

Impact of mixed survey modes on physical activity and fruit/vegetable consumption: A longitudinal study

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It is recommended that researchers who use mixed modal methods for data collection compare their impact on outcome measures. The purpose of this study was to examine the physical activity and fruit/vegetable consumption behaviors of a multiethnic sample of adults, comparing participants who continued a telephone survey and those who transitioned from a telephone to a web-based survey for a follow-up data collection point. This longitudinal study used a random sample of 700 Hawaii residents (63.3% Female; Mean age=47, SD=17.1). At baseline, participants completed a computer-assisted telephone interview assessing the stage, behavior, and decisional balance of both physical activity and fruit/vegetable consumption. For the three-month follow-up survey, participants were given the option of completing the survey either on the web or by phone. Repeated measures analysis of variance (ANOVA) was computed for related physical activity scales and fruit/vegetable consumption variables to compare the change in response across time between a web group and phone group. For both physical activity and fruit/vegetable consumption, all mode-by-time interactions were significant ($p < .05$). The participants who preferred the telephone survey maintained their levels, whereas those who preferred the web survey reported a decrease in each variable. These results suggest that changing the mode of a survey may introduce a systematic bias in data and that researchers should proceed with caution when using mixed modes of data collection.

Keywords: Mixed-mode, Telephone, Web, Questionnaire, Physical Activity, Fruit and Vegetable Consumption

Introduction

Different methodologies or “modes” are used to survey participants in observational studies of populations. Traditional modes include interviews or questionnaires delivered face-to-face or by postal mail. New modes involve computer- and internet-assisted techniques such as Interactive Voice Response (IVR; phone survey using voice recognition and touchtone data entry), e-mail surveys, and web-based surveys (Dillman and Christian 2005). Further methods can be characterized by how the survey is presented -oral communication mode (telephone, IVR) as opposed to visual communication mode (mail, e-mail, web) (Dillman and Christian 2005).

Web-based online surveys are a latest addition to the self-administered visual survey techniques. They are increas-

ingly utilized in health-related data acquisition because of their wide geographical reach, cost savings, speedy data collection, automated back end data entry, and interactive and flexible design features. A web-based survey can resemble a written survey in its layout. Participants are generally asked to enter their responses directly on a website using buttons, check boxes or selection boxes for close-ended questions and text field boxes for open-ended questions. Page turning or ‘screen-turning’ can be accomplished by having participants click the ‘go to next’ button. Although self-administered, web-based surveys can be programmed to control the user data entry by minimizing or eliminating the occurrence of data entry errors and blank responses (Schleyer and Forrest 2000). It can also incorporate audio, video, animation, color graphics, and hyper linking or branching which is not available or cumbersome in traditional survey methods.

Web-based surveys require the participant to have access to a computer and Internet with certain minimum transmission speed; however, having access to a computer is not enough for the people to complete the questionnaire. It requires some computer skills and literacy such as being able to open the Internet browser, find the web site address (URL), key in, and navigate the website (Dillman 2006;

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Bowling 2005). Depending on the types of operating systems, browsers, and screen configuration the respondents have, the same questionnaire may be displayed differently on their screens (Dillman 2006; Dillman and Christian 2005). Besides the complex issues arising from the use of technology, lower coverage and response rate are the known current limitations of web-based surveys (Dillman and Bowker 2001; Mockovak 2006).

Although random-digit-dial (RDD) telephone surveys have been an economical alternative to face-to-face surveys, they also have inherent limitations. The most notable limitations to telephone-based surveys include declining coverage due to decreasing landline subscriptions along with increasing adoption of wireless or cellular phones. According to the Federal Communications Commission (FCC) report, in 2004 the national average percentage of households with telephone services was estimated to be 94.9%, of which 51.7% households had landline and cellular services, 6% households subscribed to cellular services only, and the remaining 32.7% stayed with landline services only (FCC 2005). The same report shows that US had an average annual growth of 3% in telephone service subscription since 1970 reflecting the national population and economic growth, however, it reached the ceiling in 2000 and we now see a negative growth in landline use. Consequently, households with cellular services and broadband Internet services are growing (Federal Communications Commission 2005). Since cellular numbers are excluded from RDD samples, estimating health behaviors of cell phone users without landlines will become a challenge. Galesic et al. discusses three foreseeable drawbacks even if cellular numbers are sampled lower response rate, need for incentives to compensate for the airtime, and multitasking nature of respondents when completing the survey (2006). Hence, one option is to incorporate mixed survey modes to reduce these disadvantages.

Purpose

Previous studies show the effects of survey mode on study measures to be unpredictable (Link and Mokdad 2005). Different survey modes may produce non-equivalent responses. It is recommended that researchers who incorporate mixed modal designs be aware of the effect, and if needed, test and address the impact (Link and Mokdad 2005).

This paper reports the effects of mixed survey modes on self-reported physical activity and fruit/vegetable consumption variables in a multiethnic sample of adults. To our knowledge, there is no published physical activity behavior change study reporting web-based online survey effects compared to telephone survey effects. Similarly, there are no studies reporting mixed modal survey effects on fruit/vegetable intake.

Methods

Participants

Residents of Hawaii were recruited using random digit dialing. A total of 41,463 calls were attempted. A total of

4,392 calls resulted in contact, of which 2,785 calls (63.4%) reached eligible households, and 1,607 reached businesses or ineligible households (paggers, non-residents, non-English speakers). By asking for an adult household member who had the most recent birthday, 700 adults (18 years or older) were recruited (25.1% participation rate).

Of 700 adults who completed the baseline survey about their physical activity and nutritional intake, 542 (77.4%) also completed the three-month follow-up. Participants who completed the three-month follow-up were not demographically different from the total random sample (data not shown). Participants were from 18 to 91 years of age (mean age = 48.3, SD = 16.8 years) with 63.4% female and 53.7% married. Mean education years of participants were 14.9 years with median household income of \$50,000 \$60,000. When asked about ethnic identification, 35% identified themselves as Caucasian, 17.1% as Japanese, 18.9% as Hawaiian or Part Hawaiian, 8.6% as Filipinos, and 20.4% as others.

Survey Methodology

The questionnaire was designed and developed in order to identify the mechanisms of behavior change for physical activity and nutrition. Project staff subcontracted a local research and marketing firm based upon their agreement to recruit a statewide representative sample of 700 adults using random digit dialing (RDD). The local marketing firm created a computer assisted interviewing (CATI) system to capture all data ensuring efficient phone survey procedures. The call center assigned seven interviewers during the project's survey months, all of which were professionally trained for interviewing skills, data coding and data entry to ensure quality. Informed consent ensuring privacy and confidentiality was obtained from the participants. A \$10.00 incentive was provided to the participants each time they completed the survey. The University of Hawaii Institutional Review Board approved all procedures.

At baseline, participants responded to questions corresponding to their physical activity and fruit and vegetable consumption. Prior to the three-month follow-up, a pre-survey announcement was sent to the study participants providing them with an option of completing the survey on the web or by phone. Individually pre-assigned passwords and URLs were issued at that time. The web and CATI phone questionnaires were created simultaneously using the same software program, ensuring that question wording and format were identical. The only difference between the web-based survey and interviewer-administered phone survey was that in the CATI questionnaire, options of a "don't know" or "refused", although not read to the participants, were available as responses whereas in the web questionnaire, participants were only allowed to select a "prefer not to answer."

Measures

In the survey, participants were asked questions about demographics as well as psychosocial and behavioral variables including those addressing physical activity and fruit/vegetable consumption.

Physical Activity Stage: Four statements determined the stage of change of each participant. The precontemplation stage indicated that the participant did not meet the criterion (at least 30 minutes for five days a week of moderate or higher intensity physical activity) and had no intention to do so. The contemplation stage indicated that the participant did not meet the criterion but had an intention to do so within the next six months. The preparation stage indicated that the participant did not meet criterion but had an intention to start within the next 30 days. The action stage indicated that the participant had been at criterion for less than six months. The maintenance stage indicated that the participant had been at criterion for six or more months (Nigg 2002; Reed, Velicer, Prochaska, Rossi, and Marcus 1997). This type of stage measure has been validated against self-reported and objective physical activity indicators (Hellsten et al. in press).

Physical Activity Behavior: Physical activity was calculated as total MET hours per week using a three-item instrument from Godin and Shepard (1985). The Godin scale items correspond to the average weekly frequency of mild, moderate, and strenuous physical activity. Mild activity is defined as “minimal effort, no sweating.” Moderate activity is defined as “not exhausting, light sweating.” Strenuous activity is defined as “heart beats rapidly, sweating.” Two-week test-retest reliabilities for a sample of adults aged 18-65 years were .94, .46, and .48 for strenuous, moderate, and mild exercises respectively (Godin and Shepard 1985).

Decisional Balance for Physical Activity: The pros and cons (decisional balance) of physical activity is a two-factor, ten-item 5-point Likert scale (1 = not at all important; 2 = slightly important; 3 = moderately important; 4 = very important; 5 = extremely important) (Paxton et al., 2008). The factors are internally consistent (Cronbach’s alpha pros = .90; cons = .67) (Paxton et al. 2008).

Fruit/Vegetable Consumption Stage: A two-step algorithm consisting of a series of four possible questions was used. The precontemplation stage indicated that the participant did not meet the criterion (five or more servings of fruits and vegetables a day) and had no intention to do so. The contemplation stage indicated that the participant did not meet the criterion but had an intention to do so within the next six months. The preparation stage indicated that the participant did not meet criterion but had an intention to start within the next 30 days. The action stage indicated that the participant had been at criterion for less than six months. The maintenance stage indicated that the participant had been at criterion for six or more months (Greene, Fey-Yensan, Padula, Rossi, Rossi, and Clark 2004).

Fruit/Vegetable Consumption Behavior: The NHANES is a national surveillance instrument which includes a widely used measure of fruit/vegetable consumption (NHANES 2007). Single items addressing the average number of fruits and the average number of vegetables eaten each day have documented reliability ($n=240$, $r = .53$, $p < .01$) and validity with a three-day food record ($n=60$; $r = .33$, $p < .01$) (Prochaska, Sallis, Rupp, and Wade 2000). Their validity is supported by significant correlations with a 19-item fruit and vegetable questionnaire ($r = .28$), 24-hour dietary recalls

($r = .31$), and serum carotenoids levels ($r = .35$) (Resnicow et al. 2000).

Decisional Balance for Fruit/Vegetable Consumption: The pros and cons (decisional balance) of fruit/vegetable consumption is a two-factor, ten-item Likert format scale. Participants were asked to rate the importance of each statement in making the decision to eat fruits and vegetables using a 5-point Likert scale (1 = not at all important; 2 = slightly important; 3 = moderately important; 4 = very important; 5 = extremely important). Previous psychometric studies, using an adapted version of this scale, with older adults ($N = 178$) demonstrated acceptable internal consistency for both scales (Cronbach’s alpha = .79 pros, .75 cons) (Greene et al. 2004).

Results

There were 225 (41.5%) participants who chose the web-based survey while 317 (58.5%) chose the phone survey at time point 2. Demographic comparisons revealed significant differences between those who chose web versus phone at time point 2 (see Table 1). Males were more likely to choose phone; Caucasians and Japanese were more likely to choose web, whereas Hawaiian or Part Hawaiian and Filipinos were more likely to choose phone; and those who chose web were on average more educated, had a higher income, and were younger.

We ran initial one-way ANOVAs with mode as the main effect at baseline and there were no significant baseline differences between phone and web responders on physical activity stage, Godin scale of total MET physical activity, and physical activity pros ($F_{1,531}=.966$, $p > .05$; $F_{1,531}=1.32$, $p > .05$; $F_{1,540}=.663$, $p > .05$; respectively), but there was a significant difference in physical activity cons ($F_{1,540}=5.838$, $p < .05$). This same analysis was performed on fruit/vegetable consumption variables and there were no significant differences between the two groups in stage, NHANES scale, pros, and cons ($F_{1,512}=1.395$, $p > .05$; $F_{1,537}=1.63$, $p > .05$; $F_{1,539}=.016$, $p > .05$; $F_{1,539}=3.55$, $p > .05$; respectively).

We ran two-way mixed model ANCOVAs with mode and time as the main effects and a mode-by-time interaction on the four physical activity variables. Due to the demographic differences we controlled for gender, ethnicity, education, income and age. Significant mode-by-time interactions on the Godin scale of total MET physical activity ($p < .05$), physical activity pros ($p < .05$) and cons (marginal $p = .07$) were found, whereas the interaction was not significant for physical activity stage. The same findings were true, except for the cons, with the fruit/vegetable consumption scales ($p < .05$, see Table 2). For all variables, the phone group maintained their levels (did not change from time point 1 to time point 2) whereas the web participants reported a decrease in each variable (see Table 2).

Discussion

A previous study examined the effects of mixed modes on questions about health conditions and risk behaviors (asthma, diabetes, obesity, and HIV testing) and found differences among survey modes, even after adjusting for de-

Table 1: Baseline Demographic Comparison by Data Collection Mode.

		Phone - Phone	Phone - Web			
Overall	N	317	224			
	%	58.60	41.40			
Gender				χ^2	<i>df</i>	<i>p</i>
Male	N	132	66	8.39	1	.004
	%	66.67	33.33			
Female	N	185	158			
	%	53.94	46.06			
Ethnicity						
Caucasian	N	104	95	15.65	5	.008
	%	52.26	47.74			
Hawaiian/Part Hawaiian	N	64	23			
	%	73.56	26.44			
Filipino	N	32	13			
	%	71.11	28.89			
Japanese	N	53	47			
	%	53.00	47.00			
Refused	N	2	2			
	%	50.00	50.00			
Other	N	62	44			
	%	58.49	41.51			
Grade				<i>t</i>	<i>df</i>	<i>p</i>
	M	14.15	15.94	7.70	535	<.001
	SD	2.40	2.98			
Household Income (in \$10,000's)						
	M	4.87	6.17	4.74	400	<.001
	SD	2.75	2.68			
Age						
	M	50.91	44.69	-4.31	539	<.001
	SD	18.14	13.95			

mographic characteristics (Link and Mokdad 2005). In concordance with those findings the current study provided evidence for a difference in responses to questions administered by different survey modes for physical activity and fruit/vegetable consumption among a multiethnic sample of adults living in Hawai'i. We observed that there were no baseline differences between the groups choosing the different modes (i.e., telephone or web follow-up mode) for seven of the eight variables tested (even though there were baseline demographic differences). However at the three-month follow-up, mean values of total MET physical activity, physical activity pros and cons were significantly lower among web survey respondents when compared to phone respondents when controlling for the demographic differences. A similar pattern was found in stage of fruit/vegetable consumption, total fruit/vegetable consumption, and pros of fruit/vegetable consumption at the three-month follow-up. Statistically significant survey mode differences were not found, however, for physical activity stage or cons of fruit/vegetable consumption although the trends were in the

same directions at the three-month follow-up. Hence, our results provide evidence that the mode of interview influences participants' responses to survey questions, even though questions are worded identically. As recently noted, differences in responses between baseline and three-month follow-up may therefore be due to the effects of mode change rather than a change in actual behavior or opinion (Dillman and Christian 2005), however more research is needed to validate these assumptions.

Certain types of questions are affected by mode differences more than others, despite identical wording (Dillman and Christian 2005). Data quality is also susceptible to different mode effects (Bowling 2005). A number of contributing factors play a part in mode effects. These factors include social desirability, acquiescence, and primacy-recency effects (Dillman and Christian 2005). Interviewer-administered surveys reporting physical activity are more prone to social desirability bias than self-administered surveys (Motl, McAuley, and DiStefano 2005). This may have contributed to the observed higher mean values in the measures related

Table 2: Repeated Measures of Physical Activity and Fruit/Vegetable Variables by Data Collection Mode.*

Variable	Phone - Phone		Phone - Web		F (df)	p	Partial eta ²
	T1 Mean (SD)	T2 Mean (SD)	T1 Mean (SD)	T2 Mean (SD)			
PA Stage							
1= precontemplation	3.93	3.98	4.06	3.90	1.46	ns	0.004
2= contemplation	(1.42)	(1.40)	(1.17)	(1.35)	(1, 383)		
3= preparation							
4= action							
5= maintenance							
Godin Scale of Total PA MET	52.53	54.25	51.70	41.73	10.26	.001	.026
Total PA MET= (9* strenuous activity days/week) + (5* moderate activity days/week) + (3* mild activity days/week)	(32.33)	(32.96)	(30.95)	(29.19)	(1, 386)		
Pros Scale							
1= not important	4.09	3.99	4.02	3.49	22.79	.000	.055
2= slightly important	(.89)	(.98)	(.92)	(.96)	(1, 392)		
3= moderately important							
4= very important							
5= extremely important							
Cons Scale							
1= not important	1.82	1.80	1.63	1.48	3.23	.073	.008
2= slightly important	(.87)	(.89)	(.63)	(.58)	(1, 392)		
3= moderately important							
4= very important							
5= extremely important							
Stage of Fruit/Vegetable Consumption							
1= precontemplation	2.81	2.68	2.92	2.45	4.18	.042	.012
2= contemplation	(1.43)	(1.41)	(1.54)	(1.46)	(1, 358)		
3= preparation							
4= action							
5= maintenance							
NHANES Scale of Total Servings Fruits and Vegetables	3.91	3.66	4.02	3.03	9.09	.003	.023
	(2.67)	(2.07)	(2.50)	(2.35)	(1, 391)		
Pros Scale							
1= not important	4.05	4.14	4.02	3.51	50.49	.000	.114
2= slightly important	(.91)	(.91)	(.88)	(.99)	(1, 392)		
3= moderately important							
4= very important							
5= extremely important							
Cons Scale							
1= not important	1.97	1.91	1.80	1.65	.34	ns	.001
2= slightly important	(.98)	(1.00)	(.81)	(.72)	(1, 392)		
3= moderately important							
4= very important							
5= extremely important							

*ANCOVA with gender, ethnicity, grade, income, and age as covariates.

to physical activity and those related to fruit/vegetable consumption (behavior and psychosocial variables) in the phone survey (interviewer-administered survey) compared to the web survey (self-administered survey) at the time of three-month follow-up.

The limitation of non-random assignment (participant choice) of the mode of data collection at the second time point is acknowledged and limits the causal inferences of this study. However, the fact that the pattern of results was evidenced across health behaviors (physical activity and fruit and vegetable consumption) and for behavioral and psychological constructs lends support to our conclusions. Contrary to previous research (Link and Mokdad 2005), our study points to the predictable effects of survey mode on study measures when comparing phone versus web administered surveys.

Conclusion

Physical activity and fruit/vegetable consumption researchers have mainly relied on traditional modes of survey data collection. Web-based online surveys have not been explored, despite their benefits of real-time data collection, allowing the participant to complete at their own convenience, decreased printing and mailing costs, and eliminating data entry. Existing literature recommends that researchers attempt mixed mode surveys in order to increase the response rate and reach. Our findings suggest that researchers should proceed with caution when using mixed survey modes when assessing physical activity and fruit and vegetable consumption in a population.

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Appendix – Scales

Stage of Physical Activity Scale

We will be talking about regular exercise for the next few questions. By regular exercise we mean any *planned* physical activity – for example, brisk walking, jogging, bicycling, swimming, dancing, tennis, rowing, or lifting weights—which is performed to increase physical fitness. Vigorous activity is hard physical effort that makes you breathe much harder than normal and should be performed *3 or more times* per week for *20 or more minutes* per session. Moderate activity is moderate physical effort that makes you breathe somewhat harder than normal and should be performed *30 or more minutes* a day, *5 or more days* per week. Exercise can be vigorous activity or moderate activity.

Q.1 So, according to the definition we just went through, do you currently engage in regular exercise?

1 NO 2 YES 7 DON'T KNOW/ NOT SURE 9 REFUSED

SKIP PATTERN If No go to Q2 if Yes go to Q4

Q.2 Do you intend to engage in regular exercise in the next 6 months?

1 NO 2 YES 7 DON'T KNOW/ NOT SURE 9 REFUSED

SKIP PATTERN If No go to next section if Yes go to Q3

Q.3 Do you intend to engage in regular exercise in the next 30 days?

1 NO 2 YES 7 DON'T KNOW/ NOT SURE 9 REFUSED

SKIP PATTERN go to next section

Q.4 Have you been exercising regularly for the past six months?

1 NO 2 YES 7 DON'T KNOW/ NOT SURE 9 REFUSED

SCORING -

If item 1 = NO and item 2 = NO	Precontemplation
If item 1 = NO and item 2 = YES and item 3 = NO	Contemplation
If item 1 = NO and item 3 = YES	Preparation
If item 1 = YES and item 4 = NO	Action
If item 1 = YES and item 4 = YES	Maintenance

Physical Activity Decisional Balance Scale

This section looks at positive and negative aspects of exercise. As I read the following items, please consider how important each statement is with respect to your decision to exercise or not to exercise in your leisure time. Please answer using a 5-point scale where 1 is **“not important”**, 2 is **“slightly important”**, 3 is **“moderately important”**, 4 is **“very important”** and 5 is **“extremely important”**.

So, how important are the following opinions in your decision to exercise or not to exercise?

	Not Important	Slightly Important	Moderately Important	Very Important	Extremely Important	Don't Know/ Not Sure	Refused
1. I would have more energy for my family and friends if I exercised regularly.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9
2. I would feel embarrassed if people saw me exercising.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9
3. I would feel less stressed if I exercised regularly.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9

	Not Important	Slightly Important	Moderately Important	Very Important	Extremely Important	Don't Know/ Not Sure	Refused
4. Exercise prevents me from spending time with my friends	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9
5. Exercising puts me in a better mood for the rest of the day.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9
6. I feel uncomfortable or embarrassed in exercise clothes	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9
7. I would feel more comfortable with my body if exercised regularly.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9
8. There is too much I would have to learn to exercise	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9
9. Regular exercise would help me have a more positive outlook on life.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9
10. My exercising puts an extra burden on my significant other	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9

SCORING

PROS mean of items 1, 3, 5, 7, 9

CONS mean of items 2, 4, 6, 8, 10

Godin's Leisure Time Exercise Questionnaire

1. How many days in a week do you do **mild activity** for at least 30 minutes a day total? Mild activity is activity that makes you use little effort, and doesn't make you sweat. Some examples would be easy walking, bowling, fishing, golf, gardening, or yoga

DAYS PER WEEK ... [NONE=0, DON'T KNOW/REFUSED=9]

2. How many days in a week do you do **moderate activity** for at least 30 minutes a day total? Moderate activity is activity that doesn't make you tired, and makes you sweat just a little. Some examples would be fast walking, slow bicycling, easy swimming, weight lifting, baseball, softball, tennis, volleyball, hula, or dancing

DAYS PER WEEK ... [NONE=0, DON'T KNOW/REFUSED=9]

3. How many days in a week do you do **strenuous activity** for at least 30 minutes a day total? Strenuous activity is activity that makes your heart beat quickly, and makes you sweat.

Some examples would be running, jogging, fast bicycling, aerobic dance, roller blading, paddling, fast swimming, soccer, basketball, football or martial arts

DAYS PER WEEK ... [NONE=0, DON'T KNOW/REFUSED=9]

SCORING

Total physical activity in metabolic equivalents (METs) = (9* strenuous activity days/week) + (5* moderate activity days/week) + (3* mild activity days/week)

Fruit and Vegetable Stage Scale

Okay, now I'm going to talk to you a little about fruits and vegetables.

1. How many servings of fruits and vegetables do you usually eat each day? A serving is a cup of cooked vegetables, 1 cup of salad, a piece of fruit, cup of 100% fruit juice?

1 2 3 4 5 6 or more NONE DON'T KNOW/NOT SURE REFUSED

SKIP PATTERN If < 5 to Q2 if > 4 go to Q4

2. Do you intend to start eating 5 or more servings of fruits and vegetables a day in the next 6 months?

1 NO 2 YES 7 DON'T KNOW/ NOT SURE 9 REFUSED

SKIP PATTERN If No go to next section if Yes go to Q3

3. Do you intend to start eating 5 or more servings of fruits and vegetables a day in the next 30 days?

1 NO 2 YES 7 DON'T KNOW/ NOT SURE 9 REFUSED

SKIP PATTERN go to next section

4. Have you been eating 5 or more servings of fruits and vegetables a day for more than 6 months?

1 NO 2 YES 7 DON'T KNOW/ NOT SURE 9 REFUSED

SCORING

If item 1 < 5 and item 2 = NO	Precontemplation
If item 1 < 5 and item 2 = YES and item 3 = NO	Contemplation
If item 1 < 5 and item 3 = YES	Preparation
If item 1 > 4 and item 4 = NO	Action
If item 1 > 4 and item 4 = YES	Maintenance

Fruit and Vegetable Decisional Balance Scale

Everyone has different reasons for eating the way they do. Whether or not you decide to eat 5 fruits and vegetables each day depends upon how **important** the pros – or **benefits**, and cons – or **problems** of eating more fruits and vegetables are to you. I'm going to ask to rate each of the following statements based on how **important** it is to you **in your decision to eat, or not to eat**, fruits and vegetables.

Please answer using a 5-point scale where 1 is "**not important**", 2 is "**slightly important**", 3 is "**moderately important**", 4 is "**very important**" and 5 is "**extremely important**".

So, in making the decision to eat fruits and vegetables, how important is it to you that ...?

	Not Important	Slightly Important	Moderately Important	Very Important	Extremely Important	Don't Know/ Not Sure	Refused
1. Fruits and vegetables keep your skin and eyes healthy.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9
2. Fruits and vegetables are hard to peel and cut.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9
3. You would feel better if you ate more fruits and vegetables	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9
4. Fruits and vegetables are hard to chew and swallow.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9

	Not Important	Slightly Important	Moderately Important	Very Important	Extremely Important	Don't Know/ Not Sure	Refused
5. You would be healthier if you ate more fruits and vegetables.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9
6. It's hard to make vegetables for just one person.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9
7. Eating vegetables and fruits gives you more energy.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9
8. You feel bloated when you eat a lot of vegetables.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 7	<input type="checkbox"/> 9

SCORING

PROS mean of items 1, 3, 5, 7

CONS mean of items 2, 4, 6, 8

Fruit and Vegetable Questions

1. How many servings of fruits do you eat each day?
2. How many servings of vegetables do you eat each day?

SCORING

Servings of Fruit and Vegetables = sum of items 1 and 2