Utilizing Museums To Promote Public Understanding Of Science: Early Adolescent Misconceptions About AIDS Prevention

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Museum exhibitions have been touted by many as ideal vehicles for the transmission of general knowledge about science—in fact, as ways to promote public understanding of science. This study, conducted as part of a formative evaluation of an HIV/AIDS exhibit developed by the New York Hall of Science (NYHS), a member of the National AIDS Exhibit Consortium, was designed to investigate two issues: 1) What is the current state of youth awareness of the mechanisms by which condoms help prevent the spread of HIV and other sexually transmitted diseases; and 2) Which of two exhibit designs most efficiently communicates concepts related to HIV sexual transmission prevention.

Based upon discussions relative to AIDS and HIV with early adolescents, we had hypothesized that despite the widespread knowledge among the public that condoms can be useful in preventing the spread of AIDS, there was *not* a widespread comprehension of *how* condoms function in this regard. We predicted that if this hypothesis were true, there would be general confusion between protective strategies that enhanced birth control and protective strategies that prevented infection with the HIV virus.

Part of the purpose of the exhibit *Biology of AIDS* was to provide information to the public relevant to this subject. As currently designed, the exhibit provides a "More Topics" section on "Transmission of HIV." Within this section is a subsection on sexual transmission. The original version provided an informed, but graphically abstract, description of the mechanisms for infection and prevention of infection with the HIV virus during sexual contact. The revised version had essentially the same text, but utilized a more concrete, graphically explicit presentation. The assumption was that the original version was too abstract for most visitors, particularly children between the ages of 10 and 15, to understand. The hope was that a

more concretely illustrated, visually descriptive version would more effectively communicate the intended information.

Specifically, the three major ideas the exhibit in this section was intended to communicate were that:

1. The semen of HIV+ individuals contain HIV virus;
2. Unprotected sex with an infected partner can lead to infection with HIV; and
3. Condoms can prevent this infection.

The research reported here was designed to determine whether misperception about HIV transmission prevention existed and which, if either, version of the *Biology of AIDS* exhibit best informed adolescent visitors relative to this topic.

Methods

To assess these several issues a short questionnaire containing true/false, multiple choice or short answer questions was developed. The initial questionnaire was designed to be administered orally. After pilot testing, it was decided that in light of the topic discussed (i.e., sexual practices), a paper and pencil instrument would better insure privacy and anonymity of the respondent. Pilot testing also helped to refine the wording of questions. A copy of the questionnaire is included as Appendix A.

The approach utilized was to set-up two stations of the exhibit in an isolated corner of the exhibition floor. Small groups of visitors (one to five at a time) were instructed to view just the specific section of the exhibit dealing with sexual transmission. After viewing either the "new" or the "old" version, each visitor was administered the questionnaire. Trials primarily targeted visitors between the ages of 10 and 15 years.

Results

The study was conducted with a racially mixed sample of 118 visitors: 63 males and 55 females. Fifty-three percent were between the ages of 10 and 12 years, 25 percent were between the ages of 13 and 15 years, four were nine years old, three were 16 years or older. The data were collected on mornings during the week, and most, if not all, subjects were visiting the museum as part of a school field trip.

Visitors were asked how much they knew about AIDS. Older children were more confident of their knowledge than younger children (though the oldest visitors were less likely to feel confident about their knowledge [Table 1]). Based on Centers for Disease Control and other studies it was assumed that most visitors over the age of 10 years would already know that condoms can help prevent infection with HIV. Nearly 90% of the visitors queried, in fact, did know this. Table 2 shows that there was a positive

correlation between visitors' self-reported knowledge about AIDS and understanding the role that condoms can play in AIDS prevention—though even among those who reported relatively little knowledge, the advantages of condom use were generally well known.

Tables 3 through 9 summarize the answers to 7 questions posed about each version of the sexual transmission sequence. Table 3 shows visitors' self-reported knowledge about AIDS by treatment. The results indicate that there was no difference in self-reported initial knowledge level between the individuals who saw the two versions of the sexual risk interactive. This result was reinforced by the answers to the question, "Can condoms help prevent AIDS?"—where again no significant differences emerge between viewers of the two versions (Table 4).

Tables 5, 6, 7 and 8 more deeply probe visitor understanding of condoms as AIDS preventatives. As these tables reveal, the children who saw the new version of the sexual transmission section respond differently than those who saw the old version. New version viewers were much more likely to respond that condoms were superior to diaphragms for AIDS prevention (X^2=4.04, $p<.05$) (Table 5), and the quality of their explanations reinforced this increased level of understanding (Table 6). Visitors who saw the new version were more than twice as likely to give a correct response as were visitors who saw the old version (X^2=4.72, $p<.05$).

Examples of responses considered "good" answers were: "Because it keeps the AIDS from getting to the other person's body," "A condom does not allow semen to go to the vagina," and "Birthcontrol (sic) can stop you from having a baby but can't prevent you from AIDS." Examples of responses considered "acceptable" were: "It can stop disease," "Because it protects the person," and "Diaphragm is not good." Responses judged to be "poor" answers were those that merely restated the question, for example, "condoms are better for stopping AIDS," gave platitudes such as, "better safe than sorry," or gave wrong information. A common incorrect answer was, "If you use both you will be safer." Overall, only about half of all children queried correctly responded that condoms were superior to diaphragms. Although the new version improved understanding, a majority of children, even those seeing the new version, could not adequately explain the advantages of a condom over a diaphragm.

New version viewers were twice as likely as old version viewers to be able to explain why a condom helps to prevent infection with the AIDS virus (X^2=6.25, $p<.05$) (Table 7). Good answers specifically mentioned containment of infected sperm—the idea of a condom as a bag. Acceptable answers alluded to disease prevention or protection without specifying containment and poor answers were those that missed the mark, such as, "Because once they do sex. And he don't have a condom. He is going to get sex. Or if he did have a condom. He won't get sex." Roughly two-thirds of new version viewers were able to indicate, at least rudimentarily, how a condom works as compared to only one-third of old version viewers.

Table 8 show the results of the question, "Which of these helps to prevent AIDS?"—repeating an earlier question comparing condoms and diaphragms. There were no significant differences between the new and old version in allowing children to discriminate between AIDS prevention and birth control; the results indicated a large number of children believed that diaphragms and/or birth control pills are more or equally as effective as condoms for AIDS prevention.

Table 9 deals with the separate issue of the role of semen in the transmission of AIDS. There was a high level of overall comprehension of this idea and no indication that either of the two versions was better, or worse, at conveying it.

Conclusions

The data from this study provides strong support for the hypothesis that despite the widespread knowledge among the public that condoms can be useful in preventing the spread of AIDS, there is *not* a widespread comprehension of *how* condoms function in this regard. Support was provided for our contention that there would be general confusion between protective strategies that enhanced birth control and protective strategies that prevented infection with the HIV virus. Although this study was too limited to provide overwhelming proof of the hypothesis, it certainly is suggestive and indicates that this issue warrants continued study.

The results of the study do, however, provide extremely strong support for the benefits of the revised, more graphic version of the sexual transmission section of the *Understanding AIDS* exhibit. The data support the proposition that the group that saw the new version and the group that saw the old version of the sexual transmission section had roughly comparable levels of information prior to viewing the exhibit. Subsequent to viewing these sections, a large majority of the group that saw the new version demonstrated acceptable levels of comprehension about how condoms function to prevent the spread of AIDS. A minority of the group that saw the old version could acceptably describe how a condom functions to prevent the spread of AIDS. Despite the two versions having very similar audio tracks, the new version resulted in a doubling of comprehension on several key concepts. In the area of knowledge of the role of semen in transmitting AIDS, the two versions performed equally well.

Perhaps most importantly, the data support the contention that museums have the potential to serve as vehicles for informing the public about important, and often complex, societal issues such as disease prevention.

Appendix A

New York Hall of Science AIDS Information Survey

1. Do you know a lot, some or not much about AIDS?

2. Can condoms help stop AIDS? Yes No

3. Which is better for stopping AIDS?
   a condom or
   a diaphragm
   both are good

   Explain your choice

   _____

4. Why does a condom help stop infection by the AIDS virus?

   _____

5. If a man is infected with the AIDS virus will his semen contain the AIDS virus?
   Yes No

6. Which of these helps prevent AIDS?
   a. a diaphragm
   b. a condom
   c. birth control pills
   d. all three are helpful

   Male___ Female____
   How old are you____

Table 1
Self-Reported Knowledge of AIDS as a Function of Age of Respondent

Do you know about AIDS?	Age < 10	10 - 12	13 - 15	16 >	Overall
a lot	0.0	16.1	34.5	0.0	17.1
some	0.0	62.9	55.2	66.7	48.7
not much	100.0	21.0	10.3	33.3	17.9
Total	100.0	100.0	100.0	100.0	100.0
Number of Replies	4	62	29	3	117

Table 2
Response to the Question: "Can condoms help prevent AIDS?" as a Function of Self-Report of Knowledge of AIDS

Condems prevent AIDS?	Do you know about AIDS? a lot	some	not much	Overall
Yes	100.0	87.9	80.0	87.9
No	0.0	12.1	20.0	11.1
Total	100.0	100.0	100.0	100.0
Number of Replies	20	58	20	99

Table 3
Self-Reported Knowledge of AIDS by Treatment

Do you know about AIDS?	Treatment new version	old version	Overall
a lot	21.2	19.1	16.9
some	59.6	57.4	49.2
not much	19.2	23.4	17.8
Total	100.0	100.0	100.0
Number of Replies	52	47	118

Table 4

Response to the Question: "Can condoms help prevent AIDS?" as a Function of the Version of Interactive Seen

	Treatment		
Condems prevent AIDS?	new version	old version	Overall
Yes	85.7	88.9	86.4
No	14.3	11.1	12.7
Total	100.0	100.0	100.0
Number of Replies	63	54	118

Table 5

Response to the Question: "Which is better for preventing AIDS? A diaphragm, a condom, both are good" as a Function of Treatment

	Treatment		
Which is better?	new version	old version	Overall
Condom	68.8	44.4	57.6
Diaphragm	4.7	13.0	8.5
Both	26.6	42.6	33.9
Total	100.0	100.0	100.0
Number of Replies	64	54	118

Table 6

The Quality of the Explanation of Why Condoms or Diaphrams are Superior for Preventing AIDS as a Function of Treatment

	Treatment		
Why condom/diaphragm bett	new version	old version	Overall
good answer	28.1	11.1	20.3
acceptable answer	17.2	11.1	14.4
poor answer	26.6	50.0	37.3
no answer	28.1	27.8	28.0
Total	100.0	100.0	100.0
Number of Replies	64	54	118

Table 7

Response to "Why does a condom help prevent infection with the AIDS virus?" as a Function of the Version of Interactive Seen

	Treatment		
Why condom prevents AIDS?	new version	old version	Overall
good answer	39.1	18.5	29.7
acceptable answer	26.6	14.8	21.2
poor answer	12.5	37.0	23.7
no answer	21.9	29.6	25.4
Total	100.0	100.0	100.0
Number of Replies	64	54	118

Table 8

Response to the Question: "Which of these helps prevent AIDS?" by the Version of the Interactive Seen

	Treatment		
Which prevents AIDS?	new version	old version	Overall
a diaphragm	11.1	1.9	6.8
a condom	58.7	44.2	50.8
birth control pills	3.2	3.8	3.4
all three are helpful	27.0	50.0	36.4
Total	100.0	100.0	100.0
Number of Replies	63	52	118

Table 9

Response by Treatment to the Question "If a man is infected with the AIDS virus will his semen contain the AIDS virus?"

	Treatment		
Can semen contain AIDS?	new version	old version	Overall
Yes	81.3	88.5	83.1
No	18.8	11.5	15.3
Total	100.0	100.0	100.0
Number of Replies	64	52	118