Conspicuity by Many Other Names: How Technology, Training, Judgment, and Strategies Can Supplement Neon Green

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The paper defines the concept of conspicuity and summarizes previous research on conspicuity factors. Technological advances that may impact conspicuity are introduced. Limitations of each of these traditional views of conspicuity due to brain functions are explored and explained. MSF’s approach to conspicuity, termed “strategic conspicuity” is discussed along with several training activities designed to stretch your hazard awareness abilities. Strategic conspicuity is a rider-based solution that challenges a rider to be aware, use judgment, have a strategy, and self-reflect on the many possible responses to hazards that are under the control of the motorcyclist.
Conspicuity by Many Other Names: How Technology, Training, Judgment, and Strategies can Supplement Neon Green.

Dr. Sherry Williams
Director, MSF Quality Assurance & Research
Conspicuity (con-spik-CUE-i-tee):

A term used to define the condition of being "visible", "easy to notice" or "obvious"; the ability of an object to draw attention to itself, even if no one's actively searching for it. Rider conspicuity, therefore, is the ability of a motorcyclist to draw attention to themselves, even though other drivers may not be actively looking for them.
“I didn’t see the motorcycle.”

Man drives into a rockslide:
http://www.youtube.com/watch?feature=player_embedded&v=qBmE92n5mE1

2 vehicle, at fault:
MC: 30-70%
OVD: 30-70%
Conspicuity: Lights

- Day time lights – small effect
- T-shape recognized faster
Conspicuity: Gear

- White helmet lowers risk compared to black
- Reflective or fluorescent gear lowers risk
  - Hurt report
    - Consider the age of the report (1981)
    - Population proportion of neon – white gear compared to black

- Some inconsistencies

![Conspicuity: Gear](webBikeWorld.com)
Conspicuity: Motorcycle

- Motorcycle
  - Reflective material on frontal area studied
The Limits of Conspicuity: Cognitive Conspicuity

• **Contrast & Context**
  – High contrast needed in low salience condition
  – Object/Background dependent
    • Hole et al. (1996): the contrast between motorcyclists and background plays a considerable role in motorcyclists’ conspicuity.

• **Expectation-dependent**
  – Langham et al. (2002) suggest that even highly conspicuous objects (like a police car with flashing lights) will not be identified quickly enough as a potential hazard if a driver’s expectations are not equal to the actual traffic situation.
  – Common objects (89%) versus uncommon objects (48%)
  – Car drivers who are also licensed motorcycle riders are involved in fewer car-motorcycle collisions than car drivers who do not hold a motorcycle licence (Magazzù, Comelli and Marinoni, 2006).

• **Little crash data is currently available on this issue.**
• Automobile-based
• Motorcycle-based
  – Collision Warning System
  – ABS brakes
Vehicle to vehicle collision warning systems

- V2V, V2I
- 10-20 years?
- Welcome in the modern automobile?
- Useless nannies designed to coddle inattentive drivers?
- One motor carrier has reported that its front-end crash incidents have decreased 75 percent since it installed the devices in half of its trucks.
BMW Motorrad ConnectedRide - Collision Warning

http://www.youtube.com/watch?feature=player_detailpage&v=o7JHqs9XWwQ
• Cell phone-based applications
  – Cyclists warning display system (ISS Ltd.)
  – Warning cyclists that a potentially dangerous maneuver is about to occur and placing the onus on them to act accordingly.
• iOnRoad app
CWS: Cell-phone based
CWS: Cell-phone based

Distance Warning Alert Sound

Replay
Next
Technology: ABS brakes

- Prevent wheel lock up under extreme braking
- Proven equalizer
- Add $1000 to cost, 20 # to weight
- Studies
  - Experienced riders
  - Novice riders
- Braking in a curve?
- Mandatory?
- Used market?
A Rider-Based Solution, Strategic Conspicuity

• Awareness
• Judgment
• Strategy
  – Adaptable to situation
• Self Reflection leading to Rider Improvement
• Many possible responses under a motorcyclists control
A Level 4 Rider
Improving Awareness / Perception

http://www.myvidster.com/video/249582/The_monkey_business_illusion
We truly are arguing that directing our eyes at something does not guarantee that we will consciously see it.
The problem is not with the limitations on motor control, but with limitations on attention resources and awareness.
You’re riding down the road.

What do you see in this scene?
“I have the right-of-way.”
Agree or Disagree?

Our eyes don’t necessarily tell our brain what we see; rather our brain tells our eyes what to look for.
What do you see here?
Possible Escape Paths

2-lane, 2-way traffic
Possible Escape Paths

3 lanes going one way
MSF Website: www.msf-usa.org
Self Assessment: Skill and Risk

- High skill/high risk
- Good skill/Moderate risk
- Average skill/Average risk
- Weak skill/Mild risk
- Poor skill/Low risk

Overall & Moment-to-Moment
Risk Scale

Resulting Risk Scale

Skill Scale

High

Lower Risk

High

Higher Risk

Low

No Risk Offset

Riding the Edge

Good Risk Offset

Bad Risk Offset
Value of safety training if higher risks are taken?

- High Skill Scale
- Low Risk Scale
- Lower Risk

- High Skill Scale
- Low Risk Scale
- Higher Risk

- High Skill Scale
- High Risk Scale
- Higher Risk

- No Risk Offset
- Still Riding the Edge

MSF Advanced RiderCourse
Value of safety training!

Risk Scale

Resultant Risk Scale

Skill Scale

Risk Scale

Resultant Risk Scale

High

High

Higher Risk

No Risk Offset
Still Riding the Edge

Low

Low

Lower Risk

Target Risk 2
A new psychology of safety and health
What works? What doesn't? And why...

Gerald J.S. Wilde
Self Assessment: Continuous Improvement

Are you a Level IV Rider?

Level 0 = Self taught and/or rides without a license
Level I = Completes a learn-to-ride course & licensed
Level II = I + Completes additional courses
Level III = II + Reflects on experiences
Level IV = III + Lifelong learner & subconsciously safe
Self Assessment: A Constant Intent to Improve

The Upper Half of the Motorcycle

Improvement requires a constant intent to improve. The implementation and maintenance of this intent is a task that requires the utmost in rational control, which is a duty—a “leadership duty”—of the conscious self.
Self Assessment: Competencies & Abilities

- Self-Control
- Self-Assessment
- Courtesy / Cooperation
- Conspicuity / Protective Gear
- Cornering / Hard Braking / Swerving
- Strategy / Perception / Judgment
- Controls / Braking / Turning / Shifting
- Knowledge / Skills / Attitude / Habits / Values

Breadth

Depth

Surface

Internalized

39
Last year MSF curricula were used to train over 500,000 riders (6 million riders to date)

Thanks to…

- 9,499 certified *RiderCoaches*
- 275 certified *RiderCoach* Trainers
- Over 10,000 certifications
- 1,102 RERP Sponsors managing 2,691 sites
- State, Military, Other Administrators
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<td>Street RiderCourse 2&lt;br&gt;Advanced RiderCourse&lt;br&gt;Safe Motorcyclist Awareness and Recognition Trainer (SMART)&lt;br&gt;Ultimate Bike Bonding RiderCourse</td>
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<td><strong>Essential Core</strong>&lt;br&gt;Basic RiderCourse&lt;br&gt;Street RiderCourse 1&lt;br&gt;Basic Bike Bonding RiderCourse</td>
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New MSF Courses

Rider Perception

SMARTrainer

Basic Bike-Bonding RiderCourse

Ultimate Bike-Bonding RiderCourse

Street RiderCourse

3-Wheel Basic RiderCourse

Scooter Basic RiderCourse

Military Sportbike RiderCourse

Advanced RiderCourse
New MSF Courses

Rider Perception

Modern visual technology

Improves rider’s perceptual skills
New MSF Courses

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**SMARTTrainer**

Hazard perception

Risk management

Play back and coaching
New MSF Courses

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**Basic Bike-Bonding RiderCourse**

**Ultimate Bike-Bonding RiderCourse**

Drills on skills

Slow speed focus

Fine motor skills
New MSF Courses

Street RiderCourse (SRC 1, SRC2)

- Light residential riding
- Light suburban traffic
- Complex traffic situations
New MSF Courses

3-Wheel Basic RiderCourse

Same concepts as Basic RiderCourse, now applied to 3-wheel motorcycles
New MSF Courses

Scooter Basic RiderCourse

Same concepts as Basic RiderCourse, now applied to scooters
New MSF Courses

Military Sportbike Rider Course
Advanced Rider Course

U.S. Navy helped pilot MSRC
- 60% enrolled
- 61% reduction in Navy motorcycle-related fatalities

MSF releases ARC
Public, private
**Modular-type courses provide:**

- More breadth and depth
- Multiple points of entry and renewal
- Individualized coaching
- Segmented learning opportunities
- Distributed practice
**MSF Ready-To-Use Kits**

- **Intersections** – All Roadway Users
- **Share the Adventure** – Group Riding
- **StreetSmart** – Rider Perception
- **Riding Straight** – Alcohol Awareness
- **Seasoned Rider** – Aging Awareness
Developing the Whole Rider

Continuum of Learning

Physical Skills
Mental Skills
Reflection
Self-Assessment
Safety Renewal

Continuum of Learning
A Rider-Based Solution, Strategic Conspicuity

- Awareness
- Judgment
- Strategy
  - Adaptable to situation
- Self Reflection leading to Rider Improvement
- Many possible responses under a motorcyclists control
The MSF 100
Naturalistic Study of Motorcyclists
MSF, its members, and VTTI are conducting the first ever, Naturalistic Motorcyclist Study.

- 100+ participant-owned motorcycles
- One year per bike, ext. 400-500K miles
- Data collection 2012 and 2013
- Recruiting primarily on Age and Bike
- We will track other factors (e.g., training, experience)
- MSF will collaborate worldwide to allow use
The MSF 100 Naturalistic Study of Motorcyclists

Instrumentation Installed

- Color Video cameras (5)
- Lane tracking
- Helmet / Gaze tracking
- Front and rear brake strain gauges
- Accelerometers (3 axes)
- Gyro (3 axes)
- Speed
- Turn signals
- GPS
- Forward radar (speed to lead vehicle; distance to lead vehicle)
- Continuous collection
- 8-12 month capacity
- Expandable measures
The MSF 100 Naturalistic Study of Motorcyclists
Bike Model Listing

- Kawasaki Ninja ZX600, ZX-6R (2009 – 2012)
- Harley-Davidson Seventy-Two (2012)
- Honda Rebel CMX 250 (2001 – 2011)
- Honda Goldwing 1800 (2006-2011)
Sport Bikes

Suzuki GSX-R1000
2009, 2011 – 2012

Kawasaki Ninja
ZX600/ZX-6R
2009 – 2012
Cruisers

Honda Rebel 250
2001 – 2011

Yamaha Vstar 650
2002 – 2011
Cruisers (continued)

Harley-Davidson
Sportster 883/1200
2004 – 2012

Iron 883
2009 – 2012

Forty-Eight
2010 – 2012

Seventy-Two
2012
Touring

Honda Goldwing
2006-2011

Harley-Davidson
Ultra Classic
Electraglide
2006-2011
Naturalistic Method

Able to identify:

- Interaction of rider attributes, behaviors, roadway, adjacent vehicles, and environment.
- Factors in crashes using time-series video and numeric data.
- Factors not detectable through crash investigation.
- Compares crash-involved rider to himself/herself at all other times.
- Pre-event data, seconds, minutes, days, weeks, months prior to.
- Differences between successful and unsuccessful evasive maneuvers.
- Rider performance and behavior in non-critical and critical riding.
- Attributes and habits of safe riders
- Detailed exposure data across numerous factors
- Research questions that arise in the future.
The Value of Video

- Provides “perfect witness.”
- Documents rider, vehicle, roadway, and environmental variables sufficiently to support a wide range of investigations.
- Numerous variables can be identified post-collection based on new research questions or observation.
- Accurately records the sequence of many rapidly occurring actions.
- Captures factors that do not leave a physical record or may not be accessible in witness recall.
Current status: The Largest EVER!

- 50 fully instrumented motorcycles on the road
- All 3 markets up and running (VA, CA, FL)
- ~ 9000 trips recorded
- 2700 hours – 67,000 miles of data
- Preliminary observations in one year
Our Member Companies

We stand behind our work.

Motorcycles

HONDA

Kawasaki

KTM

SUZUKI

VICTORY

YAMAHA

Who’s in your corner?