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## Making the Message Meaningful: A Qualitative Assessment of Media Promoting All-Terrain Vehicle Safety

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### Abstract

**Background**—Millions of all-terrain vehicles (ATV) are used around the world for recreation by both adults and youth. This increase in use has led to a substantial increase in the number of injuries and fatalities each year. Effective strategies for reducing this incidence are clearly needed; however, minimal research exists regarding effective educational interventions.

**Objective**—This study was designed to assess rural ATV riders' preferences for and assessment of safety messages.

**Methods**—Thirteen focus group discussions with youth and adult ATV riders were conducted. Eighty-eight formative research participants provided feedback on existing ATV safety materials, which was used to develop more useful ATV safety messages. Sixty evaluative focus group participants critiqued the materials developed for this project.

**Results**—Existing ATV safety materials are not effective. One reason is because they do not address the content or design needs of the target population. ATV riders want educational and action-oriented safety messages that inform youth and adult riders about their responsibilities to learn, educate, and implement safety behaviors (e.g., appropriate-sized ATV, safety gear, solo riding, speed limits, riding locations). Additionally, messages should be clear, realistic, visually appealing, and easily accessible. Newly designed ATV safety materials using the acronym TRIPSS (Training, Ride Off-Road, Impairment, Plan Ahead, Safety Gear, Single Rider) meets ATV riders' safety messaging needs.

**Conclusions**—To best reach a target population, it is crucial to include them in the development and assessment of safety messages. Germane to this particular study, ATV riders provided essential information for creating useful ATV safety materials.

### INTRODUCTION

In the mid-1970s, all-terrain vehicles (ATVs) were introduced as an equipment aid for agricultural work. In 2009, approximately 10.5 million ATVs were used in the United States.[1] ATVs are now frequently used as recreational vehicles, causing a substantial number of injuries and deaths in young children.[1, 2] Between 2001 and 2009, approximately 1,186,600 people were treated in emergency departments (ED) and 5,864 people died due to ATV-related injuries in the U.S.[1] In 2009, 25% of those injured were

age 16 or younger. While the overall number of ED visits for ATV-related injuries among children under 16 has decreased since a peak of 150,900 in 2007, there were still 131,900 ED visits during 2009 in the United States alone.[1] Recent reports of increasing hospitalizations and injuries among children in the U.S., Canada, Australia, and New Zealand suggest that around the world children's exposure to these vehicles is common and risky.[3-6]

Effective strategies for reducing the incidence of ATV injuries and fatalities are clearly required. While descriptive studies of ATV injury are frequent, there is little research into effective educational interventions and to our knowledge none have been guided by behavioral theories that might serve to make them more effective in reaching target groups. , , Focus groups were conducted to determine media messages that would resonate with ATV users regarding general knowledge and perceptions about riding safety. This methodology was chosen because of the ability of focus group participants to provide rich data and insight [7] and because focus groups have been shown to demonstrate utility in exploratory research [8]. Facilitated discussions centered on content and design of media messages that might impact safety behaviors. Using this input, safety materials were developed and additional focus group participants assessed the materials. The materials were developed to meet the educational needs of ATV users in different levels of readiness to alter behavior, based on the Stages of Change behavioral model [9] that has guided the development of the ATV safety program.

## METHODS

### Setting

The formative phase of research included a total of six focus groups in the five public health-designated regions of Arkansas. Six groups were conducted to have equal number of group compositions: 1) children and adolescents 10-18 years who use ATVs and/or live in households with ATVs; 2) adult owners/users of ATVs; and 3) groups with parent-adolescent dyads. Potential target communities were identified from emergency transport data from the Arkansas Department of Health, based on county-level rates of ATV-related ambulance runs, as a proxy for high levels of ATV use in the area. The availability of local contacts to assist the study team in facilitating project implementation further identified sites. Members of a multi-disciplinary ATV workgroup (i.e., representatives from medical institutions, the Arkansas Game and Fish Commission, the University of Arkansas Cooperative Extension Service 4-H programs, ATV industry representatives, other interested parties) provided regional contacts that assisted recruitment of participants and meeting logistics. Among these contacts were county-level health improvement coalitions affiliated with the Arkansas Department of Health, public schools, and youth services.. The focus groups were held in easily identifiable community venues arranged by local facilitators including community centers, health units, and schools.

The evaluative research focus groups included seven discussions with hunter education instructors, public school teachers, 4-H (i.e., a youth development program for the 109 land-grant universities in the United States) leaders, and youth ATV riders in Louisiana and South Carolina. These states were chosen as sites based on prior interest expressed by various collaborative organizations in each state and because both states share a rural, agriculturally based economy similar to Arkansas. These focus groups were held in easily identifiable community venues arranged by local facilitators including community centers and restaurants.

## Participant Selection

The formative research participants were recruited using a purposive, case sampling strategy via flyer postings in key locations; community contacts facilitated study awareness via word of mouth. Interested parties contacted project staff via telephone to complete screening procedures before inclusion in the study.

Exclusion criteria included inappropriate age range, not residing in a targeted county, or lack of ATV use in prior 12 months. The goal was to target active ATV adult riders (i.e., adults 18 years or older who rode an ATV for any reason within the previous 12 months who had children they were responsible for communicating with about ATV safety) and active ATV youth riders. Thus, adults without children or grandchildren who use ATVs were also excluded. Participants were not asked about settings or purpose of their ATV use as safety recommendations are the same regardless. A total of 95 callers were screened for participation; only 1 was ineligible. A total of 94 were invited to participate, and 88 (93%) actually attended the focus group sessions (13 adult males, 14 adult females, 33 male youth, and 28 female youth). Weather-related rescheduling conflicts resulted in the non-attendance of 6 participants.

During a 3-month period, a total of six focus groups were held: 2 with adult/youth dyads, 1 with male youths, 1 with female youths, and 1 each with adults and youth of both sexes. Youth participants ranged in age from 10-16 years ( $M = 13.3$  years) while adult participants ranged from 20-59 ( $M = 42.5$  years). All participants were white, and 46 (52%) were male.

The evaluative research participants were recruited from a convenience sample. Adult participants in Louisiana were recruited from public school teachers who utilized the project specific materials in their classrooms. This particular parish system requires health teachers to provide 10 hours of ATV safety per school year. Adult participants in South Carolina were recruited from the Department of Natural Resources, which incorporated the use of the materials in their standardized hunter education classes. Multiple sessions were conducted in both states to accommodate participants from different geographic communities. Youth participants in both states were recruited through the 4-H organization. Inclusion criteria for adult participants were based on the use of the ATV safety toolkit in at least one class prior to the focus group discussion. Exclusion criteria for youth included inappropriate age range or lack of ATV use in prior 12 months.

During a 2-month period, a total of seven evaluative focus groups were held with available participants: 2 with youth and 5 with adults. Each focus group included both sexes. Youth participants included 10 male and 14 female 4-H members while adult participants included 21 males and 15 females (15 teachers, 14 hunter education instructors, and seven 4-H leaders).

Formative group participants were paid a small stipend, and both formative and evaluative focus group members received a meal for participation. Institutional Review Board approval was received, and informed consent was waived for this project. Prior to each session, moderators explained participants' confidentiality rights and gave the option to leave at any time, which no one chose.

## Data Collection

Semi-structured moderator guides were developed, pilot-tested, and utilized to facilitate discussion during each 2-hour group session. Each audio-recorded focus group was conducted by a trained moderator and assistant moderator. The assistant moderator documented fieldnotes during the sessions. A debriefing session between the moderator and

assistant moderator was held after each group discussion to discuss themes that emerged during the sessions.

During each formative research session, participants were shown a variety of print and electronic media pertaining to ATV safety. Due to time constraints, only key portions illustrating the format and quality of electronic media were utilized. Media pieces utilized during the discussions were a representative sample of nationally available ATV safety materials from a variety of sources including ATV manufacturers, academic institutions, and community organizations. Materials selected and topics discussed focused on appropriate vehicle selection, helmet use, avoiding riding with passengers, and training prior to ATV use, all of which are associated with safer vehicle use by both manufacturers and public health advocates. A total of 36 print and electronic materials were identified; of these, 13 print and 6 electronic materials were used. Materials were selected by a committee comprised of study staff and members of the local ATV safety workgroup based on relevance of material, compliance with current safety recommendations, the reading level of printed materials, and placement in stages of change behavioral model.

Information gathered from the formative research focus groups was utilized to develop materials (i.e., brochures, posters, curriculum) to be utilized in a toolkit to accompany an ATV safety DVD titled “A Trip Unplanned.” These materials were then assessed by the evaluative research participants.

### Data Analysis

Following accepted qualitative analytic techniques, audio-recorded focus groups were transcribed and managed using HyperRESEARCH version 2.03, a content analysis software package for qualitative research. Given the limited research in this area, a grounded theory approach was used to code data, with the data dictating the development of major and minor themes.[10] Grounded theory is a qualitative research design that allows researchers to generate explanations about phenomena given that a shared view of the phenomena is expressed by a large number of participants; hence, the explanation is grounded in the data. [11]

The moderator was the lead coder designated to analyze the transcripts. Other team members read journaling notes to confirm codes were consistent with debriefing discussions and fieldnotes. Any disagreements were discussed until consensus was reached. During the constant comparative coding process, it was determined that data saturation was achieved when no new ideas emerged from the data. After all data had been collected and coded, another research team member not involved with the initial analysis (MB) coded all the data to determine reliability (Scott’s pi = .93).[12]

## RESULTS

The purpose of the formative focus groups was to explore issues surrounding ATV use, safety, formatting of media messages, and venues for delivery. The evaluative focus groups assessed the newly developed ATV safety materials for usefulness and likeability.

### Formative Focus Group Suggestions

Results of the formative focus groups were organized into a coding tree with four major thematic areas emerging: (a) safety concerns, (b) behavior modifications, (c) material design, and (d) message delivery. When applicable, sub-themes were identified based on age group differences (i.e., adults, youth). Only the information related to desired message content (i.e., addressing safety concerns) and design are addressed in this report.

**Desired Message Content**—Discussions with participants centered on safety concerns about ATV use, which dictated what participants wanted represented in safety educational materials. Both adults and youth expressed concerns, but the foci differed. Adult participants were mainly concerned with improper use of ATVs by youth, including excessive speed, lack of training, multiple riders, paved surface use, and lack of safety equipment use. Additional safety concerns mentioned by adult participants included lack of adult supervision for young riders, lack of safe places to ride, and possibility of crashes (see Table 1 for adult themes and examples). While most of the discussion centered on educating youth about how to be responsible for safe riding behaviors, adults did note their own responsibility for safety through supervision and education as well as the recognition of environmental constraints.

The youth, however, mainly focused on the lack of licensing requirements or regulations governing ATV use for young people. They placed the onus of the responsibility on lawmakers. Youth were also concerned about the lack of proper: ATV use, safety equipment use, understanding of injury risks and machine design, and safety practices by their parents (see Table 2 for youth themes and examples). They did recognize their responsibility to be educated and practice safe riding behaviors but also argued that parental role modeling needs to illustrate safety.

Participants also suggested messages should be educational and action-oriented including the need for hands-on training, awareness-raising messages, skill builders, proper use, and statistics (see Table 3 for themes and examples). More specifically, hands-on training messages should include information regarding shifting gears, riding on specific terrain, and maintaining control of the ATV and allow riders to properly perform the messages. Awareness-raising messages should target the potential risks and consequences associated with ATV use, whereas skill builder messages should provide information on assessing readiness to ride along with visual guidelines for better understanding how to select ATVs and accessories (e.g., choosing appropriate-sized ATVs). Some argued that riders simply were not aware of proper safety procedures. Proper ATV use messages should discuss safety gear, passengers, speed, and appropriate size ATVs. Participants recognized the most common injury-causing behaviors and want messages to specifically address those issues. Finally, participants felt that some messages should emphasize the statistics surrounding ATV use, paying particular attention to not only deaths but also injuries. They believed that some riders' belief that they were not vulnerable to crashes or injury needed to be addressed by raising awareness of the likelihood and seriousness of injuries.

**Desired Message Design**—To understand material design styles acceptable to rural audiences, participants critiqued the content and appearance of various print and electronic materials. Conversations regarding content focused on the need for clarity and realism in messages, positive delivery style, and targeted messages. Discussions of material appearance concentrated on modern design style and user-friendly layouts (see Table 4 for content and appearance suggestions).

Materials that demonstrate clarity should focus on scenarios with clearly defined storylines that do not send conflicting messages. Messages also need to be realistic, which can be demonstrated in numerous ways. For example, participants suggested including dirty machines, visible injuries, and real-life statistics and personal stories. Additionally, participants argued that more positive ATV use scenarios could enhance messages because riders may be more inclined to engage in safe behaviors if they see realistic positive outcomes as opposed to stopping unsafe behaviors because of negative outcomes. Finally, the messages need to be targeted to specific audiences (e.g., youth riders, parents).

Appearance of material is as important as content and includes consideration of a design style that is visually appealing and a layout that is easy-to-use. Visually appealing material engages the audience, employs realistic and appropriate settings for the messages, utilizes modern design of bold color and real pictures/live shots, contains graphic injury/crash depictions if appropriate, and includes diversity in both rider and machine representation (e.g., different sexes and ages of riders, non-racing type machines). Participants felt that user-friendly layouts should include visually identifiable key messages through the use of bold headings, bullet points, or summaries. Additionally, they suggested that material should have font styling that is large and easy to read, be concise, and include easy-to-locate resource/contact information.

### Evaluative Focus Group Suggestions

Based on feedback received from the formative focus group discussions regarding already-developed ATV safety information, the research team refined existing materials (i.e., DVD) and developed new, more focused materials (i.e., brochure, posters, curriculum) based on information received from formative focus group discussions to disseminate to ATV instructors, school teachers, and youth. While different messages were developed, the majority of materials focused on the acronym TRIPSS (Training, Ride Off-Road, Impairment, Plan Ahead, Safety Gear, Single Rider). The research team tried to address most of the issues raised by participants in the formative group discussions (e.g., having training, riding in safe places, wearing proper safety equipment, not riding with passengers). Beyond the acronym, other suggestions were also addressed in the content such as recognizing the appropriate-size ATV and raising awareness of the consequences of ATV crashes by reporting statistics of injuries and fatalities. Results suggest that the materials addressed the needs communicated by formative participants, and slight stylistic modifications were made based on evaluative responses.

Overwhelmingly, participants liked the message design and delivery of the ATV safety messages. They particularly liked the acronym TRIPSS, realistic images (e.g., visualized themselves in the situation), and artistic elements (e.g., color, font). They believed that the message was easy to read and understand, and it reinforced messages already being communicated in other realms. One instructor said, “The message is just outstanding. I’ve been very impressed with them,” referring to the TRIPSS brochures. The 20-minute DVD was particularly powerful and effective at reaching the target audience and beyond. One instructor shared that a girl approached her after viewing the video at a summer leadership camp asking where she could get a copy of the DVD and said, “I’ve got one of my best friends who is going to kill himself on an ATV if he doesn’t change, and I’d like to show him that video.”

There was no criticism of the DVD, and it was even stated that the DVD could be used for an extended period of time (e.g., “At least 10 years before you would even have to worry about it. It’ll last 10 years without a problem”) because of its realism. Participants liked the DVD because the message was somewhat shocking yet realistic, and it provided information in an entertaining format. When discussing the DVD, an instructor said,

That wasn’t the typical documentary with the guy who talks like telling me not to do things. It was actually a video, and the kids really enjoyed it. From 6<sup>th</sup> grade to senior [grade levels], they all seemed to enjoy it. It was just like they were watching a movie. Although most of the print material images (i.e., brochures, posters) were realistic (e.g.,

muddy ATV), many wanted the image of the rider in the print materials to also be dirty. Also, although most liked the design features with the font style and color choices, a concern for many people was the placement of the acronym, which originally had TRIPSS broken

onto different sides of the page between the “I” and the “P.” Consistently, participant suggestions focused on minor stylistic choices (e.g., color of images, placement of words) and not on any content modifications. The message was strongly supported by participants; and based on their feedback, only slight stylistic modifications were made to improve readability.

## DISCUSSION

User input is critical in the development of effective educational materials.[13] For challenging public health problems like ATV-related injury, for which clear interventions are still evolving, educational materials must reflect both the limited safety evidence available and the real-world perspectives of the end-users. Focus group methodology can provide useful information about message content and message delivery to those planning injury prevention strategies. A previous study using this methodology examined adult and youth perceptions about ATV safety in general but did not focus on specific ATV safety media or message delivery as this study does.[14] Qualitative methodologies have been used to inform injury prevention strategies for road safety, teen driving, booster seat use, and teen dating violence.[15-19] Our study demonstrates that rural ATV users are interested in improved safety and willing to engage in a focus group setting to provide information that is practical and reflects their experiences.

Both the content and style of message delivery are important in crafting effective injury prevention messages.[20] The formative participants helped message designers avoid developing and using messages and styles that would have been ineffective as well as present more compelling formats and styles. The target audience is vital in developing the content and style of message delivery. This was evident in this study as adults and youth reported different desired ATV safety topics.

Several key themes about message delivery for ATV safety were apparent in the focus groups. Participants perceived realism, clarity, and personal stories to be important. Although messages with only direct, fact-based information can have modest effects, the use of narrative has been shown to be effective in a variety of settings.[21] The use of narrative may better capture the attention of the target audience and possibly increase the chance of behavior change. Health and safety messages with brief stories have been shown to be more effective than messages without such narratives. For example, an injury prevention safety message related to child swingsets was shown to be more effective when accompanied by a brief story of someone previously injured than without the narrative component. [21] Wipe Out, a traumatic brain injury prevention intervention, is another example of the use of narrative to reinforce safety messages.[22] Combining narratives with realism, as suggested by the focus group participants, has also been shown to be effective in safety training for miners [23], thus, supporting current recommendations.

The evaluative focus group participants offered additional suggestions for minor modifications to the newly developed ATV safety materials and provided support for the continued use of these more useful educational materials. These follow-up focus groups demonstrated the value of assessing target audience perceptions when developing safety messaging and how such messages can be adjusted to have more impact.

## CONCLUSION

Focus groups of adult and youth ATV riders from rural environments were helpful in the development, refinement, and assessment of the usefulness and likability of a series of educational tools to promote safer use of ATVs. Combined as an ATV safety toolkit, the

educational tools are appropriate for use in formal and informal ATV safety training environments as well as in schools. Widespread dissemination and further evaluation of the toolkit are required to fully assess its impact on ATV users' knowledge about appropriate use and, more importantly, any behavior change resulting from this knowledge. Although educational interventions are an important first step, it is essential to emphasize the importance that safety education policy can have in changing behavior and increasing safety. As noted by the youth, licensing and training requirements are lacking, yet desirable in the promotion of ATV safety.

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**Table 1**

## Adults' Desired Topics for ATV Safety Messages

Theme	Type of Safety Issue	Example
Youth's Improper Use of ATVs	Use of Excessive Speed	"With careful examination I figured out how to attach a block to limit the opening of the throttle to a high speed. I did this because a kid just doesn't have the judgment when it comes to speed."
	Lack of Training	"You've got to train 'em how to make a turn, or carry a load safely – bottom line you can't just throw 'em on there and then turn 'em loose."
	Carrying of Passengers	"I think that the biggest abuse of 4-wheelers is riding with more than one person."
	Use on Paved Surfaces	"They really just don't have any business being on the road. I mean, it is just too dangerous. They just ought to be out in a field or on a mountain or something."
	Lack of Safety Equipment Use	"You need to wear that helmet every time you get on that 4-wheeler."
Adult Irresponsibility	Lack of Adult Supervision for Young Riders	"We as parents have to be responsible for our children's behavior on an ATV."
Environmental Factors	Lack of Safe Places to Ride	"How many times I've left ... with a heavy load of hay behind me and a 4-wheeler pop up in the middle of the road in front of me. ... So as a pedestrian and landowner ... if those people [ATV riders] have a place to exercise that, it makes me feel a lot safer as a rancher and somebody driving up and down the road."
	Possibility of Crashes	"The point needs to be made, that you don't have to be far from home to have a wreck."

**Table 2**

## Youths' Desired Topics for ATV Safety Messages

Theme	Type of Safety Issue	Example
Legal Responsibilities	Lack of Licensing Requirements	"You know, we have to take a hunter's education class to get our hunting license, and all. How do they get by letting kids and some adults who have never ridden on an ATV get away with not having a class before getting to ride an ATV and all?"
	Lack of Youth ATV Regulations	"I think that there should be an age limit."
Youth Responsibilities	Lack of Proper ATV Use	"I don't think people really realize how bad you can get hurt. ... I know a bunch of my friends ride all crazy and never think about it."
	Lack of Safety Equipment Use	"I just don't wear it [helmet] – nobody else does."
	Lack of Understanding of Injury Risks and Machine Design	"They say they are for one person, but there is actually room for two people on the seat. If you drive real slow and be careful, you can ride with a passenger okay."
Parent Responsibilities	Lack of Safety Practices by Parents	"People who live in the country, like my dad, he just grew up on a 4-wheeler, and they never wore that kind of stuff [safety equipment]."

**Table 3**

## Educational and Action-Oriented Messages

Theme	Type of Safety Issue	Example
Hands-On Training	Shifting	“About how to shift [gears] properly. ‘Cause sometimes when you are in neutral, and you rev the motor up and then shift it, it can cause the 4-wheeler to lurch backward or maybe flip.”
	Terrain	“Trying to ride in some places can lead to tip-overs, and that is really dangerous.”
	Control	“They need to know how to control their 4-wheeler before parents let them just take off...like how to turn right or left and not turn it over.”
Awareness-Raising Messages	Potential Risks and Consequences	“About how dangerous they can be if not used wisely. About how quick they can get out of control and hit a tree or roll over.”
Skill Builders	Assessing Readiness	“I think that if you can’t answer all of these [readiness] questions about your child you’d better not let ‘em ride them.”
	Choosing ATVs and Accessories	“The size and shape of the child as to fitting the ATV is important.”
Proper Use	Safety Gear	“Goggles protects your eyes, helmet protects your head – to let you know what each item does.”
	Passengers	“They don’t explain well about why two people can’t ride.”
	Speed	“They should stress that too much speed can lead to bad things happening.”
	Appropriate-Sized ATVs	“I’d show ones [ATVs] properly fitted to young kids.”
Statistics	Injuries and Deaths	“They talk about the number of deaths. They also could add about the numbers of serious injuries that happen. Talk about those who become disabled, as well.”

Table 4

## Desired ATV Safety Message Design Elements

Message Area	Message Design Element	How to Address Message Design Element	Supporting Quote
Content	Clarity	Non-Conflicting Messages	"One of the pictures kind of gives the thought that the ATV can just go up that embankment. Like this ATV can go just about anywhere."
	Realism	Image of Used ATV	"I noticed that the machine he was using had no mud, no dirt, no nothing on it. That doesn't look realistic."
		Visible Injuries	"Maybe an eye patch and a big ol' cast on his leg. He just looks too perfect like he's shown. Maybe even with an artificial leg or something. Have him wearing shorts so that the artificial leg shows."
		Personal Stories	"I really like those personal comments or quotes. They make the messages really more meaningful."
	Delivery	Positivity	"They should show the proper way to ride – not have such negative connotation about riding a 4-wheeler. They should show like positive things to do to improve safety, not just everything so negatively."
	Audience	Targeted Messages	"I think that the parent needs to be educated more so than the child."
Appearance	Visual Appeal	Engaging	"The brochure has lots of good information, but it's like reading the fine print in an insurance policy. So much material that it has to be written small to cover everything, and I just don't think that most people will take time to read all this, especially if they have to squint to read it."
		Realistic and Appropriate	"It would have been better if he were outside with a single machine, not in a showroom with distracting stuff everywhere. ... A more clear setting – maybe in the woods or something. Also, ...use a used 4-wheeler, not one that looks new."
		Contemporary	"More color! Real pictures!"
		Injury/Crash Depictions	"You almost have to use that [graphic pictures] to shock. We see so many things on TV, that if it's not pretty graphic, we may not even notice."
		Diversity	"I would still put both a boy and girl in there. Safety is not just for males."

Message Area	Message Design Element	How to Address Message Design Element	Supporting Quote
	Layout	Easily Accessible Information	"I like the size of it. It's big and it's not real 'wordy.' It moves from one point to the next."