

# Adolescents' perceptions of a health survey using multimedia computer-assisted self-administered interview

## Abstract

**Objective:** To ascertain young people's perceptions of an adolescent health survey when administered by multimedia computer assisted self-administered Interview (M-CASI) through analysis of (1) questionnaire item responses and (2) focus group interviews.

**Methodology:** Setting: Auckland, New Zealand, 1999. Study type: Pilot testing of a 488-item branching questionnaire delivered using a youth-oriented and user-friendly M-CASI interface in a variety of settings using both desktop and laptop computers. Post pilot focus groups of participants identifying their perceptions and experiences of the survey. Sample: 110 school students aged 12 to 18 years.

**Results:** The mean number of questions answered by participants was 316 with the median time to completion being 48 minutes. On average 65% of the total number of questions were seen and of these 1.5% were deliberately not answered. A high level of acceptability and enjoyment of M-CASI was found in the analysis of focus group responses and agreed with the item responses relating to M-CASI within the questionnaire itself. Participants identified privacy and confidentiality as being particularly important for the honesty of their responses. The passive matrix screens of the computers were popular as they could only be viewed from in front.

**Conclusions:** M-CASI is an acceptable instrument for the administration of a youth health survey. Laptop computers with passive matrix screens are able to enhance perceptions of privacy and confidentiality, which may improve honesty of responses.

**Implications:** M-CASI is now feasible and offers advantages in health surveying.

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A fundamental challenge for youth health researchers is how to gather reliable and valid information from young people. It is potentially embarrassing or dangerous for young people to disclose socially undesirable or illegal behaviours. In addition, adolescent development includes the need for privacy.<sup>1-3</sup> The most efficient and valid means of obtaining accurate information is unclear.

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Confidential self-report surveys have been frequently employed to meet these challenges. When compared with questionnaires administered by an interviewer, pen and paper self-administered surveys have consistently been shown to improve reporting of sensitive behaviours.<sup>4,5</sup> However, these methods are not without problems. Estimation of termination of pregnancy rates from actual clinic records shows that pen and paper self-administered surveys miss about 30% of all terminations.<sup>6</sup>

More recently researchers have been using computer assisted self-administered interviews (CASI) to gather data on a wide range of adolescent health-related behaviours.<sup>7-11</sup> A major advantage of CASI is its potential to improve the quality of data collection. In comparison with pen and paper self-administered interviews, CASI generally increases the reporting of sensitive behaviours in young people.<sup>12,13</sup>

The efficiency of data collection is improved using CASI. The participants' responses determine the next question, allowing complex branching questionnaire design. This avoids exposure to non-applicable questions and reduces questionnaire completion time. A database is automatically compiled, reducing time required for data collation and avoiding data entry errors associated with data coding.

An enhancement of CASI has been the addition of an audio voice-over (A-CASI). Questions are heard over headphones at the same time they appear on screen.<sup>14,15</sup> A-CASI addresses problems due to poor literacy and has been shown to further increase reporting of sensitive behaviours.<sup>5,16</sup>

With computer technology becoming more powerful and affordable, it has now become possible to enhance A-CASI with multimedia graphics (M-CASI). This allows pictures, music and animation to accompany an A-CASI questionnaire. What is not known is how M-CASI affects ease-of-use, comprehensibility, and the participants' perceptions of privacy and confidentiality. This may well affect the accuracy and honesty of responses.

The purpose of this study was to pilot the methodology of M-CASI that will be used to undertake a large nation-wide youth health survey in New Zealand. The aim was to ascertain young people's perceptions of an adolescent health survey when administered by M-CASI through analysis of (1) questionnaire item responses and (2) qualitative focus group interviews.

## Methodology

### Questionnaire development

In preparation for the NZ Youth Health Survey, consultation on youth health information needs was undertaken with key stakeholders and end-users including health providers, youth health researchers, government agencies, schools, young people, and Maori and Pacific community leaders. Continuing dialogue was established through participation in a project advisory group. A pilot questionnaire was developed from the major themes and research questions identified from the consultation process, literature review and currently available relevant health questionnaires, validated nationally and/or internationally.

The pilot questionnaire had eight major domains of inquiry (see Table 1). Each domain included items that identified a range of health risk behaviours, risk factors, health conditions and health promoting/resiliency enhancing factors. To reflect the diverse backgrounds of New Zealand's young people, the questionnaire contained a range of ethnic-specific questions. Branched questionnaire design was used, particularly in sensitive areas such as sexuality and drug use. The aim was to limit exposure to sensitive questions for participants with no direct experience in these behaviours.

### Instrument development

A team of designers and programmers was commissioned to design a youth-oriented and user-friendly multimedia questionnaire interface. A cartoon Kiwi motif on a tropical island was developed. As the participants answered sections on the different aspects of their life, they travelled around the island ending up at the top of a mountain at the end of the survey.

Questions were read out over headphones as well as being displayed on the computer's screen. Answers required 'point and click' responses using a mouse. Keyboard data entry was not required. Respondents were also able to choose not to answer questions or sections at any point. Preceding sensitive sections of the questionnaire, reminders were given that involvement in the questionnaire was voluntary and answers were confidential and anonymous. If the questions had been upsetting for respondents, 'safety' screens provided advice and contact details of people to talk to; this included the people administering the questionnaire. Questionnaire responses were automatically coded and stored on to floppy disk. Files were then directly imported into SAS statistical software and collated for analysis.

Individual young people went through the questionnaire item-by-item with a member of the research team to assess face validity and comprehensibility. The final questionnaire consisted of 488 questions. Some questions had multiple possible responses bringing the total number of data items to 956.

### Ethics

Approval for this study was obtained from the University of Auckland Human Subjects Ethics Committee. Anticipating that this study will lead to a large nation-wide representative survey, it was recognised that active written parental consent would be a significant barrier to subject participation and reduce the quality and utility of the data collected. The Ethics Committee concurred, and the study received approval to use a passive parental consent process. Informed consent was obtained from all participating young people, school principals and school Boards of Trustees.

### Procedure

The study recruited participants from five sites: two urban secondary schools, two rural secondary schools and one out-of-school high-risk youth program. Schools were selected on the basis of having students from a diverse range of socio-economic and ethnic backgrounds.

**Table 1: Examples of research areas and questions from different survey domains.**

Domain	Example research area	Example questions
Ethnicity	Cultural connectedness	Which of the following best describes your ability in understanding Maori?
Home & school	Parental connectedness	How much do you think your mum cares about you?
	School performance	Compared with other students in your class how well do you do at school?
Neighbourhood & spirituality	Peer connectedness	How many friends do you have?
	Religious affiliations	How often do you attend church/mosque/shrine or other place of worship?
Health	Perception of health	In general how would you say your health is?
	Access to health care	Which one place do you usually go for health care?
	Emotional wellbeing	In general, how have you been feeling?
Food & activities	Eating patterns	Do you eat breakfast?
	Exercise patterns	In the last 7 days, how many times have you done any exercise or an activity that makes you sweat, breathe hard, or gets your heart rate up?
Sexuality	Source of sexual health information	Where have you got your sexual health information from?
Substance use	Cigarette use	About how often do you smoke cigarettes now?
Injuries & violence	Vehicle-related behaviour	In a car how often do you wear a seat belt?

The survey was administered to groups of 10 to 15 students. Students were given a written and verbal explanation of the study and written consent was obtained from those who chose to participate. The M-CASI survey was administered in range of settings and room layouts, using both desktop and laptop computers.

Following the completion of the questionnaire students participated in focus groups facilitated by members of the research team. The focus group sessions were approximately 40 minutes in length. The groups comprised six to 10 students of the same gender to enhance the discussion of sensitive issues. Three members of the research team completed all focus group analyses. To ensure that categories and themes captured the most relevant student responses regarding the use of M-CASI, all analyses were discussed among the researchers. Seven open-ended questions (see Table 2) were used to promote discussion about their experiences and feelings regarding the use of M-CASI to complete an adolescent health survey. Responses were manually recorded and grouped by question headings. Responses were then analysed for common themes.

In addition to the data from the focus groups, analysis of responses to questionnaire items, relating to the acceptability and enjoyment of M-CASI, was undertaken.

## Results

Between June and August 1999, one hundred and ten students, 48% male and 52% female, aged between 12 and 18 years, participated in the M-CASI adolescent health survey.

Ethnicity was determined by self-identification within the questionnaire with students being able to select more than one ethnicity. Twenty-nine per cent of the participants identified as Maori, 56% as European, 38% as Pacific, and 6% as other.

Participants answered a mean of 316 (SD 23.6) questions. The median time taken was 48 minutes (range 30-64). Three participants failed to complete the questionnaire due to insufficient time. Branching questionnaire design meant that on average only 64.8% of the total number of questions were seen. Of these, the median number of questions deliberately not answered, was five (range 0 to 34), which was 1.5% of the mean number of questions seen.

A total of 98 students participated in 14 focus groups. Each focus group comprised six to 10 subjects, and was facilitated by either one member of the research team or the research assistant. The perceptions regarding the survey and the multimedia interface are presented under the major themes derived from the analysis of focus group responses.

### *M-CASI interface*

Questionnaire items relating to the multimedia computer interface showed that most students were positive about M-CASI. Ninety-four per cent of students thought that the computer made answering the questionnaire easy and no one found it difficult. Seventy-two per cent said the computer was either 'somewhat cool' or 'very cool'.

Students were asked in the focus groups about their percep-

**Table 2: Focus group questions.**

1. How was doing the survey?
2. Do you think there was enough time to do the survey? Was the survey too short, too long, just right?
3. How did you find it, having the questions read out to you over the headphones?
4. What things in the survey did you think other young people your age would find upsetting to answer?
5. Were there any difficulties in answering the questions? What were they?
6. Where there any difficulties in using the computer? What were they?
7. What do you think is the value of doing this study?

tions of the multimedia computer interface and about using computers for youth health surveys. Analysis of the focus group data revealed very positive responses to the computer interface, particularly the audio component of M-CASI.

*"the computer was easy"*

*"the computer is better than paper"*

*"good not having to write anything"*

*"it was good not having to read the questions"*

### Privacy

A second major theme identified centred on issues of confidentiality and privacy. Participants did not like others being able to see their answers. The laptop passive matrix screens were more popular than the desktop active matrix screens, as the laptop screens could only be viewed from directly in front. Some participants said they would have wanted even more privacy.

*"I didn't want anyone looking and the [laptop] screens were good as no one could see"*

*"for some questions, I do not want people to see my answers"*

*"I want privacy, like exams"*

*"it could be even more private with cardboard side screens"*

### Enjoyment

Nineteen per cent of participants said they enjoyed the survey a lot. Eighty-one per cent thought it 'ok'. Information from the focus groups revealed that the reasons for this were varied; some students saw the value in the survey itself and others liked the change from usual school routine. Most students liked the colourful graphic and cartoon theme.

*"the questions were fun and interesting and some made you think"*

*"the Kiwi [graphic] was cool and the music was fun"*

*"good to get out of class"*

### Honesty

When asked at the end of the questionnaire how honestly had they answered their questions, 86% said they were very honest and 14% said they were mostly honest. Most focus groups highlighted the relationship between honesty and confidentiality.

*"it's hard to be honest, but anonymity makes you more honest"*

*"it's better if it is private, otherwise you could be showing off and not be honest"*

### Difficulties

When asked about difficulties, most of the comments focused on issues of interpretation and wording of questions. Some students were frustrated when the item responses did not reflect the diversity of their experience or situation. Some students indicated a preference to type in their responses in a descriptive form rather than be required to choose from predefined categories. Very few students identified problems with the multimedia computer interface itself.

*"[I wanted] a 'does not apply' to me button"*

*"I wanted to explain my answers"*

*"I wanted to type in my answer"*

### Consent

When asked within the questionnaire whether parental consent was necessary, 79% thought that parental consent was not required. Some focus group participants went further and stated that if parental consent were required they wouldn't answer as truthfully.

*"if parental consent was needed [I] wouldn't answer the same"*

*"we're doing it not them"*

*"don't need parent [consent] but they should be informed"*

### Discussion

As far as we are aware M-CASI has not yet been used for self-administered youth health surveys. The reaction of participants to this technology before undertaking this study was therefore unknown.

Focus groups provided data about participants' opinions, experiences and perceptions of using M-CASI when taking an adolescent health survey. This was compared with data obtained through analysis of questionnaire items relating to the survey itself. This study is limited by lack of comparison to the same questionnaire administered by more traditional means. This would have enabled a more direct comparison of the new technology with old.

A high level of acceptability and enjoyment of the multimedia interface was evident. Both the focus group responses and questionnaire items relating to M-CASI were positive. Participants thought the multimedia interface made answering the questions easy and appreciated not having to read the questions. The majority of participants enjoyed the graphics and music. The participants reported no difficulties with the interface, although at times some participants would have liked the opportunity to type in their answers. This resulted in refinement of the survey instrument to provide this option to participants.

There is increasing recognition of the importance of meaningful involvement of young people in research.<sup>17,18</sup> This study incorporated young people during all stages of development and allowed the participants the opportunity to voice their opinions about a potentially new health survey tool. The involvement of young people may also have contributed to the acceptability of the M-CASI questionnaire.

When young people report sensitive behaviours, privacy and anonymity are important determinants of the honesty of their responses.<sup>2,13</sup> These results support previous research regarding the importance of confidentiality and the ability of computer technology to enhance this when collecting sensitive self-report data.<sup>5</sup> Computerised interviewing enhances privacy, as others are unable to see a participant's earlier responses because the questions disappear once answered. Perceived anonymity is improved as computers are unable to identify participants individually.<sup>13</sup> However, in the school setting privacy is potentially reduced by the proximity of students to one another. Students using CASI when

seated less than five feet from other participants report less sensitive behaviours.<sup>11</sup> In this study it was observed that the passive-matrix display screen technology meant that the screens could only be read directly in front of the laptop computer. Combined with seating arrangements that stop participants seeing other screens, the use of laptop computers with passive-matrix display screens may enhance the perceived privacy of students answering M-CASI questionnaires in the future.

This study found a low non-response rate to questionnaire items using M-CASI. One of the benefits of computer-assisted interviewing is thought to be an improved response rate through enforcement of answers.<sup>10</sup> However, in this study methodology questions were voluntary and without enforcement. Despite this the non-response rate was less than 2%. This suggests the improved response rate seen with computer-assisted self-interviewing may be from other factors such as an enhanced sense of privacy or exposure to questions relevant to the participant due to the branching design employed.

The results from this pilot study showed that students found the administration of an adolescent health questionnaire using laptop multimedia computer technology acceptable and enjoyable and provided suggestions that have led to refinement to the M-CASI questionnaire. Use of this technology may have broad applications for future population-based, self-report surveys.

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## References

1. Resnick M, Blum RW, Hedin D. The Appropriateness of Health Services for

- Adolescents: Youths' Opinions and Attitudes. *J Adolesc Health Care* 1980;141:137-41.
2. Ginsburg KR, Slap GB, Cnaan A, Forke, CM, Balsley CM, Rouselle DM. Adolescents' perceptions of factors affecting their decisions to seek health care. *J Am Med Assoc* 1995;273(24):1913-8.
  3. Parrot R, Burgoon JK, Burgoon M, LePoire BA. Privacy Between Physicians and Patients: More Than a Matter of Confidentiality. *Soc Sci Med* 1989;29(12):1381-5.
  4. Aquilino W. Interview mode effects in surveys of drug and alcohol use. *Public Opin Q* 1994;58:210-40.
  5. Tourangeau R, Smith T. Asking sensitive questions: the impact of data collection mode, question format, and question context. *Public Opin Q* 1996;60:275-304.
  6. Jones E, Forrest J. Underreporting of abortions in surveys of U.S. women: 1976 to 1988. *Demography* 1992;29:113-26.
  7. Millstein SG, Irwin CE. Acceptability of computer-acquired sexual histories in adolescent girls. *J Pediatr* 1983;103:815-9.
  8. Paperny DM, Aono JY, Lehman RM, Hammer SL, Risser J. Computer-assisted detection and intervention in adolescent high-risk health behaviours. *J Pediatr* 1990;116:456-62.
  9. Hibbert ME, Hamill C, Rosier M, Caust J, Patton G, Bowes G. Computer administration of a school-based adolescent health survey. *J Paediatr Child Health* 1996;32:372-7.
  10. Erdman H, Klein MH, Greist JH. The reliability of a computer interview for drug use/abuse information. *Behav Res Methods Instrum* 1983;15:66-8.
  11. Beebe TJ, Harrison PA, McRae JA, Anderson RE, Fulkerson JA. An evaluation of computer-assisted self-interviews in a school setting. *Public Opin Q* 1998;62:623-32.
  12. Webb PM, Zimet GD, Fortenberry JD, Blythe MJ. Comparability of a computer-assisted versus written method for collecting health behavior information from adolescent patients. *J Adolesc Health* 1999;24:383-8.
  13. Supple AJ, Aquilino WS, Wright DL. Collecting sensitive self-report data with laptop computers: impact on the response tendencies of adolescents in a home interview. *J Res Adolesc* 1999;9:467-88.
  14. Johnston J, Walton C. Reducing response effects for sensitive questions: a computer-assisted self interview with audio. *Soc Sci Comput Rev* 1995;13:304-19.
  15. Romer D, Hornik R, et al. "Talking" Computers: A reliable and private method to conduct interviews on sensitive topics with children. *J Sex Res* 1997;34:3-9.
  16. Turner CF, Ku L, Rogers SM, Lindberg LD, Pleck JH, Sonenstein FL. Adolescent sexual behavior, drug use, and violence: increased reporting with computer survey technology. *Science* 1998;280:867-73.
  17. Haggerty RJ, Cohen MI. Adolescent health: is it now on the nation's agenda? *Pediatrics* 1992;89:777.
  18. *Programming for Adolescent Health and Development*. Geneva: WHO/UNFPA/UNICEF Study Group on Programming for Adolescent Health Needs, 1999. WHO technical report series No.:886.