer contagion in child and adolescent development is a recent concern, as is evident by a recent review on the interpersonal context of adolescence by Smetana and colleagues (2006), which made no reference to peer contagion processes. Evidence relevant to the processes underlying the “dark side” of friendship was introduced broadly into the developmental literature by Hartup (1996) in his presidential address to the Society for Research in Child Development. Research on peer contagion processes as they relate to child and adolescent psychopathology has increased dramatically since the mid-1990s. Evidence for potential negative effects of peer interactions in settings such as preschools first emerged in the developmental literature in the mid-1960s. Because many of these studies are relevant to peer contagion, they are cited in this review in discussions of the historical context that gave rise to current research on peer contagion processes.

This review focuses on empirical literature examining peer contagion in natural settings and in programs that aggregate youth.We focus on peer contagion in children and adolescents for two reasons. First, there is clear evidence that the social influence of peers becomes less critical in adulthood (Gardner & Steinberg 2005). Moreover, neuroanatomical and social evidence suggests that adolescence may be a specifically critical period of development during which peers are especially influential (e.g., Spear 2000, Steinberg et al. 2006). Without doubt, susceptibility to peer influence increases throughout childhood and peaks during adolescence (Dishion et al. 2004, Steinberg & Monahan 2007). The past several decades of research reveal that peer interactions in childhood can have both short-term (e.g., Snyder et al. 2005) and long-lasting (e.g., Nelson & Dishion 2004) effects on development. Second, a joint focus on influence and development calls attention to the role of peer contagion during a period of rapid change. In this review, literature describing peer contagion in adult populations occasionally will be examined to suggest the pervasiveness of the process and potential future directions for research. Our examination of peer contagion also includes potential mediation mechanisms and risk and protective factors that serve as moderators of peer contagion effects. We conclude with a discussion of methodological innovations and future directions, including the possibility of the contagion of positive behaviors and emotions.

Peer Contagion in Natural Settings

Research has examined the effects of peers on aggression and antisocial behavior in childhood and adolescence, and more recently on symptoms of emotion dysregulation, such as depression in adolescence. Natural settings are those that are not intentionally created by adults to educate, prevent adverse outcomes, or treat children and adolescents with difficulties. Although some research on peer relationships has been accomplished in these settings, much of it focuses on specific peer interactions in schools.

Childhood Aggression and Antisocial Behavior

Children sort into peer groups beginning early in development. As shown in Figure 1, the literature supports a feedback loop between children's involvement in problem behavior, peer contagion dynamics, and subsequent escalations in these behaviors in adolescence. By early childhood, the actual time spent interacting with age mates surpasses the time spent with parents (Ellis et al. 1981). During early and middle childhood, gender seems to be the most salient dimension organizing peer affiliations, reflecting the dominant and implicit interest in reinforcing values and norms associated with one's gender identity (Fagot &

Rodgers 1998, Maccoby 1990). Observation studies support the contribution of peers during play to the development of aggression. The classic work by Patterson and colleagues (1967) examined the dynamic interchanges among boys in preschool settings, revealing that responses to aggression in boys on the preschool playground formed the basis for learning and amplification of aggression. In these interactions, a successful aggressive overture in response to peer conflict led to future aggression with peers on the playground. More recently, Snyder and colleagues (1997) found that aggressive preschoolers preferred one another in play, and as would be expected, such play led to later increases in aggressive behavior. Hanish and colleagues(2005) studied girls at play in preschool and found that girls' affiliations with aggressive children increased the probability of the girls' future aggression, and that changes in problem behavior in early childhood were predicted by affiliations with aggressive male and female children.

Gender sorting continues through middle childhood. Innovative studies by Cairns and colleagues developed the social-cognitive map procedure for studying peer relationships and cliques, revealing the complexity and structure of peer networks in the middle childhood years (e.g., Cairns & Cairns 1984, Cairns et al. 1989). In these systematic studies, aggressive children, boys in particular, were often found to be central to the core social cliques in the classroom despite the fact that they were often socially rejected by many classmates (Coie & Kupersmidt 1983, Dodge 1983). Rejection by peers because of aggression depends on the overall level of aggression in the school (Stormshak et al. 1999). The body of research on aggression in middle childhood suggests that peer attention may be in part an amplifying condition, with a collateral side effect of peer rejection.

Isolating the social interaction processes (i.e., microsocial processes) underlying such effects at this age is as difficult as it is rare. Snyder and colleagues (Snyder et al. 2005) randomly selected kindergarten children from their classrooms and videotaped them engaging in play in triads. They coded the content of the children's play (what they talked about) and the process (laughter, anger, etc.). Surprisingly, at age 5 many children mocked or otherwise talked about adultlike deviant acts. They found that when this behavior was received positively by randomly selected peers, the child eliciting the positive affect was more likely to increase covert forms of antisocial behavior during the subsequent two years, as reported by parents. This finding suggests that peer interactions of the kindergarten playgroup had effects that spilled over into the home environment. It is unclear if the causal mechanism was the peers' positive reaction or the child's ability to elicit a positive reaction for mocking adult deviant behavior. One might hypothesize the latter is more probable because peers were selected randomly from the classroom for this study.

More recently, Snyder and colleagues (2008) compared the long-term outcomes associated with deviancy training on the playground for 5-year-olds with those of observed coercive interactions. In coercion, children used aggressive behavior to “get their way” as an escape condition in play situations. The children were assessed at age 8 by parent, teacher, and youth report on covert (i.e., stealing, lying) and overt (i.e., aggression) antisocial behavior. As hypothesized, controlling for past antisocial behavior, coercive exchanges with peers predicted individual differences in overt antisocial behavior, whereas deviancy training predicted covert forms of antisocial behavior. This important study suggests that the mechanisms of contagion may also include negative reinforcement arrangements, in that children may collectively learn aggression in peer contexts in which “winning” a fight is the dominant problem-solving strategy, and this in turn increases the likelihood of future aggression. These findings suggest, as discussed later in this review, that adult structure and supervision of peer environments is likely one of the key moderators of peer contagion effects.

Adolescent Problem Behavior

In general, aggression as a reactive form of behavior diminishes in middle childhood (Tremblay 2000) and is replaced by more planful forms of antisocial behavior, such as stealing and other covert problem behaviors, a basic component of which is to avoid detection (Dishion & Patterson 2006). For example, rather than react aggressively, children may plan aggressive retaliations (e.g., Poulin & Boivin 2000) or engage in bullying (Olweus 1993) in situations unsupervised by adults. Thus, in adolescence aggression becomes less overt and reactive and more covert and planful (Hawley 2003). Socially sophisticated and more covert forms of aggression include ostracism, exclusion, spreading rumors, and other forms of relational damage (Crick & Bigbee 1998). Peers' involvement in proactive (or instrumental) aggression, bullying, and relational aggression is the rule rather than the exception (Grotpeter & Crick 1996, O'Connell et al. 1999, Pepler & Craig 1995, Underwood 2003, Wolke et al. 2000). Recent research has found evidence for peer contagion of relational and instrumental aggression in adolescent friendships (Sijtsema et al. 2009). Adolescents with relationally aggressive friends became more relationally aggressive themselves over time, and adolescents with more instrumentally aggressive friends became more instrumentally aggressive. These findings controlled for initial levels of aggression, various structural network effects, and selection effects (Sijtsema et al. 2009). Potential mechanisms of aggression contagion can be found in the peer context for aggressive behaviors that commonly involve encouragement, mutual participation, and attention.

At a network level of analysis, dyadic friendships are embedded within a larger social matrix of cliques and crowds (Brown 1989, La Greca et al. 2001). Statistical and methodological challenges arise, however, when examining the function of social networks relevant to changes in adolescent problem behavior. In a sophisticated analysis of social network data of 207 Latino male adolescents in New York City, longitudinal data about the peer network and data from self-reports of carrying weapons were collected. Dijkstra and colleagues (2010) found that in early adolescence, the propensity to carry weapons was quite stable over a one-year period ($r = 0.63$). If weapon carrying is functional in the peer group, likely it is correlated with improved relationships among peers. Indeed, weapon carrying was predictive of a positive change in the number of friendship nominations in this inner city sample and a decrease in “disliked” nominations. As might be expected, associating with friends who carry weapons was associated with increases in weapon carrying over the course of a year. These findings held when controlling for prior levels of aggression and therefore suggest a peer contagion effect for more dangerous problem behaviors in communities already marked by violence.

Two recent longitudinal investigations that approached the problem of adolescent violence from a development and psychopathology perspective similarly documented the significance of gangs and deviant peer groups in the amplification of problem behavior (Dodge et al. 2008 Dodge et al. 2010). Both studies tested a “cascade” model for the progression from antisocial behavior to more serious forms of violence, with the drift into a deviant peer group identified as a core component of the progression. The models fit the data well; violence by age 18–19 was remarkably well predicted by gang identification and involvement at age 14 (Dishion et al. 2010).

Our work during the past 15 years has focused on studying deviancy training processes in adolescent friendships (Dishion et al. 1995, 1996, 1997). This work benefited from shifting the observation focus to what youth talked about with their friends and their affective responses to the semantic content. These analyses revealed that heavy reinforcement in a friendship characterized by deviant stories, endorsements of deviant attitudes, norm-violating behavior, and suggestions of deviant activity was prognostic of growth in delinquency (Dishion et al. 1996), drug use (Dishion et al. 1995), and violent behavior

(Dishion et al. 1997). In addition, Patterson and colleagues (2000) have shown that deviancy training mediates the link between involvement in a deviant peer group in early adolescence (age 13–14) and negative outcomes, such as drug and alcohol use and high-risk sexual behavior in early adulthood. These findings are alarming when one considers that the deviancy training measurement was based on 30 minutes of videotaped friendship interactions in a contrived interaction task. More recently, Piehler & Dishion (2007) found that a simple index of duration of deviant talk bouts differentiated youth defined developmentally as early-onset antisocial, late-onset antisocial, and successful (see Figure 2).

The deviancy training interpersonal dynamic lends itself to the application of process tools such as dynamic systems analysis. Granic & Dishion (2003) examined deviant talk as an attractor within a dynamic systems framework. The concept of an attractor is elegantly simple. Applied to interpersonal behavior, it involves a dyad “getting stuck” in a topic or interaction pattern and finding it difficult to shift topics or patterns. Researchers found that youth comorbid for depression and problem behavior were more likely to increase the length of their deviant talk bouts throughout a 30-minute laboratory session. Growth in adolescent problem behavior was predicted by the dyadic tendency to have increasingly longer deviant talk bouts during the videotaped discussion. In short, being in a friendship that tended to get stuck in deviant topics was associated with increasing levels of problem behavior over the course of adolescence.

Another approach to studying the dyadic dynamic underlying peer contagion has been to consider the extent to which a friendship is interpersonally organized around topics of deviance. Entropy is one dynamic systems index of interpersonal organization (Attneave 1959, Krippendorff 1986). Low entropy describes a social interaction that is well organized and predictable, and high entropy indicates a chaotic, complex, and unpredictable interpersonal exchange. Dishion et al. (2004) found that friendships involving boys with a history of antisocial behavior were high in entropy (disorganized and unpredictable) compared with those without such a history. However, social interaction entropy did not predict future behavior. The main effects for predicting antisocial behavior at age 24 from friendship interactions at age 14 were history of antisocial behavior and duration of deviant talk bouts. The statistically reliable interaction effect between deviant talk and entropy was perhaps the most interesting. Friendship interactions that were low in entropy and high in deviant talk were the most prognostic of antisocial behavior 10 years later (Dishion et al. 2004). The interpretation of this effect is that the youth more likely to continue on a pathway of deviance were those who were the most practiced at establishing and maintaining friendships on the basis of deviant talk.

Using direct observations of male and of female adolescent friendships, Piehler & Dishion (2007) extended this dynamic systems focus of entropy to the construct of dyadic mutuality. Friendships high in dyadic mutuality demonstrated responsive and reciprocal exchanges that were marked by a high degree of cooperation and closeness. Supporting the entropy findings, those dyads high in both mutuality and deviant talk were also especially likely to demonstrate high levels of antisocial behavior. These results lend further support to the idea that the most reciprocally engaging and organized friendships may also be the most influential in creating norms for behavior, be they deviant or prosocial. The data also suggest that the formation of friendships organized in deviance is perhaps the key mechanism underlying the very poor outcomes associated with early-onset antisocial behavior (Moffitt 1993, Patterson & Yoerger 1993, Robins 1966).

Disordered Eating

The concept of disordered eating in adolescence is complicated because various social dynamics steer patterns of overeating that lead to obesity, problematic dieting, purging practices in bulimia, and food restriction in anorexia (Stice & Bulik 2008). Clearly, changes in attitudes about nutrition and exercise during the past decades underlie the current epidemic in childhood obesity (Krishnamoorthy et al. 2006). It is often assumed that disordered eating results from a combination of genetic predisposition and family dynamics that determine health practices. This assumption was called into question by the innovative application of social network analysis in the Framingham Heart Study (Christakis & Fowler 2007). In this longitudinal work, it was found that same-gender, mutual friends had the most influence on the development of obesity in adulthood, and siblings and opposite-sex friends had no influence. This approach to social network analysis was later applied to a large national sample of adolescents (Fowler & Christakis 2009), and the effects were replicated in terms of health-related behaviors, such as exercise in general and development of obesity in particular.

As provocative as these findings are, scant research has examined the social mechanisms underlying disordered eating among children and adolescents. Intuitively, one might speculate that obesity is a collateral effect of the influence of activity preferences in friendship, such as enjoying sedentary activities that create social contexts for eating and drinking. However, to our knowledge, this hypothesis has yet to be tested. At a deeper level, it may also be true that a process akin to deviancy training for problem behavior also applies. Friends share perspectives and become more similar in terms of body image, concern about body image, or even dysfunctional strategies for dieting as weight control (Hutchinson & Rapee 2007). One study showed that among adolescent girls, a friend's use of extreme weight-loss behaviors predicted the adolescent's use, after individual physical and psychological variables were accounted for (e.g., body mass index, depression; Paxton et al. 1999). Some occurrence of comorbidity involving bulimia, substance use, and depression in female adolescents (Stice et al. 2004) suggests shared peer dynamics associated with all three outcomes.

Depressive Symptoms

Most of the research on peer contagion has focused on the role of friendships in amplifying problem behavior. However, contagion of emotion is equally plausible, and the neuroanatomical underpinnings have been studied (Hatfield et al. 1993). Peer contagion of emotional distress in children and adolescents is an especially important topic of research, given that the experience of depression is increasing (Costello et al. 2006), and its observed continuity from adolescence through adulthood is relatively high (Garber 2000). Stevens & Prinstein (2005) found that an adolescent's friends' depressive symptoms predicted future depressive symptoms in the adolescent (controlling for the adolescent's own initial levels of depressive symptoms). Among adolescents with reciprocated friendships, the friend's depressive attributional style at Time 1 was associated with the adolescent's attributional style at Time 2, suggesting that negative thinking styles are also influenced by peers. Depressive symptom contagion appears to work differently for boys than for girls. Prinstein (2007) found that for boys, depressive contagion occurred when the quality of the friendship (i.e., satisfaction) was low or the peer was popular. For girls, only those high in social anxiety were influenced by their peer's level of depressive symptoms.

What might be the mechanism of depressive symptom contagion? Researchers have suggested that corumination, excessive reassurance seeking, and negative feedback seeking are potential mechanisms (Stevens & Prinstein 2005). Corumination, or the excessive discussion of problems within the interpersonal context, might exacerbate negative emotions

(Rose 2002). Corumination is more common among girls and has been linked to depression, anxiety, and greater friendship quality among adolescents (Rose 2002). Longitudinal research suggests a bidirectional relationship between corumination and internalizing symptoms (Hankin et al. 2010, Rose et al. 2007). Moreover, Hankin and colleagues (2010) found that the relationship between corumination and prospective increases in internalizing symptoms was partially mediated by increases in dependent interpersonal stressors (i.e., stressors that can be partially attributed to the characteristics and actions of the person). Also notable, recent research with adolescent girls found that corumination predicted increases in depressive symptoms only for girls who had more romantic experiences (Starr & Davila 2009). The content of corumination for boys and for girls is likely to be quite different, so the form of emotional distress may be unique for each gender. More research is clearly needed to examine the growth of depressive symptoms and corumination among adolescents and their peers to examine whether the process of corumination can explain the contagion of depressive symptoms.

Of considerable alarm is the possibility that adolescent suicide and self-mutilation practices have a contagion quality. There is some support for self-mutilation fitting a contagion model (Rosen & Walsh 1989), but it is very difficult to test because of the low base rate of the phenomenon, and suicides and self-mutilation that seem to mimic other instances occur in rare occasions that are difficult to study systematically.

Emotional Experience

Another explanation for the spread of depressive symptoms is the contagion of negative emotions. There is some evidence for negative mood induction in peers who interacted with dysphoric adolescent girls (Baker et al. 1996). Given that emotion contagion is part and parcel of the human experience, there is surprisingly little research on possible contagion of positive emotional experiences in youth. Innovative social networking research of adults reveals that one's mutual friendships in adulthood can influence one's own happiness over time (Fowler & Christakis 2009). The effect is apparent even for the general clique, including friends of friends. Interestingly, it was primarily friendships that were found to be prognostic of future happiness, and family members or spouses less so. The topic of positive peer contagion is taken up later in this review as a promising direction for future research.

Peer Contagion in Interventions

Research has most often examined peer influence outside the context of intervention research, treating peer contagion as a disruptor of normative socialization. However, it is clear that much of normative socialization involves adult efforts to create environments that children enjoy and that involve other children. The intention to promote child and adolescent positive development emerged among the general public in the twentieth century and focused on group activities such as sports, peer religious activities, private schools, and the like. However, creating aggregated institutions for children in an effort to address problem behavior is historically an older practice, as are the incidental observations of possible negative effects (Dishion & Patterson 2006). An interesting area of neglect in psychological research is the systematic study of iatrogenic effects of psychological interventions in general, but in particular, the effects of aggregating problematic children despite the obvious potential for such strategies to increase problem behavior.

Feldman (1992) was the first psychologist to systematically study and report increases in problem behavior in randomized interventions that aggregated antisocial adolescents. Joan McCord, a criminologist and sociologist, also pioneered the study of potential negative effects of interventions for high-risk youth (McCord 1981, 1992).In a post hoc exploration of the mechanisms underlying the 30-year negative effects of the Cambridge-Sommerville

youth program, she found that sending high-risk youth to summer camps was associated with an increased likelihood of long-term iatrogenic effects (McCord 2003). The recent reappraisal of the potential for peer contagion in intervention and educational programs, empirical research and findings, and the salience of the potential policy implications are summarized in a recent book (Dodge et al. 2006) (see Reducing Peer Contagion sidebar). The next major section of this review provides an overview of the research addressing possible peer contagion effects in intervention and educational programs.

Figure 3 is a summary of intervention strategies that have been associated with increases in problem behavior, despite adults' efforts to reduce or prevent such behavior. Studying peer contagion effects in education and intervention programs poses some methodological challenges. One is that the programs rarely use random assignment, which could help reveal their potential negative effects. The second is that statistical power is often limited because the unit of randomization has never been “risk for peer contagion” (for obvious ethical reasons); thus, negative effects and the underlying mechanisms are difficult to study. Undoubtedly, not all children respond alike to being aggregated with other children with problem behavior. Because the data clearly suggest that not all interventions or programs that aggregate children have negative effects, more research is needed on which children respond negatively to aggregation and what conditions are most likely to produce negative effects.

Selected prevention programs are those that screen youth as at risk for psychopathology, and for efficiency, target those youth for a specific intervention deemed to improve their risk and thereby reduce outcomes such as problem behavior or psychopathology. The selected prevention programs that aggregate these high-risk youth and that are often delivered in a school context provide the most compelling evidence for peer contagion potentiating iatrogenic effects. A mixed set of findings has emerged from research efforts to identify the mediation processes underlying the peer contagion process.

Following is a discussion of peer contagion relevant to selected interventions in elementary school, secondary school (middle and high school), college, and juvenile correction contexts. The discussion concludes with a review of meta-analyses and research suggesting that aggregating youth might reduce the effectiveness of intervention and prevention programs.

Elementary School

School-based prevention is by far the most cost-effective public health strategy for improving the lives of children and adolescents. At least two randomized trials conducted in public elementary schools underscore the importance of peer contagion to prevention science. Most noteworthy is Kellam and colleagues' prevention trial revealing that first-grade classrooms that included aggressive children and that did not have a structured and effective behavior management plan showed increases in the children's aggression and other forms of problem behavior, and that the effects lasted through elementary school (Kellam et al. 1998).

The second study, which included children in second-grade classrooms with a high density of aggressive children, found increased future levels of aggression in the children (Warren et al. 2005). Note that in both studies the intervention itself did not cause increases in problem behavior; rather, the context—high-risk children in a public elementary school environment—was the factor underlying peer contagion in terms of aggression.

Lavallee and colleagues (2005) examined the child interactive processes of high-risk elementary school children in the context of the Fast Track Program social skills group

intervention. This multimodal selected prevention program involved carefully designed interventions for preidentified, high-risk 6-year-olds, relevant to family, school, and peer domains. It was designed to prevent escalation of early problem behavior to more serious forms of conduct disorder and delinquency in adolescence. Because of the multimodal nature of the randomized trial, it is difficult to disentangle the effects of any single intervention component, and no negative effects were observed in general. Nevertheless, when Lavallee and colleagues observed the peer interactions in the social skills training groups, they found that teacher ratings of peer escalation and reinforcement (i.e., deviancy training) in the group accounted for individual differences in increases in aggression over time, controlling for preintervention individual and group characteristics. This finding is noteworthy with respect to the need to study peer contagion processes in group interventions using statistical tools other than mean-level analyses. It is likely that peer contagion can reduce effect sizes at a minimum, and at a maximum, create negative effects.

When considering group-based selected prevention strategies, one may question who is most affected by the unfolding peer dynamics. In a study of the characteristics of participants in a group intervention for high-risk youth attending inner-city, poorly funded elementary schools, Boxer and colleagues (2005) examined the amplification of problem behavior among high-risk youth and among typically developing youth in the context of intervention groups. Multilevel modeling revealed both to be the case: When group members were discrepant in their level of problem behavior, individual children changed the most, with the higher-risk children pulled down (i.e., engaged in less problem behavior) when the group was mostly low in problem behavior, and the low-risk children pulled up toward more problem behavior when the group members were primarily deviant.

Secondary Schooling

A similar study was reported by Mager and colleagues (2005) with an older and smaller sample ($N = 139$) of middle school youth. The outcomes of students in pure problem behavior groups were compared with those in mixed groups. Contrary to expectation, youth in the mixed group showed the poorest outcomes, which were accounted for by deviancy training in the group. It may seem anomalous that groups that were homogeneous in terms of high levels of problem behavior were seemingly unaffected by group placement. However, this finding is reminiscent of the now-classic and important finding of Vitaro and colleagues (1997), which showed that adolescents in the moderate range of delinquency were most influenced by the deviancy of their friendships, compared with those with high levels of problem behavior.

Our work with middle school youth and a selected intervention revealed that random assignment to a cognitive-behavioral intervention for high-risk young adolescents that was delivered in a group format resulted in increases in smoking and delinquent behavior that lasted for at least three years (Dishion & Andrews 1995, Dishion et al. 1999, Poulin et al. 2001). An analysis of the observed social interaction mechanisms in the group intervention sessions indicated that deviancy training among the adolescent participants occurred during the program's unstructured times and accounted for individual differences in these behaviors (Dishion et al. 2001).

There are two basic strategies for school-based prevention programs in high school. One is to create special classroom environments for problematic students. The second is to integrate prevention programs into a core class that all high school students participate in, such as a health class. Relevant to the first strategy, Eggert and colleagues (1994) designed a program for disaffected youth that involved increasing the amount and quality of teacher–student interaction. This intervention strategy produced positive effects in the original efficacy trials. However, wider-scale implementation of this model showed that on occasion, this strategy

backfired and actually produced iatrogenic effects (Cho et al. 2005). High school youth reported increased exposure to high-risk peer environments, anger, and decreases in grades, school connectedness, and conventional peer bonding.

Relevant to the second strategy for school-based prevention programs, universal interventions in classrooms have often been quite successful in preventing behaviors such as adolescent onset of substance use (Botvin 2000). However, some evidence suggests this strategy can have harmful effects. The careful investigation by Moberg & Piper (1998) that evaluated the effects of a prevention program for high-risk sexual behavior revealed that the very behaviors targeted for prevention actually increased.

In addition, a recent randomized prevention trial in which students were assigned to a control classroom, or an evidence-based substance use prevention program (i.e., Project Towards No Drugs [TND]), or a modification of the program that was peer led and interactive (i.e., more group activities and discussion) found the TND intervention to be iatrogenic in the high-risk sample (Valente et al. 2007). The peer-led intervention worked to decrease drug use (i.e., monthly marijuana and cocaine use and the composite use score at one-year follow-up) for those who had friends that did not use drugs, but it actually increased drug use for those who had friends that used (Valente et al. 2007). Thus, aggregating youth and encouraging interaction resulted in accelerated peer influence.

College

In higher-education settings, students often live in dormitory-type residences. Although these living situations are not commonly thought of as an intervention, it is reasonable to assume the living situation has potential effects on the behavior and adjustment of young adults. In a unique and innovative study of the impact of roommates on substance use during college, Duncan and colleagues (2005) randomly assigned 18-year-old freshmen (who did not have a roommate preference) to college dormitory roommates. The researchers found that males who were assigned a roommate who shared their high school drinking history had a fourfold risk of increasing their drinking episodes over the course of the ensuing academic year. Moreover, it has been suspected for some time that the unfortunate rise in the occurrence of eating disorders was reaching into the fabric of college life, especially for females. Contagion of eating disorders has been found among females involved in the sorority system (Crandall 1988). Although in general, prevention programs for eating disorders seem to be largely successful (Stice & Shaw 2004), selected interventions may at times be iatrogenic (Mann et al. 1997).

Juvenile Corrections

The evidence for peer influence on adolescent delinquency and criminal behavior is so overwhelming that criminologists have considered delinquency to be a team activity (Elliott et al. 1985, Gold 1974, Reiss 1986). It is not surprising, then, that adolescents placed in juvenile correction settings develop friendships and networks conducive to learning new forms of crime and strategies for manipulating law enforcement (Andrews 1980, Bayer et al. 2004, Clarke-McLean 1996). Analysis of random assignment to treatment foster care as opposed to group residential treatment revealed that treatment foster care is associated with reductions in problem behavior, and group residential treatment is associated with increases in problem behavior (Leve & Chamberlain 2005). An analysis of the mediation of differential intervention effects revealed deviant peer affiliations to be the key mechanism, and group residential care has the highest levels of these affiliations.

Not all group residential facilities for children and adolescents are equivalent. A well-developed group residential program, such as that provided on the Boys Town campus, does

not seem to produce overall negative effects. Nevertheless, for a small percentage of participants (7%), problem behavior increased over the course of the year, and the increase was observed to be associated with the density of deviant peers in the program (Lee & Thompson 2009).

An important consideration is whether high-risk youth who come into contact with the juvenile justice system can be rehabilitated or whether they would be better off left alone or treated in the community without segregation or aggregation. Studies addressing this issue are difficult to conduct because they require longitudinal analysis of youth trajectories of problem behavior from early childhood through adolescence into adulthood, with careful documenting and coding of juvenile justice contacts. In just such a study conducted in Montreal, it was found that, indeed, the intensity of juvenile justice interventions was associated with escalating problem behavior (Gatti et al. 2009). “Intensity” was coded on a continuum, with residential placement regarded as the most intense, and it reflected the density of deviant peers in the intervention. Escalations in problem behavior associated with the juvenile justice interventions occurred regardless of the youth's level of deviance before being arrested. Surprisingly, self, parent, and teacher reports of deviance did not predict the intensity of the juvenile justice intervention.

Benign Effects of Peer Aggregation

Although peer contagion is more likely to occur in interventions that aggregate children and adolescents, well-supervised interventions that aggregate do not seem to produce overall negative effects. A literature review of carefully conducted randomized trials of cognitive-behavioral group treatment for children's antisocial behavior revealed that peer contagion did not produce negative effects in any of the studies (Weiss et al. 2005). It appears that systematic approaches to providing group treatment for adolescent drug use may be beneficial (Dennis et al. 2004), yet there is evidence that selected prevention programs to prevent substance use can be harmful for some youth (Valente et al. 2007, discussed above).

Similarly, using systematic meta-analysis methods, Lipsey (2006) concluded that the literature by and large did not reveal negative effects of group interventions relevant to antisocial behavior, but rather positive effects. However, it was noted that selected prevention studies of aggregation had reduced effect sizes (Lipsey 2006). Dodge and colleagues (2006) suggested that the study of peer contagion be expanded to consider the role of peers in reducing effect sizes. Few studies have used this strategy. For one, Lavallee and associates (2005) observed deviancy training in Fast Track social skills interventions in elementary school. Although there was no evidence of negative effects, observed deviancy training in the groups was related to modest increases in aggression for some children, despite the finding that the overall mean-level effects for the intervention were positive. Also noteworthy is that careful analysis of the group residential treatment in the Teaching Family model found that the density of the contact with deviant peers in the treatment home was associated with growth in problem behavior despite the overall positive treatment effects (Lee & Thompson 2009).

It is interesting to note that to date, the content of interventions has not been disentangled from the intervention process, for example, by randomly assigning participants to an individually administered versus a group-administered session. For example, very few studies have systematically compared (through random assignment) the benefits of a cognitive-behavioral intervention delivered to individuals versus to a group. Of notable exception is J.E. Lochman's ongoing study (2008, personal communication) to determine whether the empirically supported Coping Power intervention is more effective for reducing problem behavior when administered individually than when it is administered in a group of other high-risk children.

Measurement of peer dynamics underlying benefits to and possible harm of peer aggregation is only beginning, so it is plausible that the conditions most likely to lead to harmful effects during specific developmental periods will be clarified in the next decade. However, evidence suggests that child characteristics and setting characteristics moderate peer contagion effects in natural settings as well as in interventions that aggregate.

Moderators of Peer Contagion

Prinstein (2007) described four types of peer contagion moderators: target characteristics (e.g., social anxiety, self-regulation), peer characteristics (e.g., status), relationship characteristics (e.g., quality, closeness), and contextual characteristics (e.g., activity structure). Research on how relationship characteristics affect contagion processes is complex. Although some research finds that high-quality relationships are the most influential (Piehler & Dishion 2007, Stevens & Prinstein 2005), other research suggests that adolescents may be more influenced by someone with whom they want to develop a closer relationship (e.g., unreciprocated friendships) and in friendships with low levels of positive friendship quality (Poulin et al. 1999, Prinstein 2007). These paradoxical findings underscore the need for more research on the moderating effect of friendship quality and mutuality. Following is a discussion of several other moderators, including target characteristics (self-regulation), contextual characteristics (parental monitoring, structure, and social rejection), and peer characteristics (status).

Self-Regulation

Self-regulation involves the ability to manage one's prepotent tendencies in terms of the needs and demands of the environment, optimizing long-term goals over short-term motivations (see Mindfulness and Self-Regulation sidebar). For example, avoiding situations in which it may be challenging to say “no” is a self-regulation strategy. Self-regulation also involves daily routines—such as sleep, exercise, diet, work, and play—that keep individuals on track with goals. Clearly, much of self-regulation is framed in diurnal cycles, is automatic and unconscious in nature, and in this sense, is entrained (Bargh & Chartrand 1999, Bargh & Williams 2006, Fitzsimons & Bargh 2004). We are aware of our self-regulation most when some aspect of the routine is disrupted, such as when traveling to a new time zone or experiencing a radically different culture.

The self-regulation construct has a long track record in accounting for variation in early adolescent drug use (e.g., Wills et al. 1995) and is central to the highly influential control theory of delinquency and crime (Hirschi 1971). Wills & Dishion (2004) proposed a transactional model for adolescent drug use that accounts for the potential interaction between peer influence and adolescent substance use. Hirschi (2004) proposed a similar model for the link between self-control and crime. Both models hypothesize that individuals with high levels of self-control are less vulnerable to peer contagion effects to use drugs or commit antisocial acts.

In the past two years, longitudinal analyses have supported this hypothesis. An elegant analysis reported by Goodnight and colleagues (2006) found that the influence of a deviant friend was moderated by individual differences in ability to inhibit behavior in the context of rewards. Adolescents who were more vulnerable to rewards were less likely to inhibit and also showed a higher level of correlation between friend deviance and delinquent behavior. This finding was replicated by examining the role of self-regulation in moderating the influence of peers relevant to subsequent problem behavior (drug use and delinquency) from middle to late adolescence (Dishion & Connell 2006, Gardner et al. 2008). The self-regulation construct was defined by using the Rothbart measure of effortful control (Ellis & Rothbart 2005), including adolescent and parent report of effortful control and teacher

reports of self-control in the context of school. As hypothesized, adolescents with high levels of self-regulation were less vulnerable to peer influences to engage in problem behaviors.

Adult Monitoring and Structure

Given the mixed findings from the intervention literature about peer contagion effects, it is reasonable to assume that one potential moderator of these effects is amount of structure and monitoring provided by adults in the intervention. To date, few reports have been published about adult structure and monitoring in the context of interventions that aggregate, accounting for variations in outcomes. In our research, observations of high-risk youth during the unstructured periods of the group intervention sessions yielded the highest levels of deviancy training, which in turn predicted escalations in tobacco use and delinquent behavior. In a comprehensive review of the literature about interventions and programs with a variation of outcomes from positive to negative, Dodge et al. (2006) suggested that adult monitoring and structure of peer interactions was likely to be one of the key moderators of iatrogenic effects.

The empirical literature is better developed in terms of studies of peer contagion in the natural environment. Such research strongly suggests that parental structure and monitoring, and positive parenting, are major moderators of peer contagion effects. Three studies are particularly relevant to this point. First, an innovative longitudinal study reported by Laird and colleagues (2008) consisted of a person-centered trajectory analysis of a sample of adolescents. Two groups were identified, one with decreasing monitoring over time and a second with relatively high levels that were stable through adolescence. For the latter group, the covariation between having deviant friends and the youths' problem behavior was significantly less than for those whose parents were decreasing their monitoring over time. The results of this analysis fit well with a study that showed a significant interaction between changes in observed family management and deviancy training from early to late adolescence. As such, deviancy training among adolescent friends was prognostic of growth in problem behavior from adolescence to young adulthood only for those whose parents were decreasing their monitoring and structure over time (Dishion et al. 2004). Even in a sample of urban and somewhat disadvantaged children, greater parental monitoring was linked to less deviant peer affiliation; this effect remained when controlling for age, sex, socioeconomic status, neighborhood disadvantage, and early aggression. In addition, increases in parental monitoring from year to year were related to subsequent decreases in deviant peer affiliation (Lloyd & Anthony 2003).

Finally, longitudinal research in early adolescence suggests that negative parenting moderated the influence of deviant peer involvement on problem behavior in early adolescence (Mrug & Windle 2009). Approximately 500 predominantly African American youth were originally assessed at age 10 and followed to age 13. A negative parenting construct was created when the youth were age 10, as were peer deviancy and antisocial behavior constructs. Externalizing behavior was reassessed at age 13. Youth with high levels of both negative parenting and peer deviancy were the most likely to escalate in problem behavior, as were youth with high levels of antisocial behavior and peer deviancy. Youth with high levels of problem behavior and those whose parents did not use positive parenting practices were more likely to escalate to more serious forms of delinquent behavior.

Social Rejection

The link between social rejection and peer contagion is an interesting but underdeveloped area of research, in or outside the context of intervention studies. We know that children who have been socially rejected are more likely to cluster into peer groups that are likely to

promote deviant behavior (Bagwell et al. 2000, Dishion et al. 1991, Miller-Johnson et al. 2002). However, less work has addressed whether poor-quality friendships and social rejection lead to more influence. Innovative observation research by Snyder and associates (2010) found that from kindergarten through age 9, impulsive and peer-rejected children tended to be more influenced by deviancy training. Similarly, a study by Poulin et al. (1999) used direct observation to examine the quality of adolescent friendships as a predictor of the influence of deviancy training. They found that friendship quality was a moderator in that higher-quality friendships were less influenced by deviant talk during the course of the ensuing year.

The analysis of social rejection as a moderator is a complex undertaking, in part because of the importance of a youth's ecology. We have known for some time that in some ecologies and classrooms, problem behavior is the source of popularity and acceptance (e.g., Stormshak et al. 1999), whereas in others, it is a source of peer rejection (e.g., Coie & Kupersmidt 1983, Dodge 1983). The impact of social rejection by a particular group is relative to a child's or adolescent's overall connectedness with peers. Although in one analysis we found that the link between rejection and deviant peer clustering varied from school to school (Light & Dishion 2007), our social augmentation hypothesis proposes that youth rejected by peers are generally more susceptible to both deviant peer clustering and influence over time (Dishion et al. 2008). This hypothesis awaits further examination in studies with careful multilevel and ecological measurement and multivariate analytic strategies that control for other characteristics of the youth that may underlie peer rejection.

Peer Status

Social psychology research has continuously shown that conformity is influenced by status: People are more likely to be influenced by someone with high status. In an interesting experimental study, Cohen & Prinstein (2006) found that peer contagion was more likely to occur when peers' status ranked high (i.e., popular and accepted). In the study, participants believed they were interacting with an actual peer in a virtual room, but in reality the “peer” was an e-confederate. Experimental manipulation indicated how much status the e-confederate had. Participants in the high-status condition were not only influenced to endorse aggressive and risky behavior more often, but they were also more likely to ostracize another e-confederate (whom they thought was a fellow student) when the high-status peer did so. In addition, boys were more susceptible to depressive contagion when their friend scored high in peer-perceived popularity (Prinstein 2007).

Summary and Implications

Peer contagion in childhood and adolescence is a recent research focus in psychology within the domains of developmental psychopathology, developmental psychology, and intervention science. Concern about the dark side of friendships during this key period of development was only recently articulated by Hartup(1996) in his presidential address to the Society of Research in Child Development, previously noted in this review. In the 1960s, studies of the spread of aggressiveness on the preschool playground reported findings that substantiated the prospect of peer contagion. The past 10 years have produced ample evidence that peers can contribute to the amplification of problem behavior and distress from early childhood through late adolescence. Random-assignment intervention studies suggest that peer contagion dynamics are not readily controlled in programs, interventions, or educational practices that aggregate high-risk youth (Dodge et al. 2006).

A primary concern of peer contagion research is to identify influence mechanisms. One candidate is the deviancy training process during which children organize their relationships around the expression of problem behavior or emotional distress, which appears to amplify

these symptoms over time. These interaction mechanisms underlying influence have psychological parallels that appear important but require more research, such as the “false consensus bias,” when adolescents overestimate the similarity of their friends and peer group at large in terms of their engagement and endorsement of deviant behavior (Prinstein & Wang 2005).

Research on factors that reduce or enhance peer contagion effects is just beginning. Adult structure, monitoring, and leadership likely are major moderators of peer contagion effects in adolescents' everyday environment and especially for reducing peer contagion during intervention studies. Individual differences in children's self-regulation have also been shown to moderate the influence of peers on subsequent behavior. Finally, being socially rejected may render youth more vulnerable to peer effects. The extent to which individual differences shape susceptibility to peer contagion in interventions and programs and in the natural environment is critically important for adapting and tailoring interventions to the specific needs of youth to ensure more benefit than harm.

Research on peer contagion has been improved by methodological innovations. Future research would be benefited by using these methods to advance the study of the mechanisms of peer contagion, the conditions under which iatrogenic effects of interventions may occur, and the effects of positive peer influences.

Methodological Innovations

Several methodological tools are now available for studying peer contagion that were unavailable a decade ago. For example, observation systems that capture both deviant talk and positive reactions from age 5 through adolescence are available, as are measures that are potentially useful for measuring peer contagion in intervention groups.

Statistically, the development of dynamic systems as a quantitative tool for examining qualitative shifts in relationship interactions that account for long-term patterns of influence are promising for future research. In addition, the development of trajectory analyses and mixture modeling of longitudinal data enables peer contagion research to model patterns of covariation of peers among youth who are on quite different developmental pathways, and to clarify the role of peers for high-risk and for low-risk youth, for example.

One of the core methodological issues when considering peer contagion at the network level is differentiating selection from influence. Statistical advances combining social network analyses and meta-analytic procedures allow researchers to separate selection and influence effects. Specifically, multilevel social network analysis (Snijders & Baerveldt 2003) can be used to simultaneously estimate the relative contributions of selection and influence (e.g., Sijtsema et al. 2009). Sijtsema and colleagues (2009) used this technique to analyze data on students' friendship networks at three time points and found that the effect sizes for influence were greater than selection effects for instrumental, reactive, and relational aggression. Modeling friendship networks over time could help illuminate the mechanisms of peer contagion and allow researchers to separate the effects of selection and influence.

Technology and basic science have advanced to a point at which we can study the role of genetic polymorphisms underlying the propensity to be vulnerable, or conversely, invulnerable, to peer influence. In fact, a recent study on adolescent drug use found a gene-by-environment interaction such that those with a genetic liability to substance use were more influenced by best friends who were users (Harden et al. 2008). Genetic factors were also correlated with selection of a best friend who was a heavy user.

Finally, much of what we are interested in learning about peer contagion unfolds in milliseconds. The development of imaging techniques has rapidly widened the social neuroscience program of research. It has led to increased understanding of the social human brain, which is highly focused and responsive to the social environment, including an area of the brain that mirrors the behavior of the other or that responds to social rejection. It is particularly important to better understand change in the adolescent brain in terms of potential social influence. With a downward shift during puberty in self-regulatory abilities may also be an upward shift in attentional biases to peer social stimuli, sensitivity to social reward, and concomitant vulnerability to peer contagion.

Mechanisms of Contagion

Deviancy training dynamics among friends have been shown to lead to escalation in adolescent drug use, delinquency, and, more troubling, to violence. Without doubt, several events in the past decade involving tragic violent acts have been defined by peer contagion (e.g., the Columbine shootings). Another interpersonal process that may be a mechanism of depressive contagion, corumination, also deserves more investigation. There have been no direct tests of corumination as a mediator of depressive contagion.

The salience of language to the dynamics of peer contagion is clear and is without question a uniquely human capability. For example, the concept of “partying” is shared by many English speakers prone to use drugs and alcohol and can prompt a set of preparatory acts, such as the purchase of drugs or alcohol and excited communication between friends (e.g., cell phone texting) to join in the event. The pattern of partying is inherently positive (classical conditioning) and functionally valuable (more friends, opportunities for pleasure). Thus, peer contagion is made possible and highly fluid by language and is central to the rapid spread of behaviors and emotions. Intrinsic to deviancy training and corumination is the dynamic of language itself reinforcing behavior. Deviancy training in adolescent friendships is a very specific exemplar of a general mechanism underlying human conversation and influence, best understood by applying principles of relational frame theory to social interaction (Hayes et al. 2001). Interpersonally positive responses to verbal statements are potent sources of reinforcement; it is as if one were rewarding a set of behaviors that are associated with the values and attitudes inherent in the words. Similarly, coruminating about problems with a friend may be reinforcing because the process increases friendship quality and closeness (Rose 2002). However, the individual's ruminative thoughts are also reinforced, and rumination is a risk factor for depression (Nolen-Hoeksema et al. 1999). Research indeed has found that corumination leads to later depression among adolescent girls (Rose et al. 2007). To further explore the process of corumination, more detailed observational coding (similar to the coding of deviancy training described above) is needed to assess both the content of the conversation and the emotional and behavioral responses of adolescents and their peers to the discussion of problems.

Interventions

Research on interventions for children and adolescents suggests that peer contagion can undermine the positive intentions associated with interventions that aggregate children and adolescents. At worst, these interventions run the risk of causing harm to children and adolescents, or at the least, reducing the effectiveness of the intervention strategy (Dodge & Sherill 2006). Unfortunately, as of this writing, very little intervention research has responded by systematically and randomly varying the content of the intervention (i.e., cognitive-behavioral versus psychodynamic) from the format (individual versus group). Nor does there seem to be much interest in intervention science to systematically study collateral side effects of aggregating youth into groups. The focus has more often been on the positive

effects (e.g., selfesteem, decreased depression) than on the potential negative side effects associated with peer aggregation (smoking, drug use, and problem behavior).

Improving our understanding of the peer contagion process has considerable applied value in that the majority of education, community, drug use, and mental health interventions involve aggregating youth into groups of one form or another. Even in the context of a well-controlled, randomized intervention trial, peer contagion dynamics can undermine or reduce intervention effects. By extension, it is reasonable to hypothesize that real-world programs that involve aggregating youth may be even more problematic because of limitations in funding and in the training of treatment or educational staff, as well as a general lack of resources. Given that the data on iatrogenic effects are mixed, it is clear that more research is needed to examine the associated processes and dynamics.

Positive Youth Development

Although this review has focused primarily on how peers influence each other in negative ways, peers can also influence each other in positive ways. In fact, Adams and colleagues (2005) unexpectedly found that adolescents who were aggressive at Time 1 and had nonaggressive friends were less aggressive at Time 2, suggesting that the nonaggressive friend may have influenced the aggressive friend in a positive manner. One can safely assume that peer contagion processes happen for positive behaviors, such as helping others. The fact that peer relationships are so important during adolescence suggests that adults must find ways to promote positive values and behaviors in those relationships. Researchers should examine positive peer influence to more fully understand how children and adolescents influence each other and to gain insight into how we might decrease the negative outcomes of peer contagion and increase positive peer influences.

Allen & Antonishak (2008) suggest that peer influence is inevitable and thus, to reduce deviant peer influence, society must promote nondeviant values and strengthen youths' positive connections to peers and adults. The characteristics of schools and communities and children's and adolescents' experiences within those domains have a significant impact on the rate of peer contagion. Many social contexts that youth are enmeshed in, such as public schools and neighborhoods, involve teasing, bullying, and potential violence. Under such circumstances, the average youth may be living in a threatening environment, and being outside of the group can increase the risk of humiliation and abuse. Thus, the formation of friendships, having a place to sit with friends at lunch, a group to walk home with, and so forth, can be not only negatively reinforcing (relieves distress) but also rewarding. Communities, often defined by modern media, can play into contagion effects. Future research might consider community-based interventions that focus on building nurturing communities where desirable behavior is valued and reinforced. Efforts should be made to increase the safety, peer acceptance, and prosocial nature of these social contexts, which likely would decrease problem behavior. Although programs exist that emphasize adults reinforcing positive behaviors in the school context, and programs exist that focus on decreasing negative behavior such as bullying, rarely are the two intervention foci integrated into an overall effort to support youth positive behavior and reduce dynamics such as deviancy training, physical and emotional bullying, and other conditions that provide fertile ground for peer contagion.

Community and neighborhood interventions have been successful in reducing problem behaviors (for a review, see Biglan & Hinds 2009). As these researchers suggest, there is scientific value in shifting research from specific problematic outcomes to the shared contextual conditions that underlie many problems (e.g., aversive control, coercive behavior) and examining the positive impact of creating nurturing families, schools, and communities. In these nurturing communities that value prosocial behavior, self-regulation,

and cooperation with others, peers might influence each other in ways that augment and multiply these positive emotions and behaviors.

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Glossary

Deviancy training	social interactions among peers during which deviant attitudes and values are promoted by means of positive reinforcement in the relationship
Emotion dysregulation	emotional behavior that is incongruent with the situation or potentially undermines development, such as angry outbursts, extreme sadness and depression, or debilitating fear and anxiety
Cliques	small groups of individuals with mutual sentiments of friendship and affiliation, often empirically defined through social network analysis typically with a set of rules regarding the mutuality of friendship nominations

Microsocial processes	interpersonal interactions as a series of sequences and patterns that evolve over seconds or minutes, of which the relationship participants are often unaware
Coercion	social interaction that involves aversive interpersonal behavior, including escape condition, in that the aversive behavior functions to reduce conflict or demands
Entropy	concept applied to the flow of information over time. Low entropy describes a highly predictable series of events; high entropy describes an unpredictable or chaotic series of events
Emotional distress	involves symptoms of anxiety and depression that are inclusive of psychological disorders that meet diagnostic thresholds
Corumination	interpersonal process that involves repetitively discussing, rehashing, and speculating about problems within a dyadic relationship
Iatrogenic effects	outcomes of interventions in which there is unintended harm to the participants
Self-regulation	ability to control or alter one's thoughts and feelings within an environment, in line with preferred standards. It subsumes, but is not limited to, emotional regulation, inhibitory control, and effortful control of attention

Reducing Peer Contagion

Dodge et al. (2006) make the following recommendations to reduce peer contagion:

1. Improve evaluation of programs and interventions that aggregate youth and the use of science in policy decision-making. Most interventions for children and adolescents are delivered in the context of peer groups, including those in public schools and juvenile correction facilities. It is especially important to conduct careful evaluations of all programs and use random assignment if possible.
2. Implement alternative interventions that do not require peer aggregation and that can be effectively delivered in school settings, mental health settings, and juvenile corrections. In particular, family-centered interventions are an effective alternative, and in public schools, universal interventions are effective and do not involve aggregation.
3. Promote the use of empirically based principles for reducing peer contagion effects when aggregation is necessary. Research suggests taking into consideration the level of deviance, minimizing the amount of time in a group, reducing opportunities for unstructured or poorly supervised peer interactions, promoting prosocial norms among the youth, and providing training in behavior management and supervision skills for adults leading groups.

Mindfulness and Self-Regulation

Mindfulness, or paying attention to the present moment in a nonjudgmental manner, has received considerable attention in the past decade (Kabat-Zinn 2005). Mindfulness interventions have been shown to reduce stress, depression, rumination, and anxiety (Ramel et al. 2004, Shapiro et al. 2007). Mindfulness may serve to reduce the likelihood of peer contagion because of its effects on self-regulation and attention. In addition, mindfulness training reduces personal distress in response to others' distress (Tipsord 2009) and thus may reduce the likelihood of depressive symptom contagion.

Greater mindfulness has been linked to greater self-regulation of emotion and behavior in adults (Brown & Ryan 2003). Preliminary research on mindfulness training for children has found increases in cognitive control of attention and decreases in behavior and attention problems (Saltzman & Goldin 2008, Semple et al. 2009). Mindfulness is thought to produce freedom from automatic behavioral patterns and provide greater cognitive, emotional, and behavioral flexibility (Shapiro &Carlson 2009). Given that peer contagion processes often occur automatically, greater mindful awareness may protect children and adolescents from peer contagion.

Summary Points

1. In childhood and adolescence, problem behaviors, such as aggression and drug use, can spread throughout the peer group by means of influence processes that are linked to the negotiation of friendships and cliques.
2. Interpersonal processes, such as deviancy training, may explain the contagion of problem behaviors.
3. Internalizing symptoms and disordered eating may also spread through peer networks, although the mechanisms of influence have not been extensively studied.
4. Peer contagion processes can undermine interventions aimed at reducing problem behaviors by reducing effect sizes, or in some cases, causing iatrogenic effects.
5. Adult monitoring and structure, as well as self-regulation, can reduce the likelihood of peer contagion.
6. Methodological and statistical innovations have engendered more sophisticated tests of social networks and peer contagion processes.
7. More research is needed to examine how peers influence each other in positive ways.

Future Issues

1. What is the mechanism of depressive symptom contagion? Does corumination mediate the relationship between peers' levels of depressive symptoms and an adolescent's subsequent level of depressive symptoms?
2. What are high-quality friendships, and is peer contagion more or less likely in high-quality friendships?
3. How does language affect peer contagion? Can more systematic study of linguistic processes in adolescent peer interactions illuminate how peer contagion processes operate or predict under what circumstances they are most likely to occur?
4. What positive behaviors and emotions can be spread by means of peer contagion processes? Can the process of peer contagion be used to encourage peers to engage in prosocial behaviors?
5. Is greater mindfulness linked to less susceptibility to peer contagion, especially depressive contagion? Could mindfulness training reduce peer contagion for adolescents? Are mindfulness-based interventions that aggregate adolescents less likely to produce iatrogenic effects?
6. Do social networking and Internet Web sites increase the likelihood of the contagion of behaviors such as self-mutilation, problem behavior, and disordered eating?

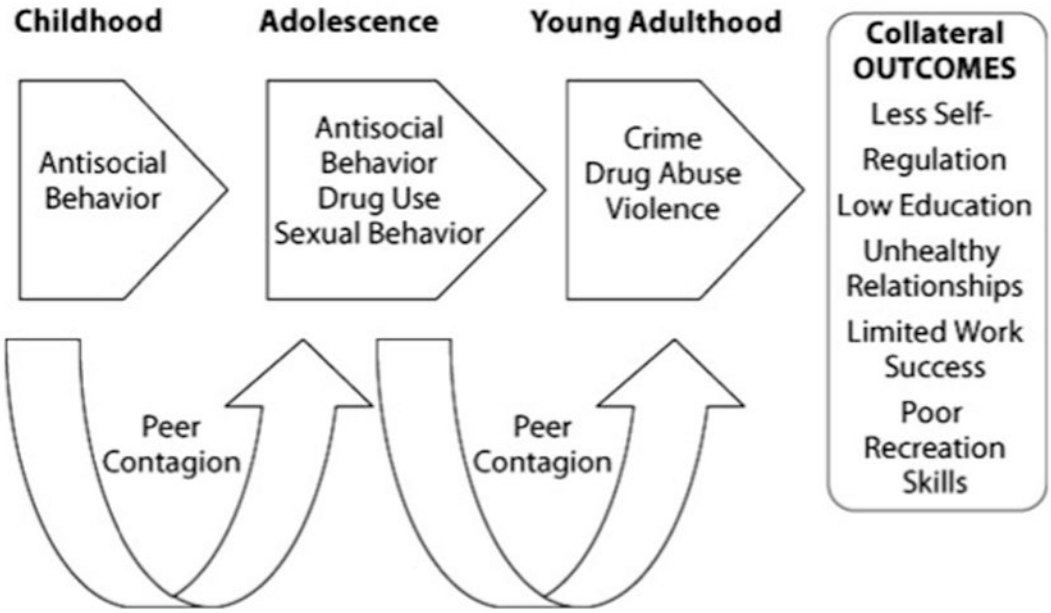

Figure 1.
A developmental perspective on peer contagion as an amplifying mechanism.

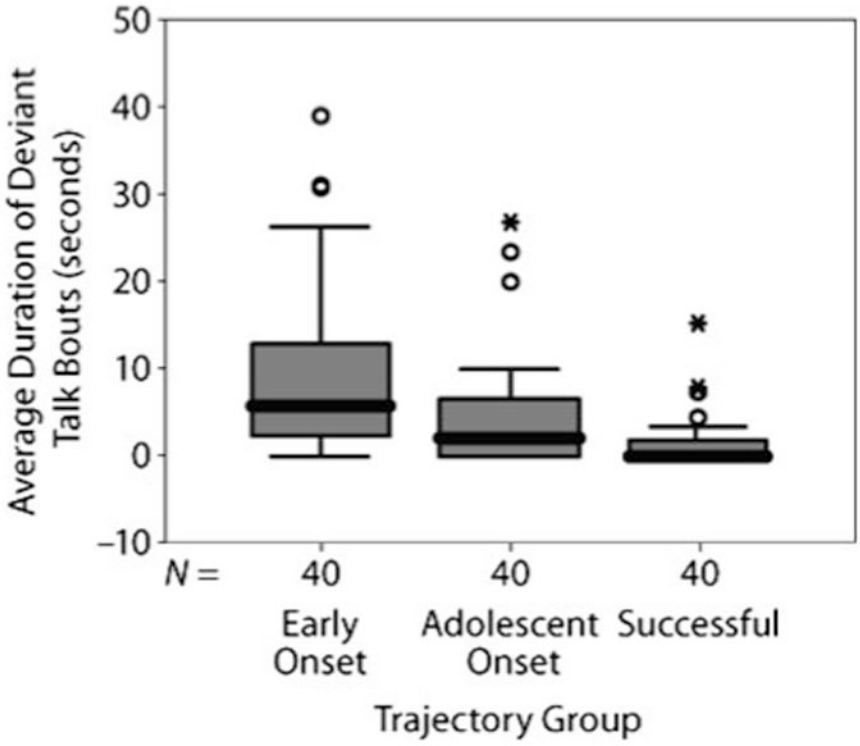

Figure 2.
Duration of deviant talk as a function of developmentally defined risk groups.

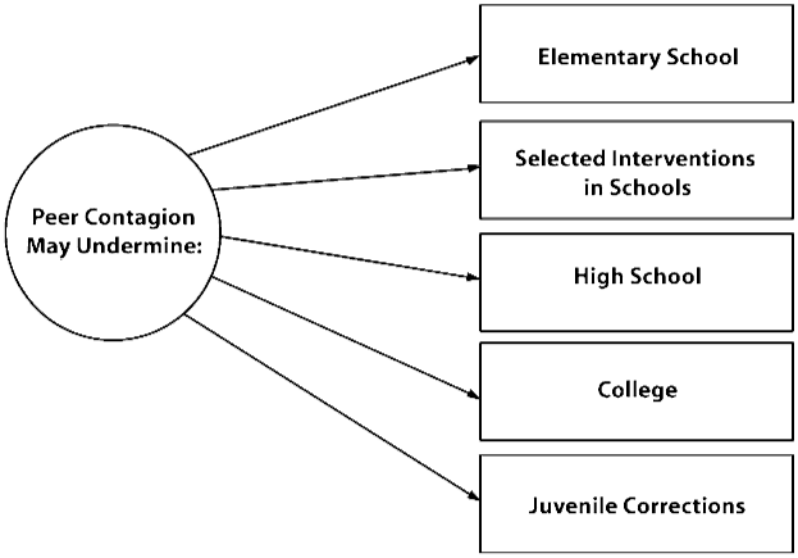

Figure 3.
Peer contagion may undermine intervention goals when youth are aggregated.