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Reconciliation in human adults: A video-assisted naturalistic observational study of post conflict
conciliatory behaviour in interpersonal aggression

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Summary

Reconciliation is an aspect of conflict resolution, with similar behavioural patterns documented in non-human primates, human children, and human adults of non-Western, non-industrialized cultures. Reconciliation amongst adults of industrialized societies has rarely been studied. We observed naturally occurring conflicts between adults, captured by public security cameras in England. Reconciliation was found in one-quarter of all conflicts and was more prevalent in milder conflicts. Reconciliation typically occurred spontaneously between opponents – and was found within friendship groups and across stranger groups. Reconciliation between opponents also appeared to be stimulated by peers, law enforcement, or shared objects. In some instances, reconciliation extended beyond the initial conflict dyad toward victimized third-party peacemakers. These findings add to growing cross-cultural and cross-species evidence demonstrating the presence and function of post-conflict reconciliation. We extend the repertoire of reconciliatory behaviour and introduce five common features of reconciliation that are central to the study of adult peacemaking.

Keywords: Reconciliation; conflict resolution; peacemaking; human adults; video observation

Introduction

40

41

42 Conflict is inherent to social living. Conflict can cause injury, disrupt social harmony, and
43 jeopardize cooperation between individuals of social species (de Waal, 2000). With the
44 development of nation states formalized rules and judiciary institutions arose to offset disruption
45 caused by social conflict (Elias, 1979; Pinker, 2011). However, the majority of everyday
46 interpersonal conflicts are managed by those involved or present, without the need for formalized
47 intervention (Black, 1993; Ellickson, 1994). This is possible because humans, similar to other
48 social species, have an evolved set of behaviours for managing and resolving conflict (Aureli & de
49 Waal, 2000). For example, human and non-human primates manage and resolve conflict through
50 tolerance and avoidance, negotiation, dominance-subordinate relationships and third-party
51 mediation (Black, 1993; Aureli & de Waal, 2000; Fry, 2000; Flack et al., 2006; Levine et al.,
52 2011; Emerson, 2015; Philpot et al., 2020). Further, social relations may be restored in the
53 aftermath of conflict via friendly interactions between former opponents—a behaviour defined as
54 reconciliation (de Waal & van Roosmalen, 1979). The study of reconciliation has a long research
55 tradition within ethology, with examples of conciliatory behaviours between opponents such as
56 touching, hugging, close proximity, and friendly vocal exchanges documented in over 40
57 nonhuman primate species (Aureli et al., 2002; Arnold & Aureli, 2007; Verbeek, 2008). Indicative
58 of convergent evolution, reconciliation has also been documented in a wide range of non-primate
59 social species, including canids (Cools et al., 2008; Cafazzo et al., 2018), corvids (Fraser &
60 Bugnyar, 2011), hyenas (Hofer & East, 2000) and marsupials (Cordoni & Norscia, 2014).

61 The standard method within ethology to study reconciliation is naturalistic observation.

62 Here, researchers observe the species of interest and compare rates of friendly exchanges between

63 opponents in a post-conflict interval against a matched control interval of the same duration of
64 social behaviour not preceded by conflict (i.e., PC-MC method, (de Waal & Yoshihara, 1983)).
65 This method is difficult to apply in the case of adult humans given the practical and ethical issues
66 associated with unobtrusively capturing real-time human conflict (de Waal, 1989; Verbeek, 2008)
67 and the difficulties of observing the same adult individuals across time and space. A few rare
68 studies have used ethological observations to study conciliatory behaviour in the aftermath of shop
69 robberies (Lindegaard et al., 2017) and during medical operation room conflicts (Jones et al.,
70 2018). However, with ethological observation so infrequently applied to the study of human
71 behaviour, “probably more is known about interactions between chimpanzees than interactions
72 between humans” (Martin, 2017, p. 118).

73 The few existing systematic observational studies of human reconciliation were almost
74 exclusively conducted on young children (typically of preschool age, e.g., Cords & Killen, 1998;
75 Butovskaya et al., 2000; Verbeek et al., 2000), as young children are more readily habituated to
76 on-site observation than older children or adults (de Waal, 1989; Verbeek, 2008). Further, while in
77 most cases it is impractical to observe the same adult individuals across time, young children can
78 be repeatedly observed in the same enclosed space (e.g., in classrooms, nurseries, and schoolyards;
79 de Waal, 2000). Illustrative of these methodological difficulties, the one systematic observational
80 study of reconciliation among human adults is restricted to the atypical case of friendly physical
81 contact between former competitors of sports matches (Benenson & Wrangham, 2016).

82 Applying the PC-MC method, developmental studies carried out in the USA, Europe, and
83 Japan show that between one-quarter to two-thirds of conflicts among young children are
84 succeeded by spontaneous reconciliation (Verbeek, 2008; Roseth, 2018). Conciliatory acts of the
85 young children in these studies included bodily contact such as hugs, embraces, affectionate

86 touches, toy offers, verbal apologies, and play invitations. Less frequently, reconciliation was
87 instigated by third-parties, for example, when peers or teachers reunited former opponents to hug
88 and make up, or to recite peacemaking rhymes ((Butovskaya et al., 2000; Roseth, 2018), for
89 similar human ethological finding, see (Eibl-Eibesfeldt, 1989)).

90 There are notable parallels in timing and function between reconciliation observed in
91 young children and in non-human primates. For example, across both populations, reconciliation
92 typically occurs in the first four minutes after a conflict (Verbeek, 2008), with the exchange often
93 reducing the opponents' distress (Aureli et al., 2002; Silk, 2002; Butovskaya et al., 2005; Fujisawa
94 et al., 2005; Fraser et al., 2010; Palagi & Norscia, 2011). Reconciliation is more likely to occur
95 when opponents have an established relationship and shared social interest (de Waal & Aureli,
96 1999). Specifically, non-human primate reconciliation occurs disproportionately more often
97 between kin and friendly dyads than between non-kin and those less affiliated (for review, see
98 Arnold & Aureli, 2007). Similarly, young children are more likely to reconcile with those they
99 typically interact with prior to the conflict (Laursen & Hartup, 1989; Hartup & Laursen, 1993;
100 Cords & Killen, 1998; Verbeek & de Waal, 2001 - though see Butovskaya & Kozintsev, 1999).
101 While the above studies provide important insights into the possible evolutionary underpinnings of
102 reconciliation, the focus on child-primate comparisons within ethology risks promoting the idea
103 "that other primates are *mentally* like human children" (de Waal, 1989, p. 249, original italics).
104 Ethological studies of naturally occurring reconciliation in human adults, while difficult to do, are
105 thus sorely needed to allow for species-comparisons at the adult level between human and
106 nonhuman primates.

107 Cultural anthropologists offer ethnographic examples of adult reconciliation across various
108 types of non-industrialized societies from around the world (Fry, 2000, 2012). Here, reconciliation

109 tends to occur between familiar individuals (e.g., within families, bands, tribes) and follows
110 conflicts that range from hostile gossip, ridicule and public shunning, through to property disputes
111 and occasional violence (Fry, 2000). The reconciliation practices following these conflicts,
112 although differing in their intricacies between cultural groups, share common behavioural and
113 symbolic expressions. For example, across cultures, former opponents reconcile with friendly
114 bodily contact (embraces, handshakes, kisses), appeasement gestures and expressions of apology,
115 and with gift giving and feasts (for review, see Fry, 2000). The goal of these peacekeeping
116 practices, as described in the anthropological literature, is to re-establish normal and harmonious
117 relationships between disputants, which benefit the sustainability of the wider group.

118 Despite these accounts the anthropological study of reconciliation remains limited: “If
119 mentioned at all in anthropological writings, reconciliations tend to receive only a sentence or
120 two” (Fry, 2000, p. 345). Reconciliation is also examined within other social sciences. For
121 example, criminologists study the impact of restorative justice programs in which perpetrators and
122 victims are brought together to negotiate for a resolution that satisfies both parties (Sherman &
123 Strang, 2007). Within political science, restorative justice processes have been studied at
124 institutional levels, with as a key example the Truth and Reconciliation Commission processes in
125 South Africa following the ending of apartheid (Gibson, 2006). Cross-cultural experimental work
126 in social psychology suggests that both victims and perpetrators have specific identity needs that
127 need to be met for reconciliation to occur, with victims needing their sense of agency restored
128 while perpetrators seek moral acceptance (Shnabel, 2018).

129 Taken together, a diverse body of evidence suggests that reconciliation is species-typical
130 behaviour for humans in post-conflict conditions (Fry, 2000; Verbeek, 2008), with a plausible
131 evolutionary basis as reflected by the parallel behaviour observed in non-human primates. Less is

132 known, however, about *how* reconciliation is displayed in face-to-face interactions. Specifically,
133 developmental studies typically focus on the quantification of presence versus absence of
134 reconciliation and rarely qualitatively describe behaviours as they unfold in their here-and-now
135 contexts (Verbeek & de Waal, 2001- for rare exception, see Schmitt, 1995). Cultural anthropology
136 describes reconciliatory events, but the details of the behavioural performances are often thin (Fry,
137 2000). Further, other social sciences tend to focus on forgiveness as a mental construct (e.g.,
138 Schnabel, 2018) or on reconciliation between broader entities (e.g., the institutional proceedings of
139 reconciliation between groups and nation states, Gibson, 2006), rather than on reconciliatory
140 micro-behavioural reunions following conflicts (though see Rossner, 2011). As such, work
141 examining interpersonal conflict and its aftermath tends to over focus on counting instances and
142 indirect measurements of behaviour as opposed to qualitatively describing reconciliation and its
143 forms as they are enacted in-situ.

144 In the current study, we use video surveillance recordings of naturally occurring
145 interpersonal aggression captured by public space closed-circuit television (CCTV) cameras to
146 detail the behavioural expression of human adult reconciliation. In our view, the dearth of micro-
147 behavioural descriptions of reconciliation relates to the methodologies that are typically deployed
148 in the social sciences (Reiss Jr, 1992; Nippert-Eng, 2015). Specifically, self-report accounts
149 provide inaccurate information of micro-behavioural details (Philpot et al., 2019), and on-site
150 observation offers unreliable insights into ongoing interaction sequences (Morrison et al., 2016).
151 By comparison video observational techniques permit the fine-grained analysis of naturally
152 occurring behaviours as they unfold in their here-and-now contexts (Gilmore & Adolph, 2017).
153 Video data may be replayed, zoomed in on, and slowed down to frame-by-frame instances, and
154 when used in a complementary fashion these techniques allow for behaviour and interaction

155 sequences to be reliably assessed (Philpot et al., 2019). Given these advantages, video data offer
156 the unique opportunity to accomplish what that has been advocated by ethologists for decades –
157 namely that researchers should not fetishize quantification and explanatory efforts at the cost of
158 detailed descriptions of the phenomena of interest (Tinbergen, 1963; Lorenz, 1973). As such, in
159 this paper we endeavour to strike a balance between rich descriptions of behaviour and
160 quantifications hereof that allows the discerning of explanatory patterns (Maxwell, 2010). In the
161 context of our lines of enquiry, video data allows access to a plethora of spontaneous, real-life
162 conflict situations that would be difficult to systematically witness with traditional onsite
163 observational methods. Repeated viewings of video captured behaviour allow us to describe how
164 human reconciliation, and its prospective elements, unfold sequentially. This methodological
165 novelty has the potential to generate new theoretical insights, as evidenced in previous CCTV
166 observational work around human violence (Philpot et al., 2019), mass emergency responses
167 (Philpot & Levine, 2022) and bystander intervention (Levine, Philpot & Kovalenko, 2020).

168 This proposed video-observational approach further satisfies recent calls for more direct
169 naturalistic observations of human conflict behaviour (Wrangham, 2008; Richer, 2017),
170 particularly of adults as opposed to children (de Waal, 2000). In sum, our study heeds the call of
171 Tinbergen (1963) to use the methods and questions of ethology to study ‘war and peace in animals
172 and man’ (cf. Verbeek, 2008; Verbeek & Peters, 2018).

173

174

Material and methods

175

176 *Data and sampling*

177 The data for this study comprised of 153 surveillance camera recordings of public space
178 aggression captured in urban places in the North West of England. Note that part of the current
179 raw video data was analysed for another study purpose, assessing third-party bystander
180 intervention during public conflicts (Philpot, 2017; Philpot et al., 2020). Data access was provided
181 by the city council, and the work was approved by the Ethics Committee of the Department of
182 Psychology, University of Exeter. The recordings covered inner-city entertainment areas, shopping
183 high streets, and transport station exteriors and lasted on average 268.22 seconds ($SD = 218.40$) or
184 four and a half minutes.

185 The video data were recorded by qualified city council operatives, who were instructed to
186 record both severe incidents (i.e., of interest to the police) and less severe, mundane public space
187 conflicts. This data collection strategy was applied in order to minimize the likelihood of a
188 sampling bias, in which data are skewed exclusively towards severe police reported incidents
189 (Lindegaard & Bernasco, 2018; Philpot et al., 2019). Recordings included for the current study
190 conformed to the following criteria: (1) The video contained aggression between at least two
191 individuals, who could then potentially reconcile as they remained co-present at the scene. (2) The
192 video had a sufficient technical quality to allow for a detailed behavioural coding (see Levine et
193 al., 2011; Philpot et al., 2020). (3) The video had no/negligible breaks in the interaction sequence
194 (e.g., with few camera obstructions or operative movements away from the conflict) (see Nassauer
195 & Legewie, 2018) and captured a duration of the post-conflict. Regarding this latter point, it was
196 soon clear from observing the data, that reconciliation was not a fixed moment in any episode - but
197 had dynamic qualities. As such, there was no single moment in a video where it was objectively
198 possible to say that a conflict was over. Rather two individuals could cease their aggression with
199 one another (meaning reconciliation could then occur between these parties), while aggression

200 could continue elsewhere amongst other interactants. As such, this raises multiple potential
201 reconciliation opportunity durations over a single clip.

202

203 *Coding*

204 Coding began by identifying the initiator(s) and recipient(s) of aggression (i.e., the conflict
205 opponents; hereafter initiator and recipient) in each surveillance clip. Aggressive behaviour
206 included both physical acts (e.g., shoves, hits, grappling) and non-physical acts (e.g., threatening
207 gestures and pointing, face-to-face aggressive personal space encroachment) (see Liebst, Philpot,
208 et al., 2019). Next, we followed the opponents in each surveillance clip and identified if any post-
209 conflict friendly interactions or affiliation occurred between conflict opponents, which we defined
210 as reconciliation. Conciliatory acts were initially defined from prior ethological, developmental,
211 and anthropological literature and later through an open-ended examination of data. Note, the
212 security camera clips did not contain sound, so only observable aggression and post-conflict
213 conciliatory acts could be recorded and subsequently analysed. Observable reconciliation acts
214 sampled from the literature included physical contact (such as handshakes, embraces, kisses,
215 affectionate strokes and patting); and sharing or giving of a valued item (Sackin & Thelen, 1984;
216 Fry, 2000; Verbeek & de Waal, 2001).

217 Next, a team of three authors applied an open-ended approach to identify additional acts
218 that appeared to serve a conciliatory function (see also Ljungberg et al., 1999). In this process we
219 utilized a key strength of video data – that it allows multiple observers to witness the same
220 interaction repeated times (Nassauer & Legewie, 2018). This ‘investigator triangulation’ was
221 important to help ensure that potentially ambivalent social meaning of the behavioural acts was not
222 misinterpreted (Valach et al., 1988; Eibl-Eibesfeldt, 1989; Denzin, 2017). For example, in a

223 developmental context, a child's passing of a toy to another child may have different social
224 connotations (reconciliatory or not), depending on whether the toy is passed to another child
225 during play or in the immediate aftermath of a peer conflict. In this example, investigator
226 triangulation allows discourse and agreement on the specific meaning of the observed act (Denzin,
227 2017). Through this process, we identified two additional conciliatory acts. First, we recorded
228 instances in which an individual helps raise an opponent back to their feet as reconciliation.
229 Second, we recorded departing farewell waves to a former opponent as reconciliation. Note that
230 these two additional reconciliatory acts were always accompanied by other physical conciliatory
231 contact, such as body touches and handshakes. To gain a better understanding of how typical these
232 reconciliatory acts are, we counted their frequency across our entire data set (Maxwell, 2010).

233 After noting the presence of reconciliation across data, two authors wrote detailed
234 qualitative behavioural and situational descriptions of each positive case (see Bloch et al., 2018).
235 Across these positive cases, we identified recurrent behavioural and circumstantial patterns, which
236 we present below (see Coffey & Atkinson, 1996). Here, we followed the example of Fry (2000) to
237 identify the key 'elements' and 'common features' of reconciliation episodes. Our analysis was
238 guided by enquiries to identify the key features of the way reconciliation emerged in the post
239 conflict period. For example, did it appear spontaneously, or was it introduced by others? Was
240 reconciliation limited to antagonists, or could it extend to third-parties? Was reconciliation
241 something that only happened between people that knew each other – as assessed through social
242 behavioural cues and tie-signs (Goffman, 1971; Ge et al., 2012; Liebst et al., 2020) – or could it
243 happen between strangers?

244 We also looked to identify contrasting cases, in which a reconciliation did not occur or
245 whereby a reconciliatory 'attempt' was rebuffed by the recipient (the latter as advocated by Webb

246 et al., 2014). By contrasting these negative cases with the positive cases, we were able to tease out
247 some of the situational background conditions associated with the conciliatory behaviour (see
248 King et al., 1994). More specifically, by contrasting cases in which reconciliation occurred against
249 cases in which it did not, we could explain whether reconciliation is more prevalent in our data
250 between male sex dyads (Benenson & Wrangham, 2016) or after more severe conflicts as
251 tentatively suggested in the developmental literature (Schmitt, 1995) but absent in the non-human
252 primate literature (Arnold & Aureli, 2007). For this latter enquiry, we operationalized conflict
253 intensity with three levels – mild, moderate and severe. Mild severity conflicts involved aggressive
254 posturing and gesturing, feinted hits, pushes and shoves, grappling, or aggressive horseplay.
255 Moderate severity conflicts comprised physical fights with open or closed-hand hits, kicks and
256 headbutts. Severe severity conflicts were physical fights in which kicks or stomps were delivered
257 to a person kneeling or lying on the ground. Finally, we examine whether the different conciliatory
258 acts are unequally distributed across our five overarching reconciliation subcategories.

259 At the request of a reviewer, we tested the interrater reliability of the variables included in
260 the final analysis. To this end, we randomly selected 46 of the video contexts (30.0% of the total
261 corpus) for independent double coding (see Riffe et al., 2014). This coding was carried out by the
262 first author and a research assistant. Agreement on identification of conflict parties, the sex and
263 social relations makeup of those conflict parties, the severity level of the conflict and whether
264 reconciliation occurred between conflict parties all reached a Krippendorff's α value of ≥ 0.8 , as
265 advocated by by Krippendorff (2004) as the satisfactory threshold for reliable interrater agreement.
266 These values were .83, 1.0, .82, .86, and .95, respectively.

267

268

Results

269

270 Of the total sampled 153 conflicts, 108 (70.59%) occurred between two males, 20
 271 (13.07%) occurred between two females, and 25 (16.34%) occurred between a mixed sex pairing.
 272 Reconciliation acts were observed in 40 (26.14%) of the of the 153 surveillance videos. Across
 273 these 40 positive video cases of reconciliation, 28 videos (70.00%) showed reconciliation between
 274 males, four videos (10.00%) displayed reconciliation between females, and eight videos (20.00%)
 275 exhibited reconciliation between a mixed sex pairing. 24 videos (60.00%) showed reconciliation
 276 after mild violence, 15 (37.50%) after moderate violence, and 1 (2.50%) after severe violence. In
 277 total, we recorded 13 different conciliatory acts across the 40 positive video cases of reconciliation
 278 (see Table 1). The most common conciliatory acts, exhibited in over half of all reconciliation clips,
 279 were strokes or pats to an opponent’s upper arm or top of shoulders. Other common conciliatory
 280 acts – occurring in half-to-a-third of all reconciliation videos – included arms placed around an
 281 opponent’s shoulder, hugs and embraces, handshakes, and strokes or pats to an opponent’s back.
 282 Rarer still, recorded in less than one-in-five reconciliatory videos, were strokes and pats to the hip,
 283 midriff, chest, face, as well as hand holding, kisses and item exchanges. The two newly recorded
 284 conciliatory acts of raising an opponent back to their feet and performing farewell waves were the
 285 rarest recorded behaviours, occurring in less than one-in-ten of reconciliation videos.

286

287 **Table 1**
 288 *Frequencies of reconciliatory acts*

Reconciliatory acts	Frequency of cases	% acts	% total samples
Stroke/pat upper arms (triceps/ biceps) or top of shoulder	21	52.50	13.73
Arm around the shoulder	19	47.50	12.42
Shake hands	16	40.00	10.46
Hugs and embraces	16	40.00	10.46

Stroke/pat back or shoulder blade	12	30.00	7.84
Stroke or pat hip, midriff, chest	7	17.50	4.58
Stroke face or hair, ruffle hair	7	17.50	4.58
Hold hands or link arms	7	17.50	4.58
Hands or arms around the waist	6	15.00	3.92
Kiss (lips, neck, face, head)	6	15.00	3.92
Exchange item	6	15.00	3.92
Wave goodbye	3	7.50	1.96
Raise individual to feet	3	7.50	1.96

289 *Note.* *N* of total video samples = 153, *n* of videos with reconciliation = 40, multiple reconciliatory acts can occur in the same video
 290 case meaning the act categories are not mutually exclusive
 291

292

293 *Five common features of reconciliation*

294 Having identified the frequency of reconciliatory acts, we explored whether it was possible
 295 to group the 40 video cases where reconciliation took place by common features and elements.
 296 Our aim was to identify the key features of the way reconciliation emerged in the post conflict
 297 period. Through joint research discussions of the behavioural and circumstantial qualities of the
 298 conciliatory acts observed, the research team identified five common features: (1) Dyadic
 299 reconciliation (*n* = 23), (2) third-party instigated reconciliation (peer stimulated *n* = 2, police
 300 stimulated *n* = 10), (3) object-mediated reconciliation (*n* = 6), (4) intergroup reconciliation (*n* =
 301 11), and (5) reconciliation with a third-party peacekeeper (*n* = 11). Note, these overarching
 302 features of reconciliation are not mutually exclusive (e.g., an opponent can reconcile with a third-
 303 party peacekeeper while under police presence).

304

305 (1) Dyadic reconciliation

306 Reconciliation is commonly recorded as self-orchestrated friendly affiliations between a
307 pair of former aggressive opponents (Verbeek & Peters, 2018). This ‘dyadic’ form or
308 reconciliation is also typical in the present data, being exhibited in 23 (57.50%) of the 40
309 reconciliatory videos. An exemplary case of this dyadic form of reconciliation is captured in the
310 following qualitative narrative. This narrative describes a video-captured conflict involving two
311 males grappling on the ground in middle of a road in a night-time drinking setting. In this fracas,
312 the initiator of the aggression gains the upper hand, placing his full body weight on the recipient
313 whilst punching the opponent’s head (see Figure 1A). At the sidewalk, several third-party
314 spectators observe the fight. A handful of spectators walk out onto the road towards the fighting
315 pair and hand signal to the approaching cars to stop driving. After some further grappling, the
316 recipient manages to release himself from the initiator’s grip. The recipient stands to his feet,
317 aggressively gestures towards his opponent, and vacates the road. The initiator, now also to his
318 feet, retrieves an item lost in the fracas. The initiator, still animated, walks directly towards his
319 opponent and raises his right arm with an open hand gesture. The recipient, just over one arm’s
320 length away in distance, turns 180 degrees displaying his back to the initiator, rejecting the
321 reconciliatory attempt. The initiator walks around to the side of the recipient and lightly shoves the
322 recipient’s arm. The force of this light shove is enough to turn the recipient back around to face the
323 initiator. The recipient reacts by taking two small steps backwards shrugging with both arms
324 extended. The initiator extends his right arm out for a handshake. The recipient individual returns
325 the gesture, gently slapping his right hand onto the hand of his former opponent while cupping the
326 now formed handshake with his left. The recipient again extends both arms out by his side and the
327 instigator embraces him, hugging around the recipient’s neck and waist. The recipient now returns
328 the hug, while heavily patting the back of the initiator (see Figure 1B). This example of a

329 ‘dominant’ or victorious individual initiating reconciliation conforms with earlier reports in the
330 human and non-human primate literature (de Waal, 1993; Benenson & Wrangham, 2016 – though
331 see Silk, 1997).

Figure 1A. Early into the conflict, the initiator pins the recipient down and punches his opponent’s head. Illustration by Nor Voldum-Clausen.



Figure 1B. After rebuffing the initiator’s reconciliatory attempts, the recipient reciprocates an embrace. Illustration by Nor Voldum-Clausen.



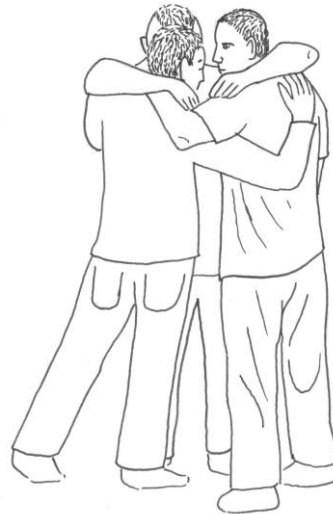
332
333 Following the suggestion of Butovskaya, Verbeek, and colleagues (2000) we examined
334 whether conflict intensity may affect the occurrence of reconciliation. Dyadic reconciliatory events
335 were observed after mildly severe conflicts and moderately severe conflicts, but were not observed
336 after severe violence. Dyadic reconciliation was observed between female opponents and between
337 mixed sex conflict parties. Mixed sex conflicts typically appeared to be verbal or physically mild
338 quarrels between what appeared to be romantic couples. In addition, we also observed a number of
339 occasions where third-parties actively joined in on the reconciliatory practices of the opponents
340 (see Figs 2A, 2B).

341

Figure 2A. Over a period of several minutes, an agitated individual enters the close personal space of another and gestures aggressively. The recipient pushes the initiator and feints a punch before breaking down in tears. Illustration by Nor Voldum-Clausen.



Figure 2B. The initiator bends down and consoles his weeping recipient, stroking his body and face. The third-party, an apparent friend, indicates he is about to leave and shakes the hand of the weeping individual before hugging him. The initiator joins the hug and the weeping recipient of aggression welcomes the initiator, hugging around his neck and stroking his upper back and shoulder. All three leave the scene together. Illustration by Nor Voldum-Clausen.



342

343 Finally, following the suggestion of Webb and colleagues (2014), we also looked to
 344 identify unsuccessful attempts at reconciliation (i.e., instances in which an individual attempted to
 345 reconcile, but their opponent did not reciprocate). We found seven examples where conciliatory
 346 hugs and embraces, body strokes or an extended arm with an open hand (i.e., handshake gesture)
 347 were ignored, pushed away or appeared to trigger the opponent to turn or walk away. In four of
 348 these seven examples, however, despite the initial setback, the opponents did finally reconcile by
 349 the end of the clip. Two of the three clips in which reconciliatory attempts remained
 350 unreciprocated involved rebuffed hugs in mild conflicts – one a male-female argument, the other

351 an animated disagreement with pushing between two males. In the third clip, an opponent offers a
 352 handshake that is slapped away. This conflict resumes and escalates to severe violence, with the
 353 individual who offered the conciliatory gesture being kicked repeatedly on the ground.

354

355 (2) Third-party instigated reconciliation

356 In addition to dyadic reconciliation, we also observed two occasions (5.00% of
 357 reconciliatory videos) where third-party peers physically brought the conflict parties together to
 358 make amends. In both cases, these third-party mediators appeared to be socially close to one (or
 359 both) of the conflict parties. Note, there may have been a number of occasions where third-parties
 360 verbally asked conflict parties to make amends. Certainly, third-party peers actively attempted to
 361 de-escalate conflicts in almost all video recordings and were observed talking to conflict parties
 362 before and as they reconciled. As we could not record verbal behaviour, however, it is likely that
 363 we underestimated the number of spontaneous ‘third-party instigated reconciliations’ and
 364 overestimated instances of spontaneous ‘dyadic reconciliation’.

365 Aside from peers, we also noted several cases where the police were directly or indirectly
 366 associated with reconciliation. Police intervention is typically present in the current data, given
 367 that the city council camera operatives recording the footage may call upon the emergency
 368 services when required. The arrival of the police can result in different outcomes. By default, the
 369 police tend to separate the conflict parties, question them in isolation, and then either send parties
 370 away separately or arrest one or more of the individuals involved. This separation by the police
 371 typically limits the possibility for former opponents to come together and reconcile their conflict.
 372 However, among the 40 reconciliatory cases, we noted ten cases (25.00% of reconciliatory videos)
 373 where the arrival of the police appeared to stimulate the conflict parties to reach a resolution

374 themselves. Here, reconciliation may be motivated by a desire to prevent the arrest of oneself or
375 the opponent. This motivation to avoid arrest may be shown in the following example, in which
376 two opponents fail to reconcile following an intervention by a member of the public, but instead
377 reconcile immediately upon the arrival of the police.

378 This specific situation involves a quarrel between two males alone in a public square
379 around midnight. One man, the initiator, shows postural cues of anger, holding himself erect with
380 emphasizing gestures and forward body inclinations towards his opponent (Dael et al., 2012). The
381 recipient, in an antithetical submissive gesture, minimizes his posture while repeatedly displaying
382 upturned open hands (Darwin, 1872; Martens et al., 2012). Despite these appeasing gestures, the
383 initiator grabs the recipient, head-butts him, and trips him to the ground. The initiator then sits on
384 the recipient's midriff, punches his head and rises to his feet to then kick, stomp on, and curse the
385 defenceless recipient who remains lying on the ground (see Figure 3A). A male bystander, now
386 witnessing the event, intervenes and blocks contact between the initiator and his fallen opponent.
387 Ignoring further de-escalatory attempts, the initiator walks around the third-party and hits the
388 opponent in the face with a single kick. The third-party once again steps in-between the two
389 individuals and extends his arm out towards the initiator in a blocking motion. Soon the initiator
390 turns and notices that a police car is arriving to the scene. The initiator again hastily walks around
391 the third-party, this time offering a hand to the recipient then raising him to his feet. As the police
392 officers exit their car, the initiator lightly touches the recipient's upper body with an open hand.
393 The recipient then gently folds his arms around the initiator's neck who responds by hugging his
394 opponent (see Figure 3B). A male police officer starts a conversation with the hugging pair, who
395 continue to huddle together with arms around one another's shoulders until the police officer, via
396 consultation with his radio, identifies and arrests the initiator.

397

Figure 3A. The initiator severely kicks and stomps on the defenceless recipient. Illustration by Nor Voldum-Clausen.

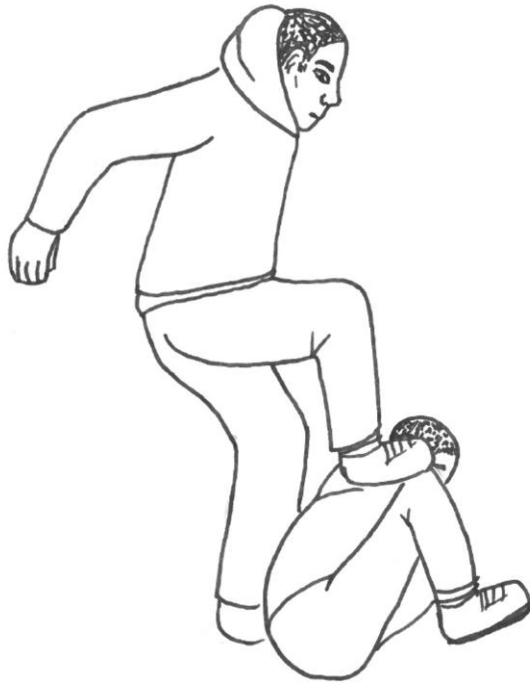


Figure 3B. The initiator and recipient of aggression exchange a hug in the presence of the police. Illustration by Nor Voldum-Clausen.



398

399 While the above example highlights authority stimulated reconciliation after severe
400 violence (e.g., with stomps and kicks to the head) involving males, affiliation between former
401 opponents in the presence of the police was also observed in moderately and mildly severe
402 conflicts and between female and mixed sexed combatants. While the above example shows that
403 opponents may reconcile when under direct police attention (perhaps denoting a motivation to
404 avoid arrest), in three out of our ten police stimulated cases, conflict parties reconciled while the
405 police either were on the scene but not physically proximate to the conflict opponents, or had
406 failed entirely to identify the combatants. It is reasonable to postulate that reconciliation behaviour
407 in these latter cases may not have reflected an instrumental motivation to avoid police sanctions, as

408 there was no police attention at that time. If this is the case, then these select examples may be
409 more fittingly classified as dyadic reconciliations.

410

411 (3) Object-mediated reconciliation

412 Among young children reconciliation between opponents may be achieved via the offering
413 of an object, such as a toy (Verbeek & de Waal, 2001). Although atypical (occurring in 6 or
414 15.00% of the reconciliatory videos), we identified similar gestures of hereinafter ‘object-mediated
415 reconciliation’ in the current data. In the following example, two females have a 10-minute
416 animated argument in a street leading out of the city centre. One conflict party, the initiator, enters
417 the intimate space of her opponent (the ‘recipient’) and inclines her upper trunk and head towards
418 the face of her target. Over a period of several minutes, the initiator shows facial expressions of
419 anger (Ekman & Friesen, 1975), points and aggressively gestures towards the recipient. During
420 these gesticulations, the recipient turns on point approximately 45 degrees so that she is no longer
421 facing the initiator. The initiator tilts her head to the side and again leans in towards the face of the
422 recipient, who reacts by pushing the initiator’s face away. Despite this push, the initiator continues
423 her gesturing for a further two minutes. The recipient continues to adjust her body away from the
424 initial aggressor, who in turn mirrors her movement maintaining the hostile face-to-face
425 interaction.

426 After a few steps to the side and a pause in aggression, the pair cross the road together and
427 begin to walk away from the city centre. After another verbal exchange and in a reversal of roles,
428 the recipient then enters the intimate space of the initiator and aggressively points and gesticulates
429 towards her. The pair continue to walk away down the street, both exchanging aggressive finger
430 prods, explicit hand gestures and shoves (see Figure 4A). Immediately after delivering an

431 aggressive shove towards the initiator, the original recipient appears to drop an object and fixes her
432 attention towards the ground. The recipient stoops down to the ground, bending her midriff
433 approximately 75 degrees towards the object. With an outstretched arm, and seemingly hampered
434 by the steep heels of her shoes, the original recipient fails to retrieve her fallen object. The initial
435 aggressor, who could take advantage of her opponent's vulnerable gait, now also diverts her
436 attention down to the ground. She steps forward, places her left hand on the shoulder of her
437 opponent, and bends low using her knees to retrieve the object (Figure 4B). The recipient also does
438 not take advantage of her counterpart's now vulnerable gait, but instead points towards the object
439 in need of retrieval. The initiator collects the object and returns to an upright position, passing the
440 object to her opponent's outstretched hand. Following a brief fixation on the object, the two
441 continue their conversation. Now the two individuals appear to speak to one another more calmly,
442 with open hand, slow gestures and without aggressive space encroachments. The camera operative,
443 perhaps noting the improved tranquillity of the exchange, discontinues monitoring the pair and the
444 clip ends.

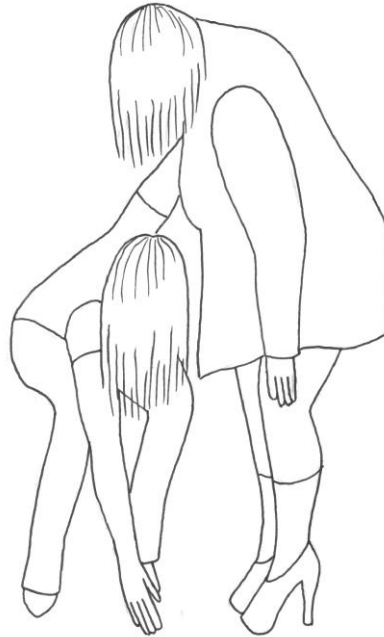
445

446

Figure 4A. After receiving an obscene two-finger hand gesture from the initiator, the original recipient pushes the off-balance initiator onto the road from the sidewalk. Illustration by Nor Voldum-Clausen.



Figure 4B. Leaving herself vulnerable for re-aggression, the initiator bends down to retrieve the object of interest and passes it to her opponent. Illustration by Nor Voldum-Clausen.



447

448 While it remains speculative that the shared-focus and attention on an object in the above
 449 example led to a cessation of aggression, we noted further examples where peace appeared to be
 450 restored after the returning of removed clothing, or after the sharing of a cigarette or lighter. These
 451 examples of object-mediated reconciliations, although occurring across all combinations of sex,
 452 were only observed in mildly and moderately severe conflicts. We also noted counter instances
 453 where a dropped object could be retrieved and returned by the conflict opponent, but the opponent
 454 either ignored the object, ignored a hand signal to return the object, or purposely damaged the
 455 object. For example, in one case, a recipient drops the cigarette from his mouth when startled by
 456 the feinted attacking movements of an initiator. The initiator, noticing the fallen object, then
 457 appears to purposely stomp and scrape his foot on the cigarette, thus rendering it unusable.

458 Symbolically, in such examples, an attack on an individual’s possession may be perceived as an
 459 attack on the individual themselves (see also Liebst, Ejbye-Ernst, et al., 2019).

460

461 (4) Intergroup reconciliation

462 The valuable relationship hypothesis proposes that reconciliation is most likely to occur
 463 between opponents who are valued social partners (de Waal & Aureli, 1999). In this framework,
 464 relationships are investments and reconciliation is critical to ensure future cooperation between
 465 parties. In the current data, we also found that more reconciliation occurred between those familiar
 466 (e.g., friends and romantic partners) than those unfamiliar. Specifically, we found that videos
 467 containing reconciliation predominately captured conflicts between seemingly familiar others
 468 (72.50%, 29/40, see Table 2), while videos that did not contain reconciliation typically captured
 469 conflicts between strangers (70.80%, 80/113) ($\chi^2 = 21.20, p < .001, \text{Cramer’s } \phi = 0.37$). This
 470 shows that the greater likelihood of individuals reconciling with familiar others is not simply an
 471 artefact of more conflicts occurring between familiar individuals.

472

473 **Table 2**

474 *Association between presence of reconciliation and familiarity*

		Familiarity	
		Familiar	Strangers
Reconciliation present	<i>n</i>	29	11
	%	(72.50)	(27.50)
Reconciliation absent	<i>n</i>	33	80
	%	(29.20)	(70.80)

475

476

477 One such example of intergroup reconciliation portrays a large fracas between a group of
 478 patrons and a group of bouncers, on the steps of a nightclub. The patrons, who were seemingly

479 refused entrance to nightclub and comprise three males and a female, stand at the bottom of the
480 nightclub's stairs, exchanging aggressive points and hand gestures with the bouncers who stand
481 resolute on the steps. The youngest of the patrons, a male in his mid-twenties, stands up onto the
482 lowest step, before being gently pushed back down by a bouncer. The eldest of the patrons, a male
483 in his mid-forties and the most gesticulating of the patrons, switches between aggressive points
484 and hand signals indicating that the bouncers should leave the steps and come down onto the
485 street. With the bouncers ignoring these requests, the eldest patron lunges forward and imitates an
486 attack. With the feint also seemingly ineffective, the eldest patron reverts back to aggressive
487 pointing and then stands resolute at the bottom of the steps, arms folded. After a further aggressive
488 point and another ignored gesture for the bouncers to descend to the street level, the eldest patron
489 ascends up the first step before being roughly pushed back down the step and away by a bouncer.
490 While pushing the patron, the bouncer is grabbed roughly from behind by the youngest patron.
491 Three other bouncers grab the youngest patron and drag him to the side, with two bouncers soon
492 releasing their grip. The youngest patron responds by throwing a punch towards the one bouncer
493 who retained his grip. In the meantime, the eldest patron returns to the bottom step and pushes the
494 bouncer who had forcibly removed him. The bouncer extends his arm out from the side of his
495 body and wraps it around the eldest patron's neck, pulling the patron to ground where he is
496 forcefully restrained with the assistance of other colleagues. The youngest patron, who throws an
497 additional two punches towards his target, is wrestled by two other bouncers and dragged into the
498 nightclub (unfortunately, there is no further information on this individual). Outside the club, for a
499 further six minutes, three bouncers continue to restrain the eldest patron—two bouncers hold down
500 the patron's upper body and one sits on his legs. After this time, two bouncers allow the eldest
501 patron to return to his feet. The bouncers lean the patron against a traffic barrier and talk to both

502 him and another (unidentified) patron who has arrived at the scene. The unidentified patron wraps
503 his arms around the elder patron, both hands holding onto the traffic barrier, forming a protective
504 ring around the elder patron. The elder patron leans over the traffic barrier facing the road. The
505 bouncers continue to talk to the elder patron from his side. The elder patron leans over the left arm
506 of his protector and extends a hand out towards one of the bouncers. The bouncer leans forward
507 and appears to shake hand of the elder patron. The elder patron stays nested in-between his
508 protector's arms and the traffic barrier for a further minute, talking with the two bouncers and his
509 protector until a police officer arrives and questions the bouncers and patron. The camera operator
510 stops the recording.

511 Aside from this one example involving patrons and bouncers, all other examples of
512 intergroup reconciliation occurred between members of the public. For example, we observed
513 reconciliation following a mild conflict between two middle-aged Asian males and a group of
514 young white males. In this example, the two Asian males were taken aside by members of the
515 opposite group and were reassured with friendly strokes and pats to the upper arm, back and
516 shoulders. When departing one Asian man and a member of the opposite group shake hands and
517 the two parties wave goodbye. We also recorded another case of intergroup reconciliation after a
518 mild conflict under police presence. In this instance, an instigator can be seen walking the streets
519 with his friends picking fights with those around. After some time, an apparent stranger, also
520 travelling with friends, accepts the challenge. The instigator shoves the stranger recipient off his
521 feet. The recipient rises with haste and speeds towards the instigator, likely to retaliate. Friends of
522 both parties intervene and block the conflict parties, presumably to stop further escalation. The
523 conflict parties continue to jostle and to push one another's hands away until both turn suddenly to
524 face the blue flashing lights of an approaching police car. Within moments, the recipient puts his

525 arm around the instigator's waist and speaks closely into his ear. A policeman arrives and takes the
526 recipient away to the side. Within a few seconds, the instigator walks up behind the recipient and
527 gently rubs the recipient's waist, stroking his hand up to the chest. The recipient looks back and
528 the two opponents exchange friendly smiles. The recipient pats the instigator affectionately twice
529 on the back and the two can be seen smiling and laughing together and imitating to the policeman
530 the shoves. After several minutes of further questioning, the policeman and his colleagues signal
531 that the opponents may leave. The two groups head off in opposite directions and after some time,
532 the camera operative stops monitoring the instigator. Intergroup reconciliation occurred across all
533 sex combinations. Intergroup reconciliation was not observed after severe violence.

534

535 (5) Reconciliation with a third-party peacekeeper

536 Arguments between two individuals rarely remain dyadic affairs. Rather, conflicts tend to
537 occur in the presence of third-parties (Planty, 2002), who frequently attempt to placate the
538 situation (Black, 1993; Roseth, 2018). In evidence of this, a recent CCTV analysis of public space
539 arguments and assaults finds that in over nine-in-ten conflicts at least one third-party individual
540 (but typically several) intervene to help (Philpot et al., 2020). With third-parties entering the
541 conflicts of others, there is always a risk of aggression being directed away from the former
542 opponent and towards the peacekeeper. A further video surveillance study of public space conflicts
543 shows that around 3.6% of third-party de-escalatory interveners are likely to receive some physical
544 form of aggression—albeit typically mild, such as a push away from the conflict (Liebst et al.,
545 2020). Therefore, in the current study, we were interested to record whether aggressors would
546 attempt to reconcile with those third-parties interveners they had been actively aggressive towards.
547 In total, we found eleven examples (27.50% of reconciliatory videos) in which an aggressor

548 reconciled with a de-escalatory intervener after directed aggression. In six of these cases,
549 reconciliation occurred after physical aggression (typically shoves) towards the de-escalator. In the
550 remaining five cases, reconciliation occurred after non-physical threats (e.g., aggressive pointing
551 and a feinted hit) that did not escalate to physical violence.

552 In an example of what we term ‘reconciliation with a third-party peacekeeper’, two females
553 are captured grappling with one another beside a carpark in the early hours of the morning. Two
554 males (likely each associated with one of the two females) appear agitated with one another. Each
555 male (the initiator and the recipient) are being held apart by intervening third-party peacekeepers.
556 The two females continue to grapple on the ground. One of the third-party peacekeepers tries to
557 help raise one of the grappling females back to her feet, but is pushed away by the male initiator.
558 The male initiator then raises the very same female combatant back up to her feet himself, before
559 returning to hostilities with the male recipient. The same third-party peacekeeper intervenes and
560 makes an attempt to hold the initiator back from the recipient. Deciding it is time to leave, the
561 male recipient turns to second female fighter and raises her feet. He hugs her and leads her away.
562 Now abandoned of a sparring partner, and seemingly still frustrated, the male initiator chases
563 down one of the remaining third-party peacekeepers who had previously restrained him. This
564 third-party peacekeeper turns and runs away. The agitated initiator then returns from this skirmish
565 and charges down the third-party peacekeeper who had attempted to raise his female associate to
566 her feet. The initiator enters the peacekeeper’s personal space pointing aggressively towards his
567 face. The initiator then roughly grabs the peacekeeper’s collar with both hands and shoves the
568 peacekeeper backwards, hard, onto the ground. The peacekeeper sits up on the ground and gestures
569 submissively with a body minimizing posture and upturned open hands. The initiator walks
570 towards the seated intervener, leans over him and exchanges a few words before turning to walk

571 away. After two strides, the initiator turns back around 180 degrees and walks up to the
 572 peacekeeper with his right arm extended. The peacekeeper returns the gesture. The initiator clasps
 573 the outstretched hand of the peacekeeper and pulls him to his feet. Now both standing, the initiator
 574 continues to cup the hand of the peacekeeper with his right hand. With his left hand, the initiator
 575 gently pats the right triceps and elbow of the peacekeeper. No further aggression occurs and after a
 576 brief conversation the initiator heads briskly down the street in the direction of his initial male
 577 opponent, seemingly in pursuit.

578 While the above example depicts third-party peacekeeper reconciliation between two
 579 males, we also found an instance in which a female protagonist reconciles with a female
 580 peacekeeper after mild aggression. We also observed several examples where romantic partners
 581 intervened to restrain their fighting partners, only to be aggressed against by their frustrated
 582 partner. This latter partner aggression, which was directed by both sexed protagonists towards both
 583 sexed romantic partners, was typically reconciled with post-conflict hugs and embraces, kisses and
 584 strokes. Reconciliation with a third-party peacekeeper was restricted to mild conflicts – i.e., after
 585 non-physical threats and mild physical aggression – the most severe case of which was the shoving
 586 of the intervener described above. This was the only reconciliation feature not observed in
 587 moderate severity cases (see Table 3).

588

589 **Table 3**

590 *A summary table of the sex combinations and severity levels observed for each reconciliation feature*

Reconciliation features	Observed sex combinations of reconciliation parties			Observed severity of conflict prior to reconciliation		
	M	F	Mixed	Mild	Mod.	Severe
(1) Dyadic	√	√	√	√	√	
(2) Police stim.	√	√	√	√	√	√
(3) Object med.	√	√	√	√	√	

(4) Intergroup	√	√		√	√
(5) Peacekeeper	√	√	√	√	

591 Note. √ depicts the presence of at least one observation among the 40 positive reconciliation video cases. For ‘(2) third-party
 592 instigated reconciliation’, given the relative low number of cases of ‘peer stimulated reconciliation’ ($n = 2$), we only assess ‘police
 593 stimulated reconciliation’ ($n = 10$). M = Males, F = Females, Mod. = Moderate.

594

595

596 *Conflict severity, sex-dyads and reconciliation*

597 One emergent finding from our close examination of the 40 positive video cases is that reconciliation
 598 seldom occurs after severe violence. Specifically, reconciliation after kicks or stomps to an opponent
 599 on the ground was restricted to a single case (described above in ‘Police stimulated reconciliation’).
 600 However, this initial finding does not provide information regarding whether reconciliation is
 601 skewed towards less severe cases, or whether moderate and severe violence were simply
 602 comparatively rarer events across the wider video corpus. Therefore, to examine the association
 603 between conflict severity and reconciliation, we compared the violence severity levels of videos
 604 containing reconciliation ($n = 40$) with the videos without reconciliation ($n = 113$). Table 4 presents
 605 these results and shows that videos with reconciliation are less likely to contain moderate and severe
 606 violence between opponents (40.0%, 16/40) than videos without reconciliation (69.03%, 78/113). A
 607 Chi Square Test finds this association to be significant, with reconciliation videos significantly
 608 skewed towards less severe conflicts ($\chi^2 = 12.60, p = .002$, Cramer’s $\phi = 0.29$).

609 Next, we examined whether any dyad sex-class is more likely to reconcile. Here we
 610 compared the dyad sex-classes of those displaying consolatory acts in the reconciliation positive
 611 videos ($n = 40$) against the dyad sex-classes of those combatants in the videos without reconciliation
 612 ($n = 113$) (see Table 4). We did not find a significant association between dyad sex-class and
 613 reconciliation ($\chi^2 = 0.84, p = 0.66$, Cramer’s $\phi = 0.07$). As such, while male dyads reconciled more,

614 it is shown that they were also disproportionately more likely to be the involved as conflict parties
 615 in the first place.

616

617 **Table 4**

618 *Association between presence of reconciliation, severity, and dyad sex-class*

		Severity level			Dyad sex-class		
		Mild	Mod.	Severe	M-M	F-F	Mixed
Reconciliation present	<i>n</i>	24	15	1	28	4	8
	%	(60.00)	(37.50)	(2.50)	(70.00)	(10.00)	(20.00)
Reconciliation absent	<i>n</i>	35	58	20	80	16	17
	%	(30.97)	(51.33)	(17.70)	(70.80)	(14.16)	(15.04)

619 *Note.* M-M = Male – Male; F-F = Female – Female; Mod. = Moderate

620

621 *Reconciliatory acts across the five common features*

622 A final area of interest is whether the different conciliatory acts are unequally distributed
 623 across our five common features of reconciliation. Table 5 presents a breakdown of the prevalence
 624 of each conciliatory act across the five common features. By and large, the distribution of the
 625 different reconciliatory acts remain relatively stable across the five common features; for example,
 626 strokes and pats to upper arm or shoulder, and arms around the shoulder are common conciliatory
 627 acts common across all five common features. There are, however, also notable differences. For
 628 instance, videos capturing intergroup reconciliation show no instances of kisses between
 629 opponents, of item exchanges between opponents, of strokes to an opponent’s face or hair, or
 630 examples of opponents raising others to their feet. These intergroup reconciliatory examples also
 631 have relatively low prevalence of hugs and embraces, but high rates of handshakes and departing
 632 waves goodbye. By contrast, videos with reconciliatory displays toward a peacekeeper, typically
 633 observed as a third-party associate of the initial aggressor, have relatively high levels of hugs and
 634 embraces, strokes to the face and hair, and kisses. Furthermore, videos capturing object exchanges

635 between individuals also record a high prevalence of more intimate acts, such as embraces, hugs,
 636 arms around the shoulder, hand holding, and touches to upper body, chest and midriff.

637

638 **Table 5**

639 *Distribution of different conciliatory acts across the reconciliation features*

Types	Reconciliation acts												
	Stroke or pat upper arms or top shoulder	Arm around the shoulder	Shake hands	Embrace or hug	Stroke or pat back or shoulder blade	Stroke or pat hip. midriff. chest	Stroke face or hair. ruffle hair	Hold hands or link arms	Hands or arms around the waist	Kiss (lips. neck. face. head)	Exchange item	Wave goodbye	Raise individual to feet
Dyadic (n=23)	n 11	12	11	9	7	5	3	6	2	1	4	2	2
	% 47.8	52.2	47.8	39.1	30.4	21.7	13	26.1	8.7	4.4	17.4	8.7	8.7
Police med. (n=10)	n 7	5	5	4	4	1	2	1	3	2	0	1	1
	% 70	50	50	40	40	10	20	10	30	20	0	10	10
Object med. (n=6)	n 4	4	0	4	0	2	1	3	0	2	6	0	1
	% 66.7	66.7	0	66.7	0	33.3	16.7	50	0	33.3	100	0	16.7
Intergroup (n=11)	n 6	3	6	2	3	2	0	1	2	0	0	3	0
	% 54.6	27.3	54.6	18.2	27.3	18.2	0	9.1	18.2	0	0	27.3	0
Peacekeeper (n=11)	n 6	5	1	6	2	1	3	3	1	3	2	2	2
	% 54.6	45.5	9.1	54.6	18.2	9.1	27.3	27.3	9.1	27.3	18.2	18.2	18.2

640 *Note.* N of reconciliation videos = 40. Reconciliation types are not mutually exclusive. Darker shading indicates higher
 641 presence of specific reconciliatory behavior. For '(2) Third-party instigated reconciliation', given the relative low number of cases
 642 of 'peer stimulated reconciliation' (n=2), we only assess 'police stimulated reconciliation'.

643

Discussion

644

645 Humans live together in gregarious communities, which, on occasion, results in conflicts
646 of interest and confrontations between individuals. In the aftermath of conflicts, social order may
647 be re-established via friendly interactions between former opponents, a behaviour defined as
648 reconciliation (de Waal & van Roosmalen, 1979). So far, examinations of reconciliation has
649 mainly focused on non-human primates (Aureli et al., 2002; Arnold & Aureli, 2007; Verbeek,
650 2008), human children (Cords & Killen, 1998; Butovskaya et al., 2000; Verbeek et al., 2000),
651 and human adults in non-Western, non-industrialized cultures (Fry, 2000, 2012). The objective
652 of the current study, therefore, was to identify, count and describe adult human reconciliation of
653 interpersonal conflicts as unobtrusively captured by public security cameras in an urban,
654 industrialized context.

655 Consistent with ethological, developmental and anthropological research, we found
656 spontaneous, friendly affiliations taking place between former opponents of aggression. In these
657 examples of ‘dyadic reconciliation,’ we observed former opponents shaking hands, hugging and
658 embracing, placing their arms around their opponent’s shoulder or hips, and stroking, patting or
659 rubbing their opponent’s body or face. Adding to the previous inventory of conciliatory acts
660 (Sackin & Thelen, 1984; Fry, 2000; Verbeek & de Waal, 2001), we also documented, albeit less
661 frequently, examples of individuals raising their opponent back to their feet, as well as departing
662 waves farewell. Dyadic reconciliation was found after mild and moderate aggression and
663 between all combinations of sex dyads.

664 Third-parties also took an active role in prompting combatants to make amends – what
665 we termed ‘third-party instigated reconciliation’. In the current data, these third-party mediators

666 appeared to be socially close peers. However, we also found that the police, entering the fray as
667 formal guardians, could stimulate (as well as restrict) reconciliation. That combatants reconcile
668 in police presence, at all levels of conflict severity, likely stems from a motivation to avoid legal
669 sanctions. However, we also noted instances in which combatants reconciled when the police
670 were on the scene but were not physically proximate or had entirely failed to identify their
671 suspects. That reconciliation may be stimulated by police presence runs counter to evidence in
672 the developmental literature, in which the presence or intervention of authority figures (i.e.,
673 teachers) is found to inhibit the likelihood of reconciliation (Verbeek, 2008). In cases where the
674 police applied their common practice of spatially separating the conflict parties, we only found a
675 single example of reconciliation. As such, while this police practice of separating conflict parties
676 likely reduces re-aggression, it may also restrict spontaneous reconciliation (Verbeek & de Waal,
677 2001).

678 In addition to prompting conflict parties to reconcile in the aftermath of a fight, third-
679 parties take an active role in trying to de-escalate aggression mid-conflict (Philpot et al., 2020).
680 This raises the concern of whether third-party peacekeepers may be subsequently victimized by
681 those fighting. Recent evidence suggests that this risk is actually low (Liebst et al., 2020). We
682 add to this optimistic picture by finding that atypical events of third-party victimization may be
683 succeeded by reconciliatory behaviour. In our examples, initiators of aggression were recorded to
684 offer apologies towards victimized third-party peacemakers, including rising individuals to their
685 feet, shaking hands, patting, stroking, kissing and embracing. These examples demonstrate
686 ‘behavioural processes of peace’ in action (Verbeek, 2018) and add to a growing body of
687 literature stressing the importance of looking beyond the initial conflict dyad to understand how
688 communal peace is achieved (Black, 1993; de Waal, 1993; Levine et al., 2011). It is interesting

689 to note that reconciliation with a third-party peacekeeper was only observed after non-physical
690 threats and mild physical aggression. As such there were no examples of reconciliation with a
691 peacekeeper after moderate violence (hits, kicks, headbutts) or severe violence (kicking or
692 stomping on fallen individual). It remains unclear whether this absence represents an inverse
693 relationship between violence severity and the likelihood of peacekeeper reconciliation, or
694 whether there are just very few examples of moderate and severe violence enacted on intervening
695 third-parties, as suggested by work of Liebst and colleagues (2020).

696 Observations of reconciliatory practices in small children and adults in non-Western,
697 non-industrialized cultures show that peace can be restored when one combatant offers another
698 an object of value (Fry, 2000; Verbeek & de Waal, 2001). We found similar examples of what
699 we termed ‘object-mediated reconciliation’ in the current dataset. Rather than toy offers, as
700 typical in the children’s literature, or feasts or livestock, as found in non-Western, non-
701 industrialized peacemaking contexts, we found that the objects offered were items afforded from
702 the inner-city, developed public space environment. These items included cigarettes, a lighter,
703 and items removed or lost during the fracas (such as clothing or a key). Therefore, while the
704 object itself may vary according to setting, the gesture of object sharing appears consistent across
705 contexts. While the offering and acceptance of an item was never followed by further aggression,
706 our observational data did not allow examination of the causal nature of events – i.e., whether the
707 offering and acceptance of an item reduced the likelihood of re-aggression, or whether the
708 conflict was already resolved to the point where items could be successfully exchanged.
709 Furthermore, we also noted examples where offered items were ignored or pushed away by the
710 recipient and the conflict continued.

711 A robust finding across primatology, anthropology and developmental psychology,
712 consistent with evolutionary models of cooperation (Trivers, 1971), is that reconciliation
713 predominately occurs between individuals who are socially close and share mutually dependent
714 ties (Fry, 2000; Aureli et al., 2002). Here reconciliation serves to repair pre-existing
715 relationships, allowing future cooperation. While reconciliation in our sample also predominately
716 occurred between those seemingly familiar, we found examples of ‘intergroup reconciliation’, in
717 which apparent strangers made amends. In these ‘stranger’ examples, we can expect a wide
718 relational distance between the opponents and an absence of social dependencies. This is a result
719 of the data being sampled from an urban environment, in which public strangers can avoid one
720 another in the present and do not expect repeated interactions in the future (Lofland, 2017). This
721 sampling property is different to the prior literature, in which there is at least some degree of
722 dependency or expectation of future interaction. For example, in the developmental literature,
723 quarrelling children are likely to have already spent time together in the past and can expect to
724 meet again. In this educational context, while quarrelling friends are as likely to make up in
725 closed space (i.e., classroom) as they are open space (i.e., playground), non-friends are unlikely
726 to reconcile in open environments, where they can easily avoid one-another (Verbeek & de
727 Waal, 2001).

728 That strangers reconciled in the current data, particularly given the open space and the
729 limited expectation of future interactions, raises the question of ‘why repair a tie that never
730 existed or will not be resumed?’. Evolutionary accounts of direct reciprocity between known
731 individuals are limited in explaining stranger reconciliation. Evolutionary accounts of indirect
732 reciprocity, such as helping that may improve one’s own reputation or social standing (Nowak &
733 Sigmund, 2005), and cultural and normative expectations to resolve conflicts (Tavuchis, 1991;

734 Gold & Davis, 2005) are better suited to explain this phenomenon. Stranger reconciliation may
735 also be prompted by more direct goals, such as to alleviate the immediate social tension and thus
736 reduce the risk of further injury or harm should the conflict resume.

737 There is clearly exciting future work to be done in this area. A series of observational
738 studies have shown that public space social groups can be reliably assessed by independent
739 coders, based on non-verbal cues alone (Liebst et al., 2019; Ejbye-Ernst, Lindegaard &
740 Bernasco, 2020; Liebst et al., 2021). However, while these studies may identify social groups
741 (ingroups and outgroups), they are unable to provide direct or precise information on the
742 perceived ‘value’ of the relationship between parties. Observational data of human behaviour
743 would undoubtedly benefit from triangulation with other data sources – particularly those
744 offering detailed verbal accounts. There are some examples of this methodological synergy in the
745 literature. Liebst and colleagues (2018) successfully combined CCTV footage with interview
746 data from police case files to validate pre-existing social ties between parties of public assaults.
747 Activist researchers have reunited protesters with video footage of police aggression during
748 demonstrations and asked participants for their reflections (Nassauer, 2016; Bramsen, 2018). We
749 advocate the use of similar creative procedures in the study of human adult peacemaking,
750 allowing a more precise investigation into the valuable relationship hypothesis and particularly
751 the motivations of individuals to reconcile with strangers.

752 In the current paper, we also examined whether different conciliatory acts occurred at
753 similar frequencies across our five common features of reconciliation. Given the general sparsity
754 of the different 13 conciliatory acts across the five reconciliatory features, we were unable to
755 conduct inferential analyses at this stage to examine whether particular acts were statistically
756 associated with certain reconciliatory features. We did, however, note interesting descriptive patterns
757 in data. Across all features, we found descriptively that the most frequent conciliatory act was

758 touches to the arm and shoulder regions. This finding is in line with cross-cultural research in
759 bodily topography, which shows that the shoulder and arm regions are the most socially
760 acceptable bodily regions to touch (Suvilehto et al., 2015). We did, however, also note key
761 differences when examining the distribution of the different conciliatory acts across the five
762 common features of reconciliation. One notable example was that videos containing intergroup
763 reconciliation displayed no instances of kisses between opponents, of item exchanges between
764 opponents, of opponents raising one another to their feet, or of strokes to an opponent's face or
765 hair. Intergroup reconciliation also had proportionately low rates of hugs and embraces, but high
766 rates of handshakes and departing waves goodbye. These lower rates of intimate exchanges
767 likely reflect the lack of social closeness between the conflict parties in an intergroup context and
768 social rules that regulate where on a stranger's body it is acceptable to touch (Suvilehto et al.,
769 2015). By contrast, videos with reconciliatory displays toward a peacekeeper—typically a third-
770 party associate of an aggressor (Liebst, Philpot, et al., 2019)—and videos capturing object
771 exchanges, had relatively high levels of hugs and embraces, strokes to the face and hair, hand-
772 holding and kisses, likely reflecting social closeness and intimacy.

773 We found that reconciliation between former opponents of aggression occurred in
774 25.66% of the video clips observed. This number is in line with the developmental literature,
775 which finds that between one-quarter to two-thirds of conflicts between young children are
776 succeeded by friendly reconciliatory exchanges (Verbeek & de Waal, 2001; Roseth, 2018).
777 Given that the prevalence of reconciliation in the current study is towards the lower end of what
778 has been found elsewhere, it is judicious to consider any factors that may be shaping our one-
779 quarter frequency. First, our security camera footage did not contain sound, and we were thus
780 unable to measure instances of verbal reconciliation, such as spoken apologies, joke and story

781 telling, or cooperative propositions (e.g., “let’s make up” “we’re friends”) (Sackin & Thelen, 1984;
782 Tavuchis, 1991). Second, public space aggression in developed societies disproportionately
783 occurs between strangers (Heinskou & Liebst, 2017), who may have less need of social bond-
784 repairing (Fry, 2000; Aureli et al., 2002). Third, the current sample had temporal restrictions
785 which limited our coverage of the post-conflict period. In the non-human primate and
786 developmental literature, the subjects of interest can be repeatedly observed in the same locality.
787 Through following the same individuals across time periods – typically for at least four or five
788 minutes *post-conflict* (Verbeek, 2008) – researchers can ensure whether reconciliation occurred.
789 The current video data was collected with the primary objective of documenting acts of
790 aggression in public space and mid-conflict bystander interventions (Philpot, 2017; Philpot et al.,
791 2020). This meant that many videos were cut by camera operatives as the post-conflict
792 interactions continued, likely omitting the capture of several positive cases of reconciliation.
793 Taken together, the inability to record verbal resolutions and our restricted observation period
794 likely deflated our reconciliation prevalence figure, which should therefore be interpreted with
795 caution.

796 In the current study, we found that reconciliation occurred disproportionately more frequently
797 following lower severity conflicts. This runs counter to a systematic observation study of 234
798 kindergarten conflicts, which found that severer arguments were more often reconciled (Schmitt,
799 1995). Furthermore, it adds to the mixed findings in the non-human primate literature, which finds
800 small positive, small negative and null associations between conflict intensity and reconciliation
801 likelihood (see Arnold & Aureli, 2007). One explanation for the divergent results between the current
802 study and the developmental study noted above may be the operationalization of conflict severity.
803 Specifically, this kindergarten study, through the use of participant observation, recorded verbal
804 disputes and thus captured the very lowest level of conflict intensity. The current CCTV data,

805 sampled externally to the research team by city council employed operatives, may not have captured
806 many of these lower level arguments and may be biased toward severe assaults in which an
807 individual was in serious danger. This may be a limitation of our data, but our sample may indicate
808 that once violence reaches a certain high level of severity, it may become emotionally or physically
809 more difficult to offer or accept apology (Luckenbill, 1977). Beyond the impact of conflict severity,
810 we also examined whether there were sex differences in the tendencies of conflict parties to
811 reconcile. We found that male-dyads were disproportionately more likely to reconcile, but that this
812 higher number was offset by the circumstance that males were disproportionately more likely to be
813 involved conflicts in the first place. When accounting for this increased male exposure, we did not
814 find evidence in data that any sex dyad-class was more likely to reconcile than any other. This adds
815 to mixed findings in the non-human primate literature (Arnold & Aureli, 2007) and runs counter to
816 the one systematic observational study of human reconciliation between sports competitors, which
817 found males to be more predisposed conciliatory acts than females (Benenson & Wrangham, 2016).

818 There is a long-standing interest regarding the extent to which behaviours are ‘human
819 universals’, i.e., innate and found across all human societies (Brown, 1991). The anthropological
820 literature has long supposed that “[w]e generally assume that we know, from ... observation,
821 what is universally human. But a little scrutiny will show that such conclusions are based only on
822 experience with one culture, our own.” (Burrows, 1963, p. 421). In the case of reconciliatory
823 behaviour, we suggest that the inverse is true. Specifically, that spontaneous reconciliation
824 between individuals is assumed to be a shared characteristic across humans because it has been
825 observed in human adults of non-Western, non-industrialized cultures, in human children, and in
826 non-human primate populations (Verbeek, 2018). Yet there is a lack of comparative evidence
827 from our own, adult-industrialized culture. In addressing this gap, we leveraged the opportunities
828 afforded by video technology to qualitatively describe displays of human-adult reconciliation in

829 urban, public shopping and entertainment areas of England. We find numerous examples of
830 reconciliation between former opponents in the current data, thus adding evidence that
831 reconciliation may represent species-typical behaviour (i.e., a ‘human universal’). In conducting
832 the current work, we further note important similarities in the reconciliatory displays between
833 adults in the current dataset and those documented in non-UK cultures. Fry (2000), in his review
834 of conflict management strategies from a cross-cultural perspective, offers a list of common
835 reconciliation rituals observed across non-Western, non-industrialized cultures. These include
836 ‘gift giving’, ‘physical contact’, ‘appeasement postures and gestures’ and ‘participation of others
837 in reconciliation rituals’ – all of which were observable in the current CCTV data. The additional
838 rituals of ‘sharing of food or drink’ and ‘verbal expressions of apology, remorse, contrition’
839 (unfortunately impossible to capture on soundless CCTV footage) were not recorded. We hope
840 that the current article will pave the way for further qualitative examinations of human-adult
841 reconciliation across industrialized cultures and settings, as well as ethogram (behavioural
842 codebook) development and statistical estimations of conciliatory behaviour. Such future lines of
843 research would satisfy calls for a closer examination of the human-adult primate (Aureli & de
844 Waal, 2000; Wrangham, 2008; Richer, 2017) and the pressing “need to observe forgiveness” and
845 its role in restorative peace (Verbeek, 2009, p. 142; cf. Verbeek & Peters, 2018).

846

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847

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