ANGRY DRIVERS: CHARACTERISTICS AND CLINICAL INTERVENTIONS*

CONDUCTORES CON IRA: CARACTERÍSTICAS E INTERVENCIONES CLÍNICAS

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Abstract: While driving, high anger drivers experience more anger triggers, frequent and intense anger, hostile thinking, aggression, risky behavior, and some crash-related conditions than low anger drivers. Findings support state-trait theory hypotheses and show high anger drivers are at risk. Intervention research shows cognitive-behavioral interventions (e.g., relaxation, cognitive restructuring, and behavioral skill building) reduce and maintain reductions of driving anger, aggressive anger expression, aggression, risky behavior, and general anger. Readiness for change may be a problem. High anger drivers not admitting problems were somewhat less aggressive than clients in clinical trials, but reported more frequent and intense anger, aggression, and risky behavior than low anger drivers, suggesting they were at risk on many indices and readiness enhancement interventions are needed.

Key words: road rage, treatment, CBT, accident, readiness

In countries around the world, the media frequently reports incidents of angry, aggressive drivers and “road rage”. Most drivers have experience with anger on the highway and have been endangered by the erratic, angry driver. Many of us know otherwise reasonable people until they get behind the wheel of a car, where they often become furious, swearing, wildly gesturing, menacing individuals. Their anger can escalate into rage and may

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precipitate assault, accidents, and even death. Many other
drivers are very angry with tempers, blood pressures, fin-
gers, fists, voices and other aggressive and discourteous
behaviors raised, even though such behavior does not
reach the level of physical assault. Such anger is a signifi-
cant problem for the angry driver, for people riding with
him/her, and for others on the road. This paper addresses
the angry driver and does four things. First, it outlines
hypotheses from the state-trait model of anger applied to
driving anger. Second, it summarizes research on the
characteristics of drivers with a high propensity to be-
come angry when driving. Data on angry university stu-
dent drivers are presented to exemplify this line of
research. Third, interventions for angry drivers are sum-
marized along with findings from a large intervention
study. Fourth, the paper concludes with data which sug-
gest that readiness for intervention is an issue to which
clinicians and prevention researchers should attend.

THEORETICAL PREDICTIONS OF THE
STATE-TRAIT MODEL OF ANGER

The state-trait model conceptualizes anger as a person
characteristic reflecting the degree to which one becomes
angry or the propensity to anger (Deffenbacher et al.,
1996; Spielberger, 1988, 1999). Applying the state-trait
model to anger while driving, high anger drivers (i.e.,
those with a high tendency toward anger behind the
wheel) compared to low anger drivers (i.e., those with a
low propensity to anger while driving) should 1) have
more driving situations elicit or trigger anger (elicitation
hypothesis) and experience anger 2) more frequently (fre-
quency hypothesis) and 3) more intensely (intensity hy-
pothesis) while driving. Since anger is frequently a
stimulus for and motivator of aggression, high anger driv-
ers should also 4) engage in more aggression (aggression
hypothesis). Since aggressive and constructive ways of
expressing anger are not highly correlated, high anger
drivers might also 5) express their anger while driving in
less positive, adaptive ways (reduced constructive cop-
ing hypothesis). Finally, because of the increased fre-
quency and intensity of anger and more aggressive and
less adaptive ways of handling anger, high anger drivers
are expected to 6) experience more negative conse-
quences or outcomes stemming from their anger while
driving (negative consequences hypothesis).

Two additional hypotheses did not derive directly from
the state-trait model. Since anger and aggression can di-
rectly lead to or at least be correlated with conditions
such as impulsivity that interfere with focused attention
and quality information processing and behaviors needed
for safe driving, it was hypothesized that high anger driv-
ers would 7) engage in more risky behavior (risky behav-
ior hypothesis) and 8) experience more crash-related
outcomes (crash-related outcomes hypothesis).

Findings summarized in this paper relative to these
hypotheses and characteristics of high anger drivers are
from a series of studies from our research group over the
past 15 years (e.g., Deffenbacher, 2003; Deffenbacher,
Deffenbacher, Lynch & Oetting, 2003; Deffenbacher,
Richards, Filetti & Lynch, 2005; Deffenbacher, Richards
& Lynch, 2004). These studies operationally defined high
and low anger drivers by the upper and lower quartiles
of the Driving Anger Scale (DAS, Deffenbacher, Oetting
& Lynch, 1994) on which participants rate on a five-point
(1 = little or no, 5 = very much) scale the degree of anger
experienced in different driving situations. These studies
assessed frequency and intensity of anger, anger-related
thinking, anger expression, aggression, risky behavior,
crash-related conditions and anger consequences via ques-
tionnaires, driving diaries, computer presented driving
simulations, and responses to visualized provocations.

A COMPARISON OF HIGH AND LOW ANGER
DRIVERS: A STUDY

Procedures. One hundred (50 male, 50 female) low (DAS <
42) and 100 (50 male, 50 female) high (DAS > 52) anger
introductory psychology student drivers (Mage = 18.90)
completed:

1) Demographic information (e.g., age, gender,
etnicity, and total times and miles driven per week).
2) Anger in response to their two Personally Most An-
gering Driving Situations (0 to 100 rating with 0 = no
anger, 100 = maximum anger the person could ex-
perience).
3) 63-item Driver’s Angry Thoughts Questionnaire
(DATQ, Deffenbacher, Petrilli, Lynch, Oetting, &
Swaim, 2003) yielding measures of a) judgmental/
disbelieving thinking (i.e., statements of disbelief and
rhetorical questions about how others are driving and
mild negative evaluations of others’ driving such as the person being unaware of what he/she is doing); b) pejorative labeling/verbally aggressive thinking (i.e., very negative, denigrating, often obscene labels of the other person and thoughts of engaging in verbally aggressive behavior such as telling the other driver off); c) revengeful/retaliatory thinking (i.e., thoughts of exacting revenge and getting back at others and behaviors necessary to do so such as thinking about cutting the person off to show them); d) physically aggressive thinking (i.e., thoughts about hurting the other person and behaviors necessary to do so such as punching them out); and e) coping self-instructional thinking (i.e., thoughts of ways to decrease or manage their anger).

4) 49-item Driving Anger Expression Inventory (DAX, Deffenbacher, Lynch, Oetting & Swaim, 2002) yielding two general forms of expressing driving anger (aggressive and adaptive/constructive). Aggressive expression breaks down into three scales: a) verbally aggressive expression (i.e., expressing anger through things such as yelling or cursing at the other drivers); b) personal physical aggressive expression (i.e., using one’s physical self to express anger through things such as shaking a fist at them or trying to engage in a physical altercation); and c) use of the vehicle to express anger (i.e., expressing anger with the vehicle as the instrument of expression such as cutting someone off or flashing lights).

5) Driving Survey (Deffenbacher, Huff, Lynch, Oetting & Salvatore, 2000) yielding: a) 13-item Aggressive Behavior Index (i.e., three-month frequency from 0 to 5+ of each aggressive behavior); b) 15-item Risky Behavior Index (i.e., three-month frequency from 0 to 5+ of each risky behavior); c) three-month frequencies (0 to 5+) of losses of concentration, losses of vehicular control, and close calls; and d) one-year frequencies (0 to 5+) of moving violations and minor and major accidents.

When students finished these instruments, they listened to two audio-taped scenarios. The tape instructed them to close their eyes and visualize the scene depicted as if the event were happening to them right then. One scenario involved the student driving around in a parking lot for 15 minutes looking for a parking spot. The student sees another driver backing out and arrives first for the spot. However, another driver coming from the opposite direction cuts in and steals the parking spot. The second scenario involved the participant being second in a left turn lane. When the signal changes, the driver in front does not move and appears to be involved in a conversation with a passenger. The other driver only proceeds through the intersection at the last moment as the signal changes, leaving the participant stuck in the left turn lane waiting for the next light. Scenes were counterbalanced across sessions. Participants visualized scenes for 90 seconds. The tape included prompts to continue visualizing the scene and attend to their feelings and reactions. The tape then instructed participants to open their eyes and complete the 15-item State Anger Scale (Spielberger, 1999) which yields measures of state anger, state verbal aggression, and state physical aggression and the two-item Positive Coping Scale measuring staying composed and cool (Novaco, 1975). When students finished these measures, research assistants started the tape for the second visualization, which followed the same procedures and measures.

Students completed a driving diary for three days on which they drove during the next week. They recorded the intensity of anger (0-100) in the most angering situation that day and the frequency of aggressive (e.g., yelled at another driver) and risky (e.g., speeded or drank alcohol and drove) behaviors. Measures were averaged across the three days.

RESULTS

Findings are presented here and then integrated into general characteristics of high anger drivers. Because findings for anger characteristics are of primary interest, they are summarized in Table 1 along with anger effect sizes. Only significant gender and interaction effects are presented in the text. Multivariate analyses of variance employed the Wilks λ statistic. Univariate analyses explored significant multivariate findings with Tukey post hoc tests for significant interactions. Partial η² served as the measure of effect size, and η² values from 0.01 to 0.04 are judged as small, 0.04 to 0.14 moderate, and greater than 0.14 large (Cohen, 1988).

Potential confounds. Anger and aggression while driving decrease with age. If groups differed on age, then findings could be confounded by age effects. Low and
high anger students did not differ with regard to age ($M_s = 19.08$ and $18.73$). If groups differed on the amount of driving, they would be exposed to different amounts of frustration and provocation on the road. They might report differences in emotions or behavior not as a function of the propensity to anger while driving, but due to differential exposure. Low and high anger drivers did not differ on the number of times driven per week ($M_s = 10.30$ and $10.86$) or total miles driven per week ($M_s = 110.83$ vs. $107.22$), suggesting that findings were not confounded by differential exposure to frustration and provocation while driving.

Intensity of anger. Intensity of anger in the individual’s two most angering driving situations demonstrated a significant multivariate effect for gender and anger, $F_{s(2, 194)} = 3.35$ and $37.03$, $p_s < .05$ and .001, $\eta^2_s = 0.03$ and 0.28, but not for the interaction, $F_{(2, 194)} = 0.32$. Both situations revealed small gender effects, $F_{s(1, 195)} = 6.36$ and $5.69$, $p_s < .05$, $\eta^2_s = 0.03$ and 0.02. Men reported more anger in both situations than women ($M_s = 75.06$ and $66.09$ vs. $68.94$ and $60.07$). Both situations showed large anger effects, due to high anger drivers reporting more intense anger than low anger drivers (Table 1).

Hostile/aggressive thinking. Driving-related angry thinking on the DATQ (Table 1) revealed significant multivariate effects for gender, anger, and the interaction, $F_{s(5, 192)} = 12.74$, 29.54, and 3.77, $p_s < .001$, .001, and .01, $\eta^2_s = 0.25$, 0.44, and 0.09. Judgmental/disbelieving, revengeful/retaliatory, and physically aggressive thinking demonstrated univariate gender effects, $F_{s(1, 196)} = 4.23$, 11.26, and $32.81$, $p_s < .05$, .001, and .001, $\eta^2_s = 0.02$, 0.05, and 0.14. Women reported more judgmental/disbelieving thinking than men ($M_s = 56.93$ vs. 42.09), but men reported more revengeful/retaliatory ($M_s = 31.65$ vs. 20.60) and physically aggressive ($M_s = 14.59$ vs. 9.98) thinking. Although there were no anger differences on coping self-instructions, moderate to large anger effects were found for the four forms of hostile/aggressive thinking (Table 1). However, significant interactions on judgmental/disbelieving and physically aggressive thinking qualify main effects, $F_{s(1, 196)} = 4.67$ and 6.45, $p_s < .05$, $\eta^2_s = 0.03$ and 0.01. For judgmental/disbelieving thinking, low anger men and women did not differ ($M_s = 42.20$ and 41.98). High anger men reported significantly more judgmental/disbelieving thinking than the two low anger groups ($M = 52.50$), but high anger women ($M = 61.36$) reported significantly more judgmental/disbelieving thoughts than all other groups, suggesting high anger women contributed more to anger and gender main effects on this variable. On physically aggressive thinking, low anger men, low anger women, and high anger women did not differ significantly ($M_s = 11.28$, 8.58, and 10.96), but reported significantly less physically aggressive thinking than high anger men ($M = 18.22$), suggesting high anger men drove anger and gender main effects on this variable.

Expression of anger while driving. Aggressive and adaptive/constructive anger expression while driving (Table 1) revealed significant multivariate effects for gender and anger, $F_{s(2, 195)} = 4.19$ and 50.14, $p_s < .05$ and .001, $\eta^2_s = 0.04$ and 0.34, but not for the interaction, $F_{(2, 195)} = 0.24$. Aggressive anger expression yielded a significant gender effect, $F_{(1, 196)} = 8.30$, $p < .01$, $\eta^2 = 0.04$. Men reported more aggressive anger expression than women ($M_s = 62.21$ vs. 56.57). High anger drivers (Table 1) reported more aggressive anger expression and less adaptive/constructive anger expression than low anger drivers with large and small effect sizes, respectively. Verbal, physical, and vehicular anger expression scales from aggressive anger expression yielded significant multivariate effects for gender, anger, and the interaction, $F_{s(3, 194)} = 7.99$, 41.45, and 3.15, $p_s < .01$, .001 and .05, $\eta^2_s = 0.11$, 0.39, and 0.03. No significant univariate interactions were found. Physically aggressive anger expression and using the vehicle to express anger demonstrated significant gender effects, $F_{s(1, 196)} = 20.29$ and 10.10, $p_s < .01$ and .01, $\eta^2_s = 0.09$ and 0.05. Men reported more of both than women ($M_s = 14.57$ and 20.43 vs. 11.35 and 17.76). All three forms of driving anger expression revealed moderate to large anger effects due to high anger drivers employing more of each than low anger drivers (Table 1).

Responses to visualized provocations. Responses to visualizing being stuck behind an inattentive driver in a left turn lane yielded multivariate effects for gender and anger, $F_{s(1, 192)} = 7.04$ and 28.27, $p_s < .001$, $\eta^2_s = 0.13$ and 0.37, but not for the interaction, $F_{(1, 191)} = 1.74$. Physical aggression showed a gender effect, $F_{(1, 194)} = 17.52$, $p < .001$, $\eta^2 = 0.07$. Men reported more physical aggression than women ($M_s = 7.53$ vs. 5.86). State anger, verbal aggression, physical aggression, and positive coping demonstrated moderate to larger anger effects with high anger drivers reporting more anger, and verbal and physical aggression, but less positive coping (Table 1).
Table 1

Anger Effects, Statistics, and Effect Sizes

<table>
<thead>
<tr>
<th>Measure</th>
<th>Group</th>
<th>Univariate</th>
<th>Anger</th>
<th>Effect</th>
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<tbody>
<tr>
<td></td>
<td>Low Anger</td>
<td>High Anger</td>
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<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
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<td><strong>Personally Most Angering Situations</strong></td>
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<td>20.42</td>
<td>81.78</td>
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<td>Driver’s Angry Thoughts Questionnaire</td>
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<tr>
<td>Judgmental/Disbelieving</td>
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<td>13.34</td>
<td>459.93</td>
<td>16.62</td>
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<td>10.58</td>
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<td>4.68</td>
<td>14.59</td>
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<td>6.35</td>
<td>19.29</td>
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<td><strong>Driving Anger Expression Inventory</strong></td>
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<tr>
<td>Adaptive/Constructive</td>
<td>32.98</td>
<td>8.93</td>
<td>30.24</td>
<td>8.27</td>
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<td>12.40</td>
<td>69.20</td>
<td>15.54</td>
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<td>6.99</td>
<td>30.02</td>
<td>6.83</td>
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<tr>
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<td>3.26</td>
<td>14.62</td>
<td>4.01</td>
</tr>
<tr>
<td>Use of Vehicle</td>
<td>15.63</td>
<td>4.45</td>
<td>22.56</td>
<td>7.35</td>
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<td><strong>Visualization: Stuck behind Inattentive Driver in Left Turn Lane</strong></td>
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<tr>
<td>State Anger</td>
<td>11.28</td>
<td>3.69</td>
<td>16.15</td>
<td>3.75</td>
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<td>13.80</td>
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<td>7.81</td>
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<td>Positive Coping</td>
<td>8.96</td>
<td>3.02</td>
<td>6.11</td>
<td>2.79</td>
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<td><strong>Visualization: Another Driver Steals Parking Spot for which You Have Been Waiting</strong></td>
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<tr>
<td>State Anger</td>
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<td>3.99</td>
<td>15.00</td>
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<td><strong>Driving Diary</strong></td>
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<tr>
<td>Anger Intensity</td>
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<td>21.27</td>
<td>54.12</td>
<td>25.61</td>
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<td>Aggression (frequency)</td>
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<td>1.19</td>
<td>1.86</td>
<td>1.39</td>
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<tr>
<td>Risky Behavior (frequency)</td>
<td>1.92</td>
<td>1.28</td>
<td>3.37</td>
<td>2.02</td>
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<td><strong>Aggression, Risky Behavior, and Crash-related Conditions (Driving Survey)</strong></td>
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<tr>
<td>Aggression</td>
<td>7.24</td>
<td>7.23</td>
<td>20.40</td>
<td>11.74</td>
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<tr>
<td>Risky Behavior</td>
<td>17.78</td>
<td>10.75</td>
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<td>Lost Concentration</td>
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<td>Lost Vehicular Control</td>
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<td>1.19</td>
<td>1.61</td>
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<td>1.08</td>
<td>1.64</td>
<td>1.49</td>
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<td>0.66</td>
<td>0.68</td>
<td>0.94</td>
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<td>0.65</td>
<td>0.37</td>
<td>0.60</td>
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<tr>
<td>Major Accidents</td>
<td>0.05</td>
<td>0.26</td>
<td>0.10</td>
<td>0.36</td>
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</table>

*p < .05, **p < .001
Responses to having someone steal a parking spot for which the person had been waiting revealed multivariate effects for gender, anger, and the interaction, $F_{s}(4, 192) = 6.26, 33.02, and 3.18, ps < .001, .001, and .05, \eta^2$s = 0.12, 0.41, and 0.06. Verbal and physical aggression showed significant gender effects, $F_{s}(1, 195) = 5.84$ and 12.40, $ps < .05$ and .001, $\eta^2$s = 0.03 and .06. Men reported more verbal and physical aggression than women ($Ms = 12.81$ and 8.75 vs. 11.45 and 7.05). High anger drivers reported more aggressive and risky behavior, but less positive coping than low anger drivers (large effect sizes). A significant interaction on verbal aggression qualified main effects, $F(1, 195) = 6.99, p < .01, \eta^2 = 0.04$. Low anger men and women did not differ significantly from each other ($Ms = 9.20$ and 9.33), but reported significantly less verbal aggression than high anger women ($M = 13.58$). High anger men reported significantly more verbal aggression than other groups ($M = 16.42$), thereby contributing more to the main effect than high anger women.

Responses in daily driving. Driving diaries showed a multivariate effect for anger, $F(3, 132) = 22.12, p < .001, \eta^2 = 0.33$, but not for gender or the interaction, $F_{s}(3, 132) = 1.46$ and 2.09. High anger drivers reported more intense anger and more frequent aggressive and risky behavior than low anger drivers (Table 1). High anger drivers engaged in 2.24 times more aggressive and 1.76 times more risky behavior than low anger drivers. It is important to remember that these were daily averages. Over a 300 driving day year, the amount students reported driving, high anger drivers would average 558 acts of aggression and 1011 risky behaviors, as compared to 249 and 576, respectively, for low anger drivers.

Aggressive, risky behavior, and crash-related conditions (Driving Survey). Aggressive and risky behavior revealed significant multivariate effects for gender and anger, $F_{s}(2, 194) = 3.27$ and 46.38, $ps < .05$ and .001, $\eta^2$s = 0.03 and 0.32, but not for the interaction, $F(2, 194) = 0.30$. Aggressive and risky behavior demonstrated small gender effects, $F_{s}(1, 195) = 4.87$ and 5.69, $ps < .05$ and .02, and 0.03, due to men ($Ms = 15.33$ and 26.20) reporting more of both than women ($Ms = 12.30$ and 21.80). High anger drivers reported more aggressive and risky behavior than low anger drivers (Table 1). Losses of concentration, losses of vehicular control, and close calls revealed a significant multivariate effect for anger, $F(3, 194) = 8.89, p < .001, \eta^2 = 0.12$, but not for gender or the interaction, $F_{s}(3, 194) = 1.43$ and 1.41. All three variables showed more anger effects, with high anger drivers experiencing more of all than low anger drivers (Table 1). Moving violations and minor and major accidents in the last year revealed a significant multivariate effect for anger, $F(3, 193) = 3.01, p < .05, \eta^2 = 0.03$, but not for gender or the interaction, $F_{s}(3, 193) = 0.58$ and 1.13. Minor and major accidents did not show anger effects. Moving violations revealed a small significant anger effect, with high anger drivers receiving twice as many moving violations as low anger drivers (Table 1).

CHARACTERISTICS OF HIGH ANGER DRIVERS

High and low anger drivers drive equally often and as many miles. As found in this study, findings are not confounded by the amount of driving or exposure to potential sources of provocation. Differences seem to reflect something about the nature of the driver in interaction with the driving environment.

More situations make high anger drivers angry. When provided a large number of driving situations, high anger drivers report three to six times as many events on the road elicit much or very much anger. High anger drivers are vulnerable to many different triggers of anger, not just more intense anger, when a few situations are encountered. These findings support the elicitation hypothesis of the state-trait model.

High anger drivers are angered more frequently. Although not assessed in the current research, other research shows high anger drivers were angered 2.43 times per day, whereas low anger drivers were angered 0.90 a day. That is, high anger drivers were angered while driving 2.7 times more often than low anger drivers. These were daily averages. Over time, these numbers take on a different meaning. Over a 300 driving day year, low anger drivers would become angry 270 times, whereas high anger drivers would become angry 729 times, rates that support the frequency hypothesis of the state-trait model.

High anger drivers experience more intense anger behind the wheel. High anger drivers rate themselves as angrier drivers, report greater anger in commonly occurring situations (e.g., ordinary traffic, rush hour traffic and being yelled at by another driver), and report more state anger during either visualizations of provocations or frustrating driving simulations (e.g., being stuck in heavy traffic.
or unable to pass a slow driver). When asked to identify the two situations that angered them most, high anger drivers reported significantly more intense anger in their most and second most angering situations. High anger drivers report more anger in day-to-day driving (e.g., $M_5 = 57.7$ vs. 27.4 on driving diaries). Moreover, high anger drivers indicated a rating of 40 was the level at which anger started to become problematic. Thus, the mean level of anger in day-to-day driving for high anger drivers was well into the problem range. Findings in the current study for most angering situations, responses to visualized provocations, and driving diaries (Table 1) were similar. Collectively these findings support the intensity hypothesis through a variety of methods.

High anger drivers are not angry all the time they drive. For example, when driving unimpeded on a country road, high and low anger drivers both report minimal anger. As stress increases, anger rises for both groups. Ordinary traffic elicits more anger than unimpeded travel on a country road, and rush hour traffic and being yelled at by another driver elicit more anger than ordinary traffic. However, high anger drivers experience more intense anger than low anger drivers in the latter three situations. Similar findings were found in driving simulations. At baseline, in a familiarization task, and when driving unimpeded, anger levels were low and equivalent for both groups. Anger rose for both groups in either of the two frustrating simulations (i.e., being stuck in slow, heavy traffic and being stuck behind and unable to pass a slow driver), but was significantly higher for high anger drivers. Thus, anger is not a chronic experience for high anger drivers, but rather something prompted by different events on the road. Such findings support a person x situation interaction hypothesis implicit in the state-trait model (i.e., person characteristics interact with the provocation/frustration characteristics of situations).

High anger drivers engage in more aggression. At a cognitive level, as found in this study (Table 1) and other studies, high anger drivers engage in more hostile, aggressive thinking. High anger drivers engage in more judgmental and disbelieving, pejorative labeling and verbally aggressive, revengeful and retaliatory, and physically aggressive thinking. Also, as found in this (Table 1) and other studies, high anger drivers report they express their anger in a more aggressive fashion. They report expressing their driving anger more through verbal (e.g., yelling or cursing at another driver), personal physical (e.g., making gestures at other drivers), and vehicular aggressive (e.g., flashing lights, tailgating or cutting a driver to intimidate) means. Additionally, high anger drivers engage in more aggression while driving. High anger drivers report more aggression in the last three months (Table 1), more verbal and physical aggression following visualization of frustrating events with other drivers (Table 1) or in frustrating, high impedance simulations. Prior research showed that high anger drivers engaged in just over two aggressive behaviors per day (2.03), whereas low anger drivers averaged one half an aggressive behavior per day (0.54) (i.e., high anger drivers engaged in 3.8 times more aggression than low anger drivers). Assuming 300 driving days per year, low anger drivers would engage in 162 aggressive behaviors a year with 609 acts of aggression for high anger drivers. Similar but somewhat smaller differences were found in the current study (Table 1). Across multiple methodologies, research strongly supports the cognitive, behavioral/expressive, and behavioral aspects of the aggression hypothesis and with large effect sizes.

High anger drivers may handle their anger less well. As in the current study (Table 1), high and low anger drivers do not differ on coping self-instruction. In the current study (Table 1), a small effect on adaptive/constructive means of expressing anger favored low anger drivers. Other studies either replicate this small effect or show no differences between high and low anger drivers. However, large effects for positive coping in response to the two visualized provocations favored low anger drivers, an effect replicated in other studies. Thus, support for the reduced coping hypothesis is not as strong as for other hypotheses and seems to depend somewhat on the type of measure, methodology, and sample.

High anger drivers experience more negative anger consequences. High anger drivers damaged (e.g., smashed the windshield with a tire iron) their vehicles in anger (not as a result of a crash) twice as often as low anger drivers. However, they are 10 to 11 times more likely to injure themselves as a result for their angry outburst. Another study showed that high anger community college student drivers reported significantly more life impairment (e.g., driving anger impacted school work, friendships, etc.) than did low anger drivers. Thus, the negative consequence hypothesis has received some support.

High anger drivers take more risks on the road. High anger drivers rate themselves as more risky, less safe drivers
and report more risky behaviors in the last three months (Table 1). In simulations involving unimpeded travel, high anger drivers averaged significantly higher speeds, more road heading errors, and greater variability within their lanes than low anger drivers. Four times more high anger drivers would have received a speeding ticket for their average speed being more than 10 mph over the limit (i.e., 40% of high anger drivers vs. 10% of low anger drivers). All drivers (12%) driving 20 mph over the speed limit were high anger drivers, the speed at which police officers are required to issue a moving violation in the state in which the research was conducted. That is, even when not highly angry, high anger drivers engaged in more risky taking. In the frustrating, high impedance simulations, high anger drivers maintained a significantly closer distance to drivers in front of them and had significantly shorter times to impact with other drivers ($M = 2.5$ seconds vs. 4.1 seconds). Driving diaries in other research showed that high anger drivers averaged 3.48 risky behaviors per day, as compared to 1.64 for low anger driver (i.e., high anger drivers engaged in 1.9 times more risky behavior). Over a 300 driving day year, low anger drivers would engage in 492 risky behaviors, as compared to 1044 for high anger drivers. The current study replicated these findings (Table 1). In summary, multiple methods show moderate to large differences between high and low anger drivers on risky behavior, strongly supporting the risky behavior hypothesis. It should be noted that not all differences were anger-mediated, because high anger drivers demonstrated significantly more risky behavior (e.g., speeding) when frustration (i.e., driving unimpeded on an open road) and anger were low.

High anger drivers possess other negative characteristics. High anger drivers report more trait anger, trait anxiety, and impulsivity and express their general anger more in outward, less controlled ways. That is, they are more likely to get into a car in an angry, tense or distressed state and more likely to react in impulsive, dysfunctional ways. These characteristics increase the likelihood of further anger and stress behind the wheel as these states transfer (Zillman, 1971) or facilitate (Berkowitz, 1990) anger on the road, an area in which high anger drivers are already vulnerable.

In summary, high anger drivers are angered by more things on the road, are more frequently and intensely angered, think and express their anger in more hostile/aggressive ways, engage in more aggressive and risky behaviors, are at risk for more anger- and crash-related outcomes, and possess other psychological characteristics that interact negatively with, and may exacerbate, problems with driving anger. They are a risk to themselves and potentially to those who ride or share the road with them.

INTERVENTIONS FOR REDUCING ANGER IN HIGH ANGER DRIVERS

Three initial controlled clinical trials compared relaxation coping skills training (RCS) to cognitive-relaxation coping skills (CRCS) [Deffenbacher, Huff, Lynch, Oetting & Salvatore, 2000; Deffenbacher, Filetti, Lynch, Dahlen & Oetting, 2002; Richards, Deffenbacher, Filetti, Lynch & Kogan, 2001]. Clients were high anger college student drivers who self-identified driving anger as a personal problem who were randomly assigned to RCS, CRCS or a no-treatment control. Therapy was conducted in eight weekly, one-hour, small group ($n = 6-10$) sessions. RCS taught progressive relaxation and five specific relaxation coping skills. Within sessions, clients practiced relaxation skills to lower anger purposefully aroused. Clients visualized situations that previously made them angry (e.g., someone cutting them off or yelling at them) and experienced anger for 30-40 seconds. Then, they applied relaxation to calm down. Initial anger levels were moderate, and therapists assisted clients in relaxation retrieval. Over sessions, anger level increased and therapist assistance decreased such that toward the end of therapy clients handled high anger and
self-initiated relaxation. Homework assignments extended relaxation coping skills to driving and application to other sources of anger. CRCS followed the same model, but added identification of anger-engendering cognitions and the development, in-session rehearsal, and transfer of cognitive as well as relaxation coping skills.

The initial study demonstrated significant anger reduction for RCS and CRCS compared to the control and some between-group differences favoring RCS for anger and CRCS for risky behavior. Protocol modifications in the second and third studies reduced between-group differences, increased generalization effects to general anger, and showed maintenance at short- and long-term follow-up.

Another study (Kogan, Richards & Deffenbacher, 2001) compared RCS to Beck’s cognitive therapy and a no-treatment control. Interventions lowered driving anger, aggressive anger expression, aggression and general anger, enhanced adaptive/constructive anger expression, and maintained these changes over short- and long-term follow-up. Treatment effect sizes were generally large. Active treatments, however, did not differ, providing no evidence of differential treatment effects.

Our group recently (Deffenbacher, Richards & Kemper, 2007; Richards, Deffenbacher & Kemper, 2007b) completed a large study comparing: 1) RCS, relaxation coping skills applied to driving anger (n = 118, year follow-up n = 71); 2) cognitive coping skills (CCS), application of cognitive restructuring to driving anger (n = 119, year follow-up n = 75); 3) behavioral coping skills (BCS), application of aggression-incompatible and safe driving behaviors to driving anger (n = 118, year follow-up n = 73); and 4) a no-treatment control (n = 119, year follow-up n = 77). Number of sessions and format were similar to earlier studies. Results are summarized in Table 2. Compared to the control, active treatments lowered driving anger, aggressive driving anger expression, aggressive and risky behavior, and improved adaptive/constructive anger expression. Treatments also led to significant reduction of trait anger, supporting generalization of treatment effects beyond driving anger to other sources of client anger. Treatment effect sizes were large, suggesting meaningful changes, and effects were maintained at short- and long-term follow-up. Moreover, treatments roughly halved the rates of aggression and cut risky behavior by a quarter. At no point in time did active treatments differ from one another, providing no evidence of differential treatment effects.

In summary, there is empirical support for relatively brief (eight session), efficient (small group) interventions for high anger drivers, drivers who acknowledge problems with driving anger. Interventions did not make individuals anger free. In general, clients moved from an average score around the 85th percentile down to slightly above or below the mean. Interventions appear to give clients the skills with which to manage and cope with frustrations and provocations on the road.

**READINESS FOR INTERVENTION MAY BE AN ISSUE**

Individuals in the treatment studies identified driving anger as a problem and sought help when it was offered. They were likely at a contemplative if not action-oriented level of readiness. However, individuals with anger problems often deny problems and externalize their source. They are generally at a precontemplative level and do not take advantage of, or benefit from, counseling or therapy.

Our research identified such a group. Screening procedures included giving the DAS to large numbers of university students. To be included in the treatment studies, students had to twice score in the upper quartile on the DAS and check a box indicating that they had a personal problem with driving anger and wanted help with it. They were thus high anger, problem admitting or HP participants. To establish characteristics of our clients, we selected students who were in the lower quartile and checked a box indicating that they did not perceive themselves experiencing a problem, but wanted to participate in the research. They were low anger, non-problem admitting or LNP participants. There were many high anger individuals who also checked this box, i.e., high anger non-problem admitting or HNP participants, who did not identify themselves as having a problem, even though they were psychometrically as high on driving anger as their HP peers.

This HNP group deserved study. It was possible that they were very angry, but did not experience problems. If so, understanding what they did naturally that HP students did not could inform therapy. On the other hand, HNP students could experience problems, but be minimizing, denying or otherwise not acknowledging them. Three studies (Deffenbacher, Filetti, Richards, Lynch & Oetting, 2003;
Table 2

Effects of Relaxation, Cognitive, and Behavioral Interventions

<table>
<thead>
<tr>
<th>Measure</th>
<th>Assess</th>
<th>Condition</th>
<th>Treatment</th>
<th>Effect Size (η²)</th>
</tr>
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<tr>
<td></td>
<td></td>
<td>Control</td>
<td>Relaxation</td>
<td>Cognitive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>M</td>
<td>M</td>
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<td>Driving</td>
<td>Pre</td>
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<td>128.4</td>
<td>127.3</td>
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<td>Post</td>
<td>124.1ₐ</td>
<td>89.5ₐ</td>
<td>88.3ₐ</td>
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<tr>
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<td>121.8</td>
<td>84.1ₐ</td>
<td>81.4ₐ</td>
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<tr>
<td></td>
<td>1-yr.</td>
<td>118.₃ₐ</td>
<td>86.₇ₐ</td>
<td>83.₅ₐ</td>
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<td>Most</td>
<td>Pre</td>
<td>83.7</td>
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<td>Angering</td>
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<td>55.₅ₐ</td>
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<td>Situation</td>
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<td></td>
<td>1-yr.</td>
<td>7₆.₉ₐ</td>
<td>4₅.₂ₐ</td>
<td>4₅.₈ₐ</td>
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<tr>
<td>Adaptive/</td>
<td>Pre</td>
<td>2₆.₈</td>
<td>2₉.₂</td>
<td>2₇.₁</td>
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<tr>
<td>Constructive</td>
<td>Post</td>
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<td>3₇.₃ₐ</td>
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<tr>
<td>Anger</td>
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<td>2₈.₆ₐ</td>
<td>3₆.₈ₐ</td>
<td>₃₈.₃ₐ</td>
</tr>
<tr>
<td>Expression</td>
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<td>2₈.₈ₐ</td>
<td>₃₇.₇ₐ</td>
<td>₃₇.₉ₐ</td>
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<tr>
<td>Aggressive</td>
<td>Pre</td>
<td>7₆.₀</td>
<td>₇₇.₀</td>
<td>₇₈.₄</td>
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<td>Anger</td>
<td>Post</td>
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<td>₅₉.₇ₐ</td>
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<td>Behavior</td>
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<td>₁₃.₃ₐ</td>
<td>₁₂.₆ₐ</td>
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<tr>
<td></td>
<td>1-yr.</td>
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<td>₁₁.₇ₐ</td>
<td>₁₀.₅ₐ</td>
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<td>₂₉.₆</td>
<td>₃₁.₅</td>
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<td>Behavior</td>
<td>1-mo.</td>
<td>₃₀.₄ₐ</td>
<td>₂₂.₄ₐ</td>
<td>₂₀.₃ₐ</td>
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<tr>
<td></td>
<td>1-yr.</td>
<td>₂₇.₇ₐ</td>
<td>₂₁.₄ₐ</td>
<td>₁₉.₁ₐ</td>
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<tr>
<td>Trait</td>
<td>Pre</td>
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<td>₂₅.₃</td>
<td>₂₅.₅</td>
</tr>
<tr>
<td>Anger</td>
<td>Post</td>
<td>₂₄.₂ₐ</td>
<td>₂₀.₁ₐ</td>
<td>₂₀.₆ₐ</td>
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<tr>
<td>Scale</td>
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<td>₂₃.₄ₐ</td>
<td>₁₈.₈ₐ</td>
<td>₁₉.₈ₐ</td>
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<tr>
<td></td>
<td>1-yr.</td>
<td>₂₃.₅ₐ</td>
<td>₁₈.₂ₐ</td>
<td>₁₉.₄ₐ</td>
</tr>
</tbody>
</table>

Notes. Pre = pretreatment assessment, Post = posttreatment assessment, 1-mo. = one-month follow-up assessment, and 1-yr. = one-year follow-up assessment. Conditions sharing the same subscript do not differ significantly from one another, whereas conditions with different subscripts differ significantly from one another (p < .001).

Deffenbacher, Lynch, Filetti, Dahlen, & Oetting, 2003; Richards, Deffenbacher & Kemper, 2007a) compared LNP, HNP, and HP students. Selected comparisons show that HNP and HP students did not differ on anger in response to their most angering situations (Mₛ = 82.0 and 82.2), frequency of anger while driving (Mₛ = 2.3 and 2.1), anger intensity in day-to-day driving (Mₛ = 54.2 and 57.7), or frequency of risky behavior while driving (Mₛ = 3.4 and 3.3), while differing significantly from LNP students (Mₛ = 63.2, 0.9, 27.4, and 1.7, respectively). Frequency of aggressive behavior from driving diaries showed a different pattern. HNP students reported triple the rate of aggressive behavior that LNP students did (Mₛ = 1.5 vs. 0.5), whereas HP students had quadruple the rate (Mₛ = 2.0). All three groups differed significantly from one another. Moving violations in the last three months showed a different pattern. LNP and HNP groups did not differ (Mₛ = 0.2 and 0.2), but both groups received significantly fewer citations than the HP group (Mₛ = 0.4). Thus, HP and HNP drivers do not differ on measures of anger and
risky behavior, but may report somewhat less aggressive behavior than HP drivers and their behavior may not come to the attention of law enforcement officers as often. Perhaps the greater aggression and involvement with the police motivated HP individuals to take advantage of counseling when offered. Nonetheless, HNP drivers were at risk. They were significantly more angry, aggressive, and risky than LNP drivers. They, however, pose a problem for those interested in prevention, because they did not take advantage of counseling which offered free and conveniently. They did not appear to be at a state of readiness from which to take advantage of therapy. There is a need to develop and evaluate readiness enhancement interventions (e.g., Deffenbacher, 1995) and/or motivational interviewing (Miller & Rollnick, 1991) for such individuals. Interventions could provide information, increase awareness of personal characteristics, their costs, consequences and risk factor relationships, and increase motivation for change.

SUMMARY

High anger drivers are more easily angered on the road, are more frequently and intensely angered, express their anger in more aggressive and less adaptive/constructive ways, engage in more aggressive and risky behaviors, and are at risk for some accident- and injury-related outcomes. For those who admit problems with their driving anger, there are some short-term, cost effective interventions which may help them reduce their anger and related problems. However, for those high anger drivers who do not identify their anger as a problem, there are as yet few empirically supported interventions with which to address their readiness and potential for change.

REFERENCES


Artículo invitado