A comparison of the FACT-G and the Supportive Care Needs Survey (SCNS) in women with ovarian cancer: Unidimensionality of constructs

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Abstract

*Purpose:* Health-related quality of life (HRQoL) and unmet needs (needs) questionnaires offer alternative perspectives for assessing cancer patients’ concerns. We examined whether the conceptual differences underlying these alternative approaches yield corresponding empirical differences in patient responses.

*Methods:* Eight-hundred and seventy-four women with ovarian cancer completed the Functional Assessment of Cancer Therapy scale (FACT-G; HRQoL) and the Supportive Care Needs Survey (SCNS-SF34; needs) every 3 months for 2 years. Correlational analysis, exploratory and confirmatory factor analysis (EFA/CFA), and Rasch analysis tested the relationship between patients’ responses to similar domains and similar items across the two questionnaires.

*Results:* Strong correlations were found between items with virtually identical wording (.67 to .75) while moderate to strong correlations (.55 to .65) were found for those with very similar wording. EFA identified two common domains across the two questionnaires: physical and psychological. For each common domain, CFA indicated models involving a single construct with systematic variation within each questionnaire fit best. Rasch analysis including very similar items within the physical and psychological domains (separately) demonstrated strong evidence of unidimensionality.

*Conclusions:* The high degree of similarity between patient responses to items addressing the same or very similar concerns suggest that patients may not differentiate between the severity of a concern and the level of need associated with that concern.

*Keywords:* Quality of life; unmet needs; FACT; SCNS; cancer
List of Abbreviations

AIC  Akaike Information Criterion
AOCS Australian Quality of Life Study
CI  Confidence Interval
CFA Confirmatory factor analysis
CFI Comparative Fit Index
EFA Exploratory factor analysis
FACT The Functional Assessment of Cancer Scale
FWB Functional Wellbeing subscale of FACT
HRQoL Health-related quality of life
IRT Item Response Theory
PHY Physical and Daily Living subscale of SCNS
PSI Pearson Separation Index
PSY Psychological subscale of SCNS
PWB Physical Wellbeing subscale of FACT
QoL Quality of life
RMSEA Root Mean Square Error of Approximation
SCNS The Supportive Care Needs Survey
SD Standard deviation
SWB Social Wellbeing subscale of FACT
A comparison of the FACT-G and the Supportive Care Needs Survey (SCNS) in women with ovarian cancer: Unidimensionality of constructs

Unmet needs (needs) and health-related quality of life (HRQoL) questionnaires offer alternative approaches to attempting to assess problems that cancer patients experience. HRQoL questionnaires (e.g. FACT-G[1], EORTC[2]) aim to assess the patient’s perception of the severity of symptoms, function, or other issues that may affect quality of life. Responding to these questionnaires involves a relatively simple, two-stage cognitive task in which the patient must answer: ‘Do I have a problem? How bad is it?’. Needs questionnaires (e.g. SCNS-34[3], CaSUN[4]) aim to assess whether or not patients need help as a result of a problem, including the possibility that any such needs have been satisfied. Responding to these questionnaires is likely a more complex four-stage cognitive task in which the patient must answer: ‘Do/did I have a problem? Do/did I need help for that problem? Have I received that help? How large is my remaining need?’

If patients can accurately answer these latter four questions, then employing needs questionnaires may have a significant advantage over HRQoL questionnaires by directly pointing to areas where services need to be deployed. However, if patients are unable to make the potentially subtle distinctions required to accurately report their needs, then the direct approach offered by HRQoL questionnaires may be more reliable and informative. Thus, it is important to determine whether the conceptual differences between the two approaches translate empirically. To this end, it is worth emphasising that the implicit hypothesis resulting from the proposed conceptual differences between the two approaches is that even for the same problem, say
depression, each questionnaire will provide related but unique information about
problems patients are faced with.

While oncological studies increasingly include both HRQoL and needs
questionnaires[4-13], few studies have compared the two approaches and these
comparisons have primarily involved correlational analysis alone [4; 7; 8; 11; 12].
Where total HRQoL and needs scores have been compared, the correlations have been
low to moderate (.13-.38)[4; 7; 8]. Where HRQoL and needs domain scores have been
compared, e.g. in the physical domain, the correlations have been moderate to high
(.42-.76)[11; 12]. While these findings may suggest patients respond similarly to both
HRQoL and needs questionnaires addressing the same problem, correlational analyses
provide only a superficial evaluation of the relationship between HRQoL and needs.

Snyder and her colleagues[14; 15] compared HRQoL (EORTC-QLQ-C30[16])
and needs (Supportive Care Needs Survey-34, SCNS-34[3]) in a sample of 117 mixed
cancer patients undergoing anticancer treatment. In one analysis, the SNCS-34 was
used to identify EORTC-QLQ-C30 scores that signal a need for clinician’s attention
via receiver operating characteristic analysis[15]. In the second, latent class analysis
was employed to identify patients reporting high or low levels of function (EORTC-
QLQ-C30), symptoms (EORTC-QLQ-C30), and unmet needs (SCNS-34), and to
evaluate concordance between these three areas[14]. Concordance was found in 56%
of patients overall, although discordance was more common in patients reporting
deficits in at least one area. The authors concluded that the two approaches were
sufficiently different to warrant use of both for comprehensive patient evaluations in
clinical care. However, Snyder et al[14; 15] did not distinguish between different
domains, meaning that the apparent differences they observed may have resulted from differences in item content, rather than differences in general constructs being assessed, that is HRQoL and needs.

The current study examined the extent to which the conceptual differences between the HQRoL and needs yield corresponding empirical differences in patients’ responses. A combination of exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and Rasch analysis was employed on HRQoL (FACT-G) and needs (SCNS-34) data in a large sample of women with ovarian cancer. The central question of interest was whether patients’ responses to the FACT-G and SCNS-34 for similar problems (e.g. depression) reflected the intended different, but related constructs, or whether they reflected a single underlying construct.

We hypothesised that if the two approaches are sufficiently different, then:

1. Items which target exactly the same or very similar difficulties (e.g. pain or distress) should have a moderate but not high correlation.

2. EFA should demonstrate separation between SCNS-34 and FACT-G items even when they assess the same domain.

3. CFA should demonstrate better fit for models in which items from SCNS-34 and FACT-G belong to separate constructs even when they assess the same domain compared with models in which 1) these items belong to a single construct or 2) these items belong to a single construct but with two additional,
4. Rasch IRT analysis should demonstrate that very similar items from common domains of both questionnaires do not adequately fit a unidimensional model. In addition, this analysis should demonstrate a reasonable level of dissociation between the person estimates obtained from the subset of similar items from each questionnaire.

METHODS

Patients

The current study analyses data from 874 women participating in the Quality of Life sub-study of the Australian Ovarian Cancer Study (AOCS)[17; 18]. AOCS is a population-based study of women aged 18–79 years newly diagnosed with primary ovarian (including borderline), fallopian tube or peritoneal cancer between 2002-2006, which collects detailed risk-factor, disease, treatment and clinical outcome data[19]. The QOL sub-study investigates the role of psychosocial factors in predicting health outcomes including HRQoL and needs. The study was approved by the Human Research Ethics Committees of the University of Sydney and all participating sites.

Questionnaires

HRQoL was assessed with the FACT-O[20], a 38-item, ovarian cancer-specific module from the FACIT suite of QoL measures. It includes the 27 items of the FACT-
G which cover four core domains of HRQoL [physical wellbeing (PWB, 7 items); social wellbeing (SWB, 7 items); emotional wellbeing (EWB, 6 items); functional wellbeing (PWB, 7 items)] and 11 ovarian cancer-specific items. Only the 27 items of the FACT-G were used in this analysis. Scores on each domain are the sum of the included items, with reversal of some items to ensure higher scores reflect greater wellbeing. Thus the PWB, SWB and FWB scales range from 0 to 28 and the EWB scale ranges from 0 to 24.

[Table 1 here]

Unmet needs were assessed with the 34-item Supportive Care Needs Survey (SCNS-34)[3]. This questionnaire addresses the level of unmet needs across five domains: psychological (PSY); health information; physical and daily living (PHY); patient care; and sexuality. Domain scores are scaled to range between 0 and 100, with higher scores reflecting higher unmet needs. Table 1 shows examples of FACT-G and SCNS-34 items and response options.

Data handling and analysis

The domain content of the FACT-G and SCNS-34 was compared and three domains were identified a priori as potentially overlapping: physical (covered by 7 FACT-PWB items and 5 SCNS-PHY items); functional (covered by 7 FACT-FWB and 5 SCNS-PHY items); and emotional (covered by 6 FACT-EWB and 10 SCNS-PSY items). The items content of these domains was independently assessed by two authors (BC and TL) to identify item-pairs from the two questionnaires that addressed the same or very similar issues. Any disagreement was resolved through discussion.
This resulted in three identical item-pairs and eleven very similar item-pairs, shown in Table 2.

Correlations and confidence intervals were calculated for each item-pair and for each common domain; these were based on participants’ last observation to maximise heterogeneity of disease characteristics and hence variation in HRQoL and needs. Correlations of around .7 were considered high. Corrected correlations between the sets of items from common domains disattenuated of the effect of measurement error were also calculated using the Spearman formula[21; 22]. This formula divides the correlation coefficient between the two sets of items by the square-root of the product of their reliability coefficients. Disattenuated correlations are not directly comparable to the uncorrected correlations, but they do provide insight into whether the correlations between two questionaries are low because of the attenuating effect of error, or because they assess different constructs[23].

All items from both FACT-G and SCNS-34 were entered into an EFA with the exception of those that assessed issues to do with sex, as 43% of women chose not to answer the relevant item on the FACT-G. Examination of the scree plot revealed five distinct factors which we then based extraction on. Extraction was based on maximum likelihood with direct oblimin rotation. Factor loadings of greater than .4 were considered significant.

CFA was used to explore our hypotheses within domains that had been shown to overlap in the EFA, namely, physical and psychological domains. As shown in Figure 1, we tested three models separately for the physical and psychological domains: 1)
HRQoL and needs as separate unrelated constructs reflecting items from FACT-G and SCNS-34, respectively, 2) HRQoL and needs as a single construct reflecting the items from both FACT-G and SCNS-34; and 3) HRQoL and needs as a single construct but with additional scale-specific factors. In general, a CFI> .90 and RMSEA< .05 are indicative of good fit. We calculated the Akaike Information Criterion (AIC) in order to compare model fit, which is an index that allows for comparisons between non-nested models[24]. Lower AIC indicates better fit relative to another model.

[Rasch analysis was used to further investigate the unidimensional fit of only very similar items (defined a priori according to the content of the items, as well as by the empirical criterion of a correlation coefficient, including confidence interval, of close to .7 between the intra-domain item-pairs shown in Table 2 below), as the CFA above indicated that the full set of items from each domain were not expected to provide a purely unidimensional solution. Pallant and Tennant (2007) provide a thorough overview of Rasch analysis as applied to self-reported health-related measurement. The FACT-G FWB items were not analysed as there were insufficient similar items identified with the SCNS-34. Furthermore, only the highest correlating counterpart for each item was analysed to avoid issues of local dependence in responses. The analysis was performed using RUMM 2030 software (Andrich, Sheridan & Luo, 2010).]
RESULTS

Inter-item Correlation

Correlations between identical and very similar item pairs across the two questionnaires are presented in Table 2. All correlations were in the predicted direction given the wording of each item-pair. The correlation between the pain items was high ($r=0.75$), and while the correlations for the two other identical items (lack of energy, $r=0.67$; sadness, $r=0.67$) were just below 0.7, their 95% CIs included this value. The correlations between the HRQOL and needs measures for the identical items were therefore considered as high.

Three of the eleven very similar item pairs also had correlations that could be considered high, each being just below 0.7 with 95% CIs that included this value. These were “I worry about dying [FACT-G]” and “Feelings about death and dying [SCNS-34]” ($r=0.68$), “Because of my physical condition, I have trouble meeting the needs of my family [FACT-G]” and “Not being able to do the things you used to [SCNS-34]” ($r=0.66$), and “I am able to work (include work from home) [FACT-G]” and “Not being able to do the things you used to [SCNS-34]” ($r=-0.68$). Of the remaining eight item pairs five had moderate to high correlations ($0.55-0.65$) and three had only moderate correlations (around 0.5).

Inter-domain Correlations

The correlations between similar domains from FACT-G and SCNS-34 are shown in Table 2. As expected, they indicated that patients with higher physical (FACT-PWB) and functional (FACT-FWB) quality of life had fewer needs associated with
physical and daily living (SCNS-PHY) and that those with higher emotional (FACT-EWB) quality of life had fewer psychological needs (SCNS-PSY). Further, all of these correlations were considered high as they were either very close to or exceeded .7. This was particularly the case when the correlations were corrected for the attenuating effect of measurement error using the Spearman [21; 22] formula, with the coefficients rising to above .8, and in the case of the FACT-PWB and SCNS-PHY relationship, approaching .9.

[Table 2 here]

Exploratory Factor Analysis

The EFA identified Social Wellbeing (FACT-G), Patient Care and Support (SCNS-34), and Information needs (SCNS-34) as separate factors with a small amount of cross-loading between Patient Care and Support and Information needs. The two other factors identified related to physical and psychological items and contained a combination of FACT-G and SCNS-34 items. All items from the Psychological domain of the SCNS-34 and 5 out of 6 items from the Emotional Wellbeing domain of the FACT-G loaded onto the psychological factor. The physical factor was comprised of all items from the Physical and Daily Living (SCNS-34) and Physical Wellbeing (FACT-G) domains and 5 out of 7 items from the Functional Wellbeing (FACT-G) domain.

Confirmatory Factor Analysis

Results of the confirmatory factor analysis analyses are presented in Table 3. For the physical domains, the model with the FACT-G and SCNS-34 reflecting a single
construct but that included two additional questionnaire specific factors allowing for commonalities within each questionnaire (Model 3) demonstrated the best fit relative to the other models, as indicated by the lowest AIC. This model, however, failed to reach any benchmark for acceptable fit, although CFI approached .9. The models in which FACT-G and SCNS-34 reflect different unrelated constructs (Model 1) or reflect a single construct (Model 2) showed similar fit to each other, although the former had a slightly lower AIC. A similar pattern of results was found for the psychological domains. Model 3 provided the best fit relative to the others, as evidenced by the lower AIC, and in this case this model showed acceptable fit on one benchmark (CFI=.93). Again there was little difference between Models 1 and 2, but this time the latter had a slightly lower AIC.

[Table 3 here]

Rasch Analysis

Individuals with missing data or extreme responses were excluded from the analysis, resulting in a final sample size of 687 for the Physical domain analysis and 714 for the Psychological domain analysis.

Physical symptoms

The three item-pairs that satisfied the criteria for similarity of content and empirical association were the FACT-G pain, energy, and meeting needs of family and SCNS PHY pain, energy, and not able to do things you used to items. Thus a total of six 5-category items (24 item thresholds) were included in a Rasch analysis to test Hypothesis 3 regarding a unidimensional physical domain. The items were
reasonably well targeted for the sample in general, with an average person location value of 1.50 (SD = 1.92). Even after removing responses indicating highest HRQoL or lowest needs for each item to reduce possible ceiling (HRQoL) and floor (needs) effects, the distribution was clearly top-heavy, indicating that the items were not well targeted for participants reporting greater physical well-being, suggesting that these items do not discriminate well between patients with higher levels of well-being.

[Figure 2 here]

The items demonstrated good reliability with a Person Separation Index (PSI) of .80 and Cronbach’s alpha (α) of .87. The mean fit residual value for the items (m=-.78,SD=.98) and persons (m=-.36; SD=.91) indicate an adequate fit of the items and persons to the model (Figure 2). The overall Chi-square test of fit was significant, $\chi^2(36) = 75.50, p < .001$, indicating overall lack of fit. However, this statistic is known to be highly sensitive to sample size (Pallant & Tennant, 2007). All individual item Chi-square tests showed acceptable fit once Bonferroni adjusted and all individual item fit residuals were within the acceptable range of ±2.5 (see Table 4 below). Furthermore, none of the thresholds between the items’ response categories were disordered and inspection of the residual correlations did not indicate any significant local independence violations. Overall, the similar FACT-G and SCNS-34 physical items appeared to adequately fit a unidimensional model, contradicting Hypothesis 3.

[Table 4 here]
In addition, an equating analysis was performed on the 3 FACT-G and 3 SCNS-34 physical items entered as subtests. The comparison is presented in Figure 3 below. The remarkable overlap of the subtest curves provides further evidence that the similar items are being responded to in an almost identical manner. The mean of the person estimates for the FACT-G and SCNS-34 subtests for the entire sample were found to be significantly different, \( t(649) = 10.00, \ p < .0001 \). However, at the individual level, 98\% of participants’ estimates were not found to significantly differ, suggesting evidence of unidimensionality for the vast majority of individuals [25].

[Figure 3 here]

**Psychological symptoms**

The item-pairs that satisfied the selection criteria included the FACT-G sad, nervous, worry about dying and worry condition will get worse and SCNS-34 sad, anxious, fears about death and dying and fear cancer will spread items. Thus a total of eight 5-category items (32 item thresholds) were included in a Rasch analysis to test Hypothesis 3 regarding a unidimensional psychological domain. Similar to the physical domain, the items were reasonably well targeted, with an average person location value of 1.09 (SD = 1.34). The distribution was again top heavy (see Figure 4 below), indicating that participants reporting higher psychological wellbeing were not well targeted, but this was not as severe as for the physical domain items.

[Figure 4 here]
The items demonstrated good reliability with a PSI of .85 and $\alpha$ of .90. The mean fit residual value for the items was -.23 (SD = 1.40), and for the persons was -.44 (SD = 1.30), indicating good fit of the items and persons to the model. The overall Chi-square test of fit was not significant, $\chi^2(72) = 84.97$, $p = .14$, indicating invariance of item difficulty across the dimension. Furthermore, the individual item fit residuals were within the acceptable range, their chi-squared tests of fit were all non-significant once Bonferroni adjusted (Table 5) and no thresholds were disordered. Inspections of the residual correlations did not indicate any substantial violations of local independence. Overall, the similar FACT-G and SCNS-34 psychological items showed good fit to the unidimensional model.

[Table 5 here]

Similarly, the equating analysis on the 4 FACT-G and 4 SCNS-34 items as subtests demonstrated remarkable overlap (Figure 5). The mean of the person estimates for the FACT-G and SCNS-34 subtests for the entire sample were significantly different, $t(686) = 6.03$, $p < .0001$. However, in this case 93% of participants demonstrated no significant differentiation in their subtest scores, also suggesting evidence of unidimensionality for the vast majority of individuals [25].

[Figure 5 here]
DISCUSSION

The current study compared the response of women with ovarian cancer on a HRQoL questionnaire (FACT-G) and a needs questionnaire (SCNS-34), in order to test whether the proposed conceptual differences between the two approaches yield corresponding empirical differences. The analyses focused on the overlapping items/domains, namely those that addressed physical problems and psychological problems. The results indicated little separation between responses to similar items/domains on the two questionnaires. Exploratory factor analysis suggested five distinct factors, rather than the seven factors that would be expected if the two approaches showed differentiation even when assessing the same domain. Two factors, physical and psychological problems, were common to both questionnaires.

Confirmatory factor analysis suggested that the models based on the FACT-G and SCNS-34 reflecting separate HRQoL and needs constructs, respectively, or the FACT-G and SCNS-34 representing a single construct, showed a similar fit for both the physical and psychological domains. The most efficient models for both the physical and psychological domains were those that treated items addressing the same domain from both questionnaires as forming part of a single construct, but that included two additional factors allowing for commonalities within each questionnaire. As with the corrected correlations, this suggests strong relationship between responses to items addressing similar domains from the two questionnaires, but that some unique intra-questionnaire co-variance exists. The unique intra-questionnaire co-variance could have arisen from the fact there are a mix of identical, similar, and other
items included in the physical and psychological domains (separately) of each questionnaire.

Rasch analysis demonstrated similar items addressing physical and psychological problems (separately) from each questionnaire fit unidimensional models, indicating a lack of significant empirical separation between similar items from the two questionnaires. Furthermore, equating analysis found that items from the two questionnaires addressing similar domains demonstrated no differentiation in subset scores for the vast majority of participants (98% for physical problems and 93% for psychological problems). Thus, the Rash analysis provides quite compelling evidence that there were minimal differences in the responses participants made to similar items from the FACT-G and the SCNS-34.

Pearson correlations between similar domains of the FACT-G and SCNS-34 were -0.70 for physical wellbeing/physical and daily living and -0.76 for emotional wellbeing/psychological. These correlations are similar to those between the FACT-G and another cancer-specific HRQoL measure (EORTC QLQ-C30) for the physical domain (range 0.63 to 0.77) and exceed those for emotional (range 0.47 to 0.60) (Ref Luckett et al, 2011 here). This suggests that the FACT-G and SCNS-34 are not more dissimilar than the FACT-G and at least one other HRQoL questionnaire.

Overall, then, there was quite strong evidence to suggest that the conceptual differences proposed to underlie HRQoL and needs questionnaires do not yield corresponding significant differences in patients’ responses to similar items/domains.
on the FACT-G and SCNS-34. There are two possible explanations for this finding. First, needs may be directly proportional to HRQoL and vice versa. That is, HRQoL and needs may simply be alternative ways of describing a single construct. If so, then there is no usefulness in obtaining information about both HRQoL and needs from participants. On the other hand, real differences may exist between HRQoL and needs, but patients may have difficulty distinguishing between the two. This difficulty distinguishing between HRQoL and needs may result from the fact that ratings of needs require quite subtle judgements about the extent to which a need has been met or remains. If so, then this means that there is a theoretical benefit to obtaining information about both HRQoL and needs, but that there are practical limitations to achieving this in that patients cannot provide the required information. In either case, the high degree of similarity between responses to the two types of questionnaire raise concerns regarding the usefulness of asking participants to report both their HRQoL and their needs for similar problems in their current forms. This has important implications for avoiding unnecessary burden on patients and research staff and associated problems of recruitment and missing data. Where cancer is advanced, patient burden is among the most important factors influencing study feasibility (Ref Shelby-James et al, in press). Where patients are more able to complete larger numbers of items, the quota may be better used by adding extra domains rather than repeating HRQoL and needs versions of the physical and emotional scales.

It is, however, important to note that HRQoL and needs questionnaires include both common and unique domains. For example, the FACT-G includes a Social Wellbeing subscale, which had no similar items in the SCNS-34. Similarly, the SCNS-34 includes Patient Care and Support and Information needs subscales, which
had no similar items in the FACT-G. This means that the two questionnaires may be useful for identifying different problems with which patients are faced. In other words, the benefit of the two approaches may not be in the differences in methodology, but rather in their coverage of different domains. If this is the case, then there may be no usefulness in requiring patients to complete both HRQoL and needs questionnaires assessing common domains. However, requiring patients to complete either an HRQoL or a needs questionnaire, perhaps complemented by the unique domains from the other questionnaire, may provide the most useful information and minimise demands on the patient. When deciding which of two similar HRQoL and needs scales is optimal, researchers should consider the relevance of individual items to the specific research context in question. Omission and substitution should always be at the level of whole scales rather than individual items. Even then, researchers need to be aware of potential threats to psychometric properties incurred when diverging from a validated questionnaire format. These threats can be minimised by administering complementary scales from the FACT-G and SCNS-34 sequentially rather than asking respondents to 'chop and change' between their different response options. Researchers also need to consider the differing recall periods of the FACT-G (past 7 days) and SCNS-34 (last month). Together with differences in the domains covered, this should be a deciding factor if choosing between the two instruments for a specific research application.

There are at least two potential limitations to these findings. First, the FACT-G and SCNS-34 questionnaires were administered consecutively. This means that the lack of separation between similar items and domains on the FACT-G and SCNS-34 may have resulted from item order effects (see Weinberger et al[26] for an example).
In the current case, the FACT-G was administered immediately prior to the SCNS-34, so it is possible that responses to the SCNS-34 were heavily influenced by the responses patients had already made to the FACT-G and this may explain the similarity between responses to the two questionnaires. However, this limitation applies to any study aiming to simultaneously assess HRQoL and needs regarding similar problems. Thus, if sequence effects did occur here, the current findings should extend to other studies that assess both HRQoL and needs. Again, this suggests that even though there may be conceptual benefits for distinguishing between HRQoL and needs, obtaining unique information about each may be quite difficult in practice. The second potential limitation concerns generalisation of the findings to other HRQoL and needs questionnaires. As noted by Harrison et al[27], there is large variety in needs questions, which is also true of HRQoL questions. This means that we cannot be sure how well the current findings will generalise to other HRQoL and needs questionnaires. Nonetheless, based on the current findings we hypothesise that the key factor will be the extent to which the HRQoL and needs questionnaires address similar items, rather than the methodological approach they adopt. Given findings from comparisons between the FACT-G and the EORTC QLQ-C30 mentioned earlier, it may be of interest to compare more than one questionnaire from HRQoL and needs categories together. Comprehensive testing of at least one needs assessment model would require satisfaction measures be included as well (Ref Davidson, 2004).

In summary, contrary to the conceptual differences proposed to underlie HRQoL and needs approaches, our analysis demonstrated little difference between patients’ responses to items addressing similar problems on the FACT-G and SCNS-34. This suggests that the value of administering the two questionnaires to the same patients...
may not lie in the differences in the methodological approaches they adopt, but rather in the differences in the domains that they cover. If so, then there is limited usefulness to asking patients to report both their HRQoL and needs for similar problems: reducing burden by omitting duplicate scales from one of the questionnaires or, asking patients to report either their HRQoL or needs for a larger variety of problems may be more worthwhile. Researchers should consider the relevance of individual items to their specific research context. Future research should examine whether the current findings extend to other HRQoL and needs questionnaires. In addition, qualitative research could be used to explore the cognitive and decisional steps they are taking in responding to each.
Acknowledgements: AOCS-QoL study was funded by The Cancer Councils of New South Wales and Queensland (RG 36/05). Financial support for the parent study was provided by the U.S. Army Medical Research and Materiel Command under DAMD17-01-1-0729, the National Health and Medical Research Council of Australia (400413 and 400281) and the Cancer Councils of New South Wales, Queensland, South Australia, Tasmania and Victoria and the Cancer Foundation of Western Australia. Additional recruitment was conducted under the Australian Cancer Study (Ovarian Cancer), funded by NHMRC (199600).

Full membership of the AOCS Group is listed at http://www.aocstudy.org/. Participating sites include: New South Wales: John Hunter Hospital, North Shore Private Hospital, Royal Hospital for Women, Royal North Shore Hospital, Royal Prince Alfred Hospital, Westmead Hospital, New South Wales Cancer Registry; Queensland: Mater Misericordiae Hospital, Royal Brisbane and Women’s Hospital, Townsville Hospital, Wesley Hospital, Queensland Cancer Registry; South Australia: Flinders Medical Centre, Queen Elizabeth II, Royal Adelaide Hospital, South Australian Cancer Registry; Tasmania: Royal Hobart Hospital; Victoria: Freemasons Hospital, Mercy Hospital For Women, Royal Women’s Hospital, Victorian Cancer Registry; Western Australia: King Edward Memorial Hospital, St John of God Hospitals Subiaco, Sir Charles Gairdner Hospital, Western Australia Research Tissue Network (WARTN), Western Australia Cancer Registry. We also acknowledge the contribution of the study nurses and research assistants and would like to thank all of the women who participated in the study.
Additional references suggested (no self-promotion intended!) –


**TABLE 1**

*Table 1.* Example of FACT-G and SCNS-34 item wording and responses for two identical problems.

<table>
<thead>
<tr>
<th>A. FACT-G</th>
<th>Not at all</th>
<th>A little bit</th>
<th>Somewhat</th>
<th>Quite a bit</th>
<th>Very much</th>
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</thead>
<tbody>
<tr>
<td><em>I have pain</em></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><em>I feel sad</em></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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</tbody>
</table>

<table>
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<tr>
<th>B. SCNS-34</th>
<th>NO NEED</th>
<th>SOME NEED</th>
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</thead>
<tbody>
<tr>
<td>Not applicable</td>
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<td>Low need</td>
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<td>2</td>
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<tr>
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</tr>
</tbody>
</table>
### TABLE 2

**Table 2.** Correlation between similar items and domains from the FACT-G and SCNS-34.

<table>
<thead>
<tr>
<th><strong>FACT-G Item</strong></th>
<th><strong>Domain</strong></th>
<th><strong>r (95%CI)</strong></th>
<th><strong>SCNS-34 Item</strong></th>
<th><strong>Domain</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>I have pain</td>
<td>PWB</td>
<td>.75 (.72; .78)</td>
<td>Pain</td>
<td>PHY</td>
</tr>
<tr>
<td>I have a lack of energy</td>
<td>PWB</td>
<td>.67 (.64; .71)</td>
<td>Lack of energy/tiredness</td>
<td>PHY</td>
</tr>
<tr>
<td>I feel sad</td>
<td>EWB</td>
<td>.67 (.63; .70)</td>
<td>Feelings of sadness</td>
<td>PSY</td>
</tr>
</tbody>
</table>

**Very Similar Items**

<table>
<thead>
<tr>
<th><strong>FACT-G Item</strong></th>
<th><strong>Domain</strong></th>
<th><strong>r</strong></th>
<th><strong>SCNS-34 Item</strong></th>
<th><strong>Domain</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel ill</td>
<td>PWB</td>
<td>.53 (.47; .57)</td>
<td>Feeling unwell a lot of the time</td>
<td>PHY</td>
</tr>
<tr>
<td>I am able to work (include work at home)</td>
<td>FWB</td>
<td>-.60 (-.64; -.57)</td>
<td>Work around the home</td>
<td>PHY</td>
</tr>
<tr>
<td>I am forced to spend time in bed</td>
<td>PWB</td>
<td>.52 (.43; .57)</td>
<td>Not being able to do the things you used to do</td>
<td>PHY</td>
</tr>
<tr>
<td>Because of my physical condition, I have trouble meeting the needs of my family</td>
<td>PWB</td>
<td>.66 (.62; .70)</td>
<td>Feeling down or depressed</td>
<td>PSY</td>
</tr>
<tr>
<td>I am able to work (include work from home)</td>
<td>FWB</td>
<td>-.68 (-.72; .65)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am enjoying the things I usually do for fun</td>
<td>FWB</td>
<td>-.57 (-.61; -.50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel sad</td>
<td>EWB</td>
<td>.64 (.60; .68)</td>
<td>Feeling down or depressed</td>
<td>PSY</td>
</tr>
<tr>
<td>I feel nervous</td>
<td>EWB</td>
<td>.61 (.56; .65)</td>
<td>Keeping a positive outlook</td>
<td>PSY</td>
</tr>
<tr>
<td>I worry about dying</td>
<td>EWB</td>
<td>.68 (.64; .71)</td>
<td>Feelings about death and dying</td>
<td>PSY</td>
</tr>
<tr>
<td>I worry that my condition will get worse</td>
<td>EWB</td>
<td>.64 (.60; .68)</td>
<td>Fears about the cancer spreading</td>
<td>PSY</td>
</tr>
</tbody>
</table>

**Similar Domains**

<table>
<thead>
<tr>
<th><strong>FACT-G Domains</strong></th>
<th><strong>r (95%CI)</strong></th>
<th><strong>SCNS-34 Domain</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Wellbeing (PWB)</td>
<td>$\alpha = .88$</td>
<td>$-.7 (-.81; -.76)$</td>
</tr>
<tr>
<td>Functional Wellbeing (FWB)</td>
<td>$\alpha = .79$</td>
<td>$-.69 (-.726; -.655)$</td>
</tr>
<tr>
<td>Emotional Wellbeing (EWB)</td>
<td>$\alpha = .86$</td>
<td>$-.76 (-.79; -.73)$</td>
</tr>
</tbody>
</table>
**TABLE 3**

**Table 3.** Results of the confirmatory factor analysis. In Model 2, the FACT-G and SCNS-34 reflect a single construct. In Model 3, the FACT-G and SCNS-34 reflect a single construct, but two extra factors are included to allow for within questionnaire commonalities.

<table>
<thead>
<tr>
<th></th>
<th>$\chi^2$ (df)</th>
<th>AIC</th>
<th>CFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>2617 (151)</td>
<td>2733</td>
<td>.801</td>
<td>.137</td>
</tr>
<tr>
<td>Model 2</td>
<td>3188 (152)</td>
<td>3302</td>
<td>.754</td>
<td>.151</td>
</tr>
<tr>
<td>Model 3</td>
<td>1429 (133)</td>
<td>1581</td>
<td>.895</td>
<td>.106</td>
</tr>
<tr>
<td><strong>Psychological</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 1</td>
<td>2535 (90)</td>
<td>2625</td>
<td>.774</td>
<td>.176</td>
</tr>
<tr>
<td>Model 2</td>
<td>2308 (91)</td>
<td>2396</td>
<td>.796</td>
<td>.167</td>
</tr>
<tr>
<td>Model 3</td>
<td>815 (75)</td>
<td>935</td>
<td>.932</td>
<td>.106</td>
</tr>
</tbody>
</table>
TABLE 4

Table 4. Physical item statistics from the Rasch analysis.

<table>
<thead>
<tr>
<th>Item</th>
<th>Location</th>
<th>SE</th>
<th>Residual</th>
<th>$\chi^2$ (df = 8)</th>
<th>$p^*$</th>
</tr>
</thead>
<tbody>
<tr>
<td>FACT – pain</td>
<td>-0.66</td>
<td>0.05</td>
<td>0.18</td>
<td>19.55</td>
<td>0.01</td>
</tr>
<tr>
<td>FACT - energy</td>
<td>1.23</td>
<td>0.05</td>
<td>0.36</td>
<td>5.74</td>
<td>0.68</td>
</tr>
<tr>
<td>FACT - family</td>
<td>-0.32</td>
<td>0.05</td>
<td>-2.24</td>
<td>16.20</td>
<td>0.04</td>
</tr>
<tr>
<td>SCNS – pain</td>
<td>-0.52</td>
<td>0.05</td>
<td>-1.52</td>
<td>13.49</td>
<td>0.10</td>
</tr>
<tr>
<td>SCNS - energy</td>
<td>0.26</td>
<td>0.05</td>
<td>-0.56</td>
<td>15.82</td>
<td>0.05</td>
</tr>
<tr>
<td>SCNS - unable</td>
<td>0.01</td>
<td>0.05</td>
<td>-0.88</td>
<td>16.37</td>
<td>0.04</td>
</tr>
</tbody>
</table>

*Bonferroni adjusted alpha level = .008
**TABLE 5**

*Table 5. Psychological item statistics for the Rasch analysis.*

<table>
<thead>
<tr>
<th>Item</th>
<th>Location</th>
<th>SE</th>
<th>Residual</th>
<th>( \chi^2 ) (df = 9)</th>
<th>( p^* )</th>
</tr>
</thead>
<tbody>
<tr>
<td>FACT - sad</td>
<td>-0.25</td>
<td>0.05</td>
<td>1.12</td>
<td>7.35</td>
<td>0.60</td>
</tr>
<tr>
<td>FACT - nervous</td>
<td>-0.43</td>
<td>0.05</td>
<td>-0.08</td>
<td>11.49</td>
<td>0.24</td>
</tr>
<tr>
<td>FACT - worry dying</td>
<td>-0.16</td>
<td>0.05</td>
<td>1.34</td>
<td>5.81</td>
<td>0.76</td>
</tr>
<tr>
<td>FACT - worry worse</td>
<td>0.70</td>
<td>0.05</td>
<td>0.80</td>
<td>11.26</td>
<td>0.26</td>
</tr>
<tr>
<td>SCNS - sad</td>
<td>-0.12</td>
<td>0.05</td>
<td>-2.19</td>
<td>14.46</td>
<td>0.11</td>
</tr>
<tr>
<td>SCNS - anxious</td>
<td>-0.18</td>
<td>0.05</td>
<td>-0.92</td>
<td>14.51</td>
<td>0.11</td>
</tr>
<tr>
<td>SCNS - fear death</td>
<td>-0.07</td>
<td>0.05</td>
<td>-2.15</td>
<td>15.63</td>
<td>0.08</td>
</tr>
<tr>
<td>SCNS - fear spread</td>
<td>0.50</td>
<td>0.05</td>
<td>0.27</td>
<td>4.46</td>
<td>0.88</td>
</tr>
</tbody>
</table>

*Bonferroni adjusted alpha level = .006
Figure 1. Models developed for confirmatory factor analysis. In Model 1, the FACT-G and SCNS-34 reflect different constructs (HRQOL and needs, respectively). In Model 2, the FACT-G and SCNS-34 reflect a single construct. In Model 3, the FACT-G and SCNS-34 reflect a single construct, but that allows for commonalities within the each approach (HRQOL, needs). F denotes a item from FACT-G and S denotes an item from the SCNS-34.
Figure 2. The person-item threshold distribution graph for the selected PWB-fact and SCNS-PHY items. Top panel: shows the frequency distribution of respondents across the physical domain with higher scores indicating better wellbeing/less needs. Bottom panel: shows the frequency distribution of items across the physical domain with higher scores indicating items assessing higher levels of wellbeing/lower levels of need. The fact that the person threshold distribution is top heavy suggests that the items do not discriminate well between patients with greater physical wellbeing/lower physical needs.
Figure 3. Comparison of the relationship between participant’s Rasch location estimates and raw scores for the FACT-PWB and SCNS-PHY subtests.
Figure 4. The person-item threshold distribution graph for the selected FACT-EWB and SCNS-PSY items. Top panel: shows the frequency distribution of respondents across the psychological domain with higher scores indicating better wellbeing/less needs. Bottom panel: shows the frequency distribution of items across the psychological domain with higher scores indicating items assessing higher levels of wellbeing/lower levels of need. The top heavy distribution for persons suggests that the items do not discriminate well between patients with higher psychological wellbeing/lower psychological needs.
FIGURE 5

*Figure 5. Comparison of the relationship between participant’s Rasch location estimates and raw scores for the FACT- EWB and SCNS-PSY subtests.*