AGGRESSIVE BEHAVIOR
Volume 31, pages 238–253 (2005)

Victim and Peer Group Responses to Different Forms of Aggression Among Primary School Children

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Both behaviourist and social learning theory emphasise the importance of the consequences of a behaviour on its subsequent frequency of occurrence [e.g., Bandura, 1973, 1977; Skinner, 1953]. Despite this, very little is known about the types of consequences children receive when they aggress towards other children. The present study employed a wireless microphone and hidden camera to record victim and peer responses to primary school children's physical, verbal, indirect, and relational forms of aggression. The results showed that the most frequent consequences of aggression were victim retaliation or withdrawal, and peer support. In addition, the results showed limited support for the suggestion that sex differences in the use of different types of aggression arise due to differential reinforcement from victims and/or peers. The implications of the results for the development of interventions aimed at reducing aggression are considered along with alternative explanations for sex differences in aggression. Aggr. Behav. 31:238–253, 2005. © 2005 Wiley-Liss, Inc.

Keywords: indirect aggression; relational aggression; victim responses; peer responses; naturalistic observation; sex differences

There have been numerous interventions aimed at reducing bullying and/or aggression in schools [e.g., Hawkins et al., 1991; Hudley and Graham, 1993; Olweus, 1994; Whitney et al., 1994; see also Smith et al., 1994]. Some of these have taken a 'whole school' approach [e.g., Olweus, 1994; Whitney et al., 1994] whilst others have focussed more attention on particular individuals who have been identified as being especially aggressive [e.g., Hudley and Graham, 1993; see also Smith et al., 1994]. However, as Mattaini et al. [1996] note, many interventions aimed at reducing aggression focus on antecedents, for example teaching new rules and rehearsing new behaviours. In contrast, both behaviourist and social learning theory emphasise the importance of the consequences of a behaviour on its subsequent frequency of occurrence [e.g., Bandura, 1973, 1977; Skinner, 1953]. This discrepancy may in part

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Received 16 May 2003; Amended version accepted 23 October 2003

Published online in Wiley InterScience (www.interscience.wiley.com). DOI: 10.1002/ab.20080

account for the fact that, when evaluated, many anti-aggression interventions receive limited or mixed support [see Farrington, 1993; Kazdin, 1987; Mattaini et al., 1996]. As Mattaini et al. [1996] state, most interventions will result in limited behavioural change unless they also alter the environmental contingencies in order to provide appropriate reinforcement and punishment. In other words, rules and new behaviours are unlikely to be followed unless the child receives an immediate benefit [Baum, 1994; Mattaini et al., 1996].

The most immediate benefits obtained by engaging in aggressive behaviour are likely to come from the victim of the attack or from onlookers. An effective method of reducing aggression may therefore be to focus on the behaviour of victims and onlookers. This method is advocated by a number of researchers. For example, Frost [1991, cited in Farrington, 1993] and Herbert [1989] both suggest that the most effective sanction for reducing bullying is peer group pressure. Olweus [1987] also believes that bullying can be reduced by encouraging non-involved peers to act against it. However, the literature indicates that punishing consequences can in some instances elicit aggression [see Malott et al., 2000], or that consequences intended to punish can sometimes actually reinforce a behaviour [Madsen et al., 1968]. Indeed, a study by DeRosier et al. [1994] found that when peers sided with the victim of an attack, the levels of aggression within the group increased.

An alternative method of reducing undesirable behaviours is to remove the consequences that reinforce them (i.e., to put them on extinction, e.g., see Kazdin, 1994). Thus a critical component of interventions that have successfully altered children's aggressive or anti-social behaviour has been the identification and removal of those consequences that reinforce the target behaviour [e.g., Broussard and Northup, 1997; DeLeon et al., 2000; Fowler et al., 1986; Marcus et al., 2001].

It is therefore evident that if we are to design effective interventions to reduce aggression in schools, a clear understanding of the ways in which aggression is reinforced is essential. First we need to identify the types of consequences that reinforce aggression in order to target those particular behaviours for change. For example, depending on a child's age, aggression may frequently be positively reinforced by some form of tangible reward (e.g., a toy) given up by the victim, or by attention from peer onlookers. In these instances an attempt to remove the reinforcing consequence may be successful at reducing aggression, especially if that consequence can be made contingent on other more appropriate behaviour [e.g., see DeLeon et al., 2000]. Alternatively, the aggression may be negatively reinforced, for example by a provocative victim withdrawing or ceasing verbal taunts. In this type of case it will be beneficial to look more closely at the contingencies maintaining the victim's behaviour. Patterson and Cobb [1971] state that negative reinforcement is more characteristic of 'dyads interacting within relatively small closed systems' [p. 73]. Since the school playground is more appropriately viewed as an open system one would expect aggression to be more frequently positively reinforced. However, regardless of this, a clear knowledge of the most common ways in which aggression is reinforced is needed to assist in the development of effective interventions.

We also need to be aware of the extent to which victims versus other peers reinforce aggressive behaviour since, again, this will have different implications for the development of interventions. For example, if the majority of reinforcement comes from victims, an intervention may have limited effect if it focuses only on altering the behaviour of peers.

Indeed, in pre-school children there is evidence to suggest that reinforcement for direct aggression is seldom delivered by adults or peers. Instead it is the victims' responses that have been found to exert the most influence on the attacker's subsequent aggression [Patterson and Cobb, 1971; see also Schwartz et al., 1993]. Other studies, however, suggest that as children get older, peers may indeed positively reinforce direct aggression [Buehler et al., 1966; Salmivalli et al., 1996]. Therefore again, it is crucial to establish the extent to which victims versus peers reinforce aggressive behaviour among primary school children.

A further issue, relevant to victim and peer responses to aggression, is that of sex differences. Research indicates that boys employ more direct or overt aggression whilst girls tend to use more indirect or relational aggression [e.g., Bjorkqvist et al., 1992; Crick and Grotpeter, 1995; Lagerspetz and Bjorkqvist, 1994]. However, the reason for these differences remains unclear. One possibility is that girls and boys receive different consequences from their peer group when they perpetrate different forms of aggression. This hypothesis receives some support from Perry et al., [1986, 1989, 1990] who found sex differences in the consequences girls and boys anticipated for physical and direct verbal aggression. For example, Perry et al. [1986] found that boys anticipated more tangible rewards for physical and direct verbal aggression than did girls, less victim suffering, less peer disapproval, and less guilt. If one assumes that these particular boys also showed higher levels of physical and direct verbal aggression than the girls, then these results are consistent with Bandura's [1973, 1977] claim that the anticipated consequences of a behaviour influences its frequency of occurrence. Although Perry et al. [1989] later found fewer sex differences and concluded that the results of the 1986 study were confounded by the sex of the target (with children tending to report on same-sex aggression), there is evidence to suggest that both girls and boys employ more same-sex than cross-sex aggression [e.g., Archer et al., 1988]. There is also evidence to suggest that children's friendship groups tend to consist of same-sex peers [see Daniels-Bierness, 1989]. Thus when children are aggressive, the consequences they receive from both victims and peers are more likely to come from same-sex rather than opposite-sex children. The expectancies found by Perry et al. [1986, 1990] are therefore likely to reflect the expectations guiding children's aggression and/or the actual consequences they receive. This is not necessarily the case for the expectancies examined by Perry et al. [1989] in which the sex of victims and peers were controlled. However, according to Bandura [1973, 1977], outcome expectancies do not necessarily directly reflect experience and therefore more data are required to determine whether girls and boys do indeed receive different consequences for their aggression.

The first aim of the present study was therefore to provide descriptive data relating to the most frequent ways in which primary school children are rewarded for aggression. As Archer [1995] noted, the study of human aggression has tended to omit the preliminary descriptive phase common to other disciplines. He argued that this has often resulted in poor ecological validity in experimental studies of aggression as well as inappropriate choices of outcome measures. Thus if we are to gain a full understanding of the ways in which victim and peer responses influence children's aggression, a sound descriptive base is an essential first step. The present study employs naturalistic observations to examine both victim and peer responses to a variety of different forms of aggression. The study also identifies those responses likely to reinforce the aggressor's actions.

To our knowledge there have been just three published studies that have employed naturalistic observations to examine peer responses to aggression. Atlas and Pepler [1998] found that in the classroom peers actively participated in bullying interactions (i.e., by aggressing towards the victim) in 32% of episodes, whilst peers came to the support of the victim in just 10% of episodes. On the playground, Craig and Pepler [1995, cited in Hawkins et al., 2001] found that peers came to the support of victims in 11% of episodes whilst Hawkins et al. [2001] found this to be the case in 19% of episodes, 57% of which were effective at putting a stop to the bullying. However, these studies focussed on bullying rather than aggression (i.e., on aggressive episodes in which the aggressor was deemed to have more power than the victim) and did not examine the ways in which victims responded.

The second aim of the present study was to compare the extent to which girls versus boys are rewarded for different forms of aggression. Given that research indicates that boys employ more direct or overt aggression whilst girls tend to use more indirect or relational aggression [e.g., Bjorkqvist et al., 1992; Crick and Grotpeter, 1995; Lagerspetz and Bjorkqvist, 1994], it was predicted that, compared to boys, girls would be more frequently rewarded for indirect and relational forms of aggression, whilst compared to girls, boys would be more frequently rewarded for direct and overt forms of aggression.

METHOD

Participants

Participants were 77 children in years 3 and 6 (ages 7 to 8 and 10 to 11) in two British primary schools. Fifteen males and 19 females were in year 3 whilst 20 males and 23 females were in year 6. Parents of all children returned forms giving consent to their child's involvement in the study.

Equipment

A wireless microphone and concealed micro-video camera, as described in Tapper and Boulton [2002] were used to record each child's behaviour throughout the morning and lunchtime breaks. The microphone transmitter was placed inside a small bag worn by the target child (see below) around his or her waist whilst the microphone was clipped to his or her clothing. Five other waist bags with microphones were also used for the purposes of habituation (see below). The video recorder, camera, and receiver were placed in a rucksack worn by the researcher or placed in a convenient position with the concealed camera facing toward the target child. See Tapper and Boulton [2002] for a more detailed description of the equipment.

Habituation

The children were told that they would be recorded some of the time that they were wearing a microphone but that most of the time they would not be recorded. They were also asked to act normally whilst wearing a microphone and were told that it would not matter what they said since only the researcher, and other researchers, would listen to the recordings. It was emphasised that neither their teachers nor parents would be told about anything they said whilst being recorded and that they would not get into trouble of any kind.

Each child wore one of the waist bags and microphones for between three and four hours a day for a minimum of four days before they served as the target child and their behaviour was recorded. See Tapper and Boulton [2002] for further details together with discussion of issues relating to habituation.

Data Collection

Throughout the recording the researcher made field notes detailing whether or not the target child was within range of the camera. These field notes reduced the time it took to code the video tapes since they meant that the tape could be fast forwarded when the child was out of range. To enable the field notes to be synchronised with the tape, a stop watch was started simultaneously with the video recorder and the time on the stopwatch recorded each time field notes were taken. The field notes were also used to record additional relevant information that might not have been recorded on the video (e.g., speech or gestures from someone at a distance), though in practice such information was rarely necessary. Microphones were collected at the end of the lunch hour. See Tapper and Boulton [2002] for a more detailed description of the procedures.

Duration of Observations

Each participant served as the target child and was observed for a minimum of 20 minutes in the playground and 40 minutes throughout the whole of the morning and lunchtime breaks. These latter periods included observations taken, for example, in the dinner hall, the queue for the dinner hall, and the classroom during playtimes when it was raining. The video recording was used to calculate observation times for each target child. If these times were not met in a single day the child was asked to wear the microphone again. In most of these cases, where only a relatively short period of time was required, the microphone was given to different children at different times on the same day. A total of 76 hours of observational data was collected. For individual children, the length of the observation period ranged from 40 to 105 minutes, with the exception of one year 6 girl for whom no data was collected as she no longer wanted to wear the microphone after the habituation period. The average observation period for those children for whom data was collected was 60 minutes.

Data Coding

Aggression. A preliminary examination of the video recordings, together with previous taxonomies of aggression [e.g., Archer et al., 1998; Bjorkqvist et al., 1992; Crick and Grotpeter, 1995], were used to devise a coding scheme. This was tested in conjunction with the recordings and modified a number of times. Aggression was classified as either direct physical, direct verbal, direct relational, indirect verbal or indirect relational (see Appendix A for definitions and further details of the coding scheme).

Victim and Peer Responses. An examination of the observational data, together with the previous literature (see below) relating to reinforcement and punishment were used to devise a coding scheme for victim and peer responses. Due to a lack of literature indicating which types of responses were most common and/or likely to be most important, the coding scheme was designed to be over-extensive on the premise that categories could be excluded or collapsed in later analyses. The coding scheme was then tested and re-tested in conjunction

with the recordings and modified a number of times. The final version consisted of 24 categories of victim response and nine categories of peer response (see appendix B for these categories together with further details of the coding scheme).

In order to examine sex and age differences in the consequences received for aggressive behaviour, a number of victim and peer responses were categorised as 'potential reinforcers'. Since the observational data were not analysed sequentially it is not possible to tell whether these consequences did indeed function as reinforcers. However, they were categorised as potential reinforcers on the basis of literature indicating that they were likely to act as reinforcers. This 'a priori' categorisation of peer and victim responses as likely reinforcers is an approach that has been used in previous research [e.g., Charlesworth and Hartup, 1967; Patterson 1963a cited in Patterson et al., 1967].

The responses categorised as potential reinforcers in the present study were primarily based on Skinner's [1953] 'generalised reinforcers'; approval, attention, affection, submissiveness, and 'tokens' (i.e., tangible rewards). Thus the following victim responses were categorised as potential reinforcers; material loss to the aggressor (i.e., an acquisition of tokens or tangible rewards by the aggressor, see also Bandura, 1973), victim withdrawal (i.e., submission, see also Patterson et al., 1967), behaviour stops (i.e., submission or alleviation of aversive treatment, see also Bandura, 1973), cry or expression of pain (i.e., submission, see also Patterson et al., 1967; Sears et al., 1957, cited in Bandura, 1973; Skinner, 1988) and apology (i.e., submission). In addition, the following peer responses were categorised as potential reinforcers; support aggressor (i.e., approval or attention, see also Bandura, 1973; Lerner, cited in Patterson and Cobb, 1971; Patterson and Reid, 1970), smile/laugh (i.e., approval or attention, see also Bandura, 1973; Lerner, cited in Patterson and Cobb, 1971; Patterson and Reid, 1970), request information (i.e., attention, see also Lerner, cited in Patterson and Cobb, 1971; Patterson and Reid, 1970).

Inter-Observer Reliability

Inter-observer reliability for the aggression types and for the victim and peer responses to aggression was assessed between the first author and the second author and between the first author and a male graduate student with no other involvement in the project.

Cohen's kappa coefficient of concordance was used to assess inter-observer reliability. Eighty-six acts of aggression, 89 victim responses, and 95 peer responses were independently coded by the first and second authors. These produced overall coefficients of 1.00, 0.84, and 0.98 respectively. Two-hundred and six acts of aggression, 199 victim responses, and 185 peer responses were independently coded by the first author and the graduate student. These resulted in coefficients of 0.95, 0.87, and 0.97 respectively. Therefore overall, good inter-observer reliability was achieved.

RESULTS

Plan of Analyses

Two broad approaches to data analyses were taken. In the first, we calculated the percentage of each category of victim and peer response across the sample as a whole. This approach allowed us to see general patterns in the data. It also ensured that the data reflected the aggression that actually occurred in the playground. It is

unsuitable, however, for comparing sub-groups (as a function of sex and age) by means of inferential statistics since the data are not independent. Consequently, our second approach was to use the child as the unit of analysis. Here, for each child, we determined the percentage of each type of victim and peer response that resulted from their acts of aggression.

Victim Responses to Direct Aggression

A total of 125 acts of physical aggression were observed, 278 acts of direct verbal aggression, and 137 acts of direct relational aggression. The proportion of acts to which victims showed particular responses, together with the proportion that resulted in victim responses coded as potential reinforcers were calculated for each of these three types of direct aggression and for direct aggression overall (Table I).

Table I shows that overall, in terms of victim responses, direct aggression most often resulted in retaliation (non-physical aggression, 36%; tease, 9%, physical aggression, 6%), behaviour likely to function as a negative reinforcer (withdrawal, 8%) or no response (9%). In contrast, very few instances of direct aggression resulted in victim behaviour

Table I. Types of Victim Response to Different Forms of Direct Aggression

	Type of aggression			
Victim response	Direct physical (n = 125)	Direct verbal (n = 275)	Direct relational (n = 133)	Overall (n = 533)
Potential reinforcers				
Withdrawal	10%	3%	17%	8%
Behaviour stops	8%	3%	2%	4%
Apology	2%	2%	1%	2%
Material loss	2%	0%	1%	1%
Pain	3%	0%	0%	1%
Cry	0%	0%	2%	0%
Overall	22%	7%	20%	13%
Other responses				
Non-physical aggression	18%	41%	42%	36%
Tease	30%	4%	1%	9%
Physical aggression	6%	9%	2%	6%
Denial	2%	6%	2%	4%
Justify/excuse	4%	5%	2%	4%
Abuse	2%	3%	2%	3%
Smile/laugh	3%	2%	1%	2%
Challenge	3%	0%	2%	1%
Physical threat	2%	0%	0%	1%
Refusal	1%	2%	1%	1%
Sarcastic apology	0%	1%	0%	0%
Other response	14%	20%	20%	19%
No response	8%	7%	14%	9%

Note. Instances in which victim responses were uncodable were excluded. Frequencies of uncodable responses were as follows: direct physical, 0; direct verbal, 3; direct relational, 4.

likely to function as a positive reinforcer (apology, 2%; material loss to aggressor, 1%; pain, 1%; cry, 0%). However, there were variations across the three different forms of aggression. Relatively more instances of physical aggression resulted in victims stopping a behaviour they were engaging in (8% compared to 3% and 2% for direct verbal and direct relational respectively), or by teasing the aggressor (30% compared to 4% and 1% respectively) and relatively fewer instances resulted in victims responding with non-physical aggression (18% compared to 41% and 42% respectively). Likewise, relatively fewer instances of direct verbal aggression, but relatively more instances of physical aggression and direct relational aggression resulted in victim withdrawal (3% for direct verbal compared to 10% and 17% for physical and direct relational respectively). Approximately 20% of instances of direct physical and direct relational aggression resulted in potential reinforcers from victims, whilst this was true of only 7% of instances of direct verbal aggression.

Peer Responses to Direct and Indirect Aggression

A total of 117 acts of direct relational aggression and 52 acts of indirect relational aggression were observed. The proportion of acts of aggression to which peers showed particular responses, together with the proportion that resulted in peer responses coded as potential reinforcers were calculated for each type of direct and indirect aggression and for aggression overall (Table II).

Table II shows that overall a relatively high proportion of acts of aggression (30%) resulted in potential reinforcers from peers. Potential reinforcers from peers exceeded potential reinforcers from victims (see Table I) for direct verbal aggression (18% and 7%, respectively) and for direct relational aggression (37% and 20%, respectively) but not for physical aggression (18% and 22% respectively). In contrast, just 9% of acts resulted in peers

Table II. Types of Peer Response to Different Forms of Direct and Indirect Aggression

	Type of aggression					
Peer response	Direct physical (n = 103)	Direct verbal (n = 227)	Direct relational (n = 105)	Indirect verbal (n = 116)	Indirect relational (n = 52)	Overall (n = 603)
Potential reinforcers						
Support aggressor	17%	12%	30%	39%	38%	24%
Smile/laugh	4%	6%	5%	15%	2%	7%
Request information	2%	1%	3%	5%	6%	3%
Overall	18%	18%	37%	53%	44%	30%
Other responses						
Support victim	15%	8%	10%	7%	8%	9%
Resolution attempt	5%	6%	8%	5%	2%	6%
Other response	14%	18%	22%	9%	13%	16%
No response	42%	49%	30%	28%	33%	39%
No peers present	12%	1%	0%	–	–	2%

Note. Instances in which peer responses were uncodable were excluded. Frequencies of uncodable responses were as follows: direct physical, 22; direct verbal, 51; direct relational, 32; indirect verbal, 1; indirect relational, 0.

showing support for the victim of the attack and 6% in peers attempting some form of resolution. In 39% of cases peers showed no response whilst for direct aggression peers were present in all but 2% of cases.

However, peer responses to the different forms of aggression also varied. A much higher proportion of acts of direct relational, indirect verbal, and indirect relational aggression resulted in peers showing support for the aggressor (30%, 39%, and 38% respectively) compared to acts of direct physical and direct verbal aggression (17% and 12% respectively). As a consequence a greater proportion of direct relational, indirect verbal, and indirect relational acts of aggression resulted in potential reinforcers from peers (37%, 53%, and 44% respectively) compared to acts of direct physical and direct verbal aggression (both 18%). Conversely, a greater proportion of acts of direct physical and direct verbal aggression resulted in no response from peers (42% and 49% respectively) compared to acts of direct relational, indirect verbal and indirect relational aggression (30%, 28% and 33% respectively). Direct physical aggression also differed from the other forms of aggression in that a higher proportion of acts resulted in peers showing support for the victim (15%) and took place in the absence of peers (12%). Similarly, indirect verbal aggression differed from the other forms in that a higher proportion of acts resulted in peers smiling or laughing (15%).

Sex Differences in Potential Reinforcers Received for Direct and Indirect Aggression

The proportion of acts of aggression resulting in potential reinforcers from victims and/or peers were calculated for each child for each type of aggression they perpetrated. Overall means were then calculated for boys and for girls using data from children who had displayed at least three acts of the relevant form of aggression (e.g., children who had displayed less than three acts of physical aggression were excluded from the calculations for physical aggression whilst children who had displayed three or more acts were included). However, in order to limit the reduction in sample size that this procedure

Table III. Mean Proportions (and SDs) of Girls' and Boys' Acts of Aggression Resulting in Potential Reinforcers From Victims and/or Peers

	Type of aggression			
	Direct physical	Direct verbal	Direct relational	Indirect verbal and relational
Girls	(n = 5)	(n = 14)	(n = 6)	(n = 13)
Victim	24% (16)	14% (19)	20% (25)	–
Peer	18% (29)	14% (14)	57% (14)	59% (28)
Overall	44% (33)	26% (26)	70% (23)	59% (28)
Boys	(n = 10)	(n = 14)	(n = 8)	(n = 11)
Victim	20% (17)	6% (9)	9% (13)	–
Peer	14% (23)	23% (23)	30% (25)	49% (25)
Overall	36% (28)	30% (21)	40% (30)	49% (25)

resulted in, the two categories of indirect aggression were collapsed into one. This was considered appropriate for these particular forms of aggression because previous analysis had shown that they resulted in similar responses (see Table II). The figures are displayed in Table III.

Table III shows that for direct relational aggression, overall a higher proportion of girls' acts resulted in potential reinforcers than did boys' acts (70% compared to 40% respectively). The same was true for indirect aggression (59% compared to 49%) and, to a lesser extent, for direct physical aggression (44% compared to 36%). In contrast, a marginally higher proportion of boys' acts of direct verbal aggression resulted in potential reinforcers than did girls' acts (30% compared to 26% respectively).

Mann Whitney U tests were used to determine whether these differences were statistically significant. The results showed no significant differences for physical aggression ($Z = 0.43$, NS), direct verbal aggression ($Z = 0.67$, NS), direct relational aggression ($Z = 1.69$, $p < .09$) or indirect aggression, ($Z = 0.73$, NS).

DISCUSSION

The results of the present study showed that overall, direct aggression most often resulted in retaliation or withdrawal from victims, whilst direct and indirect aggression most often resulted in support for the aggressor from peers. The pattern of responses varied slightly across the different forms of aggression. The most salient of these differences were that a greater proportion of direct relational, indirect verbal, and indirect relational aggression resulted in peers showing support for the aggressor compared to the proportion of direct physical and direct verbal aggression that did so. In addition, compared with other forms of aggression, a greater proportion of acts of physical aggression took place in the absence of peers.

The results contrast with those of Patterson et al. [1967] who found that 80% of pre-school children's acts of direct aggression were followed by the victim crying, giving up an object or withdrawing whilst only a very small proportion were responded to by peers. Patterson et al. suggested that aggressive behaviours in the nursery school were primarily controlled by positive reinforcement from the victim.

However, although there were slight differences in the way in which direct aggression was defined, the results of the present study suggest that Patterson et al.'s [1967] findings do not extend to primary school children. Instead the data suggest that direct aggression amongst primary school children may be primarily maintained by positive reinforcement from peers and/or negative reinforcement from victims. For example, in the present study very few acts of aggression resulted in the victim crying, showing an expression of pain, or giving up an object; i.e., responses likely to function as positive reinforcers. In contrast, a high proportion of acts resulted in victim retaliation, a response that is characteristic of a process Patterson and Cobb [1971] described as 'coercion'. Coercion refers to interactions that are maintained by the withdrawal of aversive stimuli, i.e., negative reinforcement. Patterson and Cobb describe how this type of interaction tends to lead to the escalation of aggressive exchanges over time as each child learns to dispense increasingly aversive stimuli in order to force the other party to withdraw. The high proportion of acts of aggression in the present study that resulted in victim retaliation suggests the

presence of these types of interactions. However, further analysis of the data would be needed to confirm this.

Thus the results suggest that there may be a developmental change in the conditions maintaining direct aggression in children; from positive reinforcement from victims among pre-school children, to negative reinforcement from victims and/or positive reinforcement from peers among primary school children. However, further research would be needed to confirm that the consequences described in the present study did indeed function as reinforcers for aggression. Longitudinal studies carried out with children from pre-school to primary school would also help clarify the processes involved in any developmental change. The results of the present study are consistent with observational studies of bullying behaviour carried out by Pepler and colleagues. These studies found that peers are present in 79% of bullying episodes occurring in the playground [Craig et al., 2000] but intervene in a relatively small number; between 11% and 19% of episodes [Hawkins et al., 2001]. These are similar to figures in the present study showing that peers were present at 88% of all acts of physical aggression but showed support for the victim of the attack in just 15% of cases and made an attempt to resolve the situation in just 5% of cases. The present study also shows that a relatively high proportion of acts of aggression resulted in peers showing support for the aggressor. This was particularly true for direct relational, indirect verbal, and indirect relational aggression where the figures ranged from 30 to 39%. Again this is consistent with research carried out by Atlas and Pepler [1998] who found that peers actively participated in bullying interactions in the classroom (i.e., by aggressing towards the victim) in 32% of episodes. It is also important to note that in the present study, for each form of aggression, a greater proportion of acts resulted in peers showing support for the aggressor (24% overall) compared to support for the victim (9% overall). These findings are in line with research conducted by Salmivalli et al. [1996] suggesting that amongst 12–13 year old children a greater proportion tend to reinforce or assist bullies (19.5% and 6.8% respectively) rather than defend the victim (17.3%).

The results of the present study have several implications for the development of interventions. As described above, the data showed that a relatively high proportion of acts of both direct and indirect aggression resulted in responses from peers that were likely to function as positive reinforcers. Disciplining an aggressor may therefore be more effective if one also reduces or removes any reinforcement the aggressor receives from peers. One way of achieving this might be to make it clear to all children that supporting aggressive behaviour is as unacceptable as aggression itself and by rewarding peers who behave appropriately [see Roderick et al., 1997, for an example of rewarding appropriate playground behaviour]. However, further research would be needed to test the efficacy of such a strategy.

The data also suggested that direct aggression may be maintained by negative, rather than positive, reinforcement from victims (see above). Thus whilst encouraging victims to 'stand up for themselves' might be an effective strategy amongst pre-school children [since research suggests aggression among this population is maintained by positive reinforcement, Patterson et al., 1967], it is possible that among primary school children this approach could simply result in the escalation of the aggressive exchange [e.g., see Patterson and Cobb, 1971]. In the case of unprovoked aggression, a better approach may be social skills training which has been shown to have some success with particular individuals [see Dodge and Crick, 1990; Kazdin, 1987]. However, in the case of provoked aggression more research is needed to identify the conditions maintaining the victim's provocative behaviour and to establish effective means of reducing this. Research also shows that an individual's view of what

constitutes provocation varies considerably between those involved in an aggressive exchange [e.g., Mummendey et al., 1984]. Thus in some instances the extent to which an act of aggression is provoked may be ambiguous. A more detailed examination of these types of aggressive exchanges is therefore necessary to help develop effective interventions. Further research examining the extent to which aggression is provoked, unprovoked, or ambiguous would also give some indication of the relative benefits of targeting interventions at aggressors versus victims.

The results showed limited support for the suggestion that sex differences in the use of different types of aggression arise due to differential reinforcement from victims and/or peers. The differences were in the predicted direction for three of the four comparisons (sex differences in direct verbal, direct relational, and indirect aggression) but failed to reach statistical significance. Had the sample sizes been larger these differences may have reached significance and further research would be needed to test this possibility. However, there are also other explanations for our failure to find sex differences.

One possible explanation is that some of the responses coded as potential reinforcers did not always function as reinforcers. Aversive consequences may also have influenced levels of aggression but sex differences in these were not analysed in the present study. Although previous analysis showed little difference in the types of potentially aversive responses girls and boys received from victims and peers [Tapper, 1998], it is possible that girls and boys differ in the extent to which certain victim and peer responses function as reinforcers and punishers. For example, Boldizar et al. [1989] and Perry et al. [1990] found that compared to girls, boys indicated that they cared significantly less about victim retaliation and peer rejection as a consequence of physical and direct verbal aggression. It may therefore be the case that these consequences functioned as punishers for girls but not for boys. Further research employing sequential analysis would be needed to test this possibility.

An alternative explanation is that sex differences in aggression occur due to other differences in behaviour, such as the activities in which children engage. There is a large body of research to indicate that boys and girls play different games [e.g., Blatchford et al., 1990; Boulton, 1992; Dunn and Morgan, 1987; Austin, 1986 cited in Blatchford, 1989]. Maltz and Borker [1982] claim that boys tend to play competitive games in large groups that are hierarchically structured (e.g., football) whereas girls tend to play non-competitive games in smaller groups (e.g., skipping or hopscotch) placing emphasis on friendship rather than status. This has been supported by naturalistic playground observations among children of similar age to those studied in the present study [Boulton, 1992]. Research suggests that competitive games lead to more incidents of direct aggression than non-competitive games [Boulton, 1993a; 1993b; DeRosier, 1994]. Likewise, sex differences in levels of indirect aggression may in part occur due to sex differences in conversation topic. Research suggests that girls tend to talk about their relationships with others to a much greater extent than boys [Tannen, 1990] which could in turn result in higher levels of indirect aggression. Further research examining the effects of competitive games and conversation topic on levels of direct and indirect aggression would be needed to test these suggestions.

It is important to bear in mind the limitations of the present study. In particular, the extent to which the results can be generalised to other schools is unclear since school policies and staff practices towards aggression may differ. For example, in some schools teachers and lunchtime supervisors may make it clear to pupils that aggression in any form is unacceptable and may actively encourage children to report aggression or stand up for victims. They may

also praise children for doing so. As a result, peers may show less support for the aggressor and more support for the victim of the attack. Research into the impact of such policies and practices within schools would be useful. As mentioned previously, the small sample sizes also limited the analysis of sex differences and further research with larger sample sizes would be beneficial.

As Archer [1995] noted, a sound descriptive base is necessary for a full understanding of aggression. Indeed, the development of interventions that have successfully reduced aggression amongst children with behavioural problems have made extensive use of observational data (e.g., see Patterson and Narrett, 1990]. Despite this, naturalistic observational studies of aggression within primary schools are comparatively rare. As a result we know very little about the ways in which children respond to aggression in this context, and yet it is these details that may be crucial for the design of effective interventions. It is hoped that the research described in this paper will contribute towards the development of such knowledge and interventions.

ACKNOWLEDGEMENT

We would like to thank John Coleman for help with the equipment.

Appendix A

Condensed Version of the Coding Scheme for Acts of Aggression

Type of aggression	Aggressor behaviour(s)
Direct physical	Aggresses physically against victim
Direct verbal	Insults victim or calls victim a name
Direct relational	Expresses dislike toward victim
	Excludes victim from an activity
	Excludes victim from information
	Ignores victim
Indirect verbal	Insults victim or calls victim a name in his/her absence
Indirect relational	Expresses dislike toward victim in his/her absence
	Suggests to other(s) exclusion of victim from an activity in his/her absence
	Suggests to other(s) exclusion of victim from information in his/her absence
	Suggests to other(s) ignoring of victim in his/her absence

Note. A full version of the coding scheme can be obtained from the first author.

Appendix B

Condensed Version of the Coding Scheme for Victim and Peer Responses to Aggression

Type of victim response	Victim behaviour(s)
Material loss	Loses item or observable reward to the aggressor
Withdrawal	Moves away from aggressor
Behaviour stops	Antecedent behaviour stops
Pain	Expression of pain via words or other non-specific vocalisations excluding crying
Cry	Cries
Smile/laugh	Smiles or laughs
Abuse	Makes an abusive gesture or command
Physical threat	Threatens, through actions or words, to physically hurt the aggressor
Relational threat	Threatens to use relational aggression against the aggressor
Challenge	Suggests, through actions or words, that the aggressor carry out an act of aggression towards the victim
Justify/excuse	Provides a justification or reason for the victim's behaviour, provides information that would excuse or lessen the victim's responsibility for his/her behaviour
Denial	Denies carrying out a particular behaviour, implies the victim knows nothing about the act, denies aggressor's allegations
Refusal	Refuses to do as the aggressor says
Sarcastic apology	Says sorry but with heavy emphasis on both syllables
Tease	Uses verbal or physical aggression that includes elements of humour
Physical aggression	Uses physical aggression against the aggressor
Non-physical aggression	Uses direct verbal or direct relational aggression against the aggressor, excluding ignoring
No response	Does not react to the aggressor or appear to change his/her behaviour in any way.
Type of peer response	**Peer behaviour(s)**
Support aggressor	Agrees with aggressor, aggresses towards the victim, teases the victim, justifies the aggressor's behaviour, facilitates the aggressor's behaviour
Support victim	Disagrees with aggressor, aggresses towards the aggressor, teases the aggressor, justifies the victim's behaviour, laughs at the aggressor
Smile/laugh	Smiles or laughs at the victim
Request information	Asks a question relating to the aggressive act
Resolution attempt	Attempts to resolve the dispute
No response	Does not react to the aggressor or appear to change his/her behaviour in any way.

Note: A full version of the coding scheme can be obtained from the first author.

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