Data Collection Methods and Weighting a High Pre-Post Adaptive Stages Outcome in Health Care Marketing Research

by

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Introduction

The Patterns of Adapting to Health (PATH) system has historically defined adults based on their dominance by one of nine distinct patterns of adaptive health behavior or into a single category not defined by any detectable pattern. Over the past several years detailed review of adults in the no pattern category has been characterized by lower levels of involvement in healthcare decision-making for themselves based on "strongly disagree" to "neutral" responses to Statement 20 of the Adaptive Health Behavior Inventory (AHBI-20), "I make my own health care decisions."

The Pre-Post Adaptive Stages

Recently, this "no pattern" category was better understood to represent the combination of two different adaptive stages: A Pre-Adaptive stage and Post-Adaptive stage both characterized by a weak internal locus of health decision-making control. Demographically, adults in the Pre-Adaptive stage tend to be under the age of 25 and predominately male; adults in the Post-Adaptive stage tend to be 65 or older with a bias towards males (Navarro, 2020). Because of their low internal locus of heath decision-making control, these adults are less relevant as health marketing targets.

Data Collection Methodology and the Pre-Post Adaptive Stages Outcome

The representation of adults in the Pre-Post Adaptive stages varies significantly based on the data collection methodology used.

Telephone Interviews. For over a decade telephone survey data collection was the primary methodology used to identify the PATH in community market research.

As shown in Table 1, Pre-Post Adaptive rates associated with telephone surveys conducted between 1995 and 2006 in different regions of the U.S. matched the non-classified rate found in the master's thesis research. This supported and validated the reliability of the rate at which adults are found in the Pre-Post Adaptive stage.

Mail Surveys. The second most frequently used data collection methodology to identify the PATH was mail surveys. Unlike telephone surveys, however, mail surveys produced Pre-Post Adaptive stage rates as high as 30% and simultaneously under-estimated the size of adults dominated by the other nine PATH as shown in Table 1. Many issues associated with mail surveys relevant to increasing the Pre-Post Adaptive stages rate are discussed elsewhere[1]. The method of dealing with PATH results from mail surveys were to weight down the Pre-Post Adaptive stages rate to the rate obtained by telephone interviewing and weight up the other nine PATH.

Table 1

Patterns of Adapting to Health (PATH) Assignment by Data Collection Method

	Telephone[a]		Mail[b]		IVR[c]		Online[d]	
PATH	*n*	%	*n*	%	*n*	%	*n*	%
PATH 1 - Critically Discerning	763	2%	631	2%	148	2%	713	2%
PATH 2 - Health Contented	2,126	5%	2,459	7%	288	5%	2,917	7%
PATH 3 - Wisely Frugal	7,371	19%	5,121	15%	1,126	19%	6,110	15%
PATH 4 - Traditionalist	2,290	6%	1,678	5%	215	4%	1,798	4%
PATH 5 - Family Centered	5,322	13%	3,312	10%	1,020	17%	3,878	10%
PATH 6 - Family Driven	2,747	7%	2,428	7%	622	10%	2,970	7%
PATH 7 - Healthcare Driven	6,821	17%	3,659	11%	1,001	17%	4,446	11%
PATH 8 - Independently Healthy	4,458	11%	2,434	7%	462	8%	3,009	8%
PATH 9 - Naturalist	3,189	8%	2,201	6%	512	8%	2,616	7%
PATH 0 - Pre-Post Adaptive	4,492	11%	10,218	30%	632	10%	11,632	29%
Total	39,580	100%	34,141	100%	6,026	100%	40,090	100%

[a]Data based on telephone surveys conducted from 1995 to 2006

[b]Data based on mail surveys conducted between 2001 and 2003

[c]Data based on interactive voice response (IVR) survey of disease management pop conducted in 2006

[d]Data based on online surveys conducted between 2002 and 2017

Interactive Voice Response (IVR). IVR data collection was used in a 2006 study to identify the PATH mix within a disease management population. The over 6,000 IVR interviews mimicked the experience of a telephone interview in that

participants responded to each AHBI item one at a time as if being questioned by an interviewer. Like telephone surveys, IVR data collection produced a Pre-Post Adaptive stages rate in the 11% range in line with telephone interviewing results. No sample weighting necessary.

Online, Web-Based Surveys. Early in the 2000s AHBI response data started being collected via online data collection including the use of paid respondents in online panels. Early results from such online panels yielded Pre-Post Adaptive stages percentage rates at the same level as mail surveys close to the 30% range. Examination of AHBI response data at the case level found similar problems to those encountered with mail surveys as well as others sited in the research investigating the integrity of online data collection including high volumes of missing data[2] and careless responses given by up to 10 to 12% of respondents[3]. For example, in a recent survey conducted via an online panel, 6.7% of respondents were identified as non-responsive due to nonsense answers to the AHBI.

The Benefit of Historical Trends

The benefit of having years of PATH data collected via telephone surveys was the ability to see how the shift from telephone interviewing to online data collection influenced the PATH mix and Pre-Post Adaptive stages rate. It was surprising to see PATH mix results obtained through online data collection mimicking that of mail surveys in terms of high percentages of adults in the Pre-Post Adaptive stages. As in the case of mail surveys, this required the weighting of PATH results to match the Pre-Post Adaptive stages rate obtained by telephone interviewing.

To summarize, of the four major data collection methods used to collect health-related response data from large populations, both mail surveys and online surveys dramatically over-estimate the percentage of those adults in the Pre-Post Adaptive stages and under-estimate the percentage of those adults in the other nine PATH. There are a number of different approaches to dealing with this over-representation of adults in the Pre-Post Adaptive stages that have been discussed elsewhere.[4]

The Sample Weighting Option.

The sample weighting option assigns an adjustment weight to each survey respondent. Persons in under-represented segments get a weight larger than 1, and those in over-represented groups get a weight smaller than 1. In the computation of means, totals and percentages, the weighted values are used instead of the original values.

PATH Weighting Approach

The weighting approach applied to both mail survey and online data collection PATH results is the same: 1) Weight down the percentage of adults in the Pre-Post Adaptive stages to the 11% range and 2) weight up the percentage of adults dominated by the other nine PATH by the percentage difference between the *obtained* Pre-Post Adaptive stages rate and the 11% percentage rate divided by nine.

Example:

Table 2 shows PATH results from an online survey of 1,000 adults. The Pre-Post Adaptive stages percentage rate was 29%.

Table 2

PATH Names	*n*
Critically Discerning	18
Health Contented	73
Wisely Frugal	152
Traditionalist	45
Family Centered	97
Family Driven	74
Health Care Driven	111
Independently Healthy	75
Naturalist	65
Pre-Post Adaptive stages	290
Total Sample	1000

Step 1 - Calculate the percentage point difference between this Pre-Post Adaptive stages rate and the 11% rate. In this case the difference is 29% - 11% = 18%

Step 2 – Divide the 18% by nine. 18%/9 = 2%

Step 3 – Add the 2% to the *obtained* percentage for each of the nine PATH (e.g., Critically Discerning through Naturalist) as shown in Table 3.

Table 3

PATH Names	*n*	*%*				Weighted
Critically Discerning	18	2%	+	2%	=	4%
Health Contented	73	7%	+	2%	=	9%
Wisely Frugal	152	15%	+	2%	=	17%
Traditionalist	45	4%	+	2%	=	6%
Family Centered	97	10%	+	2%	=	12%
Family Driven	74	7%	+	2%	=	9%
Health Care Driven	111	11%	+	2%	=	13%
Independently Healthy	75	8%	+	2%	=	10%
Naturalist	65	7%	+	2%	=	9%
Pre-Post Adaptive stages	290	29%				11%
Total Sample	1000	100%				100%

The **Weighted** column in Table 3 shows the *expected* PATH percentage mix. Each *obtained* percentage for the nine PATH was increased by two percentage points and the Pre-Post Adaptive stages rate decreased to the *expected* 11%.

Calculating the Weighting Factors

The next step is to calculate the weighting factors that must be applied to respondents dominated by each PATH and the Pre-Post Adaptive stages outcome.

Step 4 – Apply the new Weighted PATH percentages to the total sample size. This is simply done by multiplying the total sample size of 1,000 by the Weighted percentages for each PATH (Table 4). This produces new anticipated sample sizes (Weighted *n*) for each PATH and the Pre-Post Adaptive stages *after* the weighting factors are applied.

Table 4

PATH Names	*n*	%				Weighted	Weighted *n*
Critically Discerning	18	1.8%	+	2%	=	3.8%	38
Health Contented	73	7.3%	+	2%	=	9.3%	93
Wisely Frugal	152	15.2%	+	2%	=	17.2%	172
Traditionalist	45	4.5%	+	2%	=	6.5%	65
Family Centered	97	9.7%	+	2%	=	11.7%	117
Family Driven	74	7.4%	+	2%	=	9.4%	94
Health Care Driven	111	11.1%	+	2%	=	13.1%	131
Independently Healthy	75	7.5%	+	2%	=	9.5%	95
Naturalist	65	6.5%	+	2%	=	8.5%	85
Pre-Post Adaptive stages	290	29.0%				11.0%	110
Total Sample	1,000	100.0%				100.0%	1,000

Step 5 – To calculate the weighting factors, simply divide the Weighted *n* for each PATH by the original sample size *n* for each PATH. For example, the weighting factor applied to Critically Discerning respondents is calculated by dividing the Weighted *n* of 38 by the original subsample n of 18 = 38/18 = 2.125. The weighting factor applied to Health Contented respondents is calculated by dividing the Weighted *n* of 93 by the original subsample *n* of 73 = 93/73 = 1.275. Repeating this process for each PATH category results in the weighting factors for all the PATH as shown in Table 5.

Table 4

PATH Names	*n*	%				Weighted	Weighted *n*	Weighting Factors
Critically Discerning	18	1.8%	+	2%	=	3.8%	38	2.125
Health Contented	73	7.3%	+	2%	=	9.3%	93	1.275
Wisely Frugal	152	15.2%	+	2%	=	17.2%	172	1.131
Traditionalist	45	4.5%	+	2%	=	6.5%	65	1.446
Family Centered	97	9.7%	+	2%	=	11.7%	117	1.207
Family Driven	74	7.4%	+	2%	=	9.4%	94	1.270
Health Care Driven	111	11.1%	+	2%	=	13.1%	131	1.180
Independently Healthy	75	7.5%	+	2%	=	9.5%	95	1.266
Naturalist	65	6.5%	+	2%	=	8.5%	85	1.307
Pre-Post Adaptive stages	290	29.0%				11.0%	110	0.379
Total Sample	1,000	100.0%				100.0%	1,000	

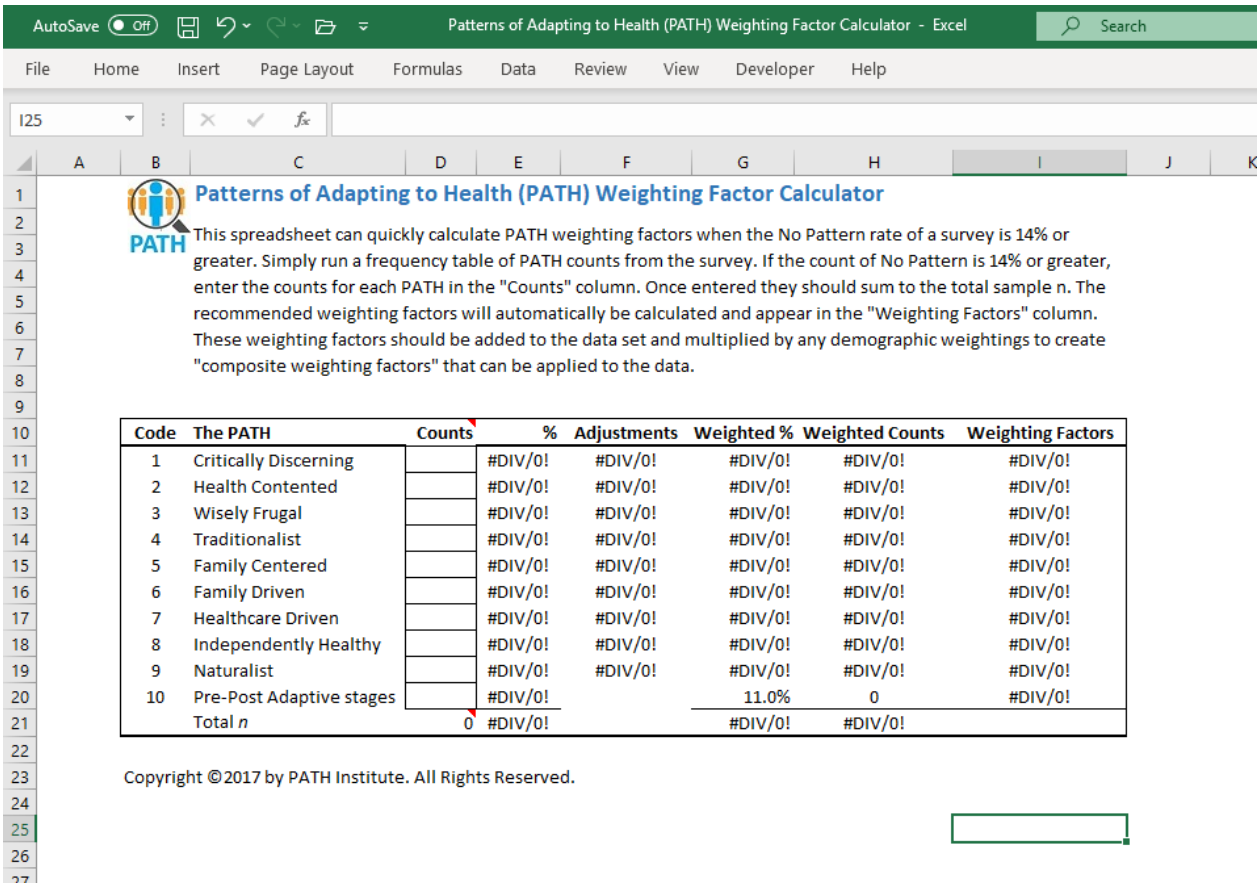
When applying weighting factors, the recommendation is to: 1) figure out all demographic weightings first, 2) calculate the PATH weighting factors, 3) multiply both sets of weighting factors by each other to create "composite weighting factors", then 4) use the composite weights to run the tables. This will produce a sample that is a better representation of the population.

When to Apply Weighting

As a rule of thumb, if the sample results show a Pre-Post Adaptive stages rate of 14% or greater, the above weighting approach be applied.

PATH Weighting Factor Calculator

The above described calculations to identify PATH weighting factors can be easily done using the **Patterns of Adapting to Health (PATH) Weighting Factor Calculator** available for download at http://www.pathinstitute.life/path-reference.html. It is a standard Excel spreadsheet. Download the file to a folder on your computer. After opening, simply enter the counts for each PATH from your survey if the Pre-Post Adaptive stages rate is 14% or greater. The spreadsheet will automatically calculate the recommended weight factors.



You can either save the spreadsheet with a different file name, or simply close it after use.

Here is a quick example of how to use it.

Step 1: Run a PATH frequency count from your survey. In this example, the sample size is 1,952 cases.

Frequency Distribution of PATH

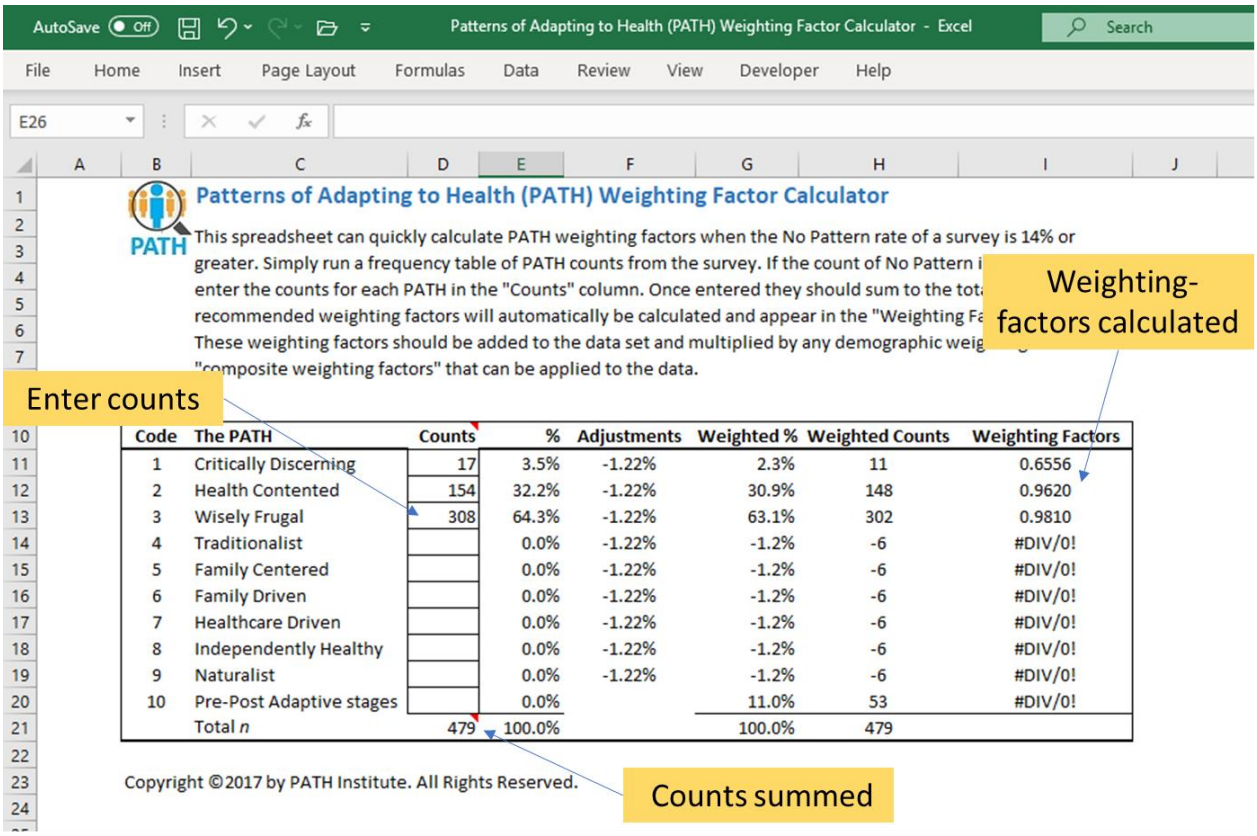
PATH Code	Count	Percent
1	17	0.9%
2	154	7.9%
3	308	15.8%
4	33	1.7%

5	162	8.3%
6	179	9.2%
7	292	14.9%
8	220	11.3%
9	135	6.9%
10	452	23.2%

The “Pre-Post Adaptive stages ” (code 10) is 23.2%, well over the 14% trigger.

Step 2: Open the **PATH Weighting Factor Calculator**

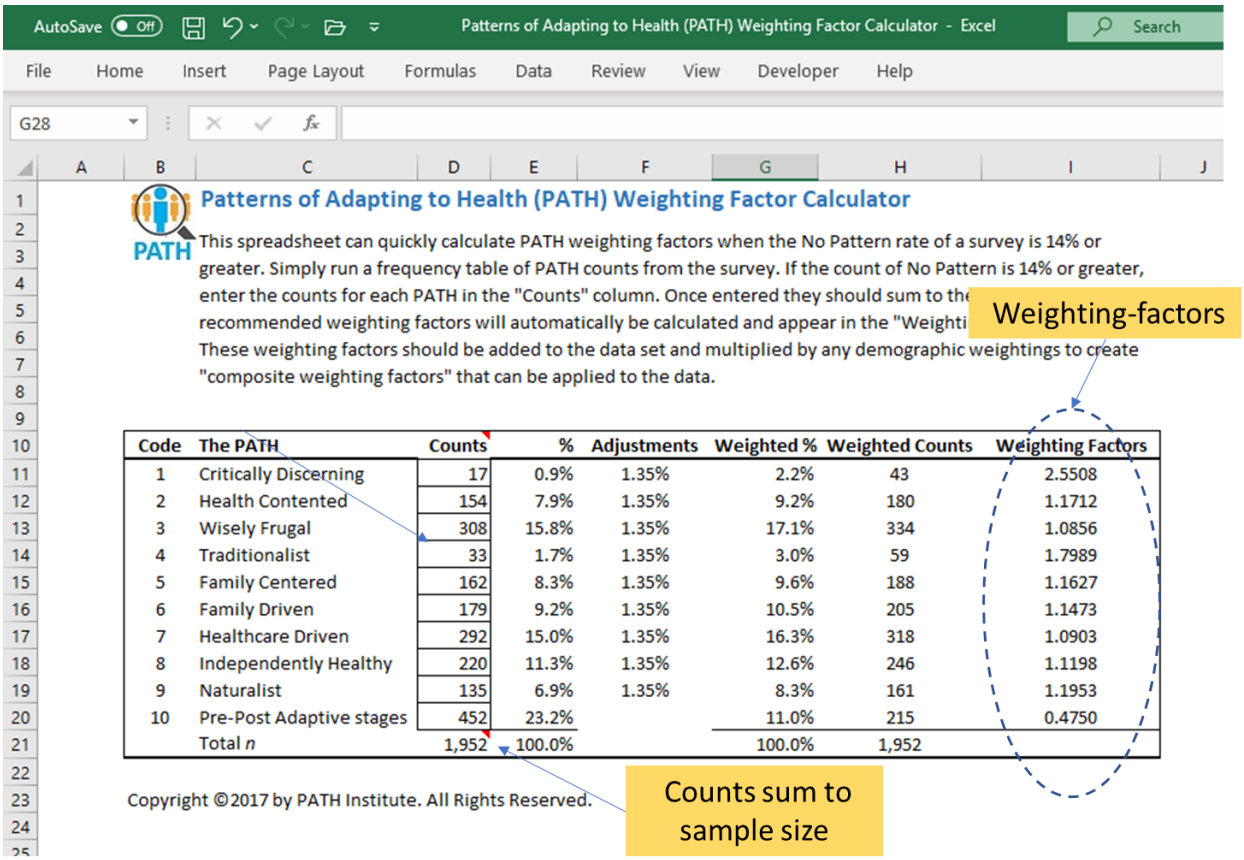
Start entering the “counts” for each PATH in the “Counts” column.



Code	The PATH	Counts	%	Adjustments	Weighted %	Weighted Counts	Weighting Factors
1	Critically Discerning	17	3.5%	-1.22%	2.3%	11	0.6556
2	Health Contented	154	32.2%	-1.22%	30.9%	148	0.9620
3	Wisely Frugal	308	64.3%	-1.22%	63.1%	302	0.9810
4	Traditionalist		0.0%	-1.22%	-1.2%	-6	#DIV/0!
5	Family Centered		0.0%	-1.22%	-1.2%	-6	#DIV/0!
6	Family Driven		0.0%	-1.22%	-1.2%	-6	#DIV/0!
7	Healthcare Driven		0.0%	-1.22%	-1.2%	-6	#DIV/0!
8	Independently Healthy		0.0%	-1.22%	-1.2%	-6	#DIV/0!
9	Naturalist		0.0%	-1.22%	-1.2%	-6	#DIV/0!
10	Pre-Post Adaptive stages		0.0%		11.0%	53	#DIV/0!
	Total *n*	479	100.0%		100.0%	479	

Step 3: Finish

After entering all the PATH counts, the total sample *n* will sum to the sample size. The full set of PATH weighting factors for the survey are calculated to four decimal places. Associate each weighting factor with the appropriate PATH code (e.g., PATH code 1 {Critically Discerning} gets weighting factor 2.5508.



Code	The PATH	Counts	%	Adjustments	Weighted %	Weighted Counts	Weighting Factors
1	Critically Discerning	17	0.9%	1.35%	2.2%	43	2.5508
2	Health Contented	154	7.9%	1.35%	9.2%	180	1.1712
3	Wisely Frugal	308	15.8%	1.35%	17.1%	334	1.0856
4	Traditionalist	33	1.7%	1.35%	3.0%	59	1.7989
5	Family Centered	162	8.3%	1.35%	9.6%	188	1.1627
6	Family Driven	179	9.2%	1.35%	10.5%	205	1.1473
7	Healthcare Driven	292	15.0%	1.35%	16.3%	318	1.0903
8	Independently Healthy	220	11.3%	1.35%	12.6%	246	1.1198
9	Naturalist	135	6.9%	1.35%	8.3%	161	1.1953
10	Pre-Post Adaptive stages	452	23.2%		11.0%	215	0.4750
	Total *n*	1,952	100.0%		100.0%	1,952	

References

[1] Adaptive Health Behavior (AHBI) Administration (http://www.pathinstitute.life/uploads/1/0/7/0/107059763/adaptive_health_behavior_inventory__ahbi__administration.pdf).

[2] Cantrell, M. A., & Lupinacci, P. (2007). Methodological issues in online data collection. *Journal of Advanced Nursing*, 60(5), 544-549. 8c3eaaf2b0$A

[3]Meade, A. W., & Craig, S. B. (2012). Identifying careless responses in survey data. *Psychological Methods*, 17(3), 437.

[4] Adaptive Health Behavior Inventory (AHBI):
Diagnostic Role of AHBI-20 in Identifying Adults in the Pre-Post Adaptive Stages