Spring 2006

Improving the AMBER Alert System: Psychology Research & Policy Recommendation

Monica K. Miller
University of Nevada, Reno

Samantha S. Clinkinbeard
University of Nebraska at Omaha, sclinkinbeard@unomaha.edu

LAW & PSYCHOLOGY REVIEW

Volume 30 Spring 2006

IMPROVING THE AMBER ALERT SYSTEM: PSYCHOLOGY RESEARCH AND POLICY RECOMMENDATIONS

Monica K. Miller[*]
Samantha S. Clinkinbeard[**]

I. INTRODUCTION

When lawmakers implemented the AMBER Alert System, they initiated a system designed to save the lives of missing children. However, the system might not be working as well as possible. If psychological research on related areas (e.g., memory and witness identification) extends to AMBER Alerts, it is likely that the system can be improved.

Section II of this article begins with a description and history of the AMBER Alert System, followed by a brief discussion of the effectiveness of the system. Section III continues with a review of numerous psychological studies that have important implications when applied to the AMBER Alert System. In Section IV, the authors make suggestions for improvements to the AMBER Alert System based on the reviewed research literature. Section V offers policy suggestions for improving the System, such as designating more money toward psychological research on AMBER Alerts. Finally, the paper concludes with suggestions for future research directly measuring the effectiveness of the AMBER Alert System. These steps are desperately needed to fully realize the visions of lawmakers who crafted the legislation.

* Assistant Professor of Criminal Justice and Social Psychology, University of Nevada, Reno
** Social Psychology, University of Nevada, Reno

II. WHAT IS THE AMBER ALERT SYSTEM?

A. History

Collaboration between Dallas–Fort Worth broadcasters and local police led to the birth of the AMBER Alert System in 1996.[1] The AMBER System, which stands for America's Missing: Broadcast Emergency Response, is an early warning system created in the memory of Amber Hagerman of Arlington, Texas.[2] Amber was abducted while riding her bicycle and was later brutally murdered.[3] The AMBER idea caught on across the nation as other communities and states began building networking systems to provide early warning of kidnappings.[4] By 2005, all fifty U.S. states had developed AMBER Alert systems.[5]

B. How it Works

In 2004, the Department of Justice (DOJ) released a set of criteria to be followed by those involved with the system.[6] The DOJ suggested that an AMBER Alert should be issued when the following criteria are met: (1) law enforcement have confirmed belief that an abduction has occurred, (2) there is belief that the child may be in imminent danger, (3) there is descriptive information about the suspect and/or victim available for release, (4) the child is seventeen years or younger, and (5) information about the child has been entered in the National Crime Information Center (NCIC) system.[7]

Once it is determined that a situation calls for the issuance of an AMBER Alert, a variety of actors put a chain of events into motion.[8] First, local law enforcement enters information into the NCIC system and the Federal Bureau of Investigations. The National Center for Missing and Exploited Children (NCMEC) is immediately alerted to the abduction by the AMBER coordinators.[9] A partnership between the NCMEC and communication companies such as NEXTEL and American Online allows information about alerts to be immediately forwarded to these companies who then use various outlets for disseminating the information.[10] For example, on May 17, 2005, wireless cell phone alerts were made available

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1. DEPARTMENT OF JUSTICE, REPORT TO THE WHITE HOUSE ON AMBER ALERT 2 (2004), *available at* http://www.amberalert.gov/docs/AmberWHReport.pdf [hereinafter DOJ].
2. *Id.*
3. *Id.*
4. *Id.*
5. *Id.*
6. DOJ, *supra* note 1, at 5–6.
7. *Id.*
8. *See generally* DOJ, *supra* note 1.
9. *Id.* at 7.
10. *Id.*

to the public.[11] Interested participants sign up online by providing their cell phone numbers and local zip codes.[12] When an AMBER Alert is issued in the participant's area, he receives a text message on his cell phone with alert-related information.[13] On the first day these cell phone alerts became available, more than 30,000 Americans signed up to participate in the system.[14]

Other entities have joined in the fight against child abductions. For instance, SurferQuest, a supplier of computer kiosks, has agreed to contribute to the AMBER Alert initiative by using kiosks to disseminate information.[15] These kiosks, which are most often located at hotels and cafes, will display AMBER Alert information when the kiosks are not in use and allow passersby to receive information about the alerts.[16]

America's Most Wanted also has made efforts to protect abducted children. The television show collaborated with parents of children who had been abducted to develop public service announcements that are widely distributed across the country.[17] These announcements are actually intended to work as a prevention tool rather than a recovery tool.[18] They send a message to the public and potential abductors that there is a system in place ready to take action if someone decides to act with malicious intentions toward children.[19]

The combination of effort and resources from the government, various business organizations, and the public has allowed a program that started in a single town in Texas to mature into a nationwide child abduction warning system. The development of such a comprehensive system is, in its own right, a success. However, the question still remains: Does it work?

C. Does the AMBER Alert System Work?

A progress report released early in 2005 by the Department of Justice detailed evidence of the AMBER Alert System's nationwide success.[20]

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11. Press Release, National Center for Missing & Exploited Children, Wireless Industry and National Center for Missing & Exploited Children Commend Americans for Demonstrating Their Commitment to Reuniting Abducted Children with Their Families (May 25, 2005), *available at* http://www.ncmec.org/missingkids/servlet/NewsEventServlet?LanguageCountry=en_US&PageId=2008.

12. *Id.*

13. *Id.*

14. *Id.*

15. ASSOCIATED PRESS, WEB KIOSKS TO SHOW MISSING KIDS (July 28, 2005), http://www.cnn.com/2005/TECH/internet/07/28/kiosks.missing.kids.ap/index.html.

16. *Id.*

17. DOJ, *supra* note 1, at 7.

18. *Id.*

19. *Id.*

20. DEPARTMENT OF JUSTICE, PROGRESS REPORT ON THE NATIONAL AMBER ALERT STRATEGY 1 (2005), *available at* http://www.amberalert.gov/docs/AMBERProgress0105.pdf.

Since its inception in 1996, the AMBER Alert System has been credited with recovering 190 children.[21] A large majority of those children (eighty percent) have been recovered since the system became a coordinated national effort in 2002.[22] Such evidence supports the idea that the AMBER Alert System saves lives. Although the system appears to be successful, any improvements which could further improve it are likely to lead to even more saved lives.

III. PSYCHOLOGICAL RESEARCH WITH IMPLICATIONS FOR AMBER ALERTS

The general idea behind the AMBER Alert System is simple. AMBER Alerts are issued to notify the public about abductions, the public provides the police with information, and, finally, the police capture the perpetrator and rescue the child. This simple process is intended to promote the safe return of children. However, the system is based on many untested assumptions. For instance, it assumes that people pay attention to and remember the notifications, that they will recognize suspects when they encounter them, and that they will be able and willing to report their observations to police.

A large body of research exists concerning the conditions that affect a person's capacity to process, remember, and recognize information related to the identification of other persons.[23] Several factors, including (a) elaboration and depth of processing upon exposure, (b) the length of exposure, and (c) the presence of distinctive facial features, among others, have been identified as impacting a person's ability to correctly identify another person after initial exposure to that person's image.[24] Further, events and information that a person is exposed to after witnessing a perpetrator or situation can impact that person's ability to correctly recall details about the perpetrator or situation.[25] This section will explore such conditions, as they provide important insight into the effectiveness of the AMBER Alert System as it is currently being used.

Another important body of research that will be explored, briefly, in this Article relates to a person's willingness to act in a way that ensures the goals of the AMBER Alert System are carried out. For instance, bystander intervention research suggests that people are not always willing to

21. *Id.*
22. *Id.*
23. See Peter N. Shapiro & Steven Penrod, *Meta-Analysis of Facial Identification Studies,* 100 PSYCHOL. BULL. 139 (1986) for a review of many such studies.
24. *See generally id.*
25. CURT R. BARTOL & ANNE M. BARTOL, PSCYHOLOGY AND LAW 240 (3d ed. 2004).

intervene in emergency situations.[26] Such psychological research can provide information about the validity of assumptions made by the AMBER Alert System about a person's willingness to help.

A. Memory Processes

AMBER Alerts would be highly effective if memory was a perfect process. However, memory can break down at any of the three stages: acquisition, retention and retrieval. An analysis of the memory process demonstrates these weaknesses and how they affect the AMBER Alert System. The first phase of memory, acquisition, is the stage at which information is encoded or processed in the short-term memory.[27] If processing of information is extensive enough, it is retained in the long-term memory, which constitutes the second stage of memory.[28] Finally, retrieval is the stage at which the pertinent information is recovered from long-term memory to be used again.[29] A breakdown in processing at any of these stages negatively affects a person's ability to contribute in a way that benefits the AMBER Alert System.

1. Acquisition

Acquisition is the first stage of memory at which details of a situation are processed and encoded for later recall.[30] Features of the perpetrator and features of the situation are likely to affect acquisition.[31] The following discussion will explore such factors (e.g., length of exposure) that affect information processing.

Temporal factors often present a serious challenge to the acquisition process. Several studies, including a meta-analysis of thirty years of research, suggest that the longer a person is exposed to stimuli, the more accurately he can recall it.[32] In one study, participants were exposed to slides with pictures of naturalistic scenes (e.g., bodies of water, mountains, horses) for varying lengths of time and then were asked to determine

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26. *See generally* Mark Levine et al., *Self-Categorization and Bystander Non-Intervention: Two Experiment Studies,* 32 J. APPLIED SOC. PSYCHOL. 1452 (2002); John M. Darley & Bibb Latané, *Bystander Intervention in Emergencies: Diffusion of Responsibility,* 8 J. SOC. PSYCHOL. 377 (1968).
27. BARTOL & BARTOL, *supra* note 25, at 228.
28. *Id.*
29. *Id.*
30. Neta Zach, Naama Kanarek, Dorrit Inbar, Yael Grinvald, Tomer Milestein & Eilon Vaadia, *Segregation Between Acquisition and Long-Term Memory in Sensorimotor Learning.* 22 EUR. J. NEUROSCIENCE, 2357, 2357 (2005) (discussing acquisition as the first stage of the learning and memory process).
31. *See generally* Robert Buckhout, *Eyewitness Testimony*, 231 SCI. AM. 23 (1974).
32. *See generally* Shapiro & Penrod, *supra* note 23; Lisa Dinardi & David Rainey, *The Effects of Illumination Level and Exposure Time on Facial Recognition,* 41 PSYCHOL. REC. 329 (1991); Kenneth R. Laughery et al., *Recognition of Human Faces: Effects of Target Exposure Time, Target Position, Pose Position, and Type of Photograph,* 55 J. APPLIED PSYCHOL. 477 (1971).

whether or not they had already seen the pictures when given a recognition task.[33] Across four experiments, those participants who viewed the initial pictures for a longer amount of time performed much better on the later recall test than did those who had less time to process the initial pictures.[34] Another early study found similar results but used pictures of people as opposed to objects.[35] The investigators found that those participants who had more time to study the target pictures were the same participants who performed better on later recall tasks.[36] Related to the length of exposure time is the speed or tempo at which events take place. Research has found that fast-moving events are harder to process and thus are less likely to be encoded into memory than slow-moving events.[37]

This line of research is highly likely to apply to AMBER Alerts. In the only known study of AMBER Alerts, Kathleen Harder and John Bloomfield conducted an experiment in which participants "drove" along a simulated highway and viewed an AMBER Alert message on a road-side sign.[38] Later, participants were asked to recall the details of the alert.[39] Of the 120 participants, only ten received an "excellent" score, indicating that they properly recalled a significant amount of the alert information.[40] This indicates that short exposures to alert information are not highly effective.

Similarly, the frequency of exposure is thought to affect acquisition.[41] That is, the more often a person is exposed to a stimulus, the more likely he is to remember details from the stimulus.[42] One study found that a person exposed to an advertisement three times was more likely to recall specific information about a product than a person who was exposed to the same advertisement only once.[43] In another study, participants were tested for their memory of a verdict in a criminal trial which they had watched on television eight months prior to the study.[44] Those who reported having the most exposure to television coverage of the trial were the participants who had the most accurate recall of the event.[45]

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33. Aura Hanna & Geoffrey Loftus, *The Effect of Expectation and Available Processing Time on Recognition of Sequences of Naturalistic Scenes,* 30 BULL. PSYCHONOMIC SOC'Y 251, 251 (1992).
34. *Id.*
35. Laughery et al., *supra* note 32, at 478.
36. *Id.* at 483.
37. BARTOL & BARTOL, *supra* note 25, at 232.
38. "AMBER ALERT" PROGRAM PROMPTS RESEARCH ON CHANGEABLE MESSAGE SIGNS (2003), www.cts.umn.edu/news/renews/2003/05/index.html#safety [hereinafter Message Signs].
39. *Id.*
40. *Id.*
41. BARTOL & BARTOL, *supra* note 25, at 233.
42. Ida E. Berger, *The Influence of Advertising Frequency on Attitude-Behaviour Consistency: A Memory Based Analysis,* 14 J. SOC. BEHAV. & PERSONALITY 547, 563 (1999).
43. *Id.*
44. Susan Bluck & Karen Z. H. Li, *Predicting Memory Completeness and Accuracy: Emotion and Exposure in Repeated Autobiographical Recall,* 15 APP. COGNITIVE PSYCHOL. 145, 148 (2001).
45. *Id.* at 151.

The above research on exposure factors is likely to have important implications for the AMBER Alert System as it currently operates. Persons exposed to AMBER Alerts typically experience relatively short exposure as they pass a roadside sign at sixty to seventy miles per hour or view a quick mention of the alert on the news. The research investigating how temporal factors affect information acquisition suggests that persons exposed to alert information under these situations are not likely to fully process the alert information for later recall.[46] Finally, the number of times a person is exposed to AMBER Alert information is likely to affect his or her ability to contribute effectively to a successful outcome. It is unlikely that most people are exposed to alert information more than once or twice, which limits the effectiveness of AMBER Alerts.

In addition to these limitations, acquisition of information is likely to be affected by natural limitations of the brain. Cognitive load refers to the burden placed on the cognitive system by performing a task.[47] Load can result from features inherent in the information being processed (e.g., highly complicated information).[48] It can also be caused by features external to the information being processed, such as the method by which the information is presented.[49] The burden that results from cognitive load, whether intrinsic or extraneous, takes up valuable space in the working memory.[50] Because humans can only process a limited amount of information simultaneously, the more load a person experiences, the more difficult it is to process information.[51] Simply put, the brain can only process so much information at once.

People who have the potential to provide information in AMBER Alert cases are likely to have their first, and possibly only, exposure to important alert information while they are doing things that take up a significant amount of cognitive energy. Drivers who are exposed to alert information on highway road signs may be talking on a cell phone or to a passenger, listening to the radio, eating, or calming down children all while they are trying to concentrate on the road. Similarly, those exposed to the alert via radio or television in their homes may be busy making dinner, doing laundry, or helping children with homework. This cognitive load makes it hard for people to encode information because they are mentally busy. As such, the chances that they will see and attend to an AMBER Alert on a road-side sign or news item are greatly reduced.

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46. *See, e.g.*, BARTOL & BARTOL, *supra* note 25, at 233; Berger, *supra* note 42, at 563.
47. John Sweller et al., *Cognitive Architecture and Instructional Design,* 10 EDUC. PSYCHOL. REV. 251, 266 (1998).
48. *Id.*
49. *Id.* at 259.
50. *See generally* Sweller et al., *supra* note 47.
51. *Id.*

2. Retention

Usually, when individuals are presented with information, there is a time lapse between the point of presentation and the point at which the person will actually *use* that information. In order for the information that has been acquired to be used later, it is necessary to retain it until such time that it is needed. This is especially true for the AMBER Alert process, in which the public is provided with a picture or other information that will help individuals to identify a suspect when they later encounter that person. Though possible, it is unlikely that the person who identifies the perpetrator will be sitting right next to the perpetrator when the alert comes across the television set. In order for the AMBER Alert System to work effectively, then, it is necessary for the public to be able to retain the information with which it is provided.

Several studies have found that, under normal conditions, people have more difficulty accurately remembering events as time increases between initial exposure to information and later recall.[52] Participants in one study were shown slides with human faces that they studied for sixteen seconds each.[53] Following a break of either fifteen minutes or twenty-four hours, participants performed a recall test in which they were to identify the faces they had already seen from an array of old and new faces.[54] Participants in the twenty-four-hour condition incorrectly identified "new" faces as often as they correctly identified faces they had already seen.[55] In other words, participants forgot the information necessary to distinguish new faces from old when they had a longer retention time.[56]

There are some factors which can counteract the effect of passage of time on memory. Specifically, Dark and Loftus found that when participants were instructed to rehearse the information between exposure and recall, they actually improved their performance as the passage of time increased.[57] Though rehearsal is likely to help, it must be noted that the passage of time in the study ranged from one second to twenty seconds.[58] The study did not explore whether that initial rehearsal time would have the same effect as the passage of time extended from seconds to minutes or even hours or days.[59]

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52. *See generally* Veronica J. Dark & Geoffrey R. Loftus, *The Role of Rehearsal in Long-Term Memory Performance,* 15 J. VERBAL LEARNING & BEHAV. 479 (1976); Sharon L. Hannigan & Mark Tippens Reinitz, *Influences of Temporal Factors on Memory Conjunction Errors,* 14 COGNITIVE PSYCHOL. 309 (2000); Ebbe B. Ebbesen & Cynthia B. Rienick, *Retention Interval and Eyewitness Memory for Events and Personal Identifying Attributes,* 83 J. APP. PSYCHOL. 745 (1998).
53. Hannigan & Reinitz, *supra* note 52, at 312-313.
54. *Id.* at 313.
55. *Id.* at 318.
56. *Id.*
57. Dark & Loftus, *supra* note 52, at 488.
58. *Id* at 483.
59. *Id.*

Retention failure also occurs when memories are changed to be less accurate. For example, research has indicated that post-event experiences alter memories.[60] The reconstructive theory of memory is a psychological perspective which suggests that as humans are exposed to new information and events, memories of past events are often altered so that they incorporate new information.[61] There are several ways in which memory can be altered depending upon the post-event information that is encountered.

Research has illustrated that being exposed to misleading information can affect an eyewitness's recollection of events.[62] Participants in one study were exposed to several slides with visual information about a car accident and were later asked questions about the accident.[63] Half of the participants were asked a misleading question about a "blue car" which was, in fact, green.[64] They were then asked to choose a color from a color wheel that best matched the car to which they had been exposed.[65] Those participants who had been asked the misleading question which referred to the blue car were much more likely to pick a blue color to describe the car than were participants who were not exposed to the misleading information.[66]

In a set of three studies, a co-witness was the source of misinformation.[67] In the first of three experiments, participants were asked to answer information about the O.J. Simpson trial.[68] The questionnaire itself contained handwritten answers next to each question which supposedly represented the way others had answered the same questionnaire a few days earlier.[69] These answers were provided to determine whether participants' answers would be influenced by misinformation provided by other people.[70] Experiments two and three of the same set of studies had participants view a video clip of a robbery; later, participants were interviewed in pairs.[71] One person in the pair was an undercover researcher who always answered the question before the participant, thus introducing co-witness information.[72] Across all experiments in the study, participants were more likely to recall incorrect information when they had been ex-

60. *See generally* Dark & Loftus, *supra* note 52; BARTOL & BARTOL, *supra* note 25.
61. BARTOL & BARTOL, *supra* note 25, at 228.
62. *See generally* Elizabeth F. Loftus, *Shifting Human Color Memory,* 5 MEMORY & COGNITION 696 (1977); John S. Shaw, III, et al., *Co-Witness Information Can Have Immediate Effects on Eyewitness Memory Reports*, 21 LAW & HUM. BEHAV. 503 (1997).
63. Loftus, *supra* note 62, at 696.
64. *Id.*
65. *Id.*
66. *Id.* at 697.
67. Shaw et al., *supra* note 62, at 505.
68. *Id.* at 507 (The first experiment was conducted approximately two weeks after a decision was made in the OJ Simpson trial.).
69. *Id.* at 508.
70. *Id.* at 506.
71. *Id.* at 505.
72. *Id.*

posed to misinformation by a co-witness as opposed to when they were not exposed to misinformation.[73] In other words, hearing information from another person after an event takes place can cause people to question their own memories and maybe even reconstruct them to fit with what others recall.

This research on post-event information has important implications for the AMBER Alert System. Imagine standing around the water cooler at the office when someone says: "Did you see the AMBER Alert story about that Hispanic man who kidnapped that little girl?" Perhaps you remember seeing the story but the man you remember seeing was white. The research suggests that you are likely to incorporate the detail of the man as Hispanic into your memory of the alert. Or maybe you are driving along in the car with your aunt and you see a car that resembles the one you remember seeing in the alert on the news. You ask your aunt if she thinks that could be the car and she replies that it couldn't be because the car on the news was blue, and that one is green. Soon, you agree that it could not be the car described in the alert, and no report is made to police. In either of these examples, your memory may have been correct; however, conflicting information made you question or change your own memory to incorporate the new information.

3. Retrieval

During the retrieval process, previously stored information is recalled from memory. As with acquisition and retention, accurate retrieval is necessary if the AMBER Alert System is to be effective. If the first two steps of memory are successful, people will be able to encode the information from an AMBER Alert and then keep it in their memory. However, these two steps alone are not sufficient for the AMBER Alert System to work. If people cannot recall the information from the alert when they actually encounter a suspect, the process has failed. There are several reasons why the retrieval process could break down, each of which will be discussed in this section.

The "tip of the tongue" phenomenon is one cause of retrieval failure.[74] The phenomenon is one in which a person cannot recall a word that she is trying to remember.[75] A person has the feeling that the information is stored in memory, but fails to retrieve it, or retrieves inaccurate information.[76] Other retrieval errors occur when people confuse a person that they see in one situation with a person that they actually saw in another

73. *Id.* at 516.
74. *See generally* Roger Brown & David McNeill, *The "Tip of the Tongue" Phenomenon,* 5 J. LEARN & VERBAL BEHAV. 325 (1966).
75. *Id.*
76. *Id.*

situation.[77] This phenomenon, which is called unconscious transference,[78] has been produced in a number of studies.[79] Students in one study listened to a story about an interaction which ultimately ended in one person throwing a brick at another person.[80] As each new actor entered the story, participants were exposed to a picture of the person for approximately two seconds.[81] After hearing the story, participants performed an unrelated activity and were dismissed with the instructions to return in three days to receive payment for their participation.[82] When they returned, participants were shown five photographs and asked to point out the character who had thrown the brick.[83] Half of the participants were shown a lineup that did not actually include the suspect but did include one of the other actors from the story.[84] Nearly eighty percent of participants falsely identified another actor as the suspect.[85] In this case, the person correctly remembers having seen the suspect before, but mistakenly recalls the person as having thrown the brick.[86]

Race is another factor that may play a role in a person's ability to correctly identify previously seen faces. Several studies have found evidence of an "own-race bias,"[87] which is the finding that people are better able to correctly identify people of their own race as compared to people of other races.[88] In their meta-analysis of over thirty years of research, Meissner and Brigham found that people had a higher hit rate (rate of correct identification) and a lower false alarm rate (incorrectly naming someone who is not the target) when they were attempting to recognize faces from their own race.[89] This phenomenon has been replicated across several different ethnic groups.[90] One study found that the own-race bias even occurred when identical faces were used to represent each race.[91] The addition of hair to computer-generated faces caused participants to describe one face

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77. *See generally* GLANVILLE L. WILLAMS, THE PROOF OF GUILT: A STUDY OF THE ENGLISH CRIMINAL TRIAL 84 (Stevens & Sons 1963).
78. *Id.*
79. *See generally* Elizabeth F. Loftus, *Unconscious Transference in Eyewitness Identification,* 2 LAW & PSYCHOL. REV. 93 (1976); Robert Buckhout, *Eyewitness Testimony,* 231 SCI. AM. 23 (1974).
80. Loftus, *Unconscious Transference, supra* note 79, at 94.
81. *Id.* at 95.
82. *Id.*
83. *Id.*
84. *Id.*
85. *Id.* at 96.
86. *Id.* at 97.
87. *E.g.*, Christian A. Meissner & John C. Brigham, *Thirty Years of Investigating the Own-Race Bias in Memory for Faces,* 7 PSYCHOL. PUB. POL'Y & L. 3 (2001); Siegfried L. Sporer, *The Cross-Race Effect: Beyond Recognition of Faces in the Laboratory,* 7 PSYCHOL. PUB. POL'Y & L. 170 (2001); Otto H. Maclin et al., *Race, Arousal, Attention, Exposure, and Delay,* 7 PSYCHOL. PUB. POL'Y & L. 134 (2001).
88. Meissner & Brigham, *supra* note 87, at 3.
89. *Id.* at 19.
90. Sporer, *Cross-Race Effect, supra* note 87, at 23.
91. *See generally* Otto H. Maclin & Roy S. Malpass, *Last But Not Least,* 32 PERCEPTION 249 (2003).

as black and another as Hispanic.[92] Even though the remainder of the features on those faces was identical, Hispanic participants were better able to identify those faces that they had categorized as Hispanic.[93]

The AMBER Alert System is likely to be affected by such retrieval errors. Even if a person consciously attempts to remember AMBER Alert information, he may be unable to recall it due to the tip-of-the-tongue phenomenon. For instance, a woman might leave home for her morning commute and remember that there was an AMBER Alert on the news the night before. No matter how hard she tries, she may not be able to remember the type of car described in the alert. Even if she had intentionally encoded and stored the information, she may not be able to retrieve it from memory. Similarly, recall of AMBER Alert information can be affected by unconscious transference. Someone might confuse AMBER Alert information with information from another source. For instance, a man might be driving and see a Dodge Stratus. He could erroneously think that the Stratus was the car described in the AMBER Alert, when in actuality it was the type of car his friend is talking about buying. In such a case, information acquired in a conversation with a friend about a certain car interfered with information acquired about the car in the alert.

Finally, alerts can be affected by own-race bias. Research suggests that when people view a person of a race other than their own they are likely to process that face differently than they would a person of their same race, which affects later recall.[94] People who view a picture of a suspect in an AMBER Alert on their television may have the best chance of later recognizing the suspect or victim if they are of his or her own race. Thus, a white person would not be as likely to recognize a Hispanic perpetrator as another Hispanic person would. Errors such as those resulting from tip-of-the-tongue, unconscious transference, and own-race bias all negatively affect AMBER Alert's effectiveness.

B. Willingness to Act

The above research suggests that much of the success of the AMBER Alert System is likely to depend on the ability of individuals to acquire, retain, and retrieve information about an alert at the appropriate time. Even if individuals are able to do all of these things, they must be able and willing to report information to the appropriate authorities. Psychological research involving bystander intervention has indicated that individuals are not always willing to help, even when they have the ability to do so.[95]

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92. *Id.*
93. *Id.*
94. Maclin et al., *Race, Arousal, Attention, supra* note 87, at 148; Maclin & Malpass,, *supra* note 91, at 250.
95. *See infra* notes 100-107.

In a classic social psychological study, college students witnessed another participant (actually an undercover researcher) in the study suffer from an epileptic seizure.[96] Some students were led to believe that they were the only person aware of the situation, while other students were led to believe that others were also aware of the situation.[97] The investigators found that those who were alone were more likely to help and to help in a timelier manner than participants who believed that others were aware of the situation.[98] Diffusion of responsibility, the phenomenon in which presence of other individuals lessens the amount of individual responsibility experienced, is used to explain this bystander apathy.[99]

Since the time of the original bystander intervention studies, several researchers have replicated the effect while also exploring individual and social factors that may moderate bystander intervention effects.[100] Factors such as gender,[101] empathy,[102] and personal implication[103] have been found to moderate the bystander effect. A series of studies demonstrated that changing certain aspects of a situation to make it more or less personally relevant can impact the occurrence of the bystander effect.[104] Participants in the study were exposed to counter-normative behavior which involved either graffiti in an elevator at a large shopping center or littering in a small neighborhood park.[105] The study revealed that (a) participants felt much more personally implicated when the deviant behavior took place in

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96. Darley & Latané, *supra* note 26, at 377.
97. *Id.* at 379.
98. *Id.*
99. *Id.* at 383.
100. *See generally* Mark Levine et al., *Self-Categorization and Bystander Non-Intervention: Two Experimental Studies,* 32 J. APP. SOC. PSYCHOL. 1452 (2002) (Self-categorization impacts a person's willingness to help another. That is, a person is more likely to help a fellow person who is categorized as an in-group member than to help a person categorized as an out-group member.); Mark Levine & Kirstien Thompson, *Identity, Place, and Bystander Intervention: Social Categories and Helping after Natural Disasters,* 144 J. SOC. PSYCHOL. 229 (2004) (Identity salience can impact a person's willingness to help. When European identity was made salient among participants in Britain, they reported being more likely to offer help after a disaster in Europe and less likely to help after a disaster in South America.); Peggy Chekroun & Markus Brauer, *The Bystander Effect and Social Control Behavior: The Effect of the Presence of Others on People's Reactions to Norm Violations,* 32 EUR. J. SOC. PSYCHOL. 853 (2002) (suggesting that people are more likely to take action when they feel that the behavior of others personally implicates them).
101. *See, e.g.*, Lori Karakashian et al., *Fear of Negative Evaluation Affects Helping Behavior: The Bystander Effect Revisited,* 8 N.A. J. PSYCHOL. 13, 27 (2006) (noting that men and women helped another female in need at the same rate when they were alone with the victim but males helped more often than females when others were present).
102. *See, e.g.,* Batson et al., *Influence of Self-Reported Distress and Empathy on Egoistic Versus Altruistic Motivation to Help,* 45 J. PERSONALITY & SOC. PSYCHOL. 706, 717 (1983) (People help others in distress for different reasons. Some help to reduce their own distress around seeing others in trouble and some help because they feel empathy for the person in distress. Those acting out of empathy are more likely to help even when there is a chance to escape.).
103. *See, e.g.,* Chekroun & Brauer, *Bystander Effect and Social Control Behavior, supra* note 100, at 63. (stating that people are more likely to take action when they feel that the behavior of others personally implicates them).
104. *Id.*
105. *Id.* at 858.

a small neighborhood park as opposed to a large shopping mall,[106] and (b) that when people felt personally implicated, intervention was not inhibited by the presence of bystanders.[107]

This research is highly applicable to the AMBER Alert process; it suggests that the presence of bystanders will lead some individuals to ignore AMBER Alert messages altogether. Because the alert was issued to the entire public, these individuals will assume that "someone else" will be on the lookout for the perpetrator. Even those people who do pay attention to the alert may fall prey to diffusion of responsibility if they do encounter a possible perpetrator. For example, a person who encounters potential AMBER Alert suspects when others are present (e.g., in a restaurant or gas station) could hesitate to report the situation, since others could also do so. This diffusion of responsibility is thus a major obstacle to the success of the AMBER Alert System.

IV. Recommendations for Improvement

The research discussed in the above section indicates that effectiveness of the AMBER Alert System is negatively affected by a host of psychological factors. Some recommendations for improving the effectiveness of the system can be made, however. Stakeholders at all levels of the AMBER System, including lawmakers, news media, private and public employers, and police have the capacity to play crucial roles in improving the system.

A. Presentation of Information

When introducing alert information, those presenting alert information should be mindful of cognitive architecture and working memory limitations, as presentation designs which do not consider such elements are likely to be less effective.[108] Effective designs are likely to be those that focus on decreasing the amount of extraneous cognitive load experienced.[109] In other words, persons and organizations responsible for presenting information pertinent to AMBER Alerts should structure the information so that it is most easily processed and recalled. For instance, details about the perpetrator and victim should be emphasized first. Other extraneous information about the situation (e.g., that the perpetrator had known the victim's family for a year) should be limited, or at least presented last. This extraneous information is not likely to help anyone find

106. *Id.* at 857.
107. *Id.* at 863.
108. Sweller et al., *Cognitive Architecture, supra* note 47, at 253.
109. *Id.* at 259.

the victim and perpetrator, and is likely to only clutter the memory of the alert information.

Cognitive load studies also suggest that AMBER Alert information should also be presented during times and places that people are not busy doing other things. While roadside signs may seem to be the most obvious places to put AMBER Alert information, it is likely not the best place to communicate alert information. Drivers are under high cognitive load and are unlikely to remember the information. One alternative, or additional place to put information, is in highway rest stop restrooms. Here, people are not under such demanding cognitive load and will be better able to attend to the information.

Another issue with cognitive load is that individuals driving down the highway do not remember vehicle descriptions or license plate numbers they see on roadside signs.[110] One way to overcome this problem is to establish a radio station to give the alert information instead of (or in addition to) having it placed on the sign.[111] Under this scenario, drivers would see the sign, which indicates that an alert has been issued and that a radio frequency had been assigned to provide the details. Drivers could then tune their radios to that frequency to get the alert information. The radio station would continuously play the details of the alert, providing the driver with multiple opportunities to hear the information. Drivers would also have the option of choosing when to hear the information, allowing them to hear it when they were able to give greater attention to the message.

Although much research on memory in general can provide information about how individuals process AMBER Alert information, more is needed. Psychological research specifically tailored to AMBER Alerts is needed to provide insights into how information should be structured to promote effective memory processing.

Temporal factors also affect successful acquisition of information. For example, the likelihood of successful acquisition and later recall increase as the length of exposure increases.[112] Any attempt to increase the amount of time to which people are exposed to alert information, especially pictures, is likely to promote better encoding. A picture that is flashed on the news for several seconds (perhaps during the entire time the details of the alert are being announced) is likely to be more successfully processed than a picture that is flashed for one to two seconds at the end of the story. Similarly, stationary signs are most likely to promote effective processing when they are placed at points where people remain for several seconds or minutes (e.g., on the back of bathroom stalls in public

110. Message Signs, *supra* note 38.
111. *Id.*
112. *See* Shapiro & Penrod, *supra* note 23; Dinardi & Rainey, *supra* note 32; Laughery et al., *supra* note 32.

restrooms, in public transportation, in places where people are likely to be standing in line).

Additionally, alert information should be disseminated in ways that will ensure people are exposed to the information on several occasions. Just as processing improves as length of exposure increases, processing also increases when the frequency of exposure increases.[113] While one exposure to the alert information is unlikely to be encoded in memory, widespread attention in many forms (e.g., internet and cell phone alerts, news alerts, and posters) would increase the chances of the information being encoded into memory.

Changes in context are likely to inhibit successful identification, suggesting that if a person only sees one photograph of another person, he or she is only likely to recognize that person if he or she looks very similar to the photograph. For example, one study found that after initially viewing a photo of a person, participants were less likely to correctly identify that person at a later point if they viewed him with a different facial expression, in a different pose, or with a different scenic background.[114] Showing pictures of AMBER Alert victims and suspects in several different contexts, then, should increase the chances that a person who sees an AMBER Alert on television will later recognize that person.

B. Use of Technology

Though technology is already infused in the AMBER Alert System through the use of television, wireless cell phone alerts, and internet kiosks, there are still changes that can improve the use of technology. For example, wireless cell phone alerts that currently utilize text messaging to disseminate alerts could be improved by adding picture attachments to the messages. The inclusion of the picture gives people more information, which will increase the probability of encoding and recall. Further, cell phone users should be encouraged to save the picture on their phones so that they can refer back to it for comparison if they encounter a potential suspect. Having the photo in hand might give persons who would otherwise doubt their own memory the confidence to report the situation.

Telematics, a relatively new technology, is used to describe technology by which automobile owners are connected to operators, the internet, and global positioning systems through a computer system in their vehicle.[115] Some of the many available features include access to driving directions,[116] news, stock quotes, and weather through voice dial.[117] It is

113. BARTOL & BARTOL, *supra* note 25, at 233.
114. Graham Davies & Alan Milne, *Recognizing Faces In and Out of Context,* 2 CURRENT PSYCHOL. RES. 235 (1982).
115. IDG, WHAT IS TELEMATICS (Sept. 2, 2005), http://archives.cnn.com/2001/TECH/ptech/05/31/what.is.telematics.idg/index.html [*hereinafter* IDG, *Telematics*].
116. *Id.*

expected that half of all cars produced in North America in 2006 will be equipped with telematics.[118] The telematics technology could be used to distribute alert information. For example, the voice dial system could be used to retrieve information about active alerts through the internet. Further, small screens could be placed in cars on which pictures related to the alerts could be displayed along with driving and weather maps, news updates, etc. People are not always familiar with street names, especially in large cities, so simply hearing this information may not be very helpful to them. Global positioning systems in automobiles would allow people to receive precise knowledge about the location of the abduction relative to their current or home location. Such information could even lead to increased participation through personal implication. That is, an individual armed with the knowledge that a child was abducted only a few blocks from her home or office may experience increased feelings of personal implications which motivate her to participate in recovery efforts.

AMBER Alert information can also be disseminated through strategically placed monitors. Computer and television monitors are everywhere in today's world and provide a variety of information including advertising, news, and transportation schedules. Many of these monitors, especially those located in high traffic places, could be used to display AMBER Alert information. For example, automated teller machine monitors and monitors at gas pumps could both display pictures and other alert-related information. Further, monitors could be installed in places where they do not already exist, such as highway rest stops or major bus stops. As alert information is displayed in more places, the number of times a person is exposed to the information is likely to increase. This would increase the chances of someone later recognizing persons presented in the alert.

C. Whom to Target

In addition to improving the way in which AMBER Alert information is presented, the system could also benefit from targeting specific sectors of the population to provide detailed information and training. Specifically, AMBER officials would do well to target high-traffic businesses and individuals who work in those businesses. Such businesses might include restaurants, retail chains, and convenience stores where perpetrators are likely to go.

One way to target such organizations would be develop an AMBER Alert notification program involving businesses such as restaurants and convenience stores. Alerts could be immediately faxed to participating

117. IDG, COMMERCIAL VEHICLES TO GET NET CONNECTIONS (Sept. 2, 2005), http://archives.cnn.com/2001/TECH/internet/10/31/vehicle.net.connection.idg/index.html.
118. IDG, *Telematics, supra* note 115.

businesses so that they may be posted for both employees and customers to see. Employees working in these high traffic businesses would be exposed to the flier several times during the course of their shifts, thus improving the likelihood that they will recognize the person(s) presented in the fliers. Because these individuals come into contact with a large number of people on a daily basis, they have an increased probability of running into the suspects or victims.

In addition to increased exposure, special training could be provided for individuals working in high-traffic businesses. For example, employees could be trained to pay attention to distinctive features of the suspect such as tattoos or scars. Research suggests that such distinctive information increases accuracy of person identification.[119] Further, employees could be educated about diffusion of responsibility and other factors that have been found to inhibit participation, as research suggests that knowledge of this phenomenon alone can be enough to overcome such barriers.[120]

Changes such as these have the potential to make a significant impact in the AMBER Alert System. Although existing psychological research can shed some light on ways to improve the system, more research is needed to further determine ways in which the AMBER Alert System can reach its potential.

V. POLICY CONSIDERATIONS

Changes such as those listed above will require significant policy changes. Policymakers need to make several steps, including dedicating more money to the system and promoting changes in implementation. Perhaps the most important change involves policymakers designating money to support the AMBER Alert System. Although some psychological research exists, much more needs to be conducted. Research can help improve the system in several ways.

First, research can help reveal the limits of AMBER Alerts and find ways to overcome them. For example, research specifically tailored to study AMBER Alerts can be conducted to determine the specific conditions under which alert information can best be remembered. Learning the limits of people's cognitive functioning and ways to maximize memory is an important step in improving the system's effectiveness.

Second, research can help develop programs to encourage reporting. The bystander effect, diffusion of responsibility, and lack of feelings of personal relevance negatively affect individual's willingness to report.

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119. *See, e.g.*, Shapiro & Penrod, *supra* note 23.

120. *See, e.g.*, San Pui Lam & Kuen-Yung Jone, *Effects of Knowledge of Bystander Effect, Presence of Bystanders, and Witness's Gender on Crime Reporting Behavior*, 36 CHINESE J. PSYCHOL. 33 (1994).

Other programs can be developed to train community members and those who are most likely to come in contact with AMBER Alert perpetrators (e.g., restaurant and convenience store employees). Such programs can emphasize the importance of being aware of alerts and reporting them promptly.

Finally, research can help evaluate the AMBER Alert System to determine whether it is being carried out in an efficient manner. If research indicates that some methods used (e.g., roadside signs) are less effective than other methods (e.g., monitors in rest stops), then it is clear that energy and money should be shifted accordingly. Evaluative research will help determine if money and effort is being expended in the most efficient and effective manner possible.

In addition to increasing the amount of money given to researching AMBER Alerts, money should also be designated to the development of technology to aid the AMBER Alert program. Monitors in rest stops, telematics, and cell phone alerts are only a few of the possible advances in technology that could promote the effectiveness of the AMBER Alert System.

Funds could also be used to help improve the program's implementation. Communication systems can be improved to better coordinate alerts in different localities. Other systems could be developed to coordinate personnel (e.g., fax alerts to businesses which will post them). Finally, funds could be used to hire on-call personnel to post alerts in off-hours and on holidays.

In addition to changes in monetary provisions, other policies should be implemented to help promote AMBER Alerts. One of the suggestions discussed above is to provide multiple exposures to alert information. While research has indicated that multiple exposures increase the likelihood of recognizing a perpetrator, there is also the risk of over-exposure. That is, if the public is inundated with alerts, it could create a climate of ambivalence. Too many alerts could lead people to confuse one alert with another or lose interest. To prevent this, some policy changes need to be implemented, limiting when alerts are issued. Alerts should be disseminated only if there is a high level of quality information and pictures available. If the descriptions of the perpetrators or their vehicles is too vague, or if the pictures are not recent or not clear enough, it is unlikely that they would be helpful in tracking down the perpetrator anyway. Limiting poor quality alerts will help reduce the risk of the public being inundated with alert information and losing interest. Second, alerts should only be posted in close proximity to the abduction area. Alerts should be dissimilated in a wide, multi-state or national area only if police have strong leads that abductor will take child to certain place. When people read about alerts that occur in other states, they are highly unlikely to pay much attention. Individuals' feelings of personal relevance of such abductions would be quite low, as most people would likely assume that their chances of seeing

the perpetrator or victim are very slim. Thus, issuing broad coverage alerts (except when warranted), would serve only to over-expose the public and lead them to be indifferent to all alerts in the future.

Another policy change involves adoption of a severity level indicator that is based on how much danger authorities believe the child is in. Social science research can determine, based on past crimes, what factors indicate that the child is more or less in danger. For example, a child who is believed to be with a child molester is likely in more immediate danger than one who is abducted by someone with no criminal record. This severity indicator will determine how many alerts should be issued, how broadly to disseminate the alerts, and so forth.

Because every child is equally important, it would seem as though every abduction should lead to the greatest amount of effort. The alert should be nationwide, on every kiosk, restraunt wall, cell phone, roadside sign and rest stop. This article has suggested many new ways to communicate alerts that would make this broad exposure possible. However, if every alert were disseminated that broadly, it would likely lead to public disinterest. If that occurs, the AMBER Alert System will have failed. Thus, in the interest of every alert, it is essential that systems be put in place to keep the public from losing interest.

VI. CONCLUSION

The AMBER Alert System is a well-intentioned program designed to protect America's children. Despite good intentions, a wealth of psychology research indicates that the system is not functioning as well as it could. Although psychology research on the AMBER Alert System is scarce, research in other areas (e.g., eyewitness identification) provides important information about the system. The system makes assumptions about the public's ability to remember information and willingness to report. For example, it assumes that people will be able to remember information that they read on a roadside sign as they drive by at seventy miles per hour. Psychological research suggests that such a brief exposure, received when the individual is dividing her attention between the alert information and a host of other activities (e.g., driving) is unlikely to be remembered. If information were posted in places where individuals could have a longer exposure (e.g., monitors in rest stops), the information would be more likely to be remembered. Thus, alerts may not currently be as effective as possible.

More research is needed to specifically address the operation of the system and provide information that will ultimately improve its implementation and operation. For instance, research can help design programs to educate and motivate individuals to report AMBER Alert perpetrators. Clearly, more money needs to be invested in the AMBER Alert System to conduct such research and make the required changes. When the AMBER

Alert System is based on psychologically sound research, America can be assured that the system protecting their children is the best system possible.