

RUNNING HEAD: Anger On and Off the Road

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### Abstract

113 participants reported on two recent experiences of anger, of which one had occurred while they were driving and the other in a non-driving situation. Anger while driving was described as less mixed with other emotions, involving purer appraisals of other-blame, more likely to be caused by communication difficulties, and slower to be noticed by the person who was its target. Levels of negative affect preceding anger were rated as significantly lower in driving than non-driving situations, and mood and unrelated pressure were considered to be less influential causes of the subsequent emotional reaction. Frequency estimates supported the popular notion that anger is relatively more likely while driving than during other activities. Individual difference measures relating to ambivalence over emotional expression, self-consciousness, and empathy showed no reliable correlations with frequency of anger while driving, but previously developed self-report indices of driving anger and aggression made a significant contribution to its prediction even after controlling for anger frequency in other situations. These results support everyday intuitions that certain features of the road situation differentially predispose drivers to become angry and that the resulting anger tends to take a different form from anger experienced off the road.

### **Anger On and Off the Road**

Despite sustained media attention, information concerning the prevalence and characteristics of “road rage” is still surprisingly limited. For example, although it is popularly assumed that something about the activity of driving increases hostile tendencies, there have been few attempts to assess the relative frequency of anger behind the wheel and in other settings. Similarly, the widely held belief that there are distinctive aspects to anger experienced while driving has rarely been investigated directly. The present research attempts to find provisional answers to questions relating to differences between anger experienced on and off the road, focusing particularly on appraisals (e.g., Lazarus, 1991; Smith & Lazarus, 1993) and communicative factors (e.g., Parkinson, 1997) and their potential roles in its causation.

Appraisal theories (e.g., Lazarus, 1991; Roseman, 1984) propose that the quality and intensity of emotion derive from the way in which the situation is interpreted and evaluated. In particular, Smith and Lazarus’s (1993) influential formulation sees anger as arising from appraisal of “other-blame” which includes three aspects: motivational relevance (the situation bears on currently active goals or concerns), motivational incongruence (what is happening conflicts with achievement of these goals), and other-accountability (someone else is responsible for the motivationally incongruent state of affairs). According to this model, differences in the nature of emotions experienced while driving should be a function of differences in the structure of appraisal. For example, the typical distances between road-users, and their usual mutual unfamiliarity may make it more difficult to co-ordinate perspectives on the situation, and easier to project blame onto the other person. In most other interpersonal situations, greater physical proximity combined with mutual acquaintanceship tends to make the mode of interaction more straightforward and direct. Consequently, appraisals are more likely to acknowledge the other party’s point of view, reducing the probability of purely externalized blame and its associated unalloyed form of anger.

Similarly, there are obvious differences in the possibilities for interpersonal communication in driving and other everyday situations. In the face-to-face interactions which represent a common context for everyday anger, emotional presentations serve the communicative function of calling the other person to account before their offence causes further harm or leads to physical retaliation. For example, expressive aspects of anger (including facial position and movement, gestures, posture, tone of voice, as well as speech content) tend to convey directly the associated evaluation and encourage the other person to adopt either a corresponding or antagonistic stance (see Parkinson, 1996). An on-line process of verbal and nonverbal negotiation may often lead to changed interpretations and resolution of the initial conflict before any violent acts are committed (e.g., one person backs down, or both reach a compromise position). This negotiation process is facilitated by the fact that our anger is usually directed at people with whom we are relatively familiar, making it easier to understand their position and to see past any idiosyncrasies in their self-presentational style.

However, when targets of anger seem not to register the communication, or apparently fail to accept the implied interpretation of their conduct, the angry person is likely to give added emphasis to any expressed disapproval, and to start replacing warnings and threats about sanctions with actual hostile acts. Indeed, much of the content of the nonverbal expression of anger reflects muscular preparation for physically antagonistic behaviour and serves its communicative function precisely because of its meaning as part of a continuable aggressive action sequence (cf. Mead, 1934). Thus, unless the other party starts to back down it becomes increasingly likely that the action will be followed through. According to this analysis, then, anger depends not only on the appraised seriousness of the offence or the apparent malicious intent behind it, but also on the perceived resistance of intended addressees to receipt and comprehension of the emotional communication (Parkinson, 1996).

In the case of irritations experienced while driving, the usual interpersonal negotiation

process is particularly likely to be undermined. Because of the typical distance between road-users, the relatively high volume of car engine noise, and the fact that there are competing demands on other drivers' attention, it is often very difficult to accurately convey any unambiguous message to its intended recipient in the first place. Even if the initial communication does get across, feedback concerning its interpretation from the other party is likely to be limited. Furthermore, the usual absence of any established relationship between parties increases the potential for misunderstanding of any transmitted information. These factors in combination plausibly lead to an increased probability of anger escalating on the road. Because other drivers often remain unaware of one's anger for longer periods, and because it is necessary to give extra emphasis to any expression of anger to get through to them, a higher intensity of emotion is often reached before any acknowledgement or apology is received. The implication of this analysis is that one of the features distinguishing anger while driving is that it takes relatively longer for targets to receive and correctly interpret the angry person's intended communication of other-blame.

Other situational factors have also been proposed as potential causes of anger while driving. For example, it is often suggested that the physical barrier of the vehicle's structure and the relatively great interpersonal distance increases perceived anonymity and engenders a deindividuated sense of insulation from the consequences of action and expression (e.g., Lowenstein, 1997, cf. Diener, 1980). These considerations may lead to disinhibition of hostile impulses that might otherwise be regulated, including those that arise from stresses and pressures unrelated to the current driving situations. In other words, the protective cocoon of one's own familiar vehicle may seem to permit venting frustrations in an unrestrained manner. Furthermore, since interactions with other drivers are less likely to be repeated than interactions with people we meet in many everyday situations, social sanctions against hostility may be correspondingly lower.

Each of these accounts of the proximal causes of anger while driving is assessed in the present research by comparison of participants' ratings of causes and characteristics of anger while driving and anger in other situations. The retrospective self-report approach to measurement of these variables has been widely adopted in previous research into emotion and appraisal (e.g., Parkinson, 1999; Roseman, Antoniou, & Jose, 1996; Smith & Ellsworth, 1985), and despite its acknowledged limitations (e.g., Parkinson, 1997; Parkinson & Manstead, 1992), seems capable of providing useful preliminary data concerning issues which are difficult to address more directly. The general prediction is that there will be differences between reported appraisals and communicative parameters in the two kinds of situation, and that these differences will also be reflected in the form of the emotional reaction itself. In particular, anger should be purer, characterized by higher levels of other-accountability, but less noticeable to its target in driving than non-driving situations.

Other situational factors potentially contributing to anger while driving include time pressure and traffic congestion, both of which may increase stress levels (e.g., Novaco, 1991). The present research also includes self-report measures of both these variables in order to assess their differential associations with anger.

Turning to individual differences, it is commonly believed that certain people are particularly susceptible to anger when behind the wheel (e.g., Lowenstein, 1997). Indeed, self-report scales have been developed to assess predispositions towards "driving anger" (Deffenbacher, Oetting, & Lynch, 1994) and "driving aggression" (Gulian, Matthews, Glendon, Davies, & Debney, 1989). However, rather than assessing personality factors that may represent possible bases for differential anger tendencies while driving, both these measures ask for direct reports of affect and behaviour in driving situations. The present study makes an initial attempt to answer the question of why certain people seem to be more disposed to become angry or aggressive while driving. One possibility is that driving anger

reflects more general factors relating to anger proneness such as hostility, irritability, external locus of control etc (e.g., Lajunen & Summala, 1995). In this case, frequency of anger while driving should show substantial positive correlations with frequency of anger in other situations. Alternatively, it may be that some people are differentially sensitive to some of the proximal causes of driving-related anger suggested above. In particular, if driver anger depends partly on failures of perspective co-ordination arising from the relative unavailability of face-to-face displays, then individuals who are more inclined to consider things from another person's point of view may be less prone to such reactions. Since the role of this kind of empathy-related dispositions in prediction of aggressive behaviour is already well-established (e.g., Bjorkqvist, Osterman, & Kaukiainen, 2000; Richardson, Hammock, Smith, Gardner, & Signo, 1994), the present study predicts that indices of perspective-taking and empathic concern (Davis, 1983) will show negative relationships with anger while driving, and to a lesser extent in other situations.

The idea that anger while driving reflects deindividuation and disinhibition of hostile impulses suggests that those individuals who are particularly aware of both the benefits and drawbacks of emotion expression may be particularly prone to "road rage." If the interpersonal insulation and anonymity supposedly provided by the car releases the social barriers on anger expression, then this effect should be relatively greater for those individuals who have stronger desires to express emotion coupled with greater awareness of potential social costs. To evaluate this account, the present study also assesses the relationship between frequency of anger while driving and standardized individual-difference measures of ambivalence over emotional expression (King & Emmons, 1990), social anxiety, and public self-consciousness (Fenigstein, Scheier & Buss, 1975).

In summary, this research is intended to provide descriptive information about the relative prevalence of anger while driving, to compare its characteristics and causes with those

of anger experienced in other everyday situations, and to determine whether specific personality dispositions are differentially associated with its frequency.

## Method

### Pilot study

Measures and procedures were piloted on a sample of 13 male and 33 female undergraduate psychology students with driving experience who completed a provisional version of the study's questionnaire as part of a course requirement. Their ages ranged from 18 to 48 (mean = 21.59). 54% of participants owned their own car and their average driving time per week was reported to be 6.65 hours. Findings of this pilot study were highly convergent with those of the main study reported below and will not be discussed further here.

### Participants

In the main study, 64 undergraduate psychology students (19 males and 45 females) with driving experience completed the final version of the study questionnaire as part of a course requirement. Extra credit was awarded for recruiting other members of the participant's family with driving experience in order to extend the sample and include a broader age range. 49 additional participants (24 males and 25 females) recruited by this means returned postal questionnaires identical to those completed by the students, yielding an overall sample of 113 with an age range of 18 to 58 (mean age = 30.04). 62.8% of the sample reported owning their own cars, their average reported driving experience was 11.01 years, and their average reported driving time per week was 9.22 hours. Participants used their cars for both business and pleasure in a wide variety of road and traffic situations. Unlike in Gulian et al's (1989) study, the sample was not preselected for amount of driving time or extent of driving experience, although scores on the driving aggression scale were at a highly similar level to those obtained in their two reported studies. Analyses of variance showed that the student group were significantly younger ( $M_s = 20.42, 42.59, F(1,109) = 195.37, p < .001$ ), had significantly fewer years of driving experience ( $M_s = 3.04, 21.42, F(1,109) = 145.33, p < .001$ ), and drove for significantly fewer hours in the average week ( $M_s = 6.39,$

12.93,  $F(1,109) = 5.35$ ,  $p < .025$ ) than the non-student group. However, none of these variables were significantly influenced either by gender or interactions between participant occupation (student vs. non-student) and gender. Students were significantly less likely to be car owners (26 out of 64 vs. 45 out of 49,  $\chi^2 = 31.67$ ,  $p < .0001$ ) but again there were no reliable differences between men and women on this measure. Participants generally rated themselves as slightly above average in driving skill ( $M = 6.33$ , cf. McCormick, Walkey, & Green, 1986; Svenson, 1981), with men rating themselves as significantly better at driving ( $M = 6.74$ ) than women ( $M = 6.07$ ,  $F(1,109) = 5.86$ ,  $p < .025$ ), but neither the main effect of occupation nor the interaction effect were significant.

### Measures

The questionnaire began with scales assessing potential individual-difference predictors of anger while driving, then asked participants to report on two anger incidents (in counterbalanced order). One of these incidents was the most recent occasion on which they had become angry at another driver while driving, and the most recent occasion on which they had become angry in their everyday lives when not driving.

*Individual-difference scales.* Participants completed two subscales of Davis' interpersonal reactivity index intended to measure *perspective-taking* ("the tendency to spontaneously adopt the psychological point of view of others" Davis, 1983, pp. 113-114) and *empathic concern* ("other-oriented" feelings of sympathy and concern for unfortunate others," p. 114). Items were rated on a 5-point scale where 0 indicates "does not describe me well" and 4 means "describes me very well." Participants next completed Fenigstein, Scheier, and Buss's (1975) questionnaire assessing self-consciousness, which consists of three subscales measuring: *public self-consciousness* ("a general awareness of the self as a social object that has effects on others," p. 523); *private self-consciousness* ("concerned with attending to one's inner thoughts and feelings," p. 523); and social anxiety, ("a discomfort in the presence of

others,” p. 523). Items are rated on a 5-point scale with 0 labeled “not at all true of me” and 4 indicating “very true of me.” The final personality measure was King and Emmons’ (1990) questionnaire assessing *ambivalence over emotional expression*, a 28-item scale including items such as “often I’d like to show others how I feel, but something seems to be holding me back” and “after I express anger at someone, it bothers me for a long time” rated on a 5-point scale ranging from “never feel like this” (0) to “very frequently feel like this (4).

Participants next completed the short form of Deffenbacher, Oetting, and Lynch’s (1994) *driving anger* scale which has 33 items assessing how angry different road situations would make the respondent feel as a driver on 5-point scales ranging from 0 (Not at all) to 4 (Very much). The questionnaire assessed anger in response to “hostile gestures” (e.g., “Someone honks their horn at you about your driving”), “illegal driving” (e.g., “Someone is driving too fast for the road conditions”), “police presence” (e.g., “You pass a radar speed trap”), “slow driving” (e.g., “Someone is slow in parking and holding up traffic”), “discourtesy” (e.g., “someone backs right out in front of you without looking”), and “traffic obstructions” (e.g., “you are stuck in a traffic jam”). Participants also completed the *driving aggression* subscale of Gulian et al’s (1989) Driving Behaviour Inventory which contained six items assessing how well various statements characterized the respondent’s driving along a 4-point scale ranging from 0 (never) to 3 (always). Items included; “Driving a car gives me a sense of power” and “When irritated I drive aggressively.”

### Anger incidents

For both everyday and driving anger, participants completed an equivalent set of items. The first two concerned the number of times participants had lost their temper (in non-driving or driving situations) over the previous month, and the estimated number of times they lost their temper in an “average” month.

The items that followed all related to the most recent occasion on which participants

had lost their temper (in a non-driving or in a driving situation). First, participants reported how long ago the incident had occurred. Second, they described the anger episode in an open-ended form, specifying with whom they had been angry and what had happened to make them lose their temper. All subsequent items used an 11-point response scale with endpoints labeled “not at all” (0) and “extremely” (10) unless otherwise indicated.

The next questions addressed characteristics of the anger episode and its situational context. Participants reported how well they had known the target of their anger previously, the extent to which this person had already been behaving angrily or aggressively, and how much they had been in a hurry to get somewhere when the incident occurred. For driving situations, participants were also asked to report how busy with traffic the roads were at the time of the incident.

Questions concerning the anger reaction itself and how participants dealt with it followed. Participants were asked to rate: maximal anger intensity during the episode (*intensity*), the extent to which their anger had arisen without warning (*surprisingness*), the extent to which they had been also experiencing other emotions while angry (*impurity*); how much they had tried to restrain or control their anger (*restraint*); to what extent an apology from the target would have reduced anger (*desire for apology*); the extent to which they wanted the targets of their anger to be aware that they were angry with them (*communicative intent*); and how quickly the target actually noticed their anger (*communicative receipt*). The final two questions in this section asked for an open-ended description of any attempts made by participants to communicate their anger to the target and a report of anger duration.

The subsequent seven items were identical to those used by Smith and Lazarus (1993) to measure appraisal dimensions of motivational relevance, motivational incongruence, self-accountability, other-accountability, future expectancy, problem-focused coping potential, and

emotion-focused coping potential.

Next, participants were asked to rate their affect prior to the incident using the positive and negative affect scales (PANAS) developed by Watson, Clark, and Tellegen (1988). This measure includes 10 adjectives describing positive affect (e.g., “excited”, “enthusiastic”, and “alert”) and 10 adjectives describing negative affect (e.g., “distressed”, “upset”, and “irritable”), each of which is rated along a 5-point scale with labels “very slightly or not at all” (1), “a little” (2), “moderately” (3), “quite a bit” (4), and “extremely” (5).

Finally, participants rated the influence of five potential causes on their experienced anger: “Feeling that the other person was to blame” for something bad (other-blame); “difficulties in communicating to the other person that they had done something wrong” (communication difficulty); “the other person’s apparent reluctance to accept responsibility for whatever he/she had done and apologize for it” (lack of apology); “pressures ... unrelated to the experience itself” (unrelated pressure); and “mood prior to the incident” (prior mood).

After completing reports of both anger incidents, participants were asked whether they believed that people were more likely to get angry when driving than in most other situations, and then rated eight potential factors contributing to the occurrence of anger while driving: “Volume of traffic on the roads” (traffic volume); “people being in a hurry to get where they are going” (hurry); “bad driving”; “aggression in society in general”; “the sense of power people feel behind the wheel”; “pace and pressures of life off the road”; “drivers feeling insulated from the consequences of their actions when inside cars”; and “problems in communicating intentions, apologies, and disapproval from inside cars.” Finally, participants were asked to list any additional factors contributing to the occurrence of anger while driving that were not covered by these eight questions.

## Results

### Anger frequency

On average, participants reported that driving occupied 9.22 hours per week. In order to correct for the substantially greater time spent in non-driving situations, estimates of anger frequency were calculated for each participant based on the relative proportion of their waking hours (set at 16 hours per day) that they reported spending driving and not driving. The resulting scores represent how often participants would have got angry if they had spent all of their waking hours driving, and how often they would have got angry if they had not spent any of their waking hours driving. Similarly, corrected scores for elapsed time since most recent anger incident were calculated<sup>1</sup>. A 2 X 2 X 2 multivariate analysis of variance using participant occupation (students vs. non-students) and gender as between-subjects factors, and activity (driving vs. non-driving) as a within-subjects factor<sup>2</sup>, was then conducted on the three derived frequency scores (number of anger incidents during the previous month and during the average month, and elapsed time since most recent anger incident). There were two significant multivariate effects. First, there was a main effect of activity ( $F(3, 87) = 14.76, p < .001$ ), reflecting univariate effects on all three dependent variables ( $F_s(1, 89) > 10.00, p_s < .01$ ), and showing that corrected frequency of anger over the last and the average month was substantially and significantly greater while driving than during non-driving activities, and corrected elapsed number of days since most recent anger incident was significantly less while driving (see Table 1 for raw and corrected means for all frequency measures). There was also a significant multivariate occupation by activity interaction ( $F(3, 87) = 3.01, p < .05$ ) and a univariate occupation by activity interaction for the corrected elapsed time variable ( $F(1, 89) = 7.13, p < .01$ ). The means for the relevant cells showed that students' most recent driving anger incident was reported to be more recent ( $M = 2.46$  days) than non-students' ( $M = 5.35$ ) but that non-students' most recent non-driving anger incident was more recent ( $M = 8.09$ ) than students' ( $M = 14.21$ ) according to the corrected scores.

### Individual-difference predictors of anger while driving

Cronbach's alpha was used to assess the reliability of all individual-difference measures included in the study. All alpha values were acceptably high and close in value to those originally obtained by the devisors of the scales (see Table 2). Partial correlations were computed between scores on these measures and the three indices relating to frequency of anger while driving after controlling for time spent driving per week. The only statistically reliable correlations were with scores on the driving anger and driving aggression measures. Driving aggression scale showed reliable and moderately positive correlations with estimated average monthly frequency of anger while driving ( $r(108) = .30, p < .001$ ) and reported frequency of anger while driving over the previous month ( $r(108) = .26, p < .01$ ). Similarly, scores on the driving anger scale also showed reliable positive correlations with both these indices of frequency of anger while driving ( $r(108) = .33, p < .001$ , and  $r(108) = .30, p < .001$ ). Although correlations of driving anger and aggression with time since reported driving anger incident were negative ( $r(97) = -.18$  and  $-.17, p < .10$ ), they did not quite reach statistical significance according to a two-tailed criterion. Driving aggression also showed a reliable, moderately sized correlation with driving anger ( $r(108) = .40, p < .001$ ).

All correlations between frequency scores relating to anger in non-driving situations and measures of driving aggression, driving anger, and subscales of the latter were non-significant and close to zero. Further, controlling for the corresponding frequency of non-driving anger score did not substantially reduce any of the correlations reported between frequency of anger while driving and driving aggression or anger, suggesting that these latter scales represent differential predictors of anger on the road rather than reflecting general aggressive tendencies. However, the two estimated frequency scores for anger while driving showed reliable, though moderate positive correlations with the corresponding scores for anger in non-driving situations after controlling for time spent driving (average monthly

frequency:  $r(107) = .31, p < .01$ , last month's frequency:  $r(108) = .41, p < .001$ ) supporting the existence of a general anger-proneness factor.

The only reliable correlation between any of the individual-difference measures and driving anger was a positive correlation with empathic concern ( $r(113) = .19, p < .05$ ). Empathic concern was also reliably *negatively* correlated with driving aggression ( $r(113) = -.22, p < .025$ ). Finally, ambivalence over emotional expression was reliably positively correlated with driving aggression ( $r(113) = .24, p < .025$ ).

Driving aggression also showed a reliable positive correlation with ratings of how rushed the participant had felt prior to the anger incident ( $r(103) = .38, p < .001$ ) which continued to be statistically significant after controlling for how rushed they had felt prior to the non-driving anger incident. Further, driving aggression showed a reliable positive correlation with average hours spent driving per week ( $r(113) = .27, p < .01$ ) suggesting that participants reporting higher levels of aggressive driving tended also to be those who drove more or were more in a hurry to get to where they were going. However, neither of these predictors showed reliable positive correlations with any of the anger frequency or intensity measures (most were in the reverse direction) suggesting that self-perceptions of driver aggression of those participants who were most hurried or drove more may not have been based in fact. Ratings of traffic volume were not reliably correlated with driving anger, driving aggression, or any of the frequency or intensity measures.

Driving anger showed reliable positive correlations with rated intensity of anger in both driving ( $r(103) = .25, p < .025$ ) and non-driving ( $r(108) = .27, p < .01$ ) situations suggesting that this measure may partly reflect a general tendency to experience anger more intensely. Age was not reliably correlated with scores on either driving anger or driving aggression scales.

#### Differences between driving and other situations

*Anger characteristics.* Reported intensity, impurity, duration, and surprisingness scores were subjected to a 2 X 2 X 2 MANOVA using occupation (students vs. non-students) and gender as between-subjects factors and activity (driving vs. non-driving) as a within-subjects factor as above. The only significant multivariate effect was a main effect of activity ( $F(4, 89) = 7.66, p < .001$ ) which was reflected in univariate effects on intensity ( $F(1, 92) = 4.98, p < .05$ ) and impurity ( $F(1, 92) = 20.84, p < .001$ ). Anger while driving tended to be less intense but purer (less mixed with other emotions) than anger in non-driving situations (see Table 3 for means). The substantial difference in reported duration of anger across the two kinds of situations was not significant due to high variance.

*Context for anger.* According to the open-ended descriptions provided by participants, most instances of driving anger were in response to other drivers cutting in or pulling out in front of the participant (e.g., “a bus went straight through a red light cutting straight in front of me”), with the second most common cause being other drivers apparently responding to perceived bad driving by the participant by tailgating, making hostile gestures and so on (e.g., “I was in my Polo and overtook a lad in his Fiesta: He started waving his fist as if to insinuate the term ‘wanker’”). Reported incidents provoking anger in non-driving situations were more disparate, but mostly involved friends, acquaintances, or family members doing something that the participant found irritating or offensive (e.g., “I was in a bad mood anyway and loads of people were in my room watching telly and I was trying to concentrate and one of my flatmates would not stop talking really, really loudly”).

Turning to the quantitative data concerning reported anger-inducing situations, ratings of target familiarity, hurry, and target aggressiveness, and prior positive and negative affect scores were analyzed using MANOVA as above. There were two significant multivariate effects. The first was a main effect of activity ( $F(5, 86) = 53.73, p < .001$ ) which reflected univariate effects on target familiarity ( $F(1, 90) = 266.89, p < .001$ ) and prior negative affect

( $F(1, 90) = 19.74, p < .001$ ). Unsurprisingly, participants reported knowing the target far less well in driving situations than in other situations. Further, participants tended to report experiencing lower levels of negative affect prior to anger while driving than prior to anger during other activities (see Table 3 for means). The other significant multivariate effect was a two-way interaction between occupation and gender ( $F(5, 86) = 2.50, p < .05$ ). This reflected a univariate effect on ratings of target aggressiveness ( $F(1, 90) = 7.21, p < .01$ ), showing that targets of anger were generally rated as more aggressive by male students ( $M = 4.71$ ) than by male non-students ( $M = 3.05$ ), but as less aggressive by female students ( $M = 3.52$ ) than by female non-students ( $M = 4.17$ ). Whether these differences arose from actual characteristics of the social encounters of these different subgroups, their differential perceptions of these encounters, or some combination of the two cannot be determined using the present data.

*Appraisal dimensions.* The appraisal ratings MANOVA revealed only a significant multivariate effect for activity ( $F(7, 87) = 9.33, p < .001$ ), reflecting its univariate effects on motivational relevance ( $F(1, 93) = 25.85, p < .001$ ), self-accountability ( $F(1, 93) = 15.45, p < .001$ ), other-accountability ( $F(1, 93) = 9.29, p < .01$ ), future expectancy ( $F(1, 93) = 6.09, p < .025$ ), and problem-focused coping potential ( $F(1, 93) = 14.57, p < .001$ ). Motivational relevance, self-accountability, future expectancy, and problem-focused coping potential were lower in driving anger situations, but other-accountability was higher (see Table 3 for means).

*Communicative factors.* The four items assessing communicative functions of anger and anger regulation were analyzed using MANOVA as above. Again, the only significant multivariate effect was a main effect of activity ( $F(4, 89) = 11.96, p < .001$ ). Univariate effects of activity on communicative intent ( $F(1, 92) = 5.52, p < .025$ ) and communicative receipt ( $F(1, 92) = 41.45, p < .001$ ) were significant. Participants reported that they wanted the target to be aware that they were angry more while driving than during other activities, and that targets were perceived by participants to be much slower to notice their anger in driving

than non-driving situations. Note that there was no significant effect of situation on ratings of anger restraint (see Table 3 for means).

*Perceived causes of experienced anger.* Ratings of the influence of potential causes of anger were also subjected to MANOVA as above. All three multivariate main effects were significant (Occupation:  $F(5, 88) = 2.32, p < .05$ , Gender:  $F(5, 88) = 2.88, p < .025$ , Activity:  $F(5, 88) = 26.82, p < .001$ ), but there were no significant interaction effects. Two dependent variables showed significant univariate effects of occupation: Both unrelated pressure and prior mood were rated as more influential cause of anger by students ( $M_s = 3.90$  and  $3.61$  respectively) than by non-students ( $M_s = 2.38$  and  $2.28, F_s(1, 92) = 8.18$  and  $8.63, p < .01$ ). Gender had only one significant univariate effect on the rated influence of communication difficulty ( $F(1, 92) = 12.60, p < .001$ ) showing that women rated this as a more influential cause of anger ( $M = 6.60$ ) than men ( $M = 4.88$ ). Activity had significant univariate effects on ratings of the influence of communication difficulty ( $F(1, 92) = 9.46, p < .01$ ), unrelated pressure ( $F(1, 92) = 26.36, p < .001$ ) and prior mood ( $F(1, 92) = 19.92, p < .001$ ). Communication difficulty was rated as a more influential cause of anger while driving than anger during other activities, whereas unrelated pressures and prior mood were rated as significantly more influential causes of non-driving than driving anger.

#### Situational and state predictors of anger intensity

For each of the two reported activities, Pearson's correlation coefficients were calculated between all situational and response-based variables analyzed above with rated anger intensity and impurity. For both kinds of activity, intensity showed statistically reliable positive associations with communicative intent and receipt, and motivational relevance and incongruence, and a reliable negative association with emotion-focused coping potential. For anger while driving, intensity was also reliably positively associated with perceived target aggressiveness (see Table 4 for correlation coefficients). According to hierarchical regression

analyses, the combination of all measured appraisal variables explained approximately 25% of the variance in reported intensity of anger while driving and 15% of the variance of anger in other situations. Both communicative intent and communicative receipt contributed significantly to prediction of anger intensity even after controlling for all measured appraisal dimensions both in driving (intent: Beta = .38,  $R^2$  change = .11,  $F$  change = 16.21,  $p < .001$ ; receipt: Beta = .24,  $R^2$  change = .05,  $F$  change = 6.97,  $p < .01$ ), and non-driving situations (intent: Beta = .26,  $R^2$  change = .05,  $F$  change = 6.90,  $p < .025$ ; receipt: Beta = .25,  $R^2$  change = .05,  $F$  change = 5.87,  $p < .025$ ).

Anger impurity was reliably positively associated with prior negative affect and self-accountability, and reliably negatively associated with emotion-focused coping potential across both activities. For driving only, impurity also showed reliable positive associations with communicative receipt, and motivational relevance and incongruence. For non-driving only, impurity was negatively associated with problem-focused coping potential (see Table 5 for correlation coefficients). The combination of all appraisal variables explained approximately 20% of the variance in impurity of anger while driving and 13% of the variance in impurity of anger in other situations. After controlling for all appraisals, communicative receipt showed a reliable positive correlation with impurity of anger while driving (Beta = .20,  $R^2$  change = .03,  $F$  change = 4.05,  $p < .05$ ) but showed a near-significant negative relationship with impurity of anger in other situations (Beta = -.19,  $R^2$  change = .03,  $F$  change = 3.47,  $p < .07$ ). Communicative intent did not contribute significantly to the variance in anger impurity after controlling for appraisals.

### Judgements about general causes of driver anger

76.9% of the sample reported that anger was relatively more likely while driving than in most other situations, and this proportion did not differ significantly between the two occupational groups or between men and women. Of the eight rated explanations for anger while driving, “bad driving” was reported to be most important ( $M = 8.32$ ), followed by “people being in a hurry to get where they are going” ( $M = 8.30$ ), “volume of traffic” ( $M = 7.14$ ), and “drivers feeling insulated from the consequences of their actions” ( $M = 7.09$ ). All eight potential causes had mean scores above the mid-point of the scale suggesting that all of them were generally perceived to be more than moderately influential. Multivariate analysis of variance of reported causes using occupation and gender as between-subjects factors revealed only a significant multivariate effect of gender ( $F(8, 100) = 2.91, p < .01$ ). Women rated each of the eight suggested causes as more influential and the difference was significant according to univariate analysis for communication problems ( $M_s = 7.10, 6.06, F(1, 107) = 4.54, p < .05$ ), “pace and pressures of life off the road” ( $M_s = 6.92, 5.56, F(1, 107) = 11.55, p < .001$ ), and “the sense of power people feel behind the wheel” ( $M_s = 7.49, 6.33, F(1, 107) = 8.56, p < .01$ ). A small minority of participants suggested other causes of anger on the roads and these mainly referred to general societal factors such as trends towards lower impulse control or supposed increases in the perceived acceptability of anger expression.

### Checking for memory distortion

The retrospective nature of many of the self-reports collected in this study raises the issue of whether participants’ memory for the recalled incidents was accurate. To evaluate this, more recent anger episodes were compared with ones from longer ago (based on median splits) separately for driving and non-driving anger. Multivariate effects of the recency variable were non-significant in both cases suggesting no differential effect of memory depending on time since reported incident.

## Discussion

The results of this study support the popular notion that anger occurs relatively more often while driving than during other activities. More than three quarters of participants subscribed to this common belief, and reported frequency of anger was substantially and significantly higher while driving (after correcting for differences in the amount of time spent in the two kinds of situation)<sup>3</sup>. What is it about driving, then, that makes anger more likely? To provide preliminary answers to this question, the present study compared the reported contexts, causes, and characteristics of anger in specific driving and non-driving situations.

Unsurprisingly, the target of anger tended to be someone relatively well known to the respondent in non-driving situations but was almost always a complete stranger in cases of driving anger. This target was reported to be slower in becoming aware of the respondent's anger in driving situations. Perhaps partly because of the target's unfamiliarity to the respondent and apparent delay in responding, other-accountability appraisals were rated as higher, but self-accountability, problem-focused coping, and future expectancy were rated as lower in driving situations. Finally, negative affect prior to the incident was rated as higher and mood was reported to be a more influential cause of anger in non-driving than driving episodes.

This pattern of findings helps to clarify which proximal factors are differentially associated with anger while driving. Starting with appraisals, other-accountability is thought to be central to the emotion of anger (e.g., Smith & Lazarus, 1993; Ellsworth & Smith, 1988), so its higher value for driving situations, coupled with the lower scores on non-central appraisals, may help explain why anger was relatively purer. Consistent with this account, self-accountability showed reliable positive correlations with anger impurity in both driving and non-driving situations suggesting that perception of partial personal responsibility in other-blame situations may bring about other negative emotions such as guilt which become

mixed with the experienced anger. Furthermore, participants reported that appraisals of other-blame were one of the most important causes of their anger in both driving and non-driving situation. However, it is worth noting that some of the associations obtained in this study may partly reflect the influence of emotion on appraisal rather than vice versa in a manner that is consistent with recent bidirectional models of the relationship between these two variables (e.g., Keltner, Ellsworth, & Edwards, 1993; Lazarus, 1991).

Moving away from established appraisal dimensions, the rated desire to communicate anger (communicative intent) proved to be one of the best predictors of anger intensity in both kinds of situations. Furthermore, this variable contributed significantly to the variance in anger intensity even after controlling for all appraisal dimensions (which taken together should completely specify and proximally determine the emotional state according to Smith & Lazarus's [1993] analysis). In addition, participants rated communicative difficulties as an influential cause of their anger, especially in driving situations. As with appraisal, however, it seems likely that the relationship between anger and communicative goals operates bidirectionally, with anger being partly motivated by communicative goals, but also increasing the motivation to communicate other-blame as it becomes more intense.

The speed with which the target was reported to become aware of the participant's anger (communicative receipt) also helped to predict anger intensity and purity. Slower communicative receipt was associated with less intense anger, but regression analysis suggested that this association could be accounted for by the conceptually prior impact of communicative intent. In short, it seems that the increased desire to communicate disapproval associated with stronger anger usually leads to the target becoming aware of the emotion more quickly. However, the positive association of anger impurity with speed of communicative receipt was independent of communicative intent. Taken together with the generally slower communicative receipt and greater reported causal influence of communicative problems in

driving situations, this result is consistent with the proposed influence of problems of interpersonal emotion transmission on anger while driving.

Although it is possible that perceptions of target awareness of anger were coloured by prior anger, it seems more plausible to suggest that unresponsiveness from the other motivated more focused anger expression while driving. Interestingly, the obtained relationship between communicative receipt and anger purity again persisted even after controlling for all measured appraisals, effectively ruling out an explanation of its effects in terms of blaming the target for his or her perceived reluctance to acknowledge the participant's anger.

Open-ended reports suggested that anger usually occurred while driving when another driver had cut in or pulled out in front of the car, thereby obstructing progress, but another frequently reported situation was when another driver was pressuring the participant by driving on his or her tail or otherwise complaining about being delayed (flashing lights etc). It is possible to imagine that the same situation is perceived as obstruction by one of the drivers and as pressurizing by the other. Perhaps the inability to negotiate interpretations contributes to the conflicting perspectives and the resulting anger. For example, flashing of lights may mean acknowledgement of another driver's presence rather than a complaint, but coming from a stranger, who has just done something motivationally incongruent, the negative interpretation may be more likely (cf. Baxter, Macrae, Manstead, Stradling, & Parker, 1990; Knapper & Copley, 1978). In contrast, the on-line presence of adjustable expressions coming from a more familiar person is likely to result in clearer and more consensual interpretations of events in the everyday face-to-face situations in which anger might occur. Relatedly, direct availability of various familiar and well-understood channels for expressing anger may allow its communicative functions to be fulfilled more efficiently. Shouting was by far the most common mode of expressing anger reported for non-driving situations, but beeping the horn, tailgating and so on were the communication channels used while driving. Clearly, the latter

are more ambiguous and less lacking in specific content than the former.

Contrary to the predictions of stress-based models of driver anger (e.g, Hennessy & Wiesenthal, 1999; Lowenstein, 1997; Novaco, 1991), negative affect prior to incidents of anger while driving was rated as lower than before other anger incidents. Further, pre-existing mood and pressures unrelated to the present situation were rated as less influential causes of anger in driving situations. These findings suggest that anger on the road is relatively less dependent on general stress than anger in other situations. However, participants still considered “pace and pressures of life off the road” to be more than moderately influential in the causation of anger while driving. Further, drivers who reported being in more of a hurry and those who spent more of their time driving tended to score higher on the individual-difference driving aggression measure<sup>4</sup>. These findings coupled with the lack of association (or reverse association) of these variables with anger frequency and intensity variables raise the possibility that drivers perceive stress and pressure to be influencing their driving behaviour more than it actually does<sup>5</sup>.

Moving from situational and proximal factors to more enduring individual differences, this study also provides evidence that some people show a differential predisposition for getting angry while driving. In particular, established self-report measures intended to assess tendencies towards driving anger and aggression predicted frequency of anger while driving but not anger in other situations. Two of the other individual-difference scales included in this study showed reliable correlations with one or both of these measures. Ambivalence over emotional expression was positively correlated with driver aggression suggesting that people who want to express emotion but are sensitive to the social costs of its expression are more likely to report aggressive tendencies while driving, presumably because the costs are seen as less than in face-to-face encounters.

Less straightforward to explain are the results for empathic concern, which was

positively related to driving anger but negatively related to driving aggression. Although it is unsurprising that people reporting greater sensitivity to others also tend to rate their general aggressiveness as lower (cf. Bjorkqvist, Osterman, & Kaukiainen, 2000; Richardson et al., 1994), it is less obvious why they should report their anger while driving to be greater. However, inspection of the items on the driving anger scale helps to account for this apparent anomaly. On this questionnaire, respondents are asked to rate the extent to which various driving situations and behaviours make them angry, and many of the behaviours identified have potential negative consequences for other drivers. For example, if “someone is driving too fast for the road conditions” this may endanger other motorists and pedestrians, and sensitivity to *their* well-being (rather than that of the other dangerous driver) may result in greater reported anger on the part of more empathically concerned participants. This interpretation is supported by the fact that there were reliable positive correlations between empathic concern and all subscales of driving anger apart from those relating to slow driving and police presence (for which the correlations were near to zero). Arguably, neither of these situations represents a particular hazard to the well-being of other motorists, and therefore they contain no features that might differentially evoke anger for people reporting greater empathy. If this explanation is correct, it raises the possibility that drivers with greater empathic concern may be more rather than less prone to anger in specific situations where they perceive someone else to be endangered by another driver’s behaviour.

Despite these correlations, neither of these scales or any of the others assessing social orientation and self-consciousness included in this study showed reliable associations with estimated anger frequency or recency. Any conclusions about the impact of empathic concern and ambivalence over emotional expression on actual anger while driving must therefore remain tentative. Further, there was no evidence that perspective-taking, social anxiety, or public or private self-consciousness had any influence on anger in driving situations according

to either frequency estimates or standardized self-report measures.

These findings offer little direct support for the argument that anger while driving depends on disinhibition of usually suppressed hostile impulses resulting from deindividuation (cf. Diener, 1980). In particular, relatively more socially anxious or publicly self-conscious individuals who might be expected to be more inhibited in face-to-face situations showed no greater tendencies towards anger while driving according to any of the dependent measures included here. Comparisons of driving and non-driving anger episodes also fail to support a disinhibition account. Ratings of self-restraint were no less in driving than non-driving situations, and this variable showed no reliable association with intensity, purity, or duration of anger in either situation<sup>6</sup>.

In summary, the present results suggest that anger is more common, has different characteristics, and different causes in driving than in non-driving situations. The individual differences underlying apparent differential dispositions towards anger while driving remain uncertain, but ambivalence over emotional expression and empathic concern may be relevant factors. Situational factors associated with anger in driving situations seem to include specific appraisals as well as problems with communication, but not general stress or negative affect or a lack of self-restraint. Of course, nothing in these results supports a single unifying explanation for all cases of anger while driving, and it remains likely that a wide range of contributory factors are involved including those identified here.

Obviously these findings should not be treated as definitive: Although the results of the pilot and main studies were highly convergent, all of the data collected here (as in most other research into appraisal and emotion, e.g., Roseman, Antoniou, & Jose, 1996; Smith & Ellsworth, 1985) depended on retrospective self-reports, which may have been partly distorted by implicit theories and stereotypes about anger and driving (e.g., Nisbett & Wilson, 1977; Parkinson & Manstead, 1992). Although there was no evidence that time since the anger

incident influenced reporting of any dependent measure, it remains possible that reconstructing experiences for the purpose of a psychological investigation brings influences which operate irrespective of the residual clarity of any memory trace. However, it seems likely that more generalized self-reports (e.g., individual-difference measures of driving anger and aggression, and estimates of causal influence for anger while driving as a whole) tend to be more theory-driven than those focused on specific episodes, with the consequence that discrepancies between these two kinds of measures are particularly revealing about the relative influence of popular conceptions. For example, I have argued above that the common belief in the influence of stress as demonstrated by the more abstract causal influence ratings is not supported by the more specific comparison between particular driving and non-driving anger episodes. Similarly, many of the other findings reported here do not seem to correspond in a simple way with intuitive beliefs about anger while driving. Nevertheless, substantiation of these findings using concurrent or prospective methods would clearly be valuable (e.g., Hennessy & Wiesenthal's [1999] use of mobile telephones for data collection). Future research should also seek to identify individual-difference predictors of dispositions towards anger while driving, focusing in particular on variables relating to appraisal and communicative intent.

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### Footnotes

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<sup>1</sup> This comparison makes no theoretical assumptions about features of road situations that may plausibly predispose people to anger. A reviewer of an earlier version of this paper made the reasonable point that most driving situations involve some level of interaction with other road users, whereas many everyday situations involve no interpersonal interaction whatsoever. If anger necessarily depends on interpersonal interaction, then, it might be considered more relevant to compute adjusted scores based on the amount of time spent when there was some level of contact with others for both driving and non-driving situations. Apart from the obvious practical difficulties participants might have in accurately estimating the amount of time they spend in this kind of social contact situation, it is worth remembering that people often become angry even when other people are not physically present at all (e.g., Parkinson, 1999). Conversely, the nature of people's contact with others in driving and non-driving situations also differs in other ways that are probably relevant to anger activation (e.g., in terms of their personal stake in the relationship with other interactants). For both of these reasons, the assumption that interpersonal interaction should be treated as the single straightforward precondition for anger is suspect, carrying questionable implicit presuppositions about what kinds of explanation are relevant to any obtained differences in anger frequency. In the present study, I made no such presuppositions and simply sought to establish at a descriptive level whether there were differences in anger frequency between driving and non-driving situations, before making a focused empirical attempt to clarify why such differences might exist.

<sup>2</sup> A reviewer of an earlier version of this manuscript questioned the relative paucity of gender differences obtained in this study by pointing out that multivariate analysis of

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variance is sensitive to differences in subsample size which apply here specifically when comparing the male and female student groups. In order to check whether the present findings were robust, I reran all MANOVAs after equalizing the N of all subsamples by random deletion of cases (as recommended by Tabachnick & Fidell, 1996, p. 382). The pattern of significant effects arising from all of these analyses was highly similar to those reported here, and there were no additional significant multivariate main effects of gender (in fact, one of the two main effects of gender obtained in the original analyses fell just short of significance in the analysis of the reduced sample). The only significant multivariate interaction effect involving gender obtained using the reduced sample, was an occupation by gender interaction for anger characteristics (reflecting a single univariate effect on the “surprisingness” variable) which had been close to significant ( $p < .09$ ) in the analysis of the full sample. The findings of these additional analyses are therefore entirely consistent with the conclusions derived from the original analyses, and do not suggest that gender differences are underrepresented here.

<sup>3</sup> Although the results suggest that anger is relatively more frequent during driving than during other everyday activities, its absolute frequency still appears to be quite low.

<sup>4</sup> Relatedly, Gulian et al (1989) reported that life stress was a positive predictor of scores on the driving aggression scale in their original article describing its development.

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<sup>5</sup> Of course, none of these findings implies that stress is irrelevant to the explanation of anger while driving, but rather that it is less of a factor in accounting for anger while driving than in accounting for anger during other activities.

<sup>6</sup> A reviewer of an earlier version of this paper argued that these findings do not rule out an influence of deindividuation on anger or aggression while driving since no comparison was made between deindividuated and individuated drivers. Nevertheless, the present results show no evidence that any of the episodes of anger while driving reported by the present sample were a consequence of deindividuation.

**Table 1****Raw and corrected anger frequency measures for driving and non-driving situations**

		<i>Driving</i>	<i>Non-driving</i>	
<b>Average frequency per month</b>	Uncorrected	Mean: 2.59 SD: 3.57 N: 110	Mean: 3.28 SD: 4.01 N: 110	
	Corrected	Mean: 60.04 SD: 3.43 N: 106	Mean: 3.43 SD: 4.43 N: 106	***
<b>Frequency during previous month</b>	Uncorrected	Mean: 1.62 SD: 1.95 N: 110	Mean: 2.76 SD: 3.50 N: 110	**
	Corrected	Mean: 32.31 SD: 50.84 N: 106	Mean: 2.85 SD: 3.79 N: 106	***
<b>Number of days since most recent anger incident</b>	Uncorrected	Mean: 49.20 SD: 100.74 N: 98	Mean: 12.16 SD: 15.77 N: 98	**
	Corrected	Mean: 3.57 SD: 9.73 N: 98	Mean: 11.43 SD: 14.81 N: 98	**

*Significance levels:* \* --  $p < .05$ , \*\* --  $p < .01$ , \*\*\* --  $p < .001$

**Table 2**  
**Reliability scores (Cronbach's alpha) for individual-difference measures**

		<i>Present study</i>	<i>Original sample</i>
<b>Interpersonal reactivity index (Davis, 1983)</b>	Perspective-taking	.76	Between .71 and .77
	Empathic concern	.77	Between .71 and .77
<b>Public and private self-consciousness (Fenigstein, Scheier, &amp; Buss, 1975)</b>	Public self-consciousness	.76	Not published
	Private self-consciousness	.78	Not published
	Social anxiety	.71	Not published
<b>Ambivalence over emotional expression (King &amp; Emmons, 1990)</b>		.91	.89
<b>Driving anger (Deffenbacher, Oetting, &amp; Lynch, 1994)</b>		.90	.90
<b>Driving aggression (Gulian et al, 1989)</b>		.69	.69

Table 3

## Quantitative comparisons between anger while driving and anger in other situations

		<i>Driving</i>	<i>Non-driving</i>	
<b>Parameters of anger</b>	Intensity	Mean: 6.56	Mean: 7.14	*
		SD: 1.99	SD: 1.88	
		N: 101	N: 101	
	Impurity	Mean: 3.10	Mean: 5.03	***
		SD: 2.92	SD: 3.14	
		N: 100	N: 100	
	Duration (hours)	Mean: 2.83	Mean: 23.82	
		SD: 18.56	SD: 94.09	
		N: 96	N: 96	
	Surprisingness	Mean: 5.13	Mean: 4.69	
		SD: 2.71	SD: 2.83	
		N: 101	N: 101	
<b>Context for anger</b>	Target familiarity	Mean: .06	Mean: 7.14	***
		SD: .59	SD: 3.73	
		N: 102	N: 102	
	Target aggressiveness	Mean: 3.99	Mean: 3.64	
		SD: 3.70	SD: 3.34	
		N: 101	N: 101	
	Hurry	Mean: 3.31	Mean: 3.26	
		SD: 2.53	SD: 3.52	
		N: 102	N: 102	
	Prior NA	Mean: 1.41	Mean: 1.73	***
		SD: .64	SD: .74	
		N: 95	N: 95	
	Prior PA	Mean: 2.21	Mean: 2.10	
		SD: .61	SD: .80	
		N: 95	N: 95	
<b>Appraisal dimensions</b>	Motivational relevance	Mean: 4.23	Mean: 6.55	***
		SD: 3.08	SD: 3.04	
		N: 101	N: 101	
	Motivational incongruence	Mean: 6.74	Mean: 7.49	
		SD: 3.03	SD: 2.58	
		N: 101	N: 101	
	Self-accountability	Mean: 1.24	Mean: 2.85	***
		SD: 2.01	SD: 2.84	
		N: 101	N: 101	
	Other-accountability	Mean: 8.93	Mean: 7.85	**
		SD: 1.75	SD: 2.34	
		N: 101	N: 101	
	Problem-focused coping potential	Mean: 3.46	Mean: 4.90	***
		SD: 3.26	SD: 3.01	
		N: 99	N: 99	
Emotion-focused coping potential	Mean: 7.01	Mean: 6.42		
	SD: 2.74	SD: 2.70		
	N: 98	N: 98		
Future expectancy	Mean: 5.00	Mean: 6.04	*	
	SD: 3.34	SD: 2.91		
	N: 99	N: 99		

Table 3 (continued)

## Quantitative comparisons between anger while driving and anger in other situations

		<i>Driving</i>	<i>Non-driving</i>	
<b>Communicative factors</b>	Communicative intent	Mean: 6.85 SD: 2.72 N: 101	Mean: 7.66 SD: 2.61 N: 101	*
	Communicative receipt	Mean: 3.62 SD: 3.58 N: 97	Mean: 6.51 SD: 3.39 N: 97	***
	Desire for apology	Mean: 5.43 SD: 3.25 N: 100	Mean: 5.85 SD: 3.14 N: 100	
	Self-restraint	Mean: 4.63 SD: 2.91 N: 100	Mean: 5.01 SD: 3.12 N: 100	
<b>Causal influence</b>	Other-blame	Mean: 7.60 SD: 2.41 N: 97	Mean: 7.32 SD: 2.47 N: 97	
	Communication difficulty	Mean: 6.60 SD: 2.98 N: 99	Mean: 5.54 SD: 3.00 N: 99	**
	Lack of apology	Mean: 7.13 SD: 2.80 N: 99	Mean: 6.66 SD: 2.99 N: 99	
	Unrelated pressure	Mean: 2.31 SD: 2.85 N: 99	Mean: 4.09 SD: 3.41 N: 99	***
	Prior mood	Mean: 2.24 SD: 2.71 N: 97	Mean: 3.98 SD: 3.29 N: 97	***

*Significance levels:* \* --  $p < .05$ , \*\* --  $p < .01$ , \*\*\* --  $p < .001$

*Note:* All dependent variables rated on a scale from 0 to 10 unless otherwise indicated.

**Table 4**  
**Statistically reliable correlations with anger intensity**

	<b>Driving</b>	<b>Other activities</b>
Communicative intent	$r(103) = .55^{***}$	$r(108) = .33^{***}$
Communicative receipt	$r(103) = .33^{***}$	$r(108) = .26^{**}$
Motivational relevance	$r(103) = .46^{***}$	$r(108) = .34^{***}$
Motivational incongruence	$r(103) = .38^{***}$	$r(108) = .19^*$
Emotion-focused coping	$r(103) = -.29^{**}$	$r(108) = -.30^{**}$
Target aggressiveness	$r(101) = .33^{***}$	<i>ns.</i>

\* --  $p < .05$

\*\* --  $p < .01$

\*\*\* --  $p < .001$

**Table 5**  
**Statistically reliable correlations with anger impurity**

	<b>Driving</b>	<b>Other activities</b>
Prior negative affect	$r(92) = .32^{***}$	$r(101) = .41^{***}$
Communicative receipt	$r(97) = .22^*$	<i>ns.</i>
Motivational relevance	$r(102) = .24^*$	<i>ns.</i>
Motivational incongruence	$r(102) = .28^{**}$	<i>ns.</i>
Emotion-focused coping	$r(100) = -.31^{***}$	$r(105) = -.26^*$
Problem-focused coping	<i>ns.</i>	$r(105) = -.20^*$
Self-accountability	$r(102) = .26^{**}$	$r(108) = .26^{**}$

\* --  $p < .05$

\*\* --  $p < .01$

\*\*\* --  $p < .001$