How Children Reacted to Televised Coverage of the Space Shuttle Disaster

by John C. Wright, Dale Kunkel,
Marites Pinon, and Aletha C. Huston

Overall, boys and girls tended to react according to gender stereotypes of impersonal regret versus personal involvement, but the strongest relations were for the two patterns themselves, with either a cognitive or affective response dominating.

On January 28, 1986, millions of U.S. school children were watching live television coverage of the launch of the space shuttle Challenger, which was expected to carry the first teacher-astronaut, Christa McAuliffe, into orbit. According to a New York Times/CBS News national survey, 25 percent of 5- to 8-year-olds, 48 percent of 9- to 13-year-olds, and 31 percent of 14- to 17-year-olds saw the Challenger launch at their school that day (6). Without warning, these children instead witnessed a violent explosion and the tragic demise of the spacecraft and its crew of seven astronauts.

The launching of space vehicles had become so commonplace that the broadcast television networks did not preempt their regularly scheduled programming to cover the Challenger. The only live coverage on over-the-air television occurred on NBC's "Today" program, and only in the western region of the country on Pacific Standard Time. The Cable News Network (CNN) provided the only live national coverage of the launch (although the three broadcast networks shifted to uninterrupted coverage of the story within minutes of the disaster's occurrence). But even those who were not watching television at the time of the disaster were almost certain to see the graphic pictures of the accident replayed as the television networks reported the story almost continu-

John C. Wright and Aletha C. Huston are Professors and Co-Directors of the Center for Research on the Influences of Television on Children (CRITC), Department of Human Development, University of Kansas, Lawrence. Marites Pinon is a doctoral candidate at CRITC. Dale Kunkel is Lecturer in the Department of Psychology, University of California at Santa Barbara. An earlier version of this article was presented at the biennial meeting of the Society for Research in Child Development, Baltimore, April 1987, and at International Communication Association, Montreal, May 1987.

The authors are grateful for the cooperation of Dr. Benjamin Friesen of the Advisory Committee on Human Experimentation, University of Kansas, and Mr. Robert Taylor of Unified School District 497, Lawrence, Kansas, for assistance in rapid completion of institutional research requirements. We are also grateful to Mr. Verlin Gilbert and the intermediate wing teachers of Deerfield School for their patience and cooperation.

ously for the rest of the day (25). According to a survey conducted for the National Science Foundation, 57 percent of the population turned immediately to television upon learning of the disaster, and 95 percent had viewed some of the coverage by the end of the day (28).

The tragedy presented an exceptional opportunity to investigate children's emotional reactions to televised news coverage in a situation where strong, direct effects might be expected.[1] Our study was designed to explore the nature and extent of children's self-reported affective and cognitive reactions to the shuttle disaster and what that might tell us about both the impact of seeing an unexpected dramatic and violent real-life event and potential differential understanding of the event among boys and girls of different ages.

A unique combination of circumstances made it likely that children who viewed the disaster coverage would be strongly affected by what they saw. First, the presence of teacher-astronaut Christa McAuliffe aboard the flight provided a familiar, concrete referent among the crew members who were killed. Second, many schools required their students to study this particular mission to prepare for McAuliffe's anticipated lessons from space. Third, the launch was viewed live by substantial numbers of children at their schools, imbuing the event with a sense of universal importance. Fourth, space travel and adventure are salient for many children, especially boys. Finally, the disaster came unexpectedly. It was the nation's first fatal space-related accident since 1967 and the only one ever to occur in flight. These factors, coupled with previous studies indicating that children react more strongly when they perceive the television content viewed as more "realistic," suggested that many children may have had substantial emotional responses to viewing the Challenger explosion.

Research exploring the emotional effects of mass-mediated communication on children dates back to the early days of motion pictures (5). Using physiological measures, Dysinger and Ruckmick (13) found that children experienced emotional arousal in response to entertainment films, with scenes of danger, conflict, or tragedy generating the strongest reactions. By comparison, adults showed little arousal during any of these types of scenes. The authors attributed this difference to adults' ability to "discount" the portrayals as fantasy.

Parallel research exploring children's affective response to television content has been surprisingly slow in developing, in part because of a paucity of theory or research examining children's affective development in any setting (7). Cantor and her colleagues (e.g., 2, 3, 4) have examined television's role in creating emotional reactions in child viewers, and Dorr and her research group (9, 10,

The only other published study (29) described children's questions, comments, and conversations about the Challenger disaster on the following day at school. Selected examples of these verbal records were used to exemplify various Piagetian constructs. The conclusion was simply that children use the schemes they have to try to understand important events, "offering explanations that reflect their own developmental perspective" (p. 92).

12) have focused on television's contribution to the development and expression of affect in children. However, this theory and research has dealt almost exclusively with the impact of fictional entertainment programs.

Investigation of the emotional effects of news or other nonfiction programming has been more limited, usually focused on unusual events such as the assassination of President John Kennedy. Research on the impact of televised coverage of the Kennedy assassination indicated that powerful emotional effects were produced in audiences of adults (32) and young adults (34) as well as children (33, 35). The most frequent reaction of child viewers was feeling sorry or sad. Behavioral symptoms of emotional upset, such as "upset stomach," "trouble sleeping," and the like, were reported less by children than by adults, although roughly a third of a national sample of school-aged children and adolescents said that they experienced such symptoms (33). No clear pattern of age-related differences in affective responses was observed; some research indicated that younger children were more upset (33) and some reported that adolescents experienced the most extreme reactions (35).

Although some parallels in the intensity of effects of viewing the Kennedy assassination and the Challenger disaster can be drawn, factors unique to each suggest that some important differences might also be expected. The fact that space travel is a topic of much greater interest for boys than girls (26, 27) might be expected to lead to boys being more involved with the incident and watching more of the Challenger follow-up coverage than girls. But the recent introduction of women astronauts to the space program and McAuliffe's presence on the flight could be expected to enhance girls' interest in this mission.

People have been thought to respond to rare threatening and catastrophic events by seeking to reduce uncertainty and restore normal order. Children may reasonably seek, if not a sense of restored normalcy, a simple interpretation of upsetting events in familiar terms and a set of schemas that place these events in a more regularized context. We hypothesize that children are motivated to normalize and thus perhaps to regain a sense that they comprehend events and can control their own reactions. Such motivation would, in turn, lead children to respond with shared traditional concepts, including stereotypical ideas and personally relevant references rather than new concepts. Because they have a familiar and shared normalcy, traditional definitions provide an unambiguous, well-defined, and immediately available set of assumptions that provide structure under conditions of shock and uncertainty.

Accordingly, we expected to find rather stereotypic gender responses to the disaster, including a greater interest in technological aspects among boys and a greater focus on human suffering among girls. In their subsequent viewing of disaster coverage, we expected more boys than girls to adopt a posture of dispassionate, intellectualized information seeking, or what one might term a cognitive orientation. Correspondingly, we anticipated that more girls than boys would report affective and social reasons for viewing follow-up coverage.

The possibility that the perceived reality of a particular piece of media content influences its effects on viewers has been of interest to those trying to understand and predict television's impact on children (8, 17, 18, 22). Several

studies provide evidence that either the likelihood or intensity of effects increases when children perceive television characters and their actions as more "realistic" (8, 14, 17, 30). Further support for that effect comes from research exploring the impact of television violence. For example, 9- to 11-year-old children who viewed a "real" version of a police action sequence subsequently behaved more aggressively than those who had seen the same program described as fantasy-drama (15). Other studies, however, have found little or no evidence that reality judgments mediated viewing effects in such areas as gender stereotypes (31), aggression (1), or other social attitudes (11, 23). Thus, although it is often hypothesized that social effects are either more likely or more powerful when television content is perceived as "real," in whatever sense the term is applied, it appears that the construct is not unidimensional. Dorr et al. (12) suggest that the perceived reality of a particular piece of television content may be judged by many different criteria and that the criterion on which a judgment is based may influence the extent to which that perception mediates effects.

The children in our study were old enough to recognize clearly that the Challenger explosion was a real event rather than a fictional televised portrayal. Younger children might have been less certain about the reality of the event, but it was not possible to make satisfactory arrangements to include them in this study. Therefore, to examine the influence of perceived reality as a mediator of affective and other responses to viewing the disaster, we explored the various cues that children called upon to recognize the televised coverage of the disaster as a real event and the sharpness with which they discriminated real from fictional space activities.

In our conception, the perceived reality of television has at least three distinguishable dimensions: factuality, social realism, and video style. *Factuality* involves whether the story or events portrayed really happened or not (as distinct from staged fictional events). *Social realism* refers to whether the characters, settings, and events portrayed seem typical of, or likely to occur in, the real world. The *video style* of the production refers to the degree to which the special production and editing techniques and unique conventions of the medium are used so that the program seems formally and stylistically typical of commercial entertainment programming and is therefore judged to be synthetic.

Because factuality is often hard to establish in the first place, children ordinarily rely on social realism to judge the reality of a program (24). But when all signs, from both the program itself and coviewers, indicate that the event is real and is happening now, then factuality should outweigh any atypicality or unexpectedness of the content in influencing children's reactions.

The formal production styles associated with different types of programming probably also play a role in the child's perception of a program's realism. When the formal features are those of a dry, educational, or informative documentary style, then the involving effects of factuality could be attenuated. Conversely, when the production techniques associated with dramatic fiction are present throughout a program, then its content, though understood to be fic-

tional, may have enhanced emotional impact, as in dramatic space fiction like the *Star Wars* movies. However, that impact, dependent as it is upon immediate cues in the style of presentation, should dissipate rather quickly.

Ordinarily the unemotional tone of press communications from NASA at a shuttle launch, the unglamorous duties of actual orbiting space crews, the manifestly informative and educational intent of media journalists, and the absence of music, dramatic costumes, and characters that populate space fiction might all combine to divest real shuttle missions of the excitement we associate with fictional space drama. But the uncompromising realism of that same documentary style makes the impact of a launch disaster inescapably real and powerful. Moreover, a viewer's awareness of that reality is a product of cognitive processing that should continue to increase for quite some time after the initial viewing experience.

Our study was conducted in a small midwestern city at an elementary school with students drawn primarily from white middle- to upper-middle-class families. The sample (n = 122) consisted of 67 boys and 55 girls in fourth (n = 37), fifth (n = 38), and sixth (n = 47) grades. Only those children whose parents consented to the interview were included in the study; six children whose parents refused were excluded. The mean age of the sample was 10.57 years, with a range of 9 to 12 years.

The Challenger explosion occurred during a recess period. As the children were returning to their classes, they were diverted to a central meeting area where television monitors had been prepared for use the following day, when teacher-astronaut Christa McAuliffe was to present a live lesson from space. The children's viewing began approximately five minutes after the disaster occurred and continued for about a half hour. They viewed the coverage with their science teacher, who was an applicant for the teacher-astronaut program and reported that he had devoted a substantial amount of classroom time in each grade level to study of the space program during the two months prior to this particular mission. He told us that he was badly shaken by the news and that the children clearly knew that at the time.

Most of the children in our sample (n = 111) attended school on the day of the shuttle launch. The remaining children (n = 11) were at home ill when the explosion occurred, but all were either watching television at the time the network coverage began or were immediately called to the set by parents or siblings. Preliminary analyses indicated that these children's responses did not differ in any consistent fashion from those of the children at school. Accordingly, they were combined with the rest of the sample for further analysis.

Each child was asked a total of 104 questions, though many were only slight variations of identically structured questions. Multiple-choice and Likert-type items were combined with open-ended questions to yield the variables described below. Based on both a priori reasoning and zero-order correlations, an initial set of 21 clusters of items was identified. Subsequent analyses of items reduced this set to the 12 major variables described below, including two clusters of sub-variables that remained differentiated for analysis.

1. *Prior general television viewing* consisted of a self-rating of viewing frequency for each of four sets of popular programs (e.g., "How often have you watched cartoon adventures like 'He-Man' or 'Transformers'?—never, once or twice, several times, or lots of times"). The four items, with scales from 1 to 4, yielded 16 possible points.

2. *Prior space media viewing* was reflected by exposure to shuttle flights and space-oriented entertainment films or TV programs (e.g., reported frequency of viewing other shuttle launches and landings, *Star Wars,* "Star Trek," etc.). The same 4-point Likert scale of frequency was used with five categories of programs, for a maximum of 20 points.

3. *Prior shuttle program knowledge* was indicated by the accuracy and completeness of answers to two factual questions likely to reflect viewing, reading, etc., before the disaster (e.g., "Tell me the names of all the other shuttle craft that NASA has besides the Challenger"). A maximum of 8 points could be awarded on the two items.

4. The amount of *negative affect and emotional upset* that each child first felt after seeing the explosion was measured on eight 4-point items (e.g., "How did you feel when you first saw the Challenger explosion?"). In addition, five checklist items, each worth 2 points, dealt with the visceral and behavioral manifestations experienced during the five days since the disaster (e.g., "cried once or more," "had trouble getting it off my mind," or "had trouble sleeping"). A total of 42 points was possible.

5. *Impersonal regret* was measured by four checklist items, each worth 1 point (e.g., "My first reaction was surprise, and I felt sorry they lost the shuttle"; "I was shocked 'cause I thought the shuttle was well equipped and all checked by the crew").

6. *Personal involvement* and grief was measured by nine checklist items, each worth 1 point (e.g., "I felt sad because the teacher died, and I felt bad for the astronauts' families"; "If it was my mom or teacher, and you think they'll be famous, and then they go up in flames, it would be awful"; "Everyone was so happy just before, and then. . .Boom!").

7. *Information-seeking orientation* after the accident had occurred, including the extent of postdisaster coverage viewed, was measured on six 4-point Likert-scale items plus three 1-point checklist items (e.g., "Since that day, whenever the TV begins to tell more about the Challenger, do you usually: turn it off, watch a little, watch it all, or watch it and then look for more?"). The total possible score was 27 points.

8. *Distinctiveness* and discriminability of a real shuttle flight from a fictional space film or television drama was measured on four 4-point ratings (e.g., "Compared to what they do in space adventures, how different are the real shuttle astronauts in the things they do in space?—completely different, mostly different, kind of the same, or almost exactly the same?"). The total possible score was 16.

9. *"Final" mission knowledge* gained from viewing the coverage was measured with three questions (e.g., "Tell me the names of the pilot and the captain of the Challenger"). One point was given for each question. This variable,

and the next one, were termed "final" as a reminder that they are outcome measures that should have been influenced by the experience of the disaster, unlike the questions on initial (predisaster) knowledge.

10. *"Final" attitude toward the space program* was measured by three 4-point items (e.g., "Should the space shuttle flights continue? Yes—for sure, yes—when it's safe, maybe some day, or no—not for a long time"). A maximum score of 12 was possible.

Two clusters of variables were based on categorizations of responses to open-ended items.

11. *Viewing motives* underlying each child's orientation to seek or avoid further information about the tragedy were measured (1 = present, 0 = absent) for (a) *affective* (e.g., "It's exciting/sad/thrilling/upsetting to see it again"), (b) *social* (e.g., "I want to see the reactions of others," "I want to talk with my friends and not be a dummy"), and (c) *cognitive* (e.g., "I'm interested in space," "I wanted to see if all the channels had the same story") dimensions.

12. *Reality cues* that were used to recognize that the Challenger explosion was real and not a fictional television story were scored for the number of cues mentioned of each type: (a) *media form* cues (e.g., "No music, no close-ups," "The CNN logo was on the screen," "They interrupted other programs to show it"); (b) *media content* cues (e.g., "The announcer didn't even know what had happened for sure," "I could tell by the reactions of other people on TV that it was real"); (c) *social inference* (e.g., "Everyone was talking about it," "I knew it was real because some of the kids were crying"); and (d) *outside knowledge* (e.g., "I know what shuttle launches are supposed to look like—this was different").

Individual interviews were conducted at the children's school six days after the Challenger explosion. Interviews lasted approximately 15 to 20 minutes each and were conducted by eight trained research assistants who recorded responses on paper. Four males and four females served as interviewers, each seeing the same proportion of boys and girls. After posing each closed-ended question, the interviewer read all of the possible Likert-scale response options while displaying a card with all of the choices printed on it. Children could respond either verbally or by pointing. On the open-ended questions, the children's answers were recorded verbatim. Special efforts were made to prevent children from perceiving demand qualities in the questions or in the interviewers' manner regarding "gender-appropriate" responses.

All of the closed-ended items used 4-point Likert scales or multiple-choice items with four alternatives. The behavioral checklist (e.g., "Did you have trouble sleeping?") was presented in a yes/no question format and was scored dichotomously.

Responses to the open-ended portions of the interview were scored by three raters using a coding scheme devised to reflect the important aspects of children's comments. Each open-ended question had from 5 to 12 dimensions that were scored as either present or absent in a child's response. For example, the open-ended question, "How did you know (it) was real?" was scored for 12

Table 1: Means and standard deviations for six major variables

	Grade 4		Grade 5		Grade 6		Total	
	x̄	sd	x̄	sd	x̄	sd	x̄	sd
Prior space-oriented media viewing (range = 0–20)								
Boys	12.44	2.83	11.75	2.40	13.50	2.13	12.58	2.55
Girls	10.33	2.23	9.94	1.63	10.96	2.53	10.49	2.21
Total	11.76	2.80	10.90	2.24	12.15	2.65	11.64	2.61
Sex: $F(1, 116) = 23.64$, $p < .001$; grade: $F(2, 116) = 3.68$, $p < .03$; sex × grade: $F(2, 116) < 1.0$, n.s.								
Prior shuttle program knowledge (range = 0–8)								
Boys	1.92	1.53	1.70	1.13	2.64	1.56	2.09	1.46
Girls	0.58	0.67	1.06	0.87	0.88	0.97	0.87	0.88
Total	1.49	1.45	1.40	1.05	1.70	1.55	1.54	1.37
Sex: $F(1, 116) = 30.03$, $p < .001$; grade: $F(2, 116) = 1.92$, n.s.; sex × grade: $F(1, 116) = 2.20$, n.s.								
Negative affect and emotional upset (range = 0–42)								
Boys	26.08	3.92	27.30	4.44	25.00	4.79	26.09	4.40
Girls	30.08	4.60	28.61	4.20	27.08	3.72	28.24	4.18
Total	27.38	4.51	27.92	4.32	26.11	4.34	27.06	4.42
Sex: $F(1, 116) = 9.66$, $p < .002$; grade: $F(2, 116) = 3.05$, $p < .05$; sex × grade: $F(2, 116) < 1.0$, n.s.								
Impersonal regret (range = 0–4)								
Boys	0.64	0.70	1.05	0.89	1.14	0.94	0.93	0.86
Girls	0.67	0.78	1.00	0.84	0.92	0.81	0.89	0.81
Total	0.65	0.72	1.03	0.85	1.02	0.87	0.91	0.83
Sex: $F(1, 116) < 1.0$, n.s.; grade: $F(2, 116) = 2.38$, $p < .10$; sex × grade: $F(1, 116) < 1.0$, n.s.								
Personal involvement (range = 0–9)								
Boys	4.68	1.41	3.85	1.46	3.59	1.94	4.08	1.66
Girls	4.75	1.14	4.89	1.02	4.68	1.31	4.76	1.17
Total	4.70	1.31	4.34	1.36	4.17	1.71	4.39	1.50
Sex: $F(1, 116) = 7.40$, $p < .008$; grade: $F(2, 116) = 1.55$, n.s.; sex × grade: $F(1,116) = 1.41$, n.s.								
Final attitude toward space program (range = 0–12)								
Boys	9.60	1.68	10.65	1.35	10.82	1.44	10.31	1.59
Girls	9.08	1.38	9.22	1.11	9.76	1.83	9.44	1.54
Total	9.43	1.59	9.97	1.42	10.26	1.73	9.92	1.62
Sex: $F(1, 116) = 12.40$, $p < .001$; grade: $F(2, 116) = 3.72$, $p < .03$; sex × grade: $F(2, 116) < 1.0$, n.s.								

For boys, n = 25 (grade 4); n = 20 (grade 5); n = 22 (grade 6). For girls, n = 12 (grade 4); n = 18 (grade 5); n = 25 (grade 6). Total n = 122 (67 boys, 55 girls; 37 in grade 4, 38 in grade 5, 47 in grade 6).

different types of possible responses that were later grouped into 4 clusters as described above (12a to 12d).

The various dimensions for each question were scored independently of one another, so the total number of judgments for each question equaled the total number of discrete dimensions that were assessed. Two-way interrater agreement for all judgments ranged from 80.4 percent to 84.7 percent overall. The scoring done by the rater with the highest degree of agreement with the other two raters was used for analysis.

Table 1 provides the overall means and standard deviations for those six of the twelve major variables yielding significant sex or grade differences. These include two of the three variables covering predisaster media use and prior knowledge, three of the four variables that are the core constructs of effects, and one of the three variables concerned with postdisaster information seeking and outcomes.

Significant sex differences were found on five of the major variables. Boys both knew more about the space program and reported regularly watching more space-oriented media before the explosion than girls. Girls scored higher than boys on all measures of self-reported negative affect and emotional upset, but a surprising number of boys admitted strong feelings, crying, and persistence of upset. Analysis of individual items shows that boys stressed the setback to the space program as a reason for their feelings more than girls, while girls were more concerned than boys about the potential dangers that a teacher-astronaut might face on a future mission. Girls scored higher on personal involvement than boys, while the boys felt more strongly than girls that the space program must be continued. The number of significant gender differences and the gender-distinctive patterns of correlations among those variables led us to conduct separate analyses for boys and girls.

Significant overall effects of grade level were found on four major variables (including one at $p \leq .10$) and two sub-variables (not shown), but none of the post hoc Scheffé contrasts between pairs reached significance. Sixth graders watched more space media content before the disaster than younger children. Overall the fourth and fifth graders reported the most negative affect and emotional upset. They were less likely to report impersonal regret than the older children. There was a regular increase with age in positive final attitude toward the space program.

Not included in the table are differences in reasons for seeking more information or avoiding it. Fourth graders were more likely than the older children to report watching the coverage for socially oriented reasons, such as being able to share and compare their understanding with that of others. Fifth and sixth graders more often reported cognitive motives for seeking information after the disaster. There were no significant sex-by-grade interactions.

A series of multiple regressions was conducted to identify the significant predictors of four key mediating and outcome variables. Table 2 summarizes the analyses for the variables of distinctiveness of space fantasy vs. reality, negative affect and emotional upset, information-seeking orientation,

Table 2: Multiple regressions of antecedents of major variables

Predictor	Standard coefficient	t	p (two-tail) <
Distinctiveness of fantasy vs. reality in space			
Prior space-oriented media viewing	−.181	−2.02	.04
Prior shuttle program knowledge	.190	2.12	.04
$R = .457$ $R^2 = .209$ $F(2, 119) = 3.81$ $p < .025$			
Antecedents of negative affect and emotional upset			
Prior general TV viewing	.267	3.30	.001
Personal involvement	.339	4.03	.001
Sex (1 = male, 2 = female)	.171	2.03	.04
$R = .486$ $R^2 = .236$ $F(3, 118) = 12.17$ $p < .001$			
Antecedents of information-seeking orientation			
Prior general TV viewing	.235	2.85	.005
Prior shuttle program knowledge	.264	3.26	.001
Negative affect and emotional upset	.272	3.30	.001
Distinctiveness of fantasy vs. reality	.198	2.45	.016
$R = .512$ $R^2 = .262$ $F(4, 117) = 10.40$ $p < .001$			
Final attitude toward space program			
Prior space media viewing	.263	2.88	.005
Distinctiveness of fantasy vs. reality	.205	2.46	.015
Impersonal loss	.204	2.47	.015
Information-seeking orientation	.182	1.96	.05
Sex (1 = male, 2 = female)	−.167	−1.86	.065
$R = .457$ $R^2 = .209$ $F(5, 117) = 7.73$ $p < .001$			

and final attitude toward the space program. The selected predictors were entered in the order of logically temporal priority. Thus, prior space and general television viewing and prior knowledge about the shuttle program were entered in the first block. The immediate responses of affect, identification, and fantasy/reality discrimination were entered in the second block. The "postdisaster" outcomes of information seeking, "final" knowledge about the mission, and "final" space program attitude were entered as the third block. For two of the regressions (negative affect and final attitude) the significant sex differences were acknowledged by entering sex (dummy coded as male = 1, female = 2) as a final predictor.

Next, stepwise regressions of all predictors of negative affect and emotional upset were run separately for boys and girls. The best predictors of negative affective reaction in girls were their prior general TV viewing, personal involvement with the mission, and the degree to which they used media form and media content cues to recognize the event as a real occurrence. For boys, the strongest predictor of negative affect was the degree to which they reported impersonal regret about the setback to the space program.

A factor analysis of the 10 major variables with varimax rotation yielded three distinctive interpretable factors for each sex with eigenvalues greater than 1.25.

Table 3: Summary of factor analyses of major variables

For boys	Loading	For girls	Loading
Factor 1: TV orientation		Factor 1: Affect and TV	
Prior space-oriented media viewing	.768	Prior general TV viewing	.719
Prior general TV viewing	.683	Negative affect and emotional upset	.721
Final attitude toward space program	.685	Information-seeking orientation	.703
Impersonal regret	.406		
Factor 2: Knowledge		Factor 2: Knowledge vs. identification	
Distinctiveness of fantasy vs. reality	.703	Personal involvement	−.680
Information-seeking orientation	.611	Impersonal regret	−.638
Prior shuttle program knowledge	.604	Prior shuttle program knowledge	.556
Final mission knowledge	.468		
Factor 3: Affect and identification		Factor 3: Space involvement	
Personal involvement	−.824	Final attitude toward space program	.718
Negative affect and emotional upset	−.763	Final mission knowledge	.601
		Prior space-oriented media viewing	.499
		Distinctiveness of fantasy vs. reality	.251

Table 3 summarizes the rotated factor loadings. Again, the large number of gender differences in both means and zero-order correlation patterns indicated the need for separate analyses by gender.

For boys the first factor is loaded on media use and impersonal concern for the space program, and the second is a cognitive factor concerned with knowledge and information seeking with regard to the event. By contrast, the third factor is similar to the girls' first factor in that it involves negative affect and emotional upset. For girls, the analyses yielded a first factor loaded on general television viewing and negative affect. The girls' second factor concerned the trade-off between personal involvement and prior shuttle program knowledge, as they were loaded in opposite directions. But like the boys' last factor, the third factor for the girls was one more characteristic of the other sex: involvement with space media, positive attitudes toward the program, and other cognitive factors. In general, an impersonal, knowledge-oriented pattern is distinguishable from a personal/social and affective pattern. Each pattern, while present in both sexes, tends to predominate in one sex along gender-stereotypic lines and to be present (but account for much less variance) among children of the other sex.

Based on the foregoing analyses, Figure 1 was developed as a proposed model of the effects of the shuttle disaster on children. It is descriptive only and not the product of a formal path analysis, as the requisite statistical

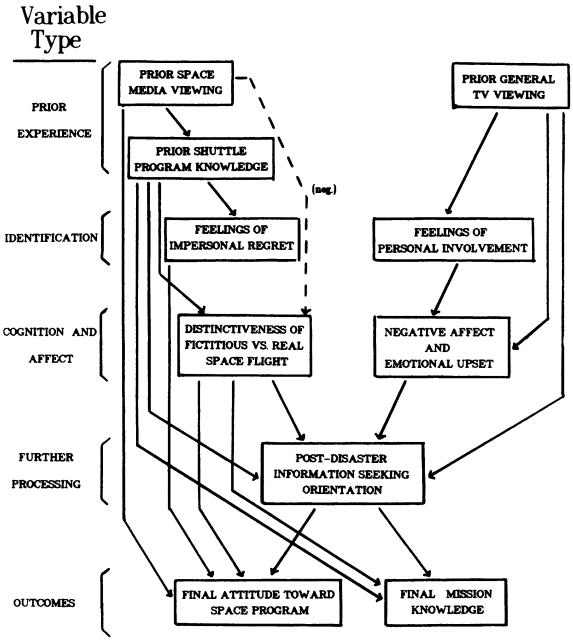

Figure 1: A model of impersonal and personal patterns of response to the space shuttle disaster

assumptions could not be met by the present data set. It is organized in approximate temporal order, with early antecedents located at the top and "final" outcomes at the bottom.

Two patterns of effects converge on whether a child sought more information about the disaster in the following six days or avoided watching further television coverage. That decision, in turn, partially mediates the final outcomes: attitude toward the space program and knowledge about this mission and the disaster.

The first pattern begins with prior space-oriented media viewing, which is positively related to sense of impersonal regret and attenuated affect. That, in turn, is associated with a sharp distinctiveness between space fiction and the realities of space travel. However, the direct link from prior space-oriented media viewing to reality-fantasy distinctiveness is a negative one. Thus the direct effect of a history of prior space-oriented media viewing is to enhance the perceived similarity of real and fictional space travel, consistent with Gerbner et al.'s "cultivation hypothesis" (see, e.g., 16). Nevertheless, the indirect

effect of such viewing is to enhance knowledge about the shuttle mission, which is positively related to the perceived distinctiveness between space reality and space fiction. This is the only such inconsistent triad in the model.[2]

Although it is seen in children of both genders, this pattern is more characteristic of boys than girls. Throughout, the boys' data yield stronger relationships and more fully elaborated connections among variables than do the girls' data. This effect probably results from the fact that the entire area of space exploration and travel, both factual and fictional, is seen as especially appropriate for males in this culture. In any case, the most systematically structured variability for boys is concerned with use of space-oriented media and hard knowledge about the shuttle program, leading to impersonal reactions to the event and a cognitive orientation toward further information seeking.

A fifth-grade boy provided answers typical of this pattern:

Interviewer: *Tell me how you felt when you first saw the explosion of Challenger.*

Boy: *Surprised—I couldn't believe what happened.*

Interviewer: *What about it made you feel that way?*

Boy: *The teacher [McAuliffe] worked a long time to get ready for this flight. . .now there might not be any more space shuttles.*

Interviewer: [later in the interview] *Why have you kept watching TV news about the Challenger?*

Boy: *Find out what made it explode.*

Interviewer: [later] *How did you know it was real?*

Boy: *The president was on every channel talking about it. The countdown numbers were on the screen.*

The second pattern begins with a diet of general television viewing, related to high personal involvement with the crew members and their families (but not the sense of impersonal regret that differentiated the first pattern) which best predicts emotional upset over the disaster. The second pattern was also observed in both sexes but is seen more clearly in the girls' than in the boys' data. The pattern predicts one's level of viewing further coverage of the disaster in the following six days (information-seeking orientation) and therefore one's

We cannot with certainty explain the inconsistent triad. Prior space media viewing is negatively related to fantasy/reality distinctiveness, while both are positively related to prior shuttle program knowledge. It is possible that heavy viewers of space fiction tended to blur the fantasy-reality differentiation, while extensive viewing of space news and documentary programs, through increased shuttle program knowledge, had the opposite effect. Such a finding would be consistent with Gerbner et al.'s cultivation hypothesis (e.g., 16). In the present data set, however, that line of reasoning cannot be evaluated because viewing of the two kinds of space-oriented television programs (i.e., fact and fiction) were strongly correlated and did not have significantly different patterns of correlation with other variables.

level of final knowledge about the mission and final attitude toward the future of the shuttle program.[3]

Part of the interview with one fifth-grade girl illustrates this pattern best:

Interviewer: *How did you feel when you first saw the explosion of the Challenger?*

Girl: *Awful. . .sad.*

Interviewer: *What about it made you feel that way?*

Girl: *All their families and friends watched them die. Everyone knew the teacher and her kids were watching. It was horrible.*

Interviewer: [later] *Why have you kept on watching news about the explosion on TV?*

Girl: *The explosion reminds me of how I feel about it. The teacher was on there—could have been Mr. Christie [the science teacher].*

Interviewer: [later] *How could you tell it was real?*

Girl: *Teachers were watching the TV. . .someone screamed. . .people said, "I can't believe this is really happening."*

It is significant that these two patterns are distinctive modes of response for both boys and girls, though each is more common for one gender than the other and approximately represents a sex-typed stereotype for that gender. For about a quarter of the girls (n = 16), impersonal regret, prior space-oriented media viewing, knowledge of the shuttle program, and distinctiveness of space reality from space fantasy are the critical determinants of final processing and outcome. For this minority of girls, general TV viewing, personal involvement, and emotional upset are not strong determinants of the outcome variables. Typ ical of this subgroup was the comment that the disaster represented "an awful waste of money and effort" or "the end of the shuttle program."

Correspondingly, about a quarter of the boys (n = 15) had outcomes dependent on their involvement in the personal pattern of response, rather than on their viewing of space-oriented media, knowledge, lack of identification with the crew, and discrimination of fantasy from reality. Several of these boys reported, without apparent embarrassment, that they cried once or more about the disaster.

The labeling of these different patterns of influence as sex-typed is generally supported by the differential factor structures reported above for boys and girls and by the multiple regressions reported in Table 2. It is also consistent with our expectation that under the shock, stress, and uncertainty of catastrophic

It should be noted that the designation of final attitude toward the space program as an outcome measure is done on theoretical grounds without documentation of children's attitudes before the disaster. Lacking such baseline information, one cannot be sure that the attitudes established previously and continuing after the disaster might not be the antecedent of information-seeking orientation, rather than its consequence.

events, people revert to the most culturally traditional and stereotypic forms of reasoning as a means of establishing a sense of predictability of events and clear knowledge of what to think and do. Independent of these analyses of individual variation, the mean gender differences described above also reflect higher scores for girls on variables in the personal pattern (right side of Figure 1) and for boys on variables in the impersonal pattern (left side).

Although none of the children evidenced any doubt that the coverage they had seen was real, they relied on different cues to gain that understanding. Children's answers to the open-ended question, "How did you know [it] was real?" were coded for 12 types of responses. These were subsequently grouped into four types of cues: media form, media content, social inference, and other knowledge (see variables 12a–12d for a description). Overall, media form cues were the most frequently cited way of identifying the coverage as real ($\bar{x} = 1.62$ out of a maximum possible score of 3 on each of these subvariables).

The children's comments reflected a high degree of awareness regarding the formal features of television production associated with realistic programming and those associated with dramatic fictional content. Many children noted that the camera seemed too far away from the explosion and/or that the picture was shaky, and this observation apparently aided their recognition that such content could not be a fictional entertainment production. Other responses given more than once were: "the announcer stopped talking," "nothing happened for a while," "there was no music," and "you couldn't see their faces."

Gauging the reactions of others around them, referred to here as social inference, was also an important reality cue ($\bar{x} = 1.01$). In particular, children cited the facial and vocal behavior of their science teacher and the vocal outbursts of other children as critical indicators. The other two dimensions, media content and outside knowledge, clearly were less useful ($\bar{x}$s < 0.30). No age, gender, or interaction effects on these variables were found.

The children were asked why they wanted to see or avoid more coverage of the disaster. Their free responses, first coded for approach or avoidance, were then coded into categories that simply discriminated types of reasons as social, affective, or cognitive. As expected, the social and affective reasons tended to be associated with variables in the personal involvement and affect pattern. Examples of reasons that children stopped watching the news about the accident were "I couldn't stand seeing those people die again and again" and "all they talk about now is why it happened—I'm more concerned about the people." Examples of reasons given for continuing to watch were "I want to find out what lots of people felt," "the teacher asks us about it in science, and if he asks me I want to say something," and "I'm interested in what they have to say. . .what happened to the families of the crew."

Conversely, cognitive reasons were more often associated with variables in the impersonal pattern. Examples of cognitive reasons were "I watch 'cause when it comes on again, it's like something that never happened before and maybe you can see something that no one else saw," "It's interesting—I want

to know what went wrong. . .what's going to happen to the program," and "I want to know if they found more pieces. . .some went in the Atlantic." There were cognitive reasons for not watching as well: "There's really nothing new—they just show the same tape over and over."

The boys' and girls' means were 0.05 and 0.11 for social reasons, 0.03 and 0.11 for affective reasons, and 0.27 and 0.15 for cognitive reasons. No overall or age differences among these three categories were significant.

The explosion of the shuttle Challenger aroused strong emotions in many children, but even those who emotionally distanced themselves from it were motivated to find out more about it, what caused it, and what it meant for the future of the space program. As we have seen, children responded in two ways, either with a cognitive orientation, together with a reliance on television for facts, or with a social and emotional orientation toward the people involved and those with whom the children interacted. Although both boys and girls exhibited each pattern, overall they were differentiated along stereotypical gender lines. The variables for each pattern were not only more strongly related to one another for one gender than for the other, but their means tended to be higher for that gender as well. For example, not only did girls show more affect and upset than boys, but their affective reactions were also more strongly related to personal involvement and postdisaster information seeking than were those of boys. Moreover, the differences between the girls' and boys' order of factors for this data set conformed to these patterns as well.

It should not be surprising that children of these ages responded in terms of sex-role stereotypes. It is true that fourth to sixth graders have advanced beyond the simple gender stereotypes that govern younger children's sex-role schemas (19). They are often described as engaged in developing more complex, multithematic, and androgynous conceptions of their sex-role identity. When a catastrophic disaster occurs, however, a child assimilates it to the schemes she or he has already constructed (29) and in terms of reactions that safely conform to the expectations of the peer group. In the absence of such expectations (i.e., lacking a script for how to react to a disaster that has not happened before), it seems reasonable to find that children revert to some of their oldest, deepest, and most familiar scripts for determining how they should feel and what their feelings mean.

Not so clear are the implications of these results for the issue of the relationships between perceived reality of television and its emotional impact on the young viewer. Until we can independently assess children's perceptions of social realism, factuality, and video style in relation to the affective significance of content, we will not have a complete picture of these complex interconnections. We can conclude that perceived factuality, communicated especially by formal features of the television coverage and by the reactions of coviewers, enhanced the emotional impact and the cognitive import of the disaster.

Another factor that likely enhanced these impacts was the degree of familiar-

ity, involvement, and even identification the children had developed with Christa McAuliffe. Almost every child reported strong affect and concern about her death and sympathy for her family and especially her children. That relationship, in turn, was undoubtedly influenced in part by their closeness to their own science teacher, Mr. Christie, whose personal reactions to the disaster were, by his account, "easy for the kids to read from my face."

Regardless of gender differences in reactions, and regardless of whether a child's orientation was one of personal involvement in grief or impersonal regret over the loss, the viewing of follow-up coverage was a common consequence of strong reactions. For both orientations, such viewing led to a more detailed knowledge of the mission and a more positive attitude toward the shuttle program for the future.

Given television's well-established role as the primary source of immediate information about significant news developments, it is virtually impossible to separate the effects of the shuttle disaster itself on the audience from the effects of the news coverage that reported it. As was the case for the Kennedy assassination, few Americans failed to turn to television to follow the developments surrounding the Challenger explosion. The event itself and the coverage surrounding it meld into a single entity.

While our evidence indicates that most children experienced substantial emotional distress, virtually all appeared to be coping well with the experience when we collected the data six days later. The special debriefing protocol designed to reassure and calm any youngsters who were upset by discussing the event with a researcher proved unnecessary and was not used. Although most children appeared saddened at recalling the tragedy and their reactions to it, they also seemed capable of placing the disaster in an appropriate context, not allowing it to dominate their thoughts. To us this suggests that children are robust in coping with real-world disasters, no matter how they are presented in the media. But the fact that they are presented by mass media has important effects. Indeed, as Katz and his colleagues have noted (20, 21), when the public collectively focuses its emotions on the television set, viewers' knowledge that virtually everyone else is also watching may help them cope with their feelings and encourage them to share their distress with others. It appears that children as well as adults can benefit from such a collective sharing of feelings.

To the extent that one can generalize from the Challenger incident to other disasters children encounter via news media, we would conclude that the shock and uncertainty generated by such news leads toward more simple, traditional, and stereotypical ways of thinking. A focus on objective costs among boys and a focus on personal and social experiences of affect among girls reflect that pattern of coping. If the children were merely reporting the responses they thought were culturally correct for their gender, then we would not have found so many boys admitting strong affect nor so many girls expressing technical interest in the program.

Whether children focus on the people who die in a disaster and become upset, or adopt a more cognitive orientation whose focus allows them to mini-

mize their expressed feelings, none is immune from the powerful impact of instantly and simultaneously distributed catastrophic news like the Challenger explosion.

References

1. Bandura, A., D. Ross, and S. Ross. "Imitation of Film-mediated Aggressive Models." *Journal of Abnormal and Social Psychology* 66, 1963, pp. 3–11.
2. Cantor, J. and S. Reilly. "Adolescents' Fright Reactions to Television and Films." *Journal of Communication* 32(1), Winter 1982, pp. 87–99.
3. Cantor, J. and G. Sparks. "Children's Fear Responses to Mass Media: Testing Some Piagetian Predictions." *Journal of Communication* 34(2), Spring 1984, pp. 90–103.
4. Cantor, J., B. Wilson, and C. Hoffner. "Emotional Responses to a Televised Nuclear Holocaust Event." *Communication Research* 13, 1986, pp. 257–277.
5. Charters, W. *Motion Pictures and Youth: A Summary.* New York: Macmillan, 1933.
6. Clymer, A. "Poll Finds Children Remain Enthusiastic on Space Flight." *New York Times,* February 2, 1986, pp. 1, 15.
7. Dorr, A. "Television and Affective Development and Functioning." In D. Pearl, E. Bouthilet, and J. Lazar (Eds.), *Television and Behavior: Ten Years of Scientific Progress and Implications for the Eighties,* Volume 2. Washington, D.C.: U.S. Government Printing Office, 1982, pp. 68–77.
8. Dorr, A. "No Shortcuts to Judging Reality." In J. Bryant and D. Zillmann (Eds.), *Children's Understanding of Television: Research on Attention and Comprehension.* New York: Academic Press, 1983, pp. 199–220.
9. Dorr, A. "Contexts for Experience with Emotion, with Special Attention to Television." In M. Lewis and C. Saarni (Eds.), *The Socialization of Emotions.* New York: Plenum, 1985, pp. 55–85.
10. Dorr, A., C. Doubleday, and P. Kovaric. "Emotions Depicted on and Stimulated by Television." In M. Meyer (Ed.), *Children and the Formal Features of Television.* New York: K. G. Saur, 1983, pp. 97–143.
11. Dorr, A., S. Graves, and E. Phelps. "Television Literacy for Young Children." *Journal of Communication* 30(3), Summer 1980, pp. 71–83.
12. Dorr, A., P. Kovaric, C. Doubleday, D. Sims, and L. Seidner. "Beliefs about the Realism of Television Programs Featuring Families." Paper presented to the annual conference of the American Psychological Association, Los Angeles, August 1985.
13. Dysinger, W. and C. Ruckmick. *The Emotional Responses of Children to the Motion Picture Situation.* New York: Macmillan, 1933.
14. Fernie, D. "Ordinary and Extraordinary People: Children's Understanding of Television and Real Life Models." In H. Kelly and H. Gardner (Eds.), *Viewing Children Through Television.* San Francisco: Jossey-Bass, 1981, pp. 47–58.
15. Feshbach, S. "Reality and Fantasy in Filmed Violence." In J. Murray, E. Rubinstein, and G. Comstock (Eds.), *Television and Social Behavior,* Volume 2. Washington, D.C.: U.S. Government Printing Office, 1972, pp. 318–345.
16. Gerbner, G., L. Gross, M. Morgan, and N. Signorielli. "Living with Television: The Dynamics of the Cultivation Process." In J. Bryant and D. Zillmann (Eds.), *Perspectives on Media Effects.* Hillsdale, N.J.: Lawrence Erlbaum, 1986, pp. 17–40.
17. Hawkins, R. "The Dimensional Structure of Children's Perceptions of Television Reality." *Communication Research* 4, 1977, pp. 299–320.

18. Hawkins, R. and S. Pingree. "Television's Influence on Social Reality." In D. Pearl, E. Bouthilet, and J. Lazar (Eds.), *Television and Behavior: Ten Years of Scientific Progress and Implications for the Eighties,* Volume 2. Washington, D.C.: U.S. Government Printing Office, 1982, pp. 224–247.

19. Huston, A. C. "Gender, Socialization, and the Transmission of Culture." In S. Brehm (Ed.), *Seeing Female: Social Roles and Personal Lives.* New York: Greenwood Press, 1988, pp. 7–20.

20. Katz, E. "Media Events: The Sense of Occasion." *Studies in Visual Communication* 6(3), Fall 1980, pp. 84–89.

21. Katz, E., D. Dayan, and P. Motyl. "In Defense of Media Events." In R. Haigh, G. Gerbner, and R. Byrne (Eds.), *Communication in the Twenty-First Century.* New York: John Wiley, 1981, pp. 43–59.

22. Kelly, H. "Reasoning about Realities: Children's Evaluations of Television and Books." In H. Kelly and H. Gardner (Eds.), *Viewing Children Through Television.* San Francisco: Jossey-Bass, 1981, pp. 59–72.

23. Klapper, H. "Children's Perceptions of Televised Fiction." *California Management Review* 22(2), 1979, pp. 36–39.

24. Leary, A. "Between the Imagination of a Producer and the Imagination of a Child: Perceiving the Realities of Television." Unpublished manuscript, Center for Research on the Influences of Television on Children, Dept. of Human Development, University of Kansas, 1982.

25. Mayer, M., W. Gudykunst, N. Perrill, and B. Merrill. "Diffusion of Information about the Shuttle Explosion." Paper presented to the annual conference of the International Communication Association, Montreal, May 1987.

26. Mielke, K. and M. Chen. "Formative Research for 3-2-1 Contact." In M. Howe (Ed.), *Learning from Television.* New York: Academic Press, 1983, pp. 31–55.

27. Mielke, K., M. Chen, H. Clarke, and B. Katz. "Survey of Television Viewing Interests among Eight to Twelve Year Olds." Unpublished report, Children's Television Workshop, New York, 1978.

28. Miller, J. "The Impact of the Challenger Accident on Public Attitudes Toward the Space Program." Report to the National Science Foundation. Public Opinion Lab, Northern Illinois University, 1987.

29. Monaco, N. and E. Gaier. "Developmental Level and Children's Responses to the Explosion of the Space Shuttle Challenger." *Early Childhood Research Quarterly* 2, 1987, pp. 83–95.

30. Noble, G. *Children in Front of the Small Screen.* Beverly Hills, Cal.: Sage, 1975.

31. Pingree, S. "The Effects of Nonsexist Television Commercials and Perceptions of Reality on Children's Attitudes about Women." *Psychology of Women Quarterly* 2, 1978, pp. 83–95.

32. Schramm, W. "Communication in Crisis." In B. Greenberg and E. Parker (Eds.), *The Kennedy Assassination and the American Public.* Stanford, Cal.: Stanford University Press, 1965, pp. 175–198.

33. Sigel, R. "Television and the Reactions of Schoolchildren to the Assassination." In B. Greenberg and E. Parker (Eds.), *The Kennedy Assassination and the American Public.* Stanford, Cal.: Stanford University Press, 1965, pp. 199–219.

34. Tomkins, S., R. McCarter, and A. Peebles. "Reactions to the Assassination of President Kennedy." In S. Tomkins and C. Izard (Eds.), *Affect, Cognition, and Personality: Empirical Studies.* New York: Springer, 1965, pp. 172–197.

35. Wolfenstein, M. "Death of a Parent and the Death of a President: Children's Reaction to Two Kinds of Loss." In M. Wolfenstein and G. Kliman (Eds.), *Children and the Death of a President: Multi-Disciplinary Studies.* New York: Doubleday, 1965, pp. 70–90.