Learning to Be Streetwise: The Acquisition of Accurate Judgments of Aggression

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The detection of potential danger is an important factor in avoiding harm that is even more important for vulnerable populations such as children. This study explores whether children can recognise the potential for a dangerous encounter from observing the gait of an approaching individual. The participants are divided into three age groups: 13- to 15-year-olds, 16- to 17-year-olds, and over 18s. Participants made judgments of nine, point light presentations of people walking on a treadmill. Ratings of intimidation made by participants were used to assess their ability to detect the walkers' trait aggression. The ability to detect trait aggression accurately was found to increase with age, as does the consistency in ratings between individuals within the same age group. The importance of experiential learning in the acquisition of aggression detection skills is highlighted.

Key words: aggression; danger; demeanour; gait.

Introduction

Children are frequently told to avoid strangers in general, but there is evidence that young children learn the 'stranger danger' message without putting it into practice, even in a laboratory setting (Moran, Warden, Macleod, Mayes, & Gillies, 1997). It is difficult for a child to develop the ability to avoid dangerous adults, as most children are not routinely exposed to high-risk street danger. Children are usually accompanied by a parent who will make judgments about potential threats. In fact, it has been found that becoming a parent heightens adults' perceptions of the formidability of unknown people (Fessler, Holbrook, Pollack, & Hahn-Holbrook, 2014). This suggests that children have even less of a responsibility to detect potential aggressors, as their parents will be overly cautious on their behalf. Over the past two decades,

parents' fear of strangers has led to less freedom for children (Foster, Villanueva, Wood, Christian, & Giles-Corti, 2014). For example, there has been an increase in the percentage of children accompanied on journeys to and from primary and secondary school (Shaw et al., 2013). With children becoming increasingly protected by their parents, it is of interest to investigate the ability of young people to detect potential aggressors.

Given the importance of efficiency in detecting potential dangers, it is no surprise that adults make judgments based on simple heuristics such as 'masculine is dangerous'. This heuristic is well established in research that reports a relationship between facial masculinity and judgments of malevolent attributes; what is rated as more masculine is perceived as more dangerous, aggressive and intimidating (Carré, McCormick, &

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Mondloch, 2009; Hehman, Flake, & Freeman, 2015; Hehman, Leitner, & Gaertner, 2013).

Past research into judgments of danger has primarily focused on static images of faces (e.g. Carré et al., 2009; Hehman et al., 2013, 2015). In reality, judgments are likely to start being formed at a distance, meaning that facial cues are absent. At this range, other information will be available such as body shape and the movements of a potential aggressor. In fact, research has demonstrated that gait is an important factor in making accurate judgments of trait aggression (Satchell, 2015).

Funder's (1999) Realistic Accuracy Model (RAM) suggests that a target individual affords a perceiver *relevant* and *available* cues for *detecting* personality traits. It has been preliminarily shown that gait is a relevant and readily available cue for trait aggression (Satchell, 2015). The availability of gait to a perceiver is notable, as walking behaviours can be seen even in impoverished situations, including at a distance or at night. This allows a judgment about a potential aggressor to be made earlier (e.g. in situations when time for avoidance behaviour is – or is at least perceived to be – limited; McNaughton & Corr, 2004).

However, as the RAM suggests, different perceivers may *utilise* (Funder, 1999) these cues in different ways. Costall (1995) notes that the understanding of affordances (in this case interpersonal affordances) may be culturally driven: 'a child, for example, is not simply left to "discover" the function of a cup or spoon; rather, the learning situation involves careful structuring' (p. 472). It is suggested in this study that Costall's comments on the social and cultural understanding of affordances from objects can also be used to understand age and cultural effects on the utilisation of interpersonal affordances in the RAM. Just as a child learns the meaning of a spoon in a structured environment, so might the child learn the risk factors inherent to the gait of an adult. The area of interest in the present study lies in how the same gait

Figure 1. A screenshot of a point light walker used in this experiment.

Note: Participants observed green dots on a black background.

information is utilised by perceivers of different ages to make judgments about intimidation which may or may not reflect the walkers' trait aggression. Funder (2012) refers to interpersonal judgments that relate to the self-reported traits of another as 'accurate' judgments, and the same term is adopted here.

Point light walkers (walking people represented by circles on critical parts of the body, see Figure 1.) were chosen for this study as this format of stimuli allows the presentation of gait cues and body shape information without the facial characteristics or clothing of the target potentially influencing judgments. Children as young as 5 years of age have been shown to recognise point light stimuli as human (Pavlova, Krägeloh-Mann, Sokolov, & Birbaumer, 2001), and children as young as 35 months have been able to identify point light motion correctly as gait (Golinkoff

et al., 2002), demonstrating that even the youngest participants in the present sample (13 years of age) were able to engage with the task. Further, teenage participants are specifically targeted as they are increasingly independent at this stage in their lives (although young teenagers, i.e. 13 years of age, can still be considered children). Whilst they may have previously experienced supervision from their parents (Foster et al., 2014), this is the critical age at which children are increasingly responsible for making decisions for themselves, and so these decisions (especially judgments of intimidation) become more consequential. It should also be noted that there is an absence of research on younger teenagers' social perceptions (apart from the topic of bullying; Boulton & Smith, 1994; Mynard & Joseph, 1997), and as such the literature review in this study is based on younger children and older adults.

The use of a 'masculine is dangerous' heuristic on participants' judgments of intimidation is explored. It was expected that all participants would use the 'masculine is dangerous' heuristic, with more masculine bodies judged as more intimidating. However, the main aim of the current study is to investigate the effect that age has on the accuracy of intimidation ratings in detecting trait aggression. Whilst it was expected that adults (over 18s) would outperform the younger participants, there was no hypothesis regarding the accuracy of the younger participants.

Method

Participants

A total of 85 schoolchildren (46 females) were recruited for the 13- to 15-year-olds group ($M = 14.40$ years, $SD = 0.73$), while 103 college students (82 females) were recruited for the 16- to 17-year-olds group ($M = 16.42$ years, $SD = 0.50$) and 54 undergraduate university students (44 females) were recruited for the over 18s group ($M = 21.15$ years, $SD = 3.21$).

Materials

The walkers were presented in 'point light' format, that is as 13 green dots on a black background (Figure 1). Each walker was filmed with retro-reflective markers placed on both heels, both knees, both greater trochanters (in effect, hips), both shoulders, both elbows, both wrists and the forehead to capture his or her gait. The individuals walking were filmed walking at their preferred walking speed for 10 seconds using Qualysis point light filming technology and 10 ProReflex infrared cameras (100 Hz).

A Sexual Dimorphism Index (SDI) score was created and calculated for each walker using his or her biometric information. The SDI score is a measure of how typically masculine each walker's body is relative to the other walkers in the study. The SDI scores are derived as a function of three sexually dimorphic features (waist-to-hip ratio, shoulder-to-hip ratio, and height) and comprise a ranked score of 1 to 23. A higher SDI score implies more typically masculine morphology, i.e. a taller, broader-shouldered, broader-waisted ('tubular') individual. All participants with an SDI score of less than 13 were female.

For the purpose of keeping the experiment efficient and retaining the attention of the younger participants, a subset of nine walkers (from a database of twenty-three walkers) were chosen for use in this study. These nine walkers ($M = 20.56$ years, $SD = 2.07$) were chosen to represent different ends of the SDI spectrum due to the previously observed relationship between masculinity and perceptions of danger (Carré et al., 2009; Hehman et al., 2013, 2015). The three most masculine walkers (three males, $SDI \geq 21$), the three most feminine walkers (three female, $SDI \leq 3$) and the three median-most walkers (two females, $SDI = 11$ and 12 ; one male, $SDI = 13$) were chosen to ensure three distinctively different groups of body types.

The walkers completed the Buss-Perry Aggression Questionnaire (Buss & Perry,

1992), which was analysed using revisions suggested by Bryant and Smith (2001). This questionnaire was used as it is a well-established measure of participants' tendencies for aggression. The questionnaire has been shown to be a valid measure of current aggression (Bryant & Smith, 2001), aggression in a hypothetical context (Archer & Webb, 2006; O'Connor, Archer, & Wu, 2001) and historic aggression (Diamond, 2006), and has been used with both student (García-León et al., 2002) and forensic (Diamond, Wang, & Buffington-Vollum, 2005) populations. Only the 'trait physical aggression' measure of the Buss-Perry Aggression Questionnaire was used, as this is most relevant to interpersonal threat judgments. In accordance with Bryant and Smith's (2001) revisions, participants can score between 3 and 21 for the physical aggression measure, and the chosen sample of 9 walkers is well spread (for an undergraduate student sample) within this range of potential aggression scores ($M = 7.11$, $SD = 5.09$, $Min = 3$, $Max = 15$).

Procedure

The younger participants took part in small groups (sessions of 15 to 29 participants held in schools and colleges) and the older participants in one larger group (54 participants in a lecture setting.) The order of presentation of the nine walkers was randomised for each group. After the presentation of each walker, the participants were given as much time as they required to make ratings on 9-point Likert scales of their perception of each walker in terms of their being *intimidating/not intimidating*, *friendly/unfriendly* and *masculine/feminine*.

Analyses

Using the procedures described in previous publications (Brand & Bradley, 2012; Kolar, Funder, & Colvin, 1996; Monin & Oppenheimer, 2005), the data are analysed two ways: correlated averages and average

correlations. Firstly, the correlation between the average intimidation rating received, the body shape and the trait aggression was analysed for each walker, allowing for an examination of the accuracy of the age groups in judging a potential aggressor as intimidating. Using this analysis is informative, as it provides information about the collective accuracy of the sampled populations. However, detail is lost in terms of individual variation in accuracy. Furthermore, the statistical n for analysis is reduced to 9 (as the properties of the nine walkers are correlated with each other) and thus is not reflective of the sample size used in this research. Therefore, the accuracy of the individual participants (as measured by Pearson's r values) is also reported. Participant accuracy is calculated by correlating the nine intimidation ratings made by each participant (relating to each of the nine walkers) with the self-reported aggression of the nine respective walkers. This individual accuracy correlation can be interpreted like any correlation, with a score of 1 demonstrating high accuracy (e.g. more aggressive targets are perceived as being more intimidating), a score of -1 demonstrating high inaccuracy (e.g. more aggressive targets are perceived as being less intimidating) and a score of 0 demonstrating no relationship between trait aggression and intimidation ratings (random performance).

It is therefore possible to examine the distribution of participant accuracy across the sample and the differences in accuracy abilities across age groups. Reporting the results for collective age groups and at an individual level provides a more complete understanding of both the properties of the walkers and the judgments of the participants.

Results

Ratings Received by Walkers

This section focuses on the walkers, using the average intimidation rating received by each walker, each walker's trait aggression and each

walker's body masculinity (the SDI score). The SDI ranking of the walkers positively correlates with the average intimidation rating received for all three age groups with very strong effects: 13- to 15-year-olds: $r(9) = .78$, 95% CI [.43, .96], $p = .014$; 16- to 17-year-olds: $r(9) = .77$, 95% CI [.34, 1.00], $p = .015$; over 18s: $r(9) = .89$, 95% CI [.65, .99], $p = .001$. This implies that in all cases a 'masculine is dangerous' heuristic was being used by the participants when judging the walkers' intimidation levels. This heuristic is reasonably accurate in itself for this set of walkers, with body masculinity and trait aggression positively correlating with a medium effect, $r(9) = .64$, 95% CI [.04, .95], $p = .064$.

The average intimidation ratings the walkers received from the younger age groups do not significantly correlate with the walkers' trait aggression: 13- to 15-year-olds: $r(9) = .36$, 95% CI [-.24, .77], $p = .341$; 16- to 17-year-olds: $r(9) = .40$, 95% CI [-.16, .91], $p = .281$. However, the average ratings received by the walkers from the over 18s positively correlate with trait aggression with a large effect size: $r(9) = .70$, 95% CI [.12, .97], $p = .036$.

It is interesting to note the variance in intimidation judgments made by the participants in each age group. Consistency in the judgments received by the walkers reflects participants rating a construct they can easily identify, while variance in judgments demonstrates more guesswork or a lack of consensus about the matter being judged. By calculating the average SD (σ) in the intimidation ratings received by each walker it is possible to test for differences in the spread of intimidation judgments between the age groups. The results show that the variation in intimidation ratings differs between age groups, $F(2,16) = 8.81$, $p = .003$, $f^2 = .70$, with the responses given by the 13- to 15-year-olds being more varied (with the highest σ), $M_\sigma = 2.02$, $SD_\sigma = 0.10$, compared to those given by the 16- to 17-year-olds, $M_\sigma = 1.88$, $SD_\sigma = 0.12$, $p = .046$, $d = 1.32$, and the over 18s (with the lowest σ), $M_\sigma = 1.73$, $SD_\sigma = 0.22$, $p = .003$,

$d = 1.75$. The over 18s and the 16- to 17-year-olds do not differ significantly, $p = .090$, $d = 0.89$. These results imply that a social consensus in judgments of intimidation develops with age.

Accuracy of Participants

In this part of the results section, comparisons are drawn between the three age groups using the accuracy correlations (r) of each participant as dependent variables (where 1 = perfect accuracy, -1 = perfect inaccuracy, and 0 = random responding). On average, all age groups only achieved a small to medium level of accuracy, $M_r = .20$, 95% CI [.15, .23]. Figure 2(a) shows the distribution of the whole sample's performance. The results of a binomial test show that the majority of 13- to 15-year-olds (81%, $p < .001$), 16- to 17-year-olds (66%, $p = .001$) and over 18s (89%, $p < .001$) have an accuracy correlation greater than zero, demonstrating overall accuracy. Few participants were notably inaccurate, with only 27 participants (11.16% of the whole sample) having an accuracy value of less than -0.20 (19 of whom are in the 16- to 17-year-olds group). There is no overall correlation between participant age and accuracy, $r(241) = .11$, 95% CI [-.01, .23], $p = .11$. However, there are differences in accuracy when correlations are compared across age groups, $F(2, 238) = 4.18$, $p = .016$, $f^2 = .19$. The over 18s, $M_r = .30$, 95% CI [.23, .37], were on average the most accurate in their intimidation ratings compared to the 13- to 15-year-olds, $M_r = .15$, 95% CI [.08, .22], $p = .010$, $d = 0.45$, and the 16- to 17-year-olds, $M_r = .18$, 95% CI [.13, .24], $p = .004$, $d = 0.45$. The 16- to 17-year-olds and the 13- to 15-year-olds performed similarly, $p = .470$, $d = 0.10$. Figure 2(b) shows the distribution of performance by age categories.

Discussion

It is important for the recognition of a potential aggressor to happen not only quickly but

Figure 2. The distribution of participant accuracy in detecting trait aggression with intimidation ratings: (a) overall sample accuracy and (b) by age category.

also accurately. It is possible that younger people do not have the life experience to detect potential dangers. This study explores how accuracy in detecting potential aggressors develops with age. The participants were shown point light displays of targets with no facial characteristics or clothing present as extra cues, leaving just gait and body shape

information available. All participants, regardless of age, made the ‘masculine is dangerous’ assumption and rated walkers with more masculine bodies as more intimidating. When evaluating the accuracy of the participants, it was found that the older participants outperformed the younger participants in terms of their ability to detect trait aggression. In fact, all participants under the age of 17 performed similarly and were less accurate than those even a couple of years older (the over 18s group). The spread of intimidation ratings was also analysed and it was found that as the age of the participants increases, the amount of variation in the judgments made of the walkers decreases.

These findings suggest that engaging in a more adult lifestyle exposes individuals to more situations which allow for aggressor detection skills to develop. Furthermore, with age, comes social consensus regarding perceptions of intimidation. Importantly, the utilisation of this consensus seems to benefit the identification of potential aggressors. These findings contribute to the argument that accurate judgments of aggressors may be acquired through the socialisation of interpersonal affordances. Individuals’ *utilisation* (Funder, 1999) of gait affordances to make an accurate intimidation judgment may develop through engagement with a social world (Costall, 1995).

This study uses an under-researched population: 13- to 17-year olds. There is a lack of interpersonal perception research on this population, which is not typically recruited from in studies of ‘children’ and is younger than the typically studied ‘adult’ population (e.g. Cheek, 1982; Funder, 2012; McCrae, 1982; Vazire & Mehl, 2008). Research on interpersonal perceptions of teenagers almost entirely focuses on bullying (Boulton & Smith, 1994; Mynard & Joseph, 1997) and does not investigate *accuracy* of trait recognition. It is clear from the individual variation in accuracy for the under 18s in the present that although, as a group, they are poorer at identifying potential aggressors than their adult counterparts,

some of the younger participants could detect trait aggression in others. In fact, some teenagers outperformed some adults. Future research should further investigate the factors that influence the acquisition of interpersonal accuracy.

It could be the case that the younger participants were less accurate simply due to the age difference between the participants and the targets. Whilst the members of the oldest group were judging targets in their own age bracket, the youngest groups were judging targets who are older than they are. It could be suggested that, much in the same way there is an own-age bias in face recognition (Rhodes & Anastasi, 2012), there could be an own-age bias in threat recognition. This could account for the general poor accuracy in the younger participants, and perhaps further research could explore own-age intimidation targets. Here, adult age targets were used as the research interest is in children’s ability to perform an adult task (such as those in Carré et al., 2009; Hehman et al., 2013, 2015).

Past research has fundamentally ignored children as active participants in judging danger. Studies have only focused on parents’ perceptions of the formidability of strangers (Fessler et al., 2014) and their choices to supervise their children closely (Foster et al., 2014). Thus, it is important to study how children acquire the skills to detect legitimate dangers. When out with their parents, children may well contribute to the decision to avoid or approach an unknown (or even known) person. In the current study, instead of considering parents’ perceptions of their children’s ability to ‘manage’ danger, the children themselves were asked to make their own judgments. Further research should extend this methodology and consider children as active participants in detecting dangers. Observations of joint decision-making between children and their parents might reveal how parents teach their children to recognise potential aggressors. This would add further weight to the finding that children’s acquisition of this ability develops over time.

The current study presented participants with images of individuals in motion using point light displays. Whilst previous research has focused on static facial stimuli (Carré et al., 2009; Hehman et al., 2013, 2015), the current work demonstrates that gait alone is communicative enough of trait aggression. Gait is frequently *available* (Funder, 1999) from an approaching person (usually before facial stimuli) and should be considered part of the overall impression when investigating aggression detection in real-world contexts.

Conclusion

The current work has strong theoretical and applied implications. It has been demonstrated that the ability to use intimidation ratings to discriminate between more- and less-aggressive individuals is acquired with age. It seems that children learn to recognise the traits of others as they gain life experience. As children growing up in the twenty-first century are more sheltered by their parents than ever before, it is interesting that not until the age of 17 – when venturing further afield – do children become better able to detect aggressors accurately.

Disclosure Statement

No potential conflict of interest was reported by the authors.

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