

TECH NOTES

Scoring the SF-12 Physical and Mental Health Summary Measures

by Mark Kosinski, M.A.

The SF-12 Health Survey—a short-form with 12 items—is a generic measure of health status that was developed to provide an alternative to the SF-36 Health Survey for purposes of monitoring large samples from general and specific populations. The SF-12 is attractive because it is short, easy to administer, has proven reliability and validity, and it can be printed on one questionnaire page. However, precise summary score estimates require complicated algorithms and some users of the SF-12 have encountered difficulty in scoring. The purpose of this article is to provide a simple explanation, via illustration, for scoring the physical (PCS-12) and mental (MCS-12) component summary scales.

The stage for the development of the SF-12 was set by two important discoveries. The first was the finding that more than 80% of the reliable variance in the eight SF-36 scales is

accounted for by physical and mental health components in general and specific populations.^{1,2} The second was the finding that in cross-sectional and longitudinal tests of validity, the SF-36 physical (PCS) and mental (MCS) component summary measures rarely missed a hypothesized difference detected by any of the eight SF-36 scales.^{1,2} These results suggested that physical and mental component summary measures could simplify the monitoring of health outcomes. Because the number of items in a survey is a function of the number of health dimensions being measured, these results also provided a basis for an even shorter form.

The 12 items in the SF-12 are a subset of those in the SF-36. That subset was selected because it best reproduces the SF-36 PCS and MCS summary scores in general and specific populations and because the set represents all eight SF-36 dimensions.³ To reproduce the SF-

36 PCS and MCS summary scales with better than 90% accuracy, scoring is done in four steps: 1) data cleaning and item recoding; 2) creating indicator variables for item response choices; 3) weighting and aggregation of indicator variables; 4) norm-based standardization of scale scores. These four steps, which are summarized below, are discussed in greater detail in the "How to Score the SF-12 Physical and Mental Health Summary Scales."⁴

The problem most frequently reported by users scoring the PCS-12 and MCS-12 scales is the creation of indicator variables for the item response choices and weighting of the indicator variables. Admittedly, the scoring steps for the SF-12 were developed with the statistical software programmer in mind, where indicator variables are derived to indicate whether or not a respondent has selected a particular item response choice. For example, a value of 1 is

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FIGURE 1

SF-12 HEALTH SURVEY

INSTRUCTIONS: This survey asks for views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities. Please answer every question by marking one box. If you are unsure about how to answer, please give the best answer you can.

- In general, would you say your health is:

(Physical)	0	-1.31872	-3.02396	-5.56461	-8.37399
(Mental)	0	-0.06064	0.03482	-0.16891	-1.71175
	Excellent	Very good	Good	Fair	Poor

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?
- Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf

(Physical)	Yes, Limited A Lot	Yes, Limited A Little	No, Not Limited At All
	-7.23216	-3.45555	0
(Mental)	-3.93115	1.86840	0
- Climbing several flights of stairs

(Physical)	-6.24397	2.68282	0
(Mental)	-2.73557	1.43103	0

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?
- Accomplished less than you would like

(Physical)	YES	NO
	-4.61617	0
(Mental)	1.44060	0
- Were limited in the kind of work or other activities

(Physical)	-5.51747	0
(Mental)	1.66968	0

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)?
- Accomplished less than you would like

(Physical)	YES	NO
	3.04365	0
(Mental)	-6.82672	0
- Didn't do work or other activities as carefully as usual

(Physical)	2.32091	0
(Mental)	-5.69921	0
- During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

(Physical)	0	3.80130	-6.50522	-8.38063	-11.25544
(Mental)	0	0.90384	1.49384	1.76691	1.48619
	Not at all	A little bit	Moderately	Quite a bit	Extremely

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 -
- Have you felt calm and peaceful?

(Physical)	All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the Time
	0.68514	0.68514	1.36689	2.37241	2.99426	3.46638
(Mental)	0	-1.94949	-4.09842	-6.31121	-7.92717	-10.19085
- Did you have a lot of energy?

(Physical)	0	0.42251	-1.14387	-1.61850	-2.02168	-2.44706
(Mental)	0	0.92057	-1.65178	-3.29805	-4.88962	-6.02409
- Have you felt downhearted and blue?

(Physical)	4.61446	3.41593	2.34247	1.28044	0.41188	0
(Mental)	-16.15395	-10.77911	-8.09914	-4.59055	-1.95934	0
- 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.)?

(Physical)	-0.33682	-0.94342	-0.18043	0.11038	0
(Mental)	-6.29724	-8.26066	-5.63286	-3.13896	0
	All of the Time	Most of the Time	Some of the Time	A Little of the Time	None of the Time

$PCS\ Score = (-3.02396) + (-3.45555) + (0) + (-4.61617) + (0) + (0) + (-3.8013) + (0.66514) + (-0.42251) + (0.41188) + (0.11038) = -9.51592$
 $Norm\text{-}Based\ Standardized\ PCS = -9.51592 + 56.57706 = 47.06$
 $MCS\ Score = (0.03482) + (1.8684) + (0) + (1.4406) + (0) + (0) + (0) + (0.90384) + (-1.94949) + (-0.92057) + (-1.95934) + (-3.13896) = -3.7207$
 $Norm\text{-}Based\ Standardized\ MCS = -3.7207 + 60.75781 = 57.04$

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assigned to the item response choice value selected by the respondent and a 0 is assigned to the item response choices not selected. The following example is intended to simply explain the scoring steps for the SF-12 physical and mental component summary scales without reference to creating indicator variables.

Figure 1 presents a completed SF-12 Health Survey for a hypothetical respondent. Note that at the top of each item response choice box is the physical weight used to score the PCS-12 scale and the mental weight used to score the MCS-12 scale is at the bottom of each item response choice box. A physical and mental weight of 0 is assigned for the item response choice indicative of the most favorable health state. In essence, the physical weights at the top of the response choice box should be considered as the item response choice value for scoring the PCS-12 scale. Similarly, the mental weight at the bottom of the response choice box should be considered as the response choice value for scoring the MCS-12 scale. Using the responses selected for the hypothetical respondent in Figure 1, scores for PCS-12 and MCS-12 would be computed in the following way: 1) summate the physical weights corresponding to the item response choice selected to score PCS-12 and sum-

mate the mental weights corresponding to the item response choices selected to score MCS-12; 2) standardize the PCS-12 score by adding the constant (56.57706) to the sum of the physical weights (-9.51592) and standardize the MCS-12 score by adding the constant (60.75781) to the sum of the mental weights (-3.7207). The final PCS-12 and MCS-12 scores for the hypothetical respondent are 47.06 and 57.04, respectively.

References

1. Ware JE, Kosinski M, Bayliss MS, McHorney CA, Rogers WH, & Raczek A. *Comparison of methods for the scoring and statistical analysis of SF-36 health profile and summary measures: Summary of results from the Medical Outcomes Study*. Medical Care 1995; 33(4):AS264-AS279.
2. Ware JE, Kosinski M, and Keller SD. *SF-36 Physical and Mental Health Summary Scales: A User's Manual*. Boston, MA: The Health Institute, 1994.
3. Ware JE, Kosinski M, and Keller SD. *A 12-Item Short-Form Health Survey (SF-12): construction of scales and preliminary tests of reliability and validity*. Medical Care 1996; 32(3):220-233.
4. Ware JE, Kosinski M, and Keller SD. *How to Score the SF-12 Physical and Mental Health Summary Scales*. Boston, MA: The Health Institute, New England Medical Center, Second Edition, 1995.

Instrument Development

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weights. The measure appears to show sensitivity to expected differences in gender, age, and self-reported health status. The results from these studies suggest the QWB-SA may be easy to apply in clinical and research settings, and sensitive to expected variations in wellness. These studies provide only initial evidence supporting the use of the QWB-SA in large scale research programs. Further investigation will be required in order to determine the most appropriate way to obtain preference data as well as to validate the QWB-SA for different populations.

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平成 18 年度輪島市門前保健センター 「脳いきいき健康教室」事前アンケート

このアンケートは、「脳いきいき健康教室」に参加される皆様方のご関心やご興味、ご質問を把握して、「脳いきいき健康教室」や今後の輪島市の事業に役立たせることを目的に行うものです。どうぞ率直なご回答をお寄せ下さるようお願い致します。

1. この事業をどのようにしてお知りになりましたか？
2. この事業に参加しようと思ったのはどのような理由からですか？
3. ご自分の物忘れや脳の働きについて、現在、不安がありますか
①大いにある ②ややある ③あまりない ④ほとんどない
4. ご自分の物忘れや脳の働きについて気になっていることはありますか？
5. 物忘れや脳の働きについて知りたいこと、疑問に思っていることはありますか？
6. 最後に、この事業について希望すること、他に仰りたいことはありますか？

付録
(関連資料)

脳いきいき健康教室を開催します

いつまでも若々しく元気でいるために頭と体を使った「脳いきいき健康教室」を実施します。
この教室は毎回継続して参加することに意味があります。皆さん、頑張って元気に参加しましょう。
皆出席の方には修了証書を交付します。さあ……頑張りましょう！

参加した日に○をしましょう

月 日	曜	内 容	血 圧	参 加
10月 3日	火	会の目的・自己紹介・みなさんの状況把握		
10月10日	火	健康学習「認知症ってなあに」		
10月17日	火	思い起こすための2日遅れの日記		
10月24日	火	頭と体を楽しく使いましょう 「回想法とレクレーションダンス」		
10月31日	火	頭と体を楽しく使いましょう 「回想法と音楽を使った体操」		
11月 7日	火	頭と体を楽しく使いましょう 「回想法と中国体操」		
11月14日	火	頭と体を楽しく使いましょう 「回想法と太極拳」		
11月21日	火	思い起こすための2日遅れの日記		
11月28日	火	健康学習「認知症を予防する生活」		
12月 5日	火	教室参加後のみなさんの状況把握		

時 間 10時～13時

会 場 輪島市門前保健センター(Tel 42-1313)

対 象 65歳以上で、老化等で心身機能の低下が心配される方

持ってくる物 昼食代 500円程度・健康手帳

費 用 無料

*送迎を希望されている方は決められた時間に所定の場所にお集まり下さい。

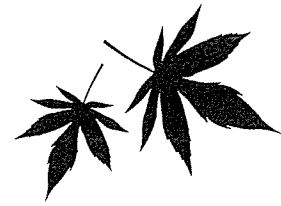
あなたの送迎場所

時 間

時 分頃

担当 門前総合支所 長寿支援室

「脳いきいき健康教室」が はじまります



この教室の目標は？

‘軽い物忘れ’が気になる方々を対象者として、物忘れや将来の認知症を予防し、いきいきとした毎日を送ることができるようにすること、そしてまた、お一人お一人が健康長寿を迎えられるようにすることを目標としています。

物忘れと認知症は？

一部の物忘れと将来の認知症は関連すると言われています。しかしながら最近の研究により、‘軽い物忘れ’の時期によく頭を使うこと、また、適度に身体を動かすこと、そして地域の人たちと交流することが、認知症の予防に役立つことが分ってきました。

脳いきいき教室の内容は？

①頭を意識的に使うこと、②身体を動かすこと、③地域の人々と交流すること、の内容からなっています。具体的には、専門家による物忘れや認知症予防に役立つ講話、昔の懐かしい話題を楽しむ回想のグループ、頭と身体の双方に役立つ楽しい運動、認知症になりかけのときに低下しやすい、毎日の生活に関する記憶を高める日記法などが含まれています。

これらの効果は？

教室で身に付けた活動を生活の中に積極的に取り組むことにより、物忘れや認知症の予防に役立つことが期待されます。また、一人で行うよりも、地域の人々と一緒に行くほうが長続きしやすく、効果的です。なお、この教室では、お一人お一人のお身体の状況をみながら参加できるようにするため、また、効果を評価するため、教室の最初と最後に調査（聞き取り）を予定しています。ご協力をお願いします。

教室の開催期間は？

10月3日から12月5日の毎週火曜日10時～13時、全10回です。効果を高めるためにも、全ての回に取り組みましょう。

実りの秋を目指して、さあ、一緒に頑張りましょう。



輪島市門前総合支所長寿支援室
(平成18年度厚生労働科学研究費補助金長寿科学総合研究事業)

宣言書

私は、物忘れ予防に取組み、生涯現役を誓います。
よって、次のことを実行します。

😊 毎日、身体を動かすために

をします。

😊 毎日、頭を使うために

をします。

😊 地域の人々とのつながりを保つために

をします。

年 月 日 本人署名

応援します：輪島市（門前保健センター）