A Microcomputer Program (sf36.exe) that Generates SAS Code for Scoring the SF-36 Health Survey

Ron D. Hays, Cathy D. Sherbourne, Karen L. Spritzer, Wil J. Dixon

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Abstract
This paper describes a microcomputer that can be used to generate SAS code that for scoring SF-36 Health Survey, one of the most widely used measures of health-related quality of life today. The generated SAS code scores the 8 SF-36 scales as well as the SF-36 physical and mental health composite scores. In addition, the program produces code that provides US general population normative scores, age and gender adjusted to one's sample. The significance of the difference between the sample and the general population on each SF-36 scale score is also generated. Example input and output files are included. Selected SF-36 publications are cited. The SF-36 Health Survey items are given in the Appendix.
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The SF-36 taps eight health concepts: physical functioning, bodily pain, role limitations due to physical health problems, role limitations due to personal or emotional problems, emotional well-being, social functioning, energy/fatigue, and general health perceptions. It also includes a single item that provides an indication of perceived change in health. These 36 items were adapted from longer instruments completed by patients participating in the Medical Outcomes Study (MOS), an observational study of variations in physician practice styles and patient outcomes in different systems of health care delivery (Hays & Shapiro, 1992; Stewart, Sherbourne, Hays, et al., 1992).

Scoring the Eight SF-36 Scales

We recommend that responses be scored as described below (the RAND method). A somewhat different scoring procedure for the pain and general health scales was advocated by New England Medical Center (NEMC) investigators (Ware, Snow, Kosinski, & Gandek, 1993). Although only our scoring recommendations for these scales are described here, the SAS program generator we provide scores these two scales both ways. Pain scale scores scored the RAND versus NEMC way correlated 0.99 in the MOS, with a mean difference of 3.33 (NEMC scoring yields lower pain scores on average). General health perception scale scores also correlated 0.99 in the MOS, with a mean difference of -1.37 (NEMC scoring yields higher general health scores on average). For further information about the scoring differences, see Hays, Sherbourne, and Mazel (1993).

Scoring the SF-36 is a two-step process. First, pre-coded numeric values are recoded per the scoring key given in Table 1. Note that all items are scored so that a high score defines a more favorable health state. In addition, each item is scored on a 0 to 100 range so that the lowest and highest possible scores are set at 0 and 100, respectively. Scores represent the percentage of total possible score achieved. In step 2, items in the same scale are averaged together to create the 8 scale scores. Table 2 lists the items averaged together to create each scale. Items that are left blank (missing data) are not taken into account when calculating the scale scores. Hence, scale scores represent the average for all items in the scale that the respondent answered. If all items in a scale are missing, then the scale score is also missing.

Example: Items 20 and 32 are used to score the measure of social functioning. Each of the two items has 5 response choices. However, a high score (response choice 5) on item 20 indicates extreme limitations in social functioning, while a high score (response choice 5) on item 32
indicates the absence of limitations in social functioning. To score both
items in the same direction, Table 1 shows that responses 1 through 5 for
item 20 should be recoded to values of 100, 75, 50, 25, and 0,
respectively. Responses 1 through 5 for item 32 should be recoded to
values of 0, 25, 50, 75, and 100, respectively. Table 2 shows that these
two recoded items should be averaged together to form the social
functioning scale. If the respondent is missing one of the two items, the
person's score will be equal to that of the nonmissing item.

Table 3 presents information on the reliability, central tendency
and variability of the scales in the MOS when scored using this method.

To use the enclosed programs, it is necessary to have a SAS dataset with
the SF-36 items in it. The program, sf36.exe, is used in combination
with your SAS file of SF-36 items to create SAS code for scoring the
SF-36 scales.

In addition to having a SAS dataset with SF-36 items, you need to
create an ASCII file that specifies the variable names you have assigned to
the 36 SF-36 items in your study. When sf36.exe is executed, you will be
asked for the name of the input file: WHAT FILE CONTAINS THE INPUT
SETUP?

Notice that the input file (sf36.in) consists of a list of 36 variable names,
each entered on a separate row beginning in column one (see Table 4). The
variable names need to be listed to correspond with the order of items
presented in the Appendix. For example, the first item reads "In general,
would you say your health is: Excellent, Very good, Good, Fair, Poor?" On
the first row of the input file, you should list the variable name you assigned
to this item. You need to list the actual SAS names used for your data set so
that the generated SAS code will include rename statements linking your
SAS names to the SAS names used in the generated code (the generated code
uses names I1 through I36 following the order of items in the Appendix).

If you use the same SAS names as assumed in the program (I1 through
I36), you can use the sf36.in file (see Table 4) as the input file when you
execute sf36.exe. If you use different SAS names, you will have to create a
file that reflects these differences (see sf36.ex, Table 5, for an example of a
different input file). Note that you should not use the variable names I1
through I36 for variables other than the SF-36 items or SAS will not be able
to distinguish the SF-36 items from these other variables.

The program assumes that your dataset includes a continuous measure
of AGE (named "AGE") and a gender variable called "MALE" (coded 0 =
female, 1 = male).

The sf36.exe program produces a file, sf36.sas, that contains SAS code for
scoring the sf-36 scales. For the pain and general health scales, both the
RAND and NEMC scoring are provided. Scale scores are created for persons
that answer any of the items in a scale (Note that NEMC only creates scores
for person who answer half or more of the items in a scale.)
The SAS code in sf36.sas assumes that the name of the SAS dataset that includes the SF-36 items is "TEMP" (see SET TEMP in the generated SAS code). If your file has a different name, you should change this part of the sf36.sas file to reflect that. Note that a raw data file, sf36.raw, is also produced and that this file is read by sf36.sas when it is run. This raw data file includes information about US general population means and standard deviations (Ware et al., 1993)

**Example of Using sf36.exe**

Table 5 provides an example of an input file, sf36.in2, for sf36.exe. In this example, the SF-36 items were assigned the SAS names T1 through T36 in the study in which they were used. The input file is read by sf36.exe and this information is used in creating the file, sf36.sas, shown in Table 6.

**Scoring the SF-36 Physical and Mental Health Composite Scores**

Running sf36b.exe will produce SAS code, saved as sf36add.sas, that will create T-scores for the 8 SF-36 scales (using the US general population norms). In addition, physical and mental health composite scores for the SF-36 (Ware, Kosinski, & Keller, 1994) and the SF-12 (Ware, Kosinski, & Keller, 1995, 1996) are produced. The sf36add.sas file can be appended to sf36.sas for analyses of the SF-36 scales and composite scores. Running the resulting sf36.sas file yields the output shown for the sample data shown in Table 7.

The output includes descriptive statistics for the 8 SF-36 scales and US general population norms, age and gender adjusted to your sample. The SF-36 SAS names used are as follows:

- **PHYFUN10** Physical functioning in your sample
- **PFISFM** Physical functioning in general population
- **ROLEP4** Role limitations--physical in your sample
- **RPSFM** Role limitations--physical in general population
- **PAIN2** Pain in your sample--RAND scoring
- **SFPAIN** Pain in your sample--NEMC scoring
- **BPSFM** Pain in general population
- **GENH5** General health in your sample--RAND scoring
- **SFGENH5** General health in your sample--NEMC scoring
- **GENSFM** General health in general population
- **EMOT5** Emotional well-being in your sample
- **MHSFM** Emotional well-being in general population
- **ROLEE3** Role limitations--emotional in your sample
- **RESFM** Role limitations--emotional in general population
- **ENFAT4** Energy in your sample
- **ENFTSFM** Energy in general population
- **SOCFUN2** Social function in your sample
SFSFM  Social function in general population

Table 7 illustrates the output of means, standard deviations, minimum and maximum values for each of these scales. Note that only the mean values are provided for the general population values (PFISFM, RPSFM, BPSFM, GENSFM, MHSFM, RESFM, ENFSTSF, SFSFM), because the standard deviations and ranges produced by SAS for these scales are not relevant (i.e., These variances and ranges because they are based on mean scores derived from age and gender subgroups of the general population, and are not the general population estimates of these statistics).

In addition to the descriptive statistics, sf36.sas provides t-statistics (asymptotically z-statistics) for the significance of the difference between SF-36 scores in the sample compared to the US general population (ZPHY10, ZRP, ZBP, ZGENH, ZENFT, ZSF, ZRE, ZMHD). Finally, sf36.sas outputs SF-36 scale scores for the sample, corresponding T-scores for each scale, and the physical (AGG_PHYS) and mental health (AGG_MENT) composite T-scores. The sample size and descriptive statistics provided here may differ from the prior output, because in the prior output respondents are omitted if they have missing data on age or gender (these variables are needed to adjust the general population values to one’s sample).

For further information please contact either:

Ron D. Hays   or  Cathy D. Sherbourne
RAND           RAND
1700 Main Street   1700 Main Street
P.O. Box 2138   P.O. Box 2138
Santa Monica, CA 90407-2138  Santa Monica, CA 90407-2138
(310) 393-0411 Ext. 7581 (Voice)  (310) 393-0411 Ext. 7216 (Voice)
(310) 393-4818 (FAX)  (310) 393-4818 (FAX)
Ronald_Hays@rand.org  Cathy_Sherbourne@rand.org
Selected SF-36 Publications (Including Those Cited Above)


Bullinger M. (1996). German translation and psychometric testing
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with outpatients with hypertension, diabetes, heart disease, and/or

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drug therapy on patients' health-related quality of life. *Quality
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IQOLA project. *International Journal of Mental Health, 23,* 49-73.

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statistical analysis of SF-36 health profile and summary measures:
Summary of results from the Medical Outcomes Study. *Medical Care,
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Ware, J. E., Kosinski, M., & Keller, S. D. (1995). *SF-12: How to score
the SF-12 physical and mental health summary scores.* Boston, MA:
The Health Institute, New England Medical Center.


Table 1

STEP 1: RECODING ITEMS

<table>
<thead>
<tr>
<th>ITEM NUMBERS</th>
<th>Change original response category (a)</th>
<th>To recoded value of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2,20,22,34,36</td>
<td>1 -------- &gt;</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>2 -------- &gt;</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>3 -------- &gt;</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>4 -------- &gt;</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>5 -------- &gt;</td>
<td>0</td>
</tr>
<tr>
<td>3,4,5,6,7,8,9,10,11,12</td>
<td>1 -------- &gt;</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2 -------- &gt;</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>3 -------- &gt;</td>
<td>100</td>
</tr>
<tr>
<td>13,14,15,16,17,18,19</td>
<td>1 -------- &gt;</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2 -------- &gt;</td>
<td>100</td>
</tr>
<tr>
<td>21,23,26,27,30</td>
<td>1 -------- &gt;</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>2 -------- &gt;</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>3 -------- &gt;</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>4 -------- &gt;</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>5 -------- &gt;</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>6 -------- &gt;</td>
<td>0</td>
</tr>
<tr>
<td>24,25,28,29,31</td>
<td>1 -------- &gt;</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2 -------- &gt;</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>3 -------- &gt;</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>4 -------- &gt;</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>5 -------- &gt;</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>6 -------- &gt;</td>
<td>100</td>
</tr>
<tr>
<td>32,33,35</td>
<td>1 -------- &gt;</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2 -------- &gt;</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>3 -------- &gt;</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>4 -------- &gt;</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>5 -------- &gt;</td>
<td>100</td>
</tr>
</tbody>
</table>

(a) Precoded response choices as printed in the questionnaire.
### Table 2

**STEP 2: AVERAGING ITEMS TO FORM SCALES**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Number Of Items</th>
<th>After Recoding Per Table 1, Average The Following Items:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical functioning</td>
<td>10</td>
<td>3 4 5 6 7 8 9 10 11 12</td>
</tr>
<tr>
<td>Role limitations due to physical health</td>
<td>4</td>
<td>13 14 15 16</td>
</tr>
<tr>
<td>Role limitations due to emotional problems</td>
<td>3</td>
<td>17 18 19</td>
</tr>
<tr>
<td>Energy/fatigue</td>
<td>4</td>
<td>23 27 29 31</td>
</tr>
<tr>
<td>Emotional well-being</td>
<td>5</td>
<td>24 25 26 28 30</td>
</tr>
<tr>
<td>Social functioning</td>
<td>2</td>
<td>20 32</td>
</tr>
<tr>
<td>Pain</td>
<td>2</td>
<td>21 22</td>
</tr>
<tr>
<td>General health</td>
<td>5</td>
<td>1 33 34 35 36</td>
</tr>
</tbody>
</table>
Table 3  
RELIABILITY, CENTRAL TENDENCY AND VARIABILITY OF SCALES  
IN THE MEDICAL OUTCOMES STUDY

<table>
<thead>
<tr>
<th>Scale</th>
<th>Items</th>
<th>Alpha</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Functioning</td>
<td>10</td>
<td>0.93</td>
<td>70.61</td>
<td>27.42</td>
</tr>
<tr>
<td>Role Functioning/physical</td>
<td>4</td>
<td>0.84</td>
<td>52.97</td>
<td>40.78</td>
</tr>
<tr>
<td>Role Functioning/emotional</td>
<td>3</td>
<td>0.83</td>
<td>65.78</td>
<td>40.71</td>
</tr>
<tr>
<td>Energy/fatigue</td>
<td>4</td>
<td>0.86</td>
<td>52.15</td>
<td>22.39</td>
</tr>
<tr>
<td>Emotional well-being</td>
<td>5</td>
<td>0.90</td>
<td>70.38</td>
<td>21.97</td>
</tr>
<tr>
<td>Social functioning</td>
<td>2</td>
<td>0.85</td>
<td>78.77</td>
<td>25.43</td>
</tr>
<tr>
<td>Pain</td>
<td>2</td>
<td>0.78</td>
<td>70.77</td>
<td>25.46</td>
</tr>
<tr>
<td>General Health</td>
<td>5</td>
<td>0.78</td>
<td>56.99</td>
<td>21.11</td>
</tr>
<tr>
<td>Health Change</td>
<td>1</td>
<td>--</td>
<td>59.14</td>
<td>23.12</td>
</tr>
</tbody>
</table>

*Note.* Data is from baseline of the Medical Outcomes Study (N = 2471), except for Health change, which was obtained one-year later.
Table 4

EXAMPLE INPUT FILE (sf36.in) For SF36.EXE

<table>
<thead>
<tr>
<th>I1</th>
<th>I2</th>
<th>I3</th>
<th>I4</th>
<th>I5</th>
<th>I6</th>
<th>I7</th>
<th>I8</th>
</tr>
</thead>
<tbody>
<tr>
<td>I9</td>
<td>I10</td>
<td>I11</td>
<td>I12</td>
<td>I13</td>
<td>I14</td>
<td>I15</td>
<td>I16</td>
</tr>
<tr>
<td>I17</td>
<td>I18</td>
<td>I19</td>
<td>I20</td>
<td>I21</td>
<td>I22</td>
<td>I23</td>
<td>I24</td>
</tr>
<tr>
<td>I25</td>
<td>I26</td>
<td>I27</td>
<td>I28</td>
<td>I29</td>
<td>I30</td>
<td>I31</td>
<td>I32</td>
</tr>
<tr>
<td>I33</td>
<td>I34</td>
<td>I35</td>
<td>I36</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5

EXAMPLE INPUT FILE (sf36.in2) For sf36.exe

| T1 | T2 | T3 | T4 | T5 | T6 | T7 | T8 | T9 | T10 | T11 | T12 | T13 | T14 | T15 | T16 | T17 | T18 | T19 | T20 | T21 | T22 | T23 | T24 | T25 | T26 | T27 | T28 | T29 | T30 | T31 | T32 | T33 | T34 | T35 | T36 |
DATA TEMP1;
SET TEMP;
RENAME
  T1=I1
  T2=I2
  T3=I3
  T4=I4
  T5=I5
  T6=I6
  T7=I7
  T8=I8
  T9=I9
  T10=I10
  T11=I11
  T12=I12
  T13=I13
  T14=I14
  T15=I15
  T16=I16
  T17=I17
  T18=I18
  T19=I19
  T20=I20
  T21=I21
  T22=I22
  T23=I23
  T24=I24
  T25=I25
  T26=I26
  T27=I27
  T28=I28
  T29=I29
  T30=I30
T31=I31
T32=I32
T33=I33
T34=I34
T35=I35
T36=I36; RUN;

DATA TEMP1; SET TEMP1;
ARRAY RFIVEPT (I) I1 I2 I20 I22 I34 I36;
ARRAY THREEPT (I) I3 I4 I5 I6 I7 I8 I9 I10 I11 I12;
ARRAY TWOPT (I) I13 I14 I15 I16 I17 I18 I19;
ARRAY SIXPT (I) I21 I23 I26 I27 I30;
ARRAY SIXPT (I) I24 I25 I28 I29 I31;
ARRAY FIVEPT (I) I32 I33 I35;

I1SF=I1; I21SF=I21; I22SF=I22;
DO OVER RFIVEPT;
  IF RFIVEPT=1 THEN RFIVEPT=100;
  ELSE IF RFIVEPT=2 THEN RFIVEPT=75;
  ELSE IF RFIVEPT=3 THEN RFIVEPT=50;
  ELSE IF RFIVEPT=4 THEN RFIVEPT=25;
  ELSE IF RFIVEPT=5 THEN RFIVEPT=0; END;
DO OVER THREEPT;
  IF THREEPT=1 THEN THREEPT=0;
  ELSE IF THREEPT=2 THEN THREEPT=50;
  ELSE IF THREEPT=3 THEN THREEPT=100; END;
DO OVER TWOPT;
  IF TWOPT=1 THEN TWOPT=0;
  ELSE IF TWOPT=2 THEN TWOPT=100; END;
DO OVER SIXPT;
  IF SIXPT=1 THEN SIXPT=100;
  ELSE IF SIXPT=2 THEN SIXPT=80;
  ELSE IF SIXPT=3 THEN SIXPT=60;
  ELSE IF SIXPT=4 THEN SIXPT=40;
  ELSE IF SIXPT=5 THEN SIXPT=20;
ELSE IF R6XPT=6 THEN R6XPT=0; END;
DO OVER SIXPT;
  IF SIXPT=1 THEN SIXPT=0;
  ELSE IF SIXPT=2 THEN SIXPT=20;
  ELSE IF SIXPT=3 THEN SIXPT=40;
  ELSE IF SIXPT=4 THEN SIXPT=60;
  ELSE IF SIXPT=5 THEN SIXPT=80;
  ELSE IF SIXPT=6 THEN SIXPT=100; END;
DO OVER FIVEPT;
  IF FIVEPT=1 THEN FIVEPT=0;
  ELSE IF FIVEPT=2 THEN FIVEPT=25;
  ELSE IF FIVEPT=3 THEN FIVEPT=50;
  ELSE IF FIVEPT=4 THEN FIVEPT=75;
  ELSE IF FIVEPT=5 THEN FIVEPT=100; END;
*****************************************************************************;
IF I1SF=1 THEN I1SF=5.0;
ELSE IF I1SF=2 THEN I1SF=4.4;
ELSE IF I1SF=3 THEN I1SF=3.4;
ELSE IF I1SF=4 THEN I1SF=2.0;
ELSE IF I1SF=5 THEN I1SF=1.0;
I1SF=(I1SF-1)*25;
IF I21SF>Z AND I22SF>Z THEN DO;
IF I22SF=1 AND I21SF=1 THEN I22SF=6;
  ELSE IF I22SF=1 AND 7>I21SF>1 THEN I22SF=5;
  ELSE IF I22SF=2 AND 7>I21SF>0 THEN I22SF=4;
  ELSE IF I22SF=3 AND 7>I21SF>0 THEN I22SF=3;
  ELSE IF I22SF=4 AND 7>I21SF>0 THEN I22SF=2;
  ELSE IF I22SF=5 AND 7>I21SF>0 THEN I22SF=1;END;
IF I21SF<=Z AND I22SF>Z THEN DO;
IF I22SF=1 THEN I22SF=6.0;
  ELSE IF I22SF=2 THEN I22SF=4.75;
  ELSE IF I22SF=3 THEN I22SF=3.5;
  ELSE IF I22SF=4 THEN I22SF=2.25;
  ELSE IF I22SF=5 THEN I22SF=1.0;END;
IF I21SF=1 THEN I21SF=6.0;
  ELSE IF I21SF=2 THEN I21SF=5.4;
  ELSE IF I21SF=3 THEN I21SF=4.2;
  ELSE IF I21SF=4 THEN I21SF=3.1;
  ELSE IF I21SF=5 THEN I21SF=2.2;
  ELSE IF I21SF=6 THEN I21SF=1.0;
I21SF=(I21SF-1)*20;I22SF=(I22SF-1)*20;

******************************************************************************;
PHYFUN10=MEAN(I3,I4,I5,I6,I7,I8,I9,I10,I11,I12);
ROLEP4=MEAN(I13,I14,I15,I16);
PAIN2=MEAN(I21,I22);SFPAIN=MEAN(I21SF,I22SF);
GENH5=MEAN(I1,I33,I34,I35,I36);
SFGENH5=MEAN(I1SF,I33,I34,I35,I36);
EMOT5=MEAN(I124,I25,I26,I28,I30);
ROLEE3=MEAN(I17,I18,I19);
SOCFUN2=MEAN(I20,I32);
ENFAT4=MEAN(I23,I27,I29,I31);RUN;
******************************************************************************;
DATA TEMP2;
SET TEMP1;
IF 18<=AGE AND MALE=0 THEN DO;
SFAGE1=0;SFAGE2=0;SFAGE3=0;SFAGE4=0;SFAGE5=0;
SFAGE6=0;SFAGE7=0;SFAGE8=0;SFAGE9=0;
SFAGE10=0;SFAGE11=0;SFAGE12=0;
END;
IF 18<=AGE<=24 AND MALE=1 THEN SFAGE1=1;
IF 24<AGE<=34 AND MALE=1 THEN SFAGE2=1;
IF 34<AGE<=44 AND MALE=1 THEN SFAGE3=1;
IF 44<AGE<=54 AND MALE=1 THEN SFAGE4=1;
IF 54<AGE<=64 AND MALE=1 THEN SFAGE5=1;
IF 64<AGE AND MALE=1 THEN SFAGE6=1;
IF 18<=AGE<=24 AND MALE=0 THEN SFAGE7=1;
IF 24<AGE<=34 AND MALE=0 THEN SFAGE8=1;
IF 34<AGE<=44 AND MALE=0 THEN SFAGE9=1;
IF 44<AGE<=54 AND MALE=0 THEN SFAGE10=1;
IF 54<AGE<=64 AND MALE=0 THEN SFAGE11=1;
IF 64<AGE AND MALE=0 THEN SFAGE12=1;

******************************************************************************
DATA GENPOP;
INFFILE 'sf36.raw' MISOVER;INPUT
#1 PF1  1-5
PF2   6-10
PF3   11-15
PF4   16-20
PF5   21-25
PF6   26-30
PF7   31-35
PF8   36-40
PF9   41-45
PF10  46-50
PF11  51-55
PF12  56-60
#2 PF1S 1-5
PF2S  6-10
PF3S  11-15
PF4S  16-20
PF5S  21-25
PF6S  26-30
PF7S  31-35
PF8S  36-40
PF9S  41-45
PF10S 46-50
PF11S 51-55
PF12S 56-60
#3 RP1  1-5
RP2    6-10
RP3    11-15
RP4    16-20
RP5    21-25
RP6    26-30
RP7    31-35
RP8    36-40
RP9    41-45
RP10   46-50
RP11   51-55
RP12   56-60
#4 RP1S 1-5
RP2S   6-10
RP3S   11-15
RP4S   16-20
RP5S   21-25
RP6S   26-30
RP7S   31-35
RP8S   36-40
RP9S   41-45
RP10S  46-50
RP11S  51-55
RP12S  56-60
#5 BP1  1-5
BP2   6-10
BP3   11-15
BP4   16-20
BP5   21-25
BP6   26-30
BP7   31-35
BP8   36-40
BP9   41-45
BP10  46-50
BP11  51-55
BP12  56-60
#6 BP1S 1-5
BP2S  6-10
BP3S  11-15
BP4S  16-20
BP5S  21-25
BP6S  26-30
BP7S  31-35
BP8S  36-40
BP9S  41-45
BP10S 46-50
BP11S 51-55
BP12S 56-60
#7 GEN1 1-5
GEN2  6-10
GEN3  11-15
GEN4  16-20
GEN5  21-25
GEN6  26-30
GEN7  31-35
GEN8  36-40
GEN9  41-45
GEN10 46-50
GEN11 51-55
GEN12  56-60
#8 GEN1S  1-5
GEN2S   6-10
GEN3S   11-15
GEN4S   16-20
GEN5S   21-25
GEN6S   26-30
GEN7S   31-35
GEN8S   36-40
GEN9S   41-45
GEN10S  46-50
GEN11S  51-55
GEN12S  56-60
#9 ENFT1  1-5
ENFT2   6-10
ENFT3   11-15
ENFT4   16-20
ENFT5   21-25
ENFT6   26-30
ENFT7   31-35
ENFT8   36-40
ENFT9   41-45
ENFT10  46-50
ENFT11  51-55
ENFT12  56-60
#10 ENFT1S  1-5
ENFT2S  6-10
ENFT3S  11-15
ENFT4S  16-20
ENFT5S  21-25
ENFT6S  26-30
ENFT7S  31-35
ENFT8S  36-40
ENFT9S  41-45
ENFT10S 46-50
ENFT11S 51-55
ENFT12S 56-60
#11SF1 1-5
SF2 6-10
SF3 11-15
SF4 16-20
SF5 21-25
SF6 26-30
SF7 31-35
SF8 36-40
SF9 41-45
SF10 46-50
SF11 51-55
SF12 56-60
#12 SF1S 1-5
SF2S 6-10
SF3S 11-15
SF4S 16-20
SF5S 21-25
SF6S 26-30
SF7S 31-35
SF8S 36-40
SF9S 41-45
SF10S 46-50
SF11S 51-55
SF12S 56-60
#13
RE1 1-5
RE2 6-10
RE3 11-15
RE4 16-20
RE5 21-25
RE6 26-30
RE7 31-35
RE8 36-40
RE9  41-45
RE10  46-50
RE11  51-55
RE12  56-60
#14
RE1S  1-5
RE2S  6-10
RE3S  11-15
RE4S  16-20
RE5S  21-25
RE6S  26-30
RE7S  31-35
RE8S  36-40
RE9S  41-45
RE10S 46-50
RE11S 51-55
RE12S 56-60
#15
MH1   1-5
MH2   6-10
MH3   11-15
MH4   16-20
MH5   21-25
MH6   26-30
MH7   31-35
MH8   36-40
MH9   41-45
MH10  46-50
MH11  51-55
MH12  56-60
#16
MH1S  1-5
MH2S  6-10
MH3S  11-15
MH4S  16-20
MH5S  21-25
MH6S  26-30
MH7S  31-35
MH8S  36-40
MH9S  41-45
MH10S 46-50
MH11S 51-55
MH12S 56-60 ;RUN;

*****************************************************************************
DATA TEST;
IF _N_=1 THEN SET GENPOP;
SET TEMP2;
PFIFSM=(SFAGE1*PF1)+(SFAGE2*PF2)+(SFAGE3*PF3)+(SFAGE4*PF4)+(SFAGE5*PF5)+(SFAGE6*PF6)+(SFAGE7*PF7)+(SFAGE8*PF8)+(SFAGE9*PF9)+(SFAGE10*PF10)+(SFAGE11*PF11)+(SFAGE12*PF12);
IF SFAGE1=1 THEN ZPHY10=(PHYFUN10-PFIFSM)/PF1S;
ELSE IF SFAGE2=1 THEN ZPHY10=(PHYFUN10-PFIFSM)/PF2S;
ELSE IF SFAGE3=1 THEN ZPHY10=(PHYFUN10-PFIFSM)/PF3S;
ELSE IF SFAGE4=1 THEN ZPHY10=(PHYFUN10-PFIFSM)/PF4S;
ELSE IF SFAGE5=1 THEN ZPHY10=(PHYFUN10-PFIFSM)/PF5S;
ELSE IF SFAGE6=1 THEN ZPHY10=(PHYFUN10-PFIFSM)/PF6S;
ELSE IF SFAGE7=1 THEN ZPHY10=(PHYFUN10-PFIFSM)/PF7S;
ELSE IF SFAGE8=1 THEN ZPHY10=(PHYFUN10-PFIFSM)/PF8S;
ELSE IF SFAGE9=1 THEN ZPHY10=(PHYFUN10-PFIFSM)/PF9S;
ELSE IF SFAGE10=1 THEN ZPHY10=(PHYFUN10-PFIFSM)/PF10S;
ELSE IF SFAGE11=1 THEN ZPHY10=(PHYFUN10-PFIFSM)/PF11S;
ELSE IF SFAGE12=1 THEN ZPHY10=(PHYFUN10-PFIFSM)/PF12S;
RPSFM=(SFAGE1*RP1)+(SFAGE2*RP2)+(SFAGE3*RP3)+(SFAGE4*RP4)+(SFAGE5*RP5)+(SFAGE6*RP6)+(SFAGE7*RP7)+(SFAGE8*RP8)+(SFAGE9*RP9)+(SFAGE10*RP10)+(SFAGE11*RP11)+(SFAGE12*RP12);
IF SFAGE1=1 THEN ZRP=(ROLEP4-RPSFM)/RP1S;
ELSE IF SFAGE2=1 THEN ZRP=(ROLEP4-RPSFM)/RP2S;
ELSE IF SFAGE3=1 THEN ZRP=(ROLEP4-RPSFM)/RP3S;
ELSE IF SFAGE4=1 THEN ZRP=(ROLEP4-RPSFM)/RP4S;
ELSE IF SFAGE5=1 THEN ZRP=(ROLEP4-RPSFM)/RP5S;
ELSE IF SFAGE6=1 THEN ZRP=(ROLEP4-RPSFM)/RP6S;
ELSE IF SFAGE7=1 THEN ZRP=(ROLEP4-RPSFM)/RP7S;
ELSE IF SFAGE8=1 THEN ZRP=(ROLEP4-RPSFM)/RP8S;
ELSE IF SFAGE9=1 THEN ZRP=(ROLEP4-RPSFM)/RP9S;
ELSE IF SFAGE10=1 THEN ZRP=(ROLEP4-RPSFM)/RP10S;
ELSE IF SFAGE11=1 THEN ZRP=(ROLEP4-RPSFM)/RP11S;
ELSE IF SFAGE12=1 THEN ZRP=(ROLEP4-RPSFM)/RP12S;
BPSFM=(SFAGE1*BP1)+(SFAGE2*BP2)+(SFAGE3*BP3)+
(SFAGE4*BP4)+(SFAGE5*BP5)+(SFAGE6*BP6)+
(SFAGE7*BP7)+(SFAGE8*BP8)+(SFAGE9*BP9)+
(SFAGE10*BP10)+(SFAGE11*BP11)+(SFAGE12*BP12);
IF SFAGE1=1 THEN ZBP=(SFPAIN-BPSFM)/BP1S;
ELSE IF SFAGE2=1 THEN ZBP=(SFPAIN-BPSFM)/BP2S;
ELSE IF SFAGE3=1 THEN ZBP=(SFPAIN-BPSFM)/BP3S;
ELSE IF SFAGE4=1 THEN ZBP=(SFPAIN-BPSFM)/BP4S;
ELSE IF SFAGE5=1 THEN ZBP=(SFPAIN-BPSFM)/BP5S;
ELSE IF SFAGE6=1 THEN ZBP=(SFPAIN-BPSFM)/BP6S;
ELSE IF SFAGE7=1 THEN ZBP=(SFPAIN-BPSFM)/BP7S;
ELSE IF SFAGE8=1 THEN ZBP=(SFPAIN-BPSFM)/BP8S;
ELSE IF SFAGE9=1 THEN ZBP=(SFPAIN-BPSFM)/BP9S;
ELSE IF SFAGE10=1 THEN ZBP=(SFPAIN-BPSFM)/BP10S;
ELSE IF SFAGE11=1 THEN ZBP=(SFPAIN-BPSFM)/BP11S;
ELSE IF SFAGE12=1 THEN ZBP=(SFPAIN-BPSFM)/BP12S;
GENSFm=(SFAGE1*GEN1)+(SFAGE2*GEN2)+(SFAGE3*GEN3)+
(SFAGE4*GEN4)+(SFAGE5*GEN5)+(SFAGE6*GEN6)+
(SFAGE7*GEN7)+(SFAGE8*GEN8)+(SFAGE9*GEN9)+
(SFAGE10*GEN10)+(SFAGE11*GEN11)+(SFAGE12*GEN12);
IF SFAGE1=1 THEN ZGENH=(SFGENH5-GENSFm)/GEN1S;
ELSE IF SFAGE2=1 THEN ZGENH=(SFGENH5-GENSFm)/GEN2S;
ELSE IF SFAGE3=1 THEN ZGENH=(SFGENH5-GENSFm)/GEN3S;
ELSE IF SFAGE4=1 THEN ZGENH=(SFGENH5-GENSFm)/GEN4S;
ELSE IF SFAGE5=1 THEN ZGENH=(SFGENH5-GENSFm)/GEN5S;
ELSE IF SFAGE6=1 THEN ZGENH=(SFGENH5-GENSFm)/GEN6S;
ELSE IF SFAGE7=1 THEN ZGENH=(SFGENH5-GENSFm)/GEN7S;
ELSE IF SFAGE8=1 THEN ZGENH=(SFGENH5-GENSFm)/GEN8S;
ELSE IF SFAGE9=1 THEN ZGENH=(SFGENH5-GENSFm)/GEN9S;
ELSE IF SFAGE10=1 THEN ZGENH=(SFGENH5-GENSFm)/GEN10S;
ELSE IF SFAGE11=1 THEN ZGENH=(SFGENH5-GENSFm)/GEN11S;
ELSE IF SFAGE12=1 THEN ZGENH=(SFGENH5-GENSFm)/GEN12S;
ENFTSFm=(SFAGE1*ENFT1)+(SFAGE2*ENFT2)+(SFAGE3*ENFT3)+
(SFAGE4*ENFT4)+(SFAGE5*ENFT5)+(SFAGE6*ENFT6)+
(SFAGE7*ENFT7)+(SFAGE8*ENFT8)+(SFAGE9*ENFT9)+
(SFAGE10*ENFT10)+ (SFAGE11*ENFT11)+ (SFAGE12*ENFT12);
IF SFAGE1=1 THEN ZENFT=(ENFAT4-ENFTSFM)/ENFT1S;
ELSE IF SFAGE2=1 THEN ZENFT=(ENFAT4-ENFTSFM)/ENFT2S;
ELSE IF SFAGE3=1 THEN ZENFT=(ENFAT4-ENFTSFM)/ENFT3S;
ELSE IF SFAGE4=1 THEN ZENFT=(ENFAT4-ENFTSFM)/ENFT4S;
ELSE IF SFAGE5=1 THEN ZENFT=(ENFAT4-ENFTSFM)/ENFT5S;
ELSE IF SFAGE6=1 THEN ZENFT=(ENFAT4-ENFTSFM)/ENFT6S;
ELSE IF SFAGE7=1 THEN ZENFT=(ENFAT4-ENFTSFM)/ENFT7S;
ELSE IF SFAGE8=1 THEN ZENFT=(ENFAT4-ENFTSFM)/ENFT8S;
ELSE IF SFAGE9=1 THEN ZENFT=(ENFAT4-ENFTSFM)/ENFT9S;
ELSE IF SFAGE10=1 THEN ZENFT=(ENFAT4-ENFTSFM)/ENFT10S;
ELSE IF SFAGE11=1 THEN ZENFT=(ENFAT4-ENFTSFM)/ENFT11S;
ELSE IF SFAGE12=1 THEN ZENFT=(ENFAT4-ENFTSFM)/ENFT12S;
SFSFM=(SFAGE1*SF1)+(SFAGE2*SF2)+(SFAGE3*SF3)+
(SFAGE4*SF4)+(SFAGE5*SF5)+(SFAGE6*SF6)+
(SFAGE7*SF7)+(SFAGE8*SF8)+(SFAGE9*SF9)+
(SFAGE10*SF10)+(SFAGE11*SF11)+(SFAGE12*SF12);
IF SFAGE1=1 THEN ZSF=(SOCFUN2-SFSFM)/SF1S;
ELSE IF SFAGE2=1 THEN ZSF=(SOCFUN2-SFSFM)/SF2S;
ELSE IF SFAGE3=1 THEN ZSF=(SOCFUN2-SFSFM)/SF3S;
ELSE IF SFAGE4=1 THEN ZSF=(SOCFUN2-SFSFM)/SF4S;
ELSE IF SFAGE5=1 THEN ZSF=(SOCFUN2-SFSFM)/SF5S;
ELSE IF SFAGE6=1 THEN ZSF=(SOCFUN2-SFSFM)/SF6S;
ELSE IF SFAGE7=1 THEN ZSF=(SOCFUN2-SFSFM)/SF7S;
ELSE IF SFAGE8=1 THEN ZSF=(SOCFUN2-SFSFM)/SF8S;
ELSE IF SFAGE9=1 THEN ZSF=(SOCFUN2-SFSFM)/SF9S;
ELSE IF SFAGE10=1 THEN ZSF=(SOCFUN2-SFSFM)/SF10S;
ELSE IF SFAGE11=1 THEN ZSF=(SOCFUN2-SFSFM)/SF11S;
ELSE IF SFAGE12=1 THEN ZSF=(SOCFUN2-SFSFM)/SF12S;
RESFM=(SFAGE1*RE1)+(SFAGE2*RE2)+(SFAGE3*RE3)+
(SFAGE4*RE4)+(SFAGE5*RE5)+(SFAGE6*RE6)+
(SFAGE7*RE7)+(SFAGE8*RE8)+(SFAGE9*RE9)+
(SFAGE10*RE10)+(SFAGE11*RE11)+(SFAGE12*RE12);
IF SFAGE1=1 THEN ZRE=(ROLEE3-RESFM)/RE1S;
ELSE IF SFAGE2=1 THEN ZRE=(ROLEE3-RESFM)/RE2S;
ELSE IF SFAGE3=1 THEN ZRE=(ROLEE3-RESF)/RE3S;
ELSE IF SFAGE4=1 THEN ZRE=(ROLEE3-RESF)/RE4S;
ELSE IF SFAGE5=1 THEN ZRE=(ROLEE3-RESF)/RE5S;
ELSE IF SFAGE6=1 THEN ZRE=(ROLEE3-RESF)/RE6S;
ELSE IF SFAGE7=1 THEN ZRE=(ROLEE3-RESF)/RE7S;
ELSE IF SFAGE8=1 THEN ZRE=(ROLEE3-RESF)/RE8S;
ELSE IF SFAGE9=1 THEN ZRE=(ROLEE3-RESF)/RE9S;
ELSE IF SFAGE10=1 THEN ZRE=(ROLEE3-RESF)/RE10S;
ELSE IF SFAGE11=1 THEN ZRE=(ROLEE3-RESF)/RE11S;
ELSE IF SFAGE12=1 THEN ZRE=(ROLEE3-RESF)/RE12S;
MHSFM=(SFAGE1*MH1)+(SFAGE2*MH2)+(SFAGE3*MH3)+(SFAGE4*MH4)+(SFAGE5*MH5)+(SFAGE6*MH6)+(SFAGE7*MH7)+(SFAGE8*MH8)+(SFAGE9*MH9)+(SFAGE10*MH10)+(SFAGE11*MH11)+(SFAGE12*MH12);
IF SFAGE1=1 THEN ZMHI=(EMOT5-MHSFM)/MH1S;
ELSE IF SFAGE2=1 THEN ZMHI=(EMOT5-MHSFM)/MH2S;
ELSE IF SFAGE3=1 THEN ZMHI=(EMOT5-MHSFM)/MH3S;
ELSE IF SFAGE4=1 THEN ZMHI=(EMOT5-MHSFM)/MH4S;
ELSE IF SFAGE5=1 THEN ZMHI=(EMOT5-MHSFM)/MH5S;
ELSE IF SFAGE6=1 THEN ZMHI=(EMOT5-MHSFM)/MH6S;
ELSE IF SFAGE7=1 THEN ZMHI=(EMOT5-MHSFM)/MH7S;
ELSE IF SFAGE8=1 THEN ZMHI=(EMOT5-MHSFM)/MH8S;
ELSE IF SFAGE9=1 THEN ZMHI=(EMOT5-MHSFM)/MH9S;
ELSE IF SFAGE10=1 THEN ZMHI=(EMOT5-MHSFM)/MH10S;
ELSE IF SFAGE11=1 THEN ZMHI=(EMOT5-MHSFM)/MH11S;
ELSE IF SFAGE12=1 THEN ZMHI=(EMOT5-MHSFM)/MH12S;
IF PHYFUN10=1 THEN PFISFM=.IF PFISFM=. THEN PHYFUN10=1.
IF ROLEP4=. THEN RPSFM=.IF RPSFM=. THEN ROLEP4=.;
IF PAIN2=. THEN BPSFM=.IF BPSFM=. THEN PAIN2=.;
IF BPSFM=. THEN SPFAIN=.
IF GENH5=. THEN GENSFM=.IF GENSFM=. THEN GENH5=1.
IF GENSFM=1 . THEN SFGENH5=.
IF ENFAT4=. THEN ENFTSFM=.IF ENFTSFM=. THEN ENFAT4=.
IF SOCFUN2=. THEN SFSFM=.IF SFSFM=. THEN SOCFUN2=.
IF ROLEE3=. THEN RESFM=.IF RESFM=. THEN ROLEE3=.
IF EMOT5=. THEN MHSFM=.; IF MHSFM=. THEN EMOT5=.; RUN;
***********************************************************************;
DATA TEST; SET TEST; RUN;
PROC MEANS;
VAR
PHYFUN10 ROLEP4 PAIN2 SFPAIN GENH5 SFGENH5
EMOT5 ROLEE3 ENFAT4 SOCFUN2; RUN;
PROC MEANS N MEAN;
VAR
PFISFM RPSFM BPSFM GENSFNMHSFM RESFM ENFTSFMSPSFM; RUN;
***********************************************************************;
PROC MEANS T PRT;
VAR ZPHY10 ZRP ZBP ZGENH ZENFT ZSF ZRE ZMHI; RUN;
***********************************************************************;
PROC CORR NOMISS ALPHA; VAR
I3 I4 I5 I6 I7 I8 I9 I10 I11 I12;
TITLE 'PHYSICAL FUNCTIONING'; RUN;
***********************************************************************;
PROC CORR NOMISS ALPHA; VAR
I13 I14 I15 I16;
TITLE 'ROLE LIMITATIONS--PHYSICAL'; RUN;
***********************************************************************;
PROC CORR NOMISS ALPHA; VAR
I21 I22;
TITLE 'PAIN--RAND SCORING'; RUN;
***********************************************************************;
PROC CORR NOMISS ALPHA; VAR
I21SF I22SF;
TITLE 'PAIN--NEMC SCORING'; RUN;
***********************************************************************;
PROC CORR NOMISS ALPHA; VAR
I1 I33 I34 I35 I36;
TITLE 'GENERAL HEALTH--RAND SCORING'; RUN;
***********************************************************************;
PROC CORR NOMISS ALPHA;VAR
I1SF I33 I34 I35 I36;
TITLE 'GENERAL HEALTH--NEMC SCORING';RUN;

PROC CORR NOMISS ALPHA;VAR
I24 I25 I26 I28 I30;
TITLE 'EMOTIONAL WELL-BEING';RUN;

PROC CORR NOMISS ALPHA;VAR
I17 I18 I19;
TITLE 'ROLE LIMITATIONS--EMOTIONAL';RUN;

PROC CORR NOMISS ALPHA;VAR
I20 I32;
TITLE 'SOCIAL FUNCTION';RUN;

PROC CORR NOMISS ALPHA;VAR
I23 I27 I29 I31;
TITLE 'ENERGY';RUN;

**********************************************************************************

PROC CORR NOMISS ALPHA;VAR
I17 I18 I19;
TITLE 'ROLE LIMITATIONS--EMOTIONAL';RUN;

**********************************************************************************

PROC CORR NOMISS ALPHA;VAR
I20 I32;
TITLE 'SOCIAL FUNCTION';RUN;

**********************************************************************************

PROC CORR NOMISS ALPHA;VAR
I23 I27 I29 I31;
TITLE 'ENERGY';RUN;

**********************************************************************************
## Table 7

**EXAMPLE SAS Output from sf36.sas FILE**

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
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<tbody>
<tr>
<td>PHYFUN10</td>
<td>177</td>
<td>82.4293785</td>
<td>20.6300431</td>
<td>10.0000000</td>
<td>100.0000000</td>
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<tr>
<td>ROLEP4</td>
<td>177</td>
<td>90.2542373</td>
<td>19.4108626</td>
<td>0.0000000</td>
<td>100.0000000</td>
</tr>
<tr>
<td>PAIN2</td>
<td>177</td>
<td>84.2090395</td>
<td>17.3862808</td>
<td>25.0000000</td>
<td>100.0000000</td>
</tr>
<tr>
<td>SPFAIN</td>
<td>177</td>
<td>81.1242938</td>
<td>19.0079627</td>
<td>20.0000000</td>
<td>100.0000000</td>
</tr>
<tr>
<td>GENH5</td>
<td>177</td>
<td>73.0508475</td>
<td>15.3561050</td>
<td>25.0000000</td>
<td>100.0000000</td>
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<tr>
<td>SFGENH5</td>
<td>177</td>
<td>74.5423729</td>
<td>15.1481195</td>
<td>27.0000000</td>
<td>100.0000000</td>
</tr>
<tr>
<td>EMOT5</td>
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<td>15.5941727</td>
<td>20.0000000</td>
<td>100.0000000</td>
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<tr>
<td>ROLEE3</td>
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<td>82.2975518</td>
<td>29.3101553</td>
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<td>ENFAT4</td>
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<td>68.1073446</td>
<td>16.8197260</td>
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<td>100.0000000</td>
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<td>SOCFUN2</td>
<td>177</td>
<td>78.9548023</td>
<td>20.7349533</td>
<td>0.0000000</td>
<td>100.0000000</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFISFM</td>
<td>177</td>
<td>91.7229944</td>
</tr>
<tr>
<td>RPSFM</td>
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<tr>
<td>BPSFM</td>
<td>177</td>
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</tr>
<tr>
<td>GENPSFM</td>
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<td>77.1684746</td>
</tr>
<tr>
<td>MHSFM</td>
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<td>74.9923164</td>
</tr>
<tr>
<td>KESFM</td>
<td>177</td>
<td>83.2776836</td>
</tr>
<tr>
<td>ENPTSFM</td>
<td>177</td>
<td>63.6044633</td>
</tr>
<tr>
<td>SFSFM</td>
<td>177</td>
<td>86.0232203</td>
</tr>
</tbody>
</table>

<p>| Variable | T    | Prob&gt;|T| |
|----------|------|------|
| ZPHY10   | -6.0582746 | 0.0001 |
| ZBP      | 0.1866498  | 0.8522 |
| ZSP      | 0.6750584  | 0.5005 |
| ZGENH    | -2.4358239  | 0.0159 |
| ZENFT    | 3.5896520  | 0.0004 |
| ZSF      | -4.5436598  | 0.0001 |
| ZRE      | -0.3998480  | 0.6898 |
| ZMH      | 0.5717541   | 0.5682 |</p>
<table>
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<th>Std Dev</th>
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</tbody>
</table>
APPENDIX: SF-36 QUESTIONNAIRE ITEMS

1. In general, would you say your health is:
   
   (Circle One Number)
   
   Excellent ................................................. 1
   Very good ................................................. 2
   Good ......................................................... 3
   Fair .......................................................... 4
   Poor ......................................................... 5

2. **Compared to one year ago**, how would you rate your health in general **now**?

   (Circle One Number)
   
   Much better now than one year ago ................................................. 1
   Somewhat better now than one year ago ......................................... 2
   About the same ......................................................... 3
   Somewhat worse now than one year ago ....................................... 4
   Much worse now than one year ago ................................................. 5

The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

   (Circle One Number on Each Line)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Yes, Limited a Lot</th>
<th>Yes, Limited a Little</th>
<th>No, Not Limited at All</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. <strong>Vigorous activities</strong>, such as running, lifting heavy objects, participating in strenuous sports</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. <strong>Moderate activities</strong>, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5. Lifting or carrying groceries</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6. Climbing several flights of stairs</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7. Climbing one flight of stairs</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8. Bending, kneeling, or stooping</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9. Walking <strong>more than a mile</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10. Walking <strong>several blocks</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>11. Walking <strong>one block</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>12. Bathing or dressing yourself</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

(Circle One Number on Each Line)

13. Cut down the amount of time you spent on work or other activities ....................................................... 1 2

14. Accomplished less than you would like............................. 1 2

15. Were limited in the kind of work or other activities....... 1 2

16. Had difficulty performing the work or other activities (for example, it took extra effort)................................. 1 2

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

(Circle One Number on Each Line)

17. Cut down the amount of time you spent on work or other activities ....................................................... 1 2

18. Accomplished less than you would like............................. 1 2

19. Didn’t do work or other activities as carefully as usual 1 2

20. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

(Circle One Number)

Not at all........................................ 1
Slightly ........................................ 2
Moderately .................................... 3
Quite a bit..................................... 4
Extremely.................................... 5

21. How much bodily pain have you had during the past 4 weeks?

(Circle One Number)

None ........................................... 1
Very mild .................................... 2
Mild ........................................... 3
Moderate ..................................... 4
Severe......................................... 5
Very severe................................ 6
22. During the **past 4 weeks**, how much did **pain** interfere with your normal work (including both work outside the home and housework)?

(Circle One Number)

- Not at all.......................... 1
- A little bit .......................... 2
- Moderately ......................... 3
- Quite a bit.......................... 4
- Extremely ......................... 5

These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the **past 4 weeks**

(Circle One Number on Each Line)

<table>
<thead>
<tr>
<th></th>
<th>All of the Time</th>
<th>Most of the Time</th>
<th>A Good Bit of the Time</th>
<th>Some of the Time</th>
<th>A Little of the Time</th>
<th>None of the Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>23. Did you feel full of pep?...</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>24. Have you been a very nervous person?...</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>25. Have you felt so down in the dumps that nothing could cheer you up?...</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>26. Have you felt calm and peaceful?...</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>27. Did you have a lot of energy?...</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>28. Have you felt downhearted and blue?...</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>29. Did you feel worn out?...</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>30. Have you been a happy person?...</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>31. Did you feel tired?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

32. During the **past 4 weeks**, how much of the time has your **physical health or emotional problems** interfered with your social activities (like visiting with friends, relatives, etc.)?

(Circle One Number)

- All of the time.......................... 1
- Most of the time .......................... 2
- Some of the time .......................... 3
- A little of the time .......................... 4
- None of the time .......................... 5
How TRUE or FALSE is each of the following statements for you.

<table>
<thead>
<tr>
<th></th>
<th>Definitely True</th>
<th>Mostly True</th>
<th>Don't Know</th>
<th>Mostly False</th>
<th>Definitely False</th>
</tr>
</thead>
<tbody>
<tr>
<td>33. I seem to get sick a little easier than other people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>34. I am as healthy as anybody I know</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>35. I expect my health to get worse</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>36. My health is excellent</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>