

Supplementary Materials:

Psychometric testing of the British-English Long-Term Conditions Job Strain Scale, Long-Term Conditions Work Spillover Scale and Work-Health-Personal Life Perceptions Scale in four rheumatic and musculoskeletal conditions. Hammond, A., Tennant, A., Ching, A., et. al., Musculoskeletal Care (2023).

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Phase 1

1.1 INTRODUCTION

Linguistic validation is needed to ensure that the wording in the Long-Term Conditions Job Strain Scale (LTCJSS), Long-Term Conditions Work Spillover Scale (LTCWSS) and Work-Health-Personal Life Perceptions Scale (WHPLPS) is understandable in the United Kingdom (UK) before scales can be used in clinical practice and research. Content validity (i.e., the degree to which the content of a scale is considered an adequate reflection of what is being measured) should also be tested in cognitive-debriefing interviews (De Vet et.al., 2011). The aims of Phase 1 were to adapt, and then test the comprehensiveness and comprehensibility of the British-English versions LTCJSS, LTCWSS and WHPLPS in working people with rheumatoid arthritis (RA), axial spondyloarthritis (axSpA), osteoarthritis (OA) or fibromyalgia (FM) in the United Kingdom (UK).

2. METHOD:

The method recommended by Beaton et al (2007) was followed to ensure equivalence of the British-English to original Canadian versions. The following procedures were used. First, two translators (a non-health professional (JG) and RMD researcher (AH)), independently reviewed the LTCJSS, LTCWSS and WHPLPS to identify words requiring changing into British-English and if any phrases could be simplified. Recommended changes were synthesised into a report. Backward translation was not necessary as the translation was into another form of English. An expert panel discussed this report, made further recommendations, and agreed draft British-English versions of the scales. The panel included: one translator (AH); three occupational therapists experienced in work and RMD (YH, TW, RO'B); the scales' developer (MG: Canadian-English speaker); experienced outcome measure researchers (AT, AH, SV, YP) and two patient research partners (AP, SK).

The draft scales were field tested in cognitive debriefing interviews, and content validity investigated from people with RMD' perspectives (Acquadro et. al.,2011; De Vet et.al., 2011). At least 10 in each

target group should be included (Terwee et.al., 2012). Participants were mailed a paper questionnaire booklet, including the draft British-English LTCJSS, LTCWSS and WHPLPS, to complete at home, and asked to consider ease of completion, item relevance and if any important content was missing. Within two weeks, they were interviewed, face-to-face or by telephone, about comprehensiveness (1 = not relevant to 5 = extremely relevant; and if any important items were missing) and comprehensibility (instructions, content, layout). To identify whether items were considered similarly relevant by participants across condition and skill level group, Chi square tests were conducted. Skill level groups were combined into groups 1 and 2 versus groups 3 and 4, as there were only five participants with level group 1 jobs. To identify whether there were any differences in ease of completion (including comprehensibility) between condition groups, and between skill level groups, Chi square tests were also conducted. Interview findings were discussed with the expert panel. Changes suggested by three or more participants were considered as potential changes to make. Further changes were made, if necessary, and final British-English versions of the scales were agreed. Flesch-Kincaid Grade scores were calculated using Microsoft Word to check readability of each scale compared to the original Canadian versions (Badarudeen & Sabharwal, 2010).

3. RESULTS

The expert panel agreed to change “arthritis” to “condition” within all three scales, as those with FM may not consider their diagnosis as “arthritis.” Cognitive debriefing interviews were conducted with 48 participants (face-to-face n = 6; telephone n = 42). Demographic and health characteristics are shown in Table 1. Results were reviewed by the expert panel to determine if any further changes were required if at least three participants recommended the same change.

3.1. Long-Term Conditions Job Strain Scale.

For the draft version, the expert panel changed “employment” to “work” in most items. Other changes were: “scheduling of your job” to “shifts or work hours” (item 3); and for “managing absences from work” (item 6) examples were added to clarify absences, “e.g., sick leave, medical appointments”; and “future career plans” (item 10), modified to “future work and career plans” as some may not connect with “career.” Wording in the instructions and items 9, 13 and 15 was simplified.

Thirty-five (73%) participants made specific comments about the LTCJSS. Four noted that items were long and repetitive, i.e., “To what extent is.... stressful” in each item. To shorten items, the expert panel changed this to a root question “How stressful...”, repeated at four points in the scale. The term “stress” was questioned by eight participants as: the impact of their condition is wider than just stress and could include depression (n = 2); a different term would be better (e.g., coping, harder, difficult; n = 4); and positive phrasing in items would be better (n=2). However, 21 commented “stress” was appropriate: “*I suddenly realised quite a lot of stress I am getting from work*” (RA: woman, 61 years, nurse); “*Stress comes into it a lot*” (RA: man, 68 years, business owner); “*This questionnaire opened my mind to thinking I need to sort myself out*” (OA: man, 46 years, warehouseperson); “*Although I often moan about pain and fatigue, it made me think that I am actually really, really stressed*” (FM: woman, 36 years, teaching assistant); and “*this really seemed to understand how things are for me*” (OA: woman, 56 years, probation worker). The LTCJSS aims to evaluate stress and not more generally “impact” or “coping” therefore the expert panel retained the focus on stress, as following the original construct.

During the cognitive debriefing interviews, for item 11 (relationship with employer) and item 12 (relationships with co-workers) it was noted that responses were left blank if a participant was self-employed or had no co-workers, respectively. The expert panel added instructions about self-employment and co-worker status at the scale start to facilitate scoring these items if left blank. Responses can then be identified as “not applicable,” and scored as “not stressful = 0,” rather than missing. This was preferable to a “not applicable” option throughout, as all items are otherwise applicable. If an item is not a problem, it will not be stressful.

All 48 participants considered that the main issues were included. Only two additional items were suggested: your employer not providing equipment at work (n = 1; RA) and the stress of getting to and from work (n = 1; OA). These were not added as only suggested by one participant each. All items were considered as very or extremely relevant by most, with no significant differences for items between conditions (p = 0.09 to 0.48) (see Table S1). More participants in job skill level groups 1 and 2 reported 7/15 items on average as “extremely relevant” compared to “very relevant” in groups 3 and 4 (see Table S2). Most (43/48) considered the LTCJSS easy to complete, and five partly easy (RA n = 3; FM n = 1,

OA $n = 1$: $X^2 = 4.10$; $df = 3$; $p = 0.25$). There were no differences in ease of completion between skill level groups, with the five indicating “partly easy” spread across skill level groups (level 2 = 2; level 3 = 2; level 4 = 1; $X^2 = 2.21$; $df = 3$; $p = 0.53$). Wording changes reduced the Flesch-Kincaid Grade Level from 9.9 (14-15 years: Canadian version) to 6.9 (11-12 years: British-English version).

3.2. Long-Term Conditions Work Spillover Scale

For the draft version, the expert panel added an instruction to explain the “not applicable” option, i.e., to tick this if the item was considered not applicable to their job, in line with instructions in the Workplace Activity Limitations Scale. The first three items were kept the same as the original, apart from standardising some of the wording to “the demands of my work.” For item 4 “*the demands of my arthritis make it difficult for me to do as good a job at my work as I would like*” was changed to “*the impact and management of my condition make it difficult for me to do a good job.*” The patient research partners considered “demands of my arthritis” needed clarification. “Demands” is not just about symptom impact but also managing this impact, e.g., attending hospital appointments. Thus “impact and management” would be preferable. The last three items were also simplified whilst retaining the same meaning.

Thirty-two (66%) participants commented on this scale. Two raised issues about wording: items 1 to 3, “*could remove demands so it’s just “my work”,*” and for item 3 “*I never liked suffer*” (AS, man, 48 years, soft furnisher); and “*I felt like this put the responsibility on the person, and it all felt quite negative. If adaptations were in place and management had a better understanding, there wouldn’t be issues*” (OA: woman, 56 years, probation worker). In contrast, 27 made comments about how relevant this scale was to them: “*As a starter to show how your job affects you, it’s very good*” (RA: woman, 61 years, nurse); “*These are all relevant as they are speaking to you directly about how you are coping with your job. It’s a personal thing*” (RA, man, 53 years, butcher); “*I like the name of this scale, as your condition really spills all over your life*” (FM: man; 24 years, academic) and “*This made me think more widely about arthritis, work, and my condition*” (OA, women, 56 years, manager). The expert panel made no further changes.

Most ($n=47$) participants considered that the main issues were included. One considered there should be an item about support at home: “*Demands of work – how effects your home life, do you get support*”

at home to allow you to do the job... If have a partner, I can maybe do a better job... Maybe a gender issue, men may be looked after more by their partner and can rest. Women have more caring, homemaking roles. As a woman, I don't want to be seen as not to be coping, and still insist on doing the cooking, housework. Have a section on how home impacts on work." (OA, woman, 67 years, administrator). Although pertinent, this was raised by only one person, and no changes were made. All items were considered as very or extremely relevant by most, with no significant differences for items between conditions ($p = 0.09$ to 0.38) (see Supplementary Table S3). More participants in job skill level groups 1 and 2 reported 2/6 items on average as "extremely relevant" compared to "very relevant" in groups 3 and 4 (see Table S4). All participants considered the LTCWSS very easy to complete. Wording changes reduced the Flesch-Kincaid Grade Level from 9.6 (14-15 years, Canadian version) to 6.9 (11-12 years: British-English version).

3.3. Work – Health – Personal Life Perceptions Scale.

The expert panel changed the introductory sentence to focus on the topic of the scale more clearly. Changes to items were: item 5, "professional image" to "self-image at work" as non-professional workers may not consider this term applicable; item 8 "trade-offs in other areas of my life" to "sacrifices..." as trade-off is a less commonly used term in the UK; item 11, "attend appointments for my arthritis" was clarified to "attend health appointments for my condition"; item 12 "I don't have time to *take care of* my arthritis" was changed to "...*manage* my condition" as the patient research partners recommended an explicit focus on self-management (e.g., resting, eating properly, socialising, exercising); and item 14 to change "personal demands" to "personal needs."

Thirty-four (71%) made comments about this scale. Two considered item wording should be changed to include a mix of positive and negative statements or re-phrase all items positively. One considered that items 9 and 12 should be rephrased from "no time" to "less time" so not so "black-and-white." One considered that the scale was too long, and that items 16 to 20 could be reduced to one item, such as item 18. As only a few made these comments, no changes were made. Twenty-two participants made positive comments about the relevance of this scale to them: "*It would be good to have to do every year. If you have a long-term condition, you just get on with it! It helps to re-appraise or revisit your situation and think, is there anything more I need to do, as things change.... You can be so busy getting*

on with life you aren't thinking about the impact of your condition " (RA, woman, 59 years, healthcare worker); *"They are all relevant questions as individual questions, as I can identify that I have a positive outlook...All the questions are quite different in their own way and all relevant"* (AS, woman, 42 years, restaurateur); *"a questionnaire which makes people think how they cope with the condition"* (FM, woman, 39 years, administrator); and *"A good questionnaire, it makes you think about the real impact of the condition on your daily life as well as work"* (OA, man, 61 years, factory worker).

Fourteen stated that they especially liked Part 3 (items 16-20): *"I really liked all these, particularly towards the end putting in work is about a purpose, keeping active, work is part of who I am. People can say – you just have to give up work and they don't see you as a person, your identity"* (RA, woman, 59 years, healthcare worker); *"Hospital can treat you as if you don't have a work life. Questions 16-20 are particularly good as they are positive statements about work. I liked the question "work is part of who I am" as I really enjoy my work. That summed me up totally. These last 5 questions were very good"* (RA, man, 68 years, business owner); *"Work is what I get up for. There's nothing in the house for me to do. So, it's what I do it for, why I go to work. It's very important to me"* (FM, woman, 49 years, dog groomer); and *"The one about purpose in life – I could give up work and claim benefits but it's just not me. The last section was good"* (OA, woman, 54 years, receptionist).

All 48 participants considered that the main issues were included. Only one person suggested an additional item (for part 3), which was therefore not added: *"Going to work, connecting with people. If you've got OA and not working – all your friends are at work, it gives a social life"* (OA, man, 46 years, warehouseperson). All items were considered as very or extremely relevant by most, with no significant differences for items between conditions ($p = 0.07$ to 0.90), except for item 11, which participants with axSpA considered significantly less relevant than those with other conditions ($p = 0.02$) (see Table S5). More participants in skill level groups 1 and 2 reported 18/20 items on average as "extremely relevant" compared to "very relevant" in groups 3 and 4 (see Table S6). Most ($n=46$) considered the WHPLPS very easy to complete and two partly easy (RA $n = 1$; OA $n = 1$). There were no differences in ease of completion between job skill level groups, with the two reporting partly easy being in level 2 = 1 and level 3 = 1; $X^2 = 2.08$; $df 3$; $p = 0.56$). As minimal wording changes were made, the Flesch-Kincaid

Grade Level reduced only marginally from 5.7 (10-11 years, Canadian version) to 5.4 (10-11 years: British-English version).

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Supplementary File S2: Long Term Conditions Job Strain Scale– British-English.

These questions ask about what might make working with arthritis or a musculoskeletal condition stressful for you. Please **tick the box** indicating how much you agree or disagree with each question:

Firstly:

Are you self-employed (including business owner)? Yes No

(If yes, leave out Question 11, if not applicable*)

Do you have co-workers, work colleagues or employees? Yes No

(If no, leave out Question 12, if not applicable*)

| How stressful.... | Not at all stressful | A little stressful | Somewhat stressful | Quite a bit stressful | Extremely stressful |
|--|-----------------------------|---------------------------|---------------------------|------------------------------|----------------------------|
| 1. ...do the symptoms of your condition make your work? For example, pain or fatigue? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. ...is the day-to-day uncertainty about how you will feel at work? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. ...do your shifts or work hours, combined with your condition, make your work? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. ... do the demands of your job, combined with your condition, make your work? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| How stressful.... | | | | | |
| 5. ... are thoughts about the impact of your condition on your finances, now or in the future? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. ... are managing any absences from work because of your condition? For example, sick leave, medical appointments? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. ... is a lack of information and/ or resources about how to manage your condition and work? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. ... are thoughts about the impact of your condition on your ability to keep working? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| How stressful.... | Not at all stressful | A little stressful | Somewhat stressful | Quite a bit stressful | Extremely stressful |
|--|-----------------------------|---------------------------|---------------------------|------------------------------|----------------------------|
| 9. ... is the impact of your condition on your ability to use (or not use) your skills and training in your employment? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. ... are thoughts about the impact of your condition on your future work or career plans? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. ...is your relationship with your employer (or concerns about your future relationship with them), because of your condition? * | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. ...is your current relationship with your co-workers (or concerns about your future relationship with them) because of your condition? * | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| How stressful.... | | | | | |
| 13. ...does the “invisibility” of your condition make working? That is, people can’t tell how you feel? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. ...is balancing your health, work, and your personal life because of your condition? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15. ...is trying to accept the changes in your life because of your condition? For example, changes in circumstances, your sense of identity, etc? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Scoring instructions:

Items are scored: not at all stressful = 0; a little stressful = 1; somewhat stressful = 2; quite a bit stressful = 3; extremely stressful = 4. Items are summed to form a 0-60 scale. High scores indicate greater work-related stress.

Items 11 and 12: if the person identified they are self-employed and/or has no co-workers, and the answer(s) to either question(s) have been left blank, please score these **items as 0**, as the question/s are not applicable and therefore can be scored as “not at all stressful.”

Missing data: up to three missing items are allowed. Missing items are replaced by either the person’s overall median or mean LTCJSS score, dependent on the analysis approach. Please note: if items 11 and/or 12 were “not applicable” and scored 0, do **not** count these items as missing data.

A Rasch transformation table is available to convert LTCJSS raw scores to interval scores.

Note: this scale is termed the **Chronic Illness Job Strain Scale** in Canada (Gignac, M.A.M., Sutton, D., & Badley, E.M. (2007). Arthritis Symptoms, the Work Environment, and the Future: Measuring Perceived Job Strain Among Employed Persons with Arthritis. *Arthritis Care & Research* 57, 738-747. DOI: [10.1002/art.22788](https://doi.org/10.1002/art.22788))

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Supplementary File S3: Long-Term Conditions Work Spillover Scale – British-English.

Please indicate how much you agree with the following statements about your health condition(s) and your employment.

| | Strongly Disagree | Disagree | Do Not Agree or Disagree | Agree | Strongly Agree |
|---|--------------------------|--------------------------|---------------------------------|--------------------------|--------------------------|
| 1. The demands of my work make it difficult for me to take good care of my condition. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. It takes a great deal of my energy and time to manage the demands of my work. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. My condition suffers because of the demands of my work. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. The impact and management of my condition make it difficult for me to do a good job. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. It takes a lot of my energy and time to manage my condition. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. My condition impacts the quality of my work. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Scoring instructions:

items are scored: strongly disagree = 0; disagree = 1; neither agree or disagree = 2; agree = 3; strongly agree = 4. Items are summed, with the score range being 0 to 24. Higher scores indicate greater role balance/ conflict in managing working with the condition.

Missing or non-applicable items: one missing item only is allowed and can be replaced with the mean or median score of the remaining five items (depending on analysis approach).

A Rasch transformation table is available to convert LTCJSS raw scores to interval scores.

Note: this scale is called the **Arthritis Work Spillover Scale** in Canada: Gignac, M.A.M., Sutton, D., Badley, E.M. (2006). Re-examining the Arthritis-Employment Interface: perceptions of Arthritis-Work Spillover among employed adults. *Arthritis Care & Research*, 55, 233-240. DOI: 10.1002/art.21848.

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Supplementary File S4: Work-Health-Personal Life Perceptions Scale- British-English

These statements are about how your health condition, work and personal life affect each other. **Please tick the box** that indicates how much you agree or disagree with the following statements:

| | Strongly Disagree | Disagree | Do Not Agree or Disagree | Agree | Strongly Agree |
|---|------------------------------|--------------------------|---|--------------------------|---------------------------|
| Part 1: | | | | | |
| 1. My condition means that I don't have as much energy at work as I would like. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. The symptoms of my condition are unpredictable which creates stress at work. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Having my condition means that I work harder to compensate for it. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. My condition makes it hard to perform some of my work tasks. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. My condition affects my self-image at work. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Having my condition makes me look less competent to others. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. I feel guilty for not doing as good a job as I would like. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Working with my condition means I've had to make sacrifices in other areas of my life. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Part 2: | | | | | |
| 9. Working means that I have no time to look after myself properly. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. I feel guilty for not taking as much care of my health condition as I would like. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. Working makes it hard to attend health appointments for my condition. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. I have so much to do in my personal life that I don't have time to manage my condition. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | Strongly Disagree | Disagree | Do Not Agree or Disagree | Agree | Strongly Agree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 13. I'm so tired with all the other things I have to do that I don't have the energy to take care of myself. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. I feel like there are not enough hours in the day for me to deal with work, personal needs, and my health. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15. I worry about how I will deal with all the demands on my work, personal life, and health. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| For use in axSpA only (Or for information and not scored). | Strongly Disagree | Disagree | Do Not Agree or Disagree | Agree | Strongly Agree |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Part 3: | | | | | |
| 16. Work keeps me moving and active which helps my condition. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 17. Work gives me a purpose – a reason to get up. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18. My work is a part of who I am. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 19. Work gives me something to focus on other than my health. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 20. Work allows me to do something I really enjoy. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Scoring instructions:

items are scored: strongly disagree = 0; disagree = 1; neither agree or disagree = 2; agree = 3; strongly agree = 4.

There are two sub-scales:

Part 1 = items 1 to 8 (CAW = Condition negatively Affects Work and personal life)

Part 2 = items 9 to 15 (WAC = Work and personal life affect Condition and its management;).

Part 3 = items 16 to 20 (BW = Benefits of working).

Items within each sub-scale are summed, with the score range being Part 1: 0 - 32; and Part 2: 0 - 28. Higher scores indicate greater interference of health condition on work (part 1), and work/personal life on health condition (part 2).

Part 3: score range is 0 – 20. Higher scores indicate more positive benefits of working. Please note: this sub-scale is only valid for axial spondyloarthritis. It **cannot** be used in research and clinical evaluations in RA, OA, and FM and combined conditions, as it does not assess a consistent or single construct.

Sub-scales are **not** summed together. A Rasch transformation table is available to convert WHPLPS Part 1 raw scores to interval scores.

Missing items: one missing item is allowed in each sub-scale. Missing items are replaced by either the person's median or mean relevant WHPLPS sub-scale score, dependent on the analysis approach.

Please contact the first author if planning to create another language version. A WORK-PROM study manual with further details will be available at:

<https://usir.salford.ac.uk/view/authors/10108.html>- search Monographs.

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Supplementary File S5: Long-Term Conditions Job Strain Scale, Long-Term Conditions Work Spillover Scale and Work-Health-Personal Life Perceptions Scale: Rasch Analysis methods and results.

1. INTRODUCTION

Testing should include both classical testing and item response theory to establish psychometric properties (e.g., reliability and validity) (Mokkink et. al., 2010).

2. METHOD

Data was tested against the requirements of the Rasch Measurement model (Rasch, 1980). Briefly, items added together to provide a score should satisfy all the following requirements (Gustafsson, 1980; Teresi et.al., 2000):

- i) unidimensionality, i.e., measure one thing (domain/construct/trait),
- ii) monotonicity, i.e., the probability of a positive response to an item (or in the case of polytomous items, i.e., having two or more ordinal categories, items, the transition from one response category to the next) should increase with underlying ability, as should the total score (Kang et.al., 2018),
- iii) homogeneity, i.e., the same hierarchical ordering of items should hold for each level (or grouping) of the score (Rost, 1982),
- iv) local independence, i.e., items should be conditionally (on the score) independent of one another (Wilson, 1988) and
- v) group invariance, i.e., the response to items across different groups, such as age or gender should, conditioned on the total score, be the same. This is referred to as (the absence of) Differential Item Functioning (DIF) (Teresi et.al., 2000).

Each requirement is tested. A t-test is used to determine if two separate groups of items deliver significantly different estimates, following the procedure given by Smith (2002). The hierarchical ordering of items across the scale is determined through a Chi-Square test of fit based on grouped scores. Monotonicity is evaluated through inspection of the item-category ordering. Conditional item

dependence is determined through the correlation of residuals, where pair-wise correlations should not exceed 0.2 above the average residual (Christensen et.al., 2017). Should clusters of locally dependent items be found, consideration is given to grouping these into 'super items' or testlets (simply adding them together to make one larger item, the latter based on a priori defined groups) to absorb the local dependency (Wainer & Keily, 1987). In the RUMM2030 software, this gives a bi-factor equivalent solution retaining a specified proportion of the variance. This "Explained Common Variance (ECV)" is reported, whereby a value less than 0.7 is indicative of requiring a multidimensional model, a value above 0.9 a unidimensional model, and the grey area in between, undetermined, requiring further evidence (Quinn, 2014). Consequently, a value of the ECV at 0.9 and above is considered acceptable in this analysis. Where possible, when two parallel forms are created from the pattern of local dependency in the item set, this requires a latent correlation ≥ 0.9 . This is consistent with the reliability required for individual use (Bland, 1997; Andrich, 2013; Andrich et.al., 2015; Andrich, 2016). Consequently, valid parallel forms would require both their latent correlation to be ≥ 0.9 and the ECV to be ≥ 0.9 .

Group invariance (DIF) is tested through an analysis of variance (ANOVA) of residuals for age, gender, disease duration, education- and job skill- levels, and whether the participant is: self-employed or employed; and full-time or part-time. Should DIF be identified it is tested by a comparison of person estimates from split and unsplit solutions to see if it is 'substantive' (Andrich, 2016; Hagquist & Andrich 2017). Where the difference is significant (identified through a paired t-test), the result is reported as an effect size where a value higher than 0.1 is considered to represent substantive DIF (Rouquette et al., 2019). If this is present, then the scale works in different ways for the scale under consideration, and results are reported separately.

Given the requirements for fit, a hierarchical strategy was used to achieve fit to the model (Supplementary Table S10). With level 1 as the priority, all requirements listed above for fit to the model must be met. Should a Level 5 solution be unavailable, item deletion will be considered (Level 6). If this fails, then Level 7 will be utilised to test if the scale satisfies ordinal scaling; and if this fails then Level 8 indicates no valid ordinal scale. Data were fitted for the LTCJSS, LTCWSS and WHPLPS scales within each condition.

3. RESULTS

Results are shown in Table 3, and Supplementary Tables S10 – S14.

3.1. Long-Term Conditions Job Strain Scale.

The initial fit of the LTCJSS to the Rasch model showed multidimensionality. The item most easily affirmed (i.e., the transition between “not at all stressful” and a “little stressful” was item 1: “how stressful do the symptoms of your condition...make your work” (all four conditions). The items most difficult to affirm (i.e., the transition between “quite a bit stressful” to “extremely stressful”) were: item 9 “...ability to use skills and training...” (axSpA); item 11 “How stressful is your current relationship with employer...because of your condition” (OA); and item 12 “How stressful is the current relationship with your co-workers...” (RA, FM). Various pairs of locally dependent items are clustered in the first and second half of the scale. For example, items 3 and 4 “How stressful do your shifts or work hours, combined with your condition, make your work?” and “How stressful do the demands of your job, combined with your condition, make your work?” have a residual correlation of: RA = 0.48; axSpA = 0.50; OA = 0.45; and FM = 0.40, where values above 0.12 would be considered indicative of local item dependency. As such, given the pattern of locally dependent items, two parallel forms were made from the first 7 items, and the next 8 items. Fit to the model was good, with variance discarded in the bi-factor solutions being only: RA = 5%; axSpA = 2%; OA = 3%; and FM = 4%. Consequently, fit of the LTCJSS items to the Rasch model in those with RA, axSpA, OA and FM was at level 4 (i.e., local-dependency cluster based-parallel form), so confirming construct (structural validity). The amount of variance discarded was small, giving confidence that the scale is unidimensional. Invariance was confirmed for age, gender, condition, disease duration, educational and work status, except for DIF by gender and education in RA. However, the paired t-test for the difference between unsplit and split solutions for gender was not significant ($p > 0.05$). Splitting the scale for gender removed the DIF for education, suggesting the former influenced the latter. In summary, the LTCJSS satisfied Rasch model requirements, given a bi-factor equivalent solution only requiring 2-5% of the variance to be discarded.

For the combined dataset ($n = 831$), across all four conditions, the easiest item to affirm is the transition from “Not at all stressful” to “A little stressful” in item 1 “How stressful do the symptoms of your condition (e.g., pain, fatigue) make your work.” The hardest item transition is from “quite a bit stressful” to “extremely stressful” is item 12 “How stressful is your current relationship with your co-workers (or

concerns about the future relationship with them) because of your condition.” As with the above individual condition Rasch analyses, various pairs of locally dependent items were clustered in the first and second half of the scale. With the pattern of locally dependent items, two parallel forms were made from the first 7 items, and the next 8 items. Fit to the model was good with just 3% of the variance discarded. Invariance was confirmed for age, condition, disease duration, and work status. DIF was found for both gender and education. However, the unsplit and split estimates had a t-test significance of 0.66, and so no further action was taken. The DIF on education disappeared once gender was controlled. In summary, across conditions the LTCJSS had adequate fit to the model, given a bi-factor solution based upon two parallel forms.

3.2. Long-Term Conditions Work Spillover Scale.

The initial fit of the LTCWSS to the Rasch model showed multidimensionality. The item most easily affirmed (i.e., the transition between strongly disagree and disagree) was item 2 “it takes a great deal of my energy and time to manage the demands of my work” (RA); and item 3 “my conditions suffers because of the demands of my work” (OA, axSpA). The most difficult to affirm (i.e., the transition between agree and strongly agree) was item 4 “the impact and management of my condition make it hard for me to do a good job” (RA, axSpA) and “my condition impacts the quality of my work” (OA). There is some low-level item dependency in the scale. For example, items 4 and 6, “the impact and management of my condition make it hard for me to do a good job” and “my condition impacts the quality of my work” with residual correlations ranging from 0.24 to 0.37. Grouping items based on these patterns of local dependency into two super items (reflecting the two elements of the scale: work impacting on condition; and condition impacting on work) resulted in two parallel forms achieving satisfactory fit in axSpA and FM. Fit to the model was good, with variance discarded in the bi-factor solutions being only: axSpA = 2% and FM = 4%. However, grouping into two super-items failed to obtain parallel forms with a sufficient latent correlation in RA and OA. Alternative items were therefore taken, which showed good fit to the model and a high latent correlation in RA and OA, with variance discarded being only: RA = 1% and OA = 1%. Consequently, fit of the LTCWSS items to the Rasch model was at level 4 (i.e., local-dependency cluster based-parallel form) in axSpA and FM; and at level 5 (i.e., parallel form, alternative items) in RA and OA. The amount of variance discarded was small, giving confidence that the scale is unidimensional. Invariance was confirmed for age, gender, condition,

disease duration, educational and work status. In summary the LTCWSS satisfied the Rasch model requirements when implemented in a bi-factor equivalent solution, requiring only 1 – 4% of variance to be discarded.

For the combined dataset (n = 831), across all four conditions, the easiest item to affirm (the transition for strongly disagree to disagree) was item 2 “It takes a great deal of my energy and time to manage the demands of my work”, while the most difficult transition (agree to strongly agree) was for item 4 “The impact and management of my condition makes it difficult for me to do a good job.” Much the same pattern of local item dependency was present as in the individual condition analyses, e.g., between item 1 “The demands of my job make it difficult to take care of my condition” and item 3 “My condition suffers because of the demands of my work,” with a residual correlation of 0.14. Grouping items based on these patterns of local dependency into two parallel forms achieved satisfactory fit, with only 1% of variance discarded. No DIF was observed.

3.3. Work-Health-Personal Life Perceptions Scale.

The three sub-scales were tested separately. A total score is **not** created from the whole scale.

Part 1: Condition negatively affects Work and personal life (CAW): this showed good fit to the Rasch model in all four conditions (with some adjustment needed for low-level item dependency in axSpA and FM). The easiest transition in RA and OA was from strongly agree to agree in item 2 “the symptoms of my condition are unpredictable which creates stress at work” in RA and OA. In AxSpA, this was from strongly disagree to disagree, (i.e., less likely to strongly disagree) for item 1 “My condition means I do not have as much energy as I would like.” In FM, this was from strongly disagree to disagree was item 3 “Having my condition means I work harder to compensate for it.” The hardest transitions were from agree to strongly agree: item 6 “Having my condition makes me look less competent to others” (RA, axSpA, OA); and item 4 “My condition makes it hard to perform some of my work tasks” (FM). In summary, Part 1 satisfied Rasch model requirements. No DIF was present. For the combined dataset (n=831), across all four conditions, Part 1 showed good fit to the model after adjusting for some low-level item dependency into two consecutive blocks. The easiest transition was from strongly disagree to disagree on item 2” The symptoms of my condition are unpredictable which creates stress

at work.” The hardest transition was from agree to strongly agree on item 4 “My condition makes it hard to perform some of my work tasks.” No DIF was present.

Part 2: Work and personal life affects Condition and its management (WAC): this showed good fit to the Rasch model in all four conditions, having adjusted for pairs of locally dependent items, to make two item sets in RA, axSpA, OA and FM. The easiest transition was from strongly disagree to disagree on item 15 “I worry about how I will deal with all the demands on my work, personal life, and health” (RA, OA, FM). In axSpA, this was from item 14 “I feel like there are not enough hours in the day for me to deal with work, personal needs, and my health.” The hardest transitions from agree to strongly agree (i.e., it was very rare to strongly agree with this item) was item 12 “I have so much to do in my personal life that I don’t have time to manage my condition” (RA, OA, axSpA, FM). No DIF was present. For the combined dataset (n = 831) across all four conditions, Part 2 showed **poor** fit to the model, having adjusted for set of locally dependent items. Its reliability was particularly low. The easiest transit from strongly disagree to disagree on item 15 “I worry about how I deal with all the demands on my work, personal life and health.” The hardest was from agree to strongly agree’ on item 12 “I have so much to do in my personal life that I do not have time to manage my condition.” This suggests that this sub-scale should not be used in studies combining conditions into one group. No DIF was present.

Part 3: Benefits of Working (BW): This sub-scale did not fit the Rasch model under any analysis strategy in RA, OA, or the combined dataset (n=831) of all four conditions. In axSpA, there was mostly adequate fit to the model. The easiest transition was between strongly disagree and disagree on item 18 “My work is part of who I am” (i.e., less likely to strongly disagree). The hardest transition was between agree and strongly agree on item 16 ‘Work keeps me moving and active which helps my condition.” In FM, there was also mostly adequate fit to the model but only after deleting item 16 “Work keeps me moving and active which helps my condition.” The easiest transition in the remaining four items was between strongly disagree and disagree on item 19 “Work gives me something to focus on other than my health.” The hardest transition was between agree and strongly agree on item 20 “Work allows me to do something I really enjoy.”

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Supplementary Table S1: Phase 1 participants' responses regarding item relevance by condition group in the Long-Term Conditions Job Strain**Scale items (n = 48; median (IQR)).**

| Item no. | Item: How stressful.... | RA n=12 | AS n=10 | OA n=13 | FM n=13 | Chi square | df | p |
|----------|---|------------|------------|------------|------------|------------|----|------|
| 1 | do the symptoms of your condition (e.g., pain, fatigue) make your work? | 4 (4-5) | 5 (3.75-5) | 5 (4-5) | 5 (4-5) | 8.57 | 9 | 0.48 |
| 2 | is the day-to-day uncertainty about how you will feel at work? | 4 (4-5) | 5 (2.75-5) | 5 (4-5) | 5 (4-5) | 11.82 | 12 | 0.46 |
| 3 | do your shifts or work hours, combined with your condition, make your work? | 4 (4-5) | 5 (4-5) | 5 (4.50-5) | 5 (4-5) | 11.51 | 9 | 0.24 |
| 4 | do the demands of your job, combined with your condition, make your work? | 4 (4-5) | 4 (2.75-5) | 5 (4-5) | 5 (4-5) | 12.34 | 12 | 0.42 |
| 5 | are thoughts about the impact of your condition on your finances, now or in the future? | 4 (4-5) | 5 (4-5) | 5 (4.50-5) | 5 (4-5) | 12.32 | 9 | 0.20 |
| 6 | are managing any absences from work (e.g., sick leave, medical appointments) because of your condition? | 4 (4-5) | 5 (4.50-5) | 5 (4.50-5) | 5 (4-5) | 15.19 | 9 | 0.09 |
| 7 | is a lack of information and/ or resources about how to manage your condition and work? | 4 (4-5) | 5 (3.5-5) | 5 (4-5) | 5 (4-5) | 12.50 | 12 | 0.41 |
| 8 | are thoughts about the impact of your condition on your ability to keep working? | 4 (4-5) | 4 (3.75-5) | 5 (4-5) | 5 (4-5) | 12.91 | 12 | 0.38 |

| Item no. | Item | RA n=12 | AS n=10 | OA n=13 | FM n=13 | Chi square | df | p |
|----------|--|------------|------------------|------------|------------|------------|----|------|
| 9 | is the impact of your condition on your ability to use (or not use) your skills and training in your employment? | 4 (4-5) | 4.50 (2.75-5) | 5 (4-5) | 5 (4-5) | 13.63 | 12 | 0.33 |
| 10 | are thoughts about the impact of your condition on your future work or career plans? | 4 (4-5) | 5 (3.75-5) | 5 (4-5) | 5 (4-5) | 11.72 | 9 | 0.23 |
| 11 | is your relationship with your employer (or concerns about your future relationship with them), because of your condition? | 4 (4-5) | 5 (3.75-5) | 5 (4-5) | 5 (4-5) | 12.08 | 9 | 0.21 |
| 12 | is your current relationship with your co-workers (or concerns about your future relationship with them) because of your condition? | 4 (4-5) | 5 (3.5-5) | 5 (4-5) | 5 (4-5) | 14.57 | 12 | 0.27 |
| 13 | does the "invisibility" of your condition make working (i.e., people can't tell how you feel)? | 4 (4-5) | 5 (3.5-5) | 5 (4.50-5) | 5 (4-5) | 15.73 | 12 | 0.20 |
| 14 | is balancing your health, work, and your personal life because of your condition? | 4 (4-5) | 5 (3.75-5) | 5 (4-5) | 5 (4-5) | 9.78 | 9 | 0.37 |
| 15 | is trying to accept the changes in your life because of your condition (i.e., changes in circumstances, your sense of identity, etc.)? | 4 (4-5) | 5 (3.5-5) | 5 (4-5) | 5 (4-5) | 18.34 | 12 | 0.11 |

Key: 1 = not at all relevant; 5 = extremely relevant. axSpA = axial spondyloarthritis; FM = fibromyalgia; IQR = inter-quartile range; OA = osteoarthritis; RA = rheumatoid arthritis.

Supplementary Table S2: Phase 1 participants' responses by skill level group regarding item relevance in the Long-Term Conditions Job Strain Scale items (n = 47).

| Item no. | Item | Job skill level 1 and 2 Median (IQR) (n = 22) | Job skill level 3 and 4 Median (IQR) (n = 25) | Chi square | df | p |
|----------|---|---|---|------------|----|--------|
| 1 | do the symptoms of your condition (e.g., pain, fatigue) make your work? | 5 (5 – 5) | 4 (4 – 5) | 10.62 | 3 | 0.01** |
| 2 | is the day-to-day uncertainty about how you will feel at work? | 5 (5 – 5) | 4 (4 – 5) | 12.71 | 4 | 0.01** |
| 3 | do your shifts or work hours, combined with your condition, make your work? | 5 (5 – 5) | 4 (4 – 5) | 12.55 | 3 | 0.01** |
| 4 | do the demands of your job, combined with your condition, make your work? | 5 (4 – 5) | 4 (4 – 5) | 10.37 | 4 | 0.04* |
| 5 | are thoughts about the impact of your condition on your finances, now or in the future? | 5 (4.75 – 5) | 4 (4 – 5) | 7.21 | 3 | 0.07 |
| 6 | are managing any absences from work (e.g., sick leave, medical appointments) because of your condition? | 5 (5 – 5) | 4 (4 – 5) | 7.80 | 3 | 0.05* |
| 7 | is a lack of information and/ or resources about how to manage your condition and work? | 5 (4 – 5) | 4 (4 – 5) | 5.72 | 4 | 0.22 |
| 8 | are thoughts about the impact of your condition on your ability to keep working? | 5 (4 – 5) | 4 (4 – 5) | 7.80 | 4 | 0.10 |

| Item no. | Item How stressful.... | Job skill level 1 and 2 | Job skill level 3 and 4 | Chi square | df | P |
|----------|--|-------------------------|--------------------------|------------|----|-------|
| | | Median (IQR) (n=22) | Median (IQR) (n = 25) | | | |
| 9 | is the impact of your condition on your ability to use (or not use) your skills and training in your employment? | 5 (4 – 5) | 4 (3.50 – 5) | 10.57 | 4 | 0.03* |
| 10 | are thoughts about the impact of your condition on your future work or career plans? | 5 (4.75 – 5) | 4 (4 – 5) | 7.54 | 3 | 0.06 |
| 11 | is your relationship with your employer (or concerns about your future relationship with them), because of your condition? | 5 (5 – 5) | 4 (4 – 5) | 9.13 | 3 | 0.03* |
| 12 | is your current relationship with your co-workers (or concerns about your future relationship with them) because of your condition? | 5 (4.75 – 5) | 4 (4 – 5) | 8.86 | 4 | 0.07 |
| 13 | does the “invisibility” of your condition make working (i.e., people can’t tell how you feel)? | 5 (4 – 5) | 4 (4 – 5) | 5.23 | 4 | 0.27 |
| 14 | is balancing your health, work, and your personal life because of your condition? | 5 (4.75 – 5) | 4 (4 – 5) | 6.69 | 3 | 0.08 |
| 15 | is trying to accept the changes in your life because of your condition (i.e., changes in circumstances, your sense of identity, etc.)? | 5 (5 – 5) | 4 (4 – 5) | 8.10 | 4 | 0.09 |

Key: * p = ≤ 0.05, ** p = ≤ 0.01; Item relevance: 1 = not at all relevant; 5 = extremely relevant; IQR = inter-quartile range; Job skill level categories: 1 = elementary occupations, e.g., cleaner, refuse collector, shelf filler; 2 = requiring compulsory education/ work-related training; 3 = post-compulsory education (sub-degree) or longer work experience; 4 = degree education or equivalent experience.

Supplementary Table S3: Phase 1 participants' responses regarding item relevance by condition group in the Long-Term Conditions Work

Spillover Scale (n = 48; median (IQR)).

| Item no. | Item: median (IQR) scores | RA n=12 | AS n=10 | OA n=13 | FM n=13 | Chi square | df | p |
|----------|--|------------|------------|------------|------------|------------|----|------|
| 1 | The demands of my work make it difficult for me to take good care of my condition. | 4 (4-5) | 5 (5-5) | 5 (4-5) | 5 (4.50-5) | 6.59 | 3 | 0.09 |
| 2 | It takes a great deal of my energy and time to manage the demands of my work. | 4 (4-5) | 5 (4-5) | 5 (4-5) | 5 (4-5) | 6.57 | 6 | 0.36 |
| 3 | My condition suffers because of the demands of my work. | 4 (4-5) | 5 (4-5) | 5 (4-5) | 5 (4-5) | 6.36 | 6 | 0.38 |
| 4 | The impact and management of my condition make it difficult for me to do a good job. | 4 (4-5) | 5 (4-5) | 5 (4-5) | 5 (4-5) | 6.57 | 6 | 0.36 |
| 5 | It takes a lot of my energy and time to manage my condition. | 4 (4-5) | 5 (4-5) | 5 (4-5) | 5 (4.50-5) | 3.65 | 3 | 0.30 |
| 6 | My condition impacts the quality of my work. | 4 (4-5) | 5 (5-5) | 5 (4-5) | 5 (4.50-5) | 9.43 | 6 | 0.15 |

Key: 1 = not at all relevant; 5 = extremely relevant. axSpA = axial spondyloarthritis; FM = fibromyalgia; IQR = inter-quartile range; OA = osteoarthritis; RA = rheumatoid arthritis.

Supplementary Table S4: Phase 1 participants' responses by skill level group regarding item relevance in the Long-Term Conditions Work Spillover Scale (n = 47).

| Item no. | Item | Job skill level 1 and 2 | Job skill level 3 and 4 | Chi square | df | p |
|----------|--|-------------------------|--------------------------|------------|----|--------|
| | | Median (IQR) (n=22) | Median (IQR) (n = 25) | | | |
| 1 | The demands of my work make it difficult for me to take good care of my condition. | 5 (4.75 – 5) | 5 (4 – 5) | 2.36 | 1 | 0.13 |
| 2 | It takes a great deal of my energy and time to manage the demands of my work. | 5 (4 – 5) | 5 (4 – 5) | 0.75 | 2 | 0.69 |
| 3 | My condition suffers because of the demands of my work. | 5 (4 – 5) | 5 (4 – 5) | 2.17 | 2 | 0.34 |
| 4 | The impact and management of my condition make it difficult for me to do a good job. | 5 (4 – 5) | 4 (4 – 5) | 2.15 | 2 | 0.34 |
| 5 | It takes a lot of my energy and time to manage my condition. | 5 (5 – 5) | 4 (4 – 5) | 9.10 | 1 | 0.01** |
| 6 | My condition impacts the quality of my work. | 5 (5 – 5) | 4 (4 – 5) | 7.04 | 2 | 0.03* |

Key: * p = ≤ 0.05, ** p = ≤ 0.01; Item relevance: 1 = not at all relevant; 5 = extremely relevant; IQR = inter-quartile range; Job skill level categories: 1 = elementary occupations, e.g., cleaner, refuse collector, shelf filler; 2 = requiring compulsory education/ work-related training; 3 = post-compulsory education (sub-degree) or longer work experience; 4 = degree education or equivalent experience.

Supplementary Table S5: Phase 1 participants’ responses regarding item relevance by condition group in the Work-Health-Personal Life Perceptions Scale (n = 48; median (IQR)).

| Item no. | Item | RA n=12 | AS n=10 | OA n=13 | FM n=13 | Chi square | df | p |
|--|--|------------|------------|------------|-----------------|------------|----|------|
| Part 1: Condition negatively affects Work and personal life | | | | | | | | |
| 1 | My condition means that I don’t have as much energy at work as I would like. | 4 (4-5) | 5 (4.75-5) | 5 (4-5) | 5 (4-5) | 12.26 | 9 | 0.20 |
| 2 | The symptoms of my condition are unpredictable which creates stress at work. | 4 (4-5) | 4.50 (4-5) | 5 (4-5) | 5 (4-5) | 6.46 | 6 | 0.37 |
| 3 | Having my condition means that I work harder to compensate for it. | 4 (4-5) | 4.50 (4-5) | 5 (4-5) | 5 (4-5) | 9.53 | 6 | 0.15 |
| 4 | My condition makes it hard to perform some of my work tasks. | 4 (4-5) | 5 (4-5) | 5 (4-5) | 5 (4-5) | 10.94 | 6 | 0.90 |
| 5 | My condition affects my self-image at work. | 4 (4-5) | 4.50 (4-5) | 5 (4-5) | 4 (4-5) | 11.67 | 6 | 0.07 |
| 6 | Having my condition makes me look less competent to others. | 4 (4-4.75) | 4 (4-5) | 4 (2.50-5) | 4 (4-5) | 11.94 | 12 | 0.45 |
| 7 | I feel guilty for not doing as good a job as I would like. | 4 (4-4.75) | 4 (4-5) | 4 (3-5) | 4 (4-5) | 15.63 | 12 | 0.21 |
| 8 | Working with my condition means I’ve had to make sacrifices in other areas of my life. | 4 (4-5) | 5 (4.75-5) | 5 (4-5) | 5 (4-5) 4 (4-5) | 9.19 | 6 | 0.16 |

| Item no. | Item | RA n=12 | AS n=10 | OA n=13 | FM n=13 | Chi square | df | p |
|--|--|------------|------------|------------|------------|------------|----|-------------|
| Part 2: Work and personal life affect Condition and its management. | | | | | | | | |
| 9 | Working means that I have no time to look after myself properly. | 4 (4-5) | 5 (4.75-5) | 5 (4-5) | 5 (4-5) | 6.72 | 6 | 0.35 |
| 10 | I feel guilty for not taking as much care of my health condition as I would like. | 4 (4-5) | 5 (4.75-5) | 5 (3.50-5) | 5 (4-5) | 12.89 | 9 | 0.17 |
| 11 | Working makes it hard to attend health appointments for my condition. | 4 (4-4.75) | 2 (2-3.25) | 4 (3-5) | 4 (2-5) | 24.18 | 12 | 0.02 |
| 12 | I have so much to do in my personal life that I don't have time to manage my condition. | 4 (4-4.75) | 4.50 (4-5) | 3 (1-5) | 4 (4-4.50) | 19.34 | 12 | 0.08 |
| 13 | I'm so tired with all the other things I have to do that I don't have the energy to take care of myself. | 4 (4-5) | 5 (4-5) | 5 (3-5) | 5 (4-5) | 15.45 | 9 | 0.08 |
| 14 | I feel like there are not enough hours in the day for me to deal with work, personal needs, and my health. | 4 (4-5) | 5 (4-5) | 5 (4-5) | 5 (4-5) | 10.06 | 6 | 0.12 |
| 15 | I worry about how I will deal with all the demands on my work, personal life, and health. | 4 (4-5) | 5 (4-5) | 5 (4-5) | 5 (4-5) | 10.06 | 6 | 0.12 |

| Item no. | Item | RA n=12 | AS n=10 | OA n=13 | FM n=13 | Chi square | df | p |
|------------------------------------|---|------------|---------------|------------|------------|------------|----|------|
| Part 3: Benefits of Working | | | | | | | | |
| 16 | Work keeps me moving and active which helps my condition. | 4 (4-5) | 5 (4-5) | 5 (4-5) | 4 (4-5) | 8.74 | 9 | 0.46 |
| 17 | Work gives me a purpose – a reason to get up. | 4 (4-5) | 4.50 (3.75-5) | 4 (3.50-5) | 4 (4-5) | 10.84 | 9 | 0.29 |
| 18 | My work is a part of who I am. | 4 (4-5) | 5 (4-5) | 5 (3.50-5) | 5 (4-5) | 11.69 | 9 | 0.23 |
| 19 | Work gives me something to focus on other than my health. | 4 (4-5) | 5 (4-5) | 5 (3.50-5) | 4 (4-5) | 13.07 | 9 | 0.16 |
| 20 | Work allows me to do something I really enjoy. | 4 (4-5) | 4 (4-5) | 4 (3.50-5) | 4 (4-5) | 9.21 | 9 | 0.42 |

Key: 1 = not at all relevant; 5 = extremely relevant. axSpA = axial spondyloarthritis; FM = fibromyalgia; IQR = inter-quartile range; OA = osteoarthritis; RA = rheumatoid arthritis.

Supplementary Table S6: Phase 1 participants' responses regarding item relevance by skill level group in the Work-Health-Personal Life Perceptions Scale (n = 47).

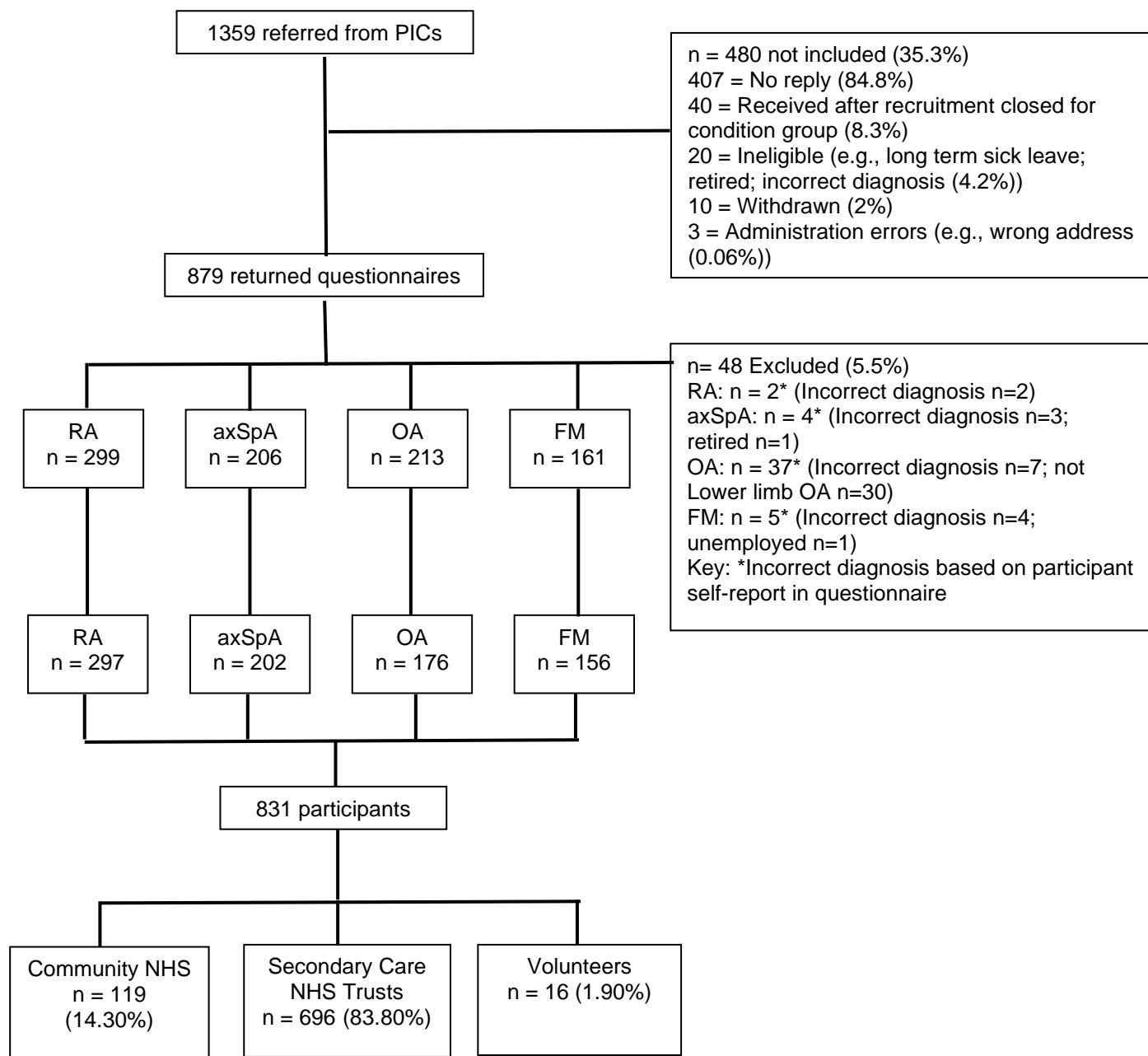
| Item no. | Item | Job skill level 1 and 2 Median (IQR) (n=22) | Job skill level 3 and 4 Median (IQR) (n = 25) | Chi square | df | p |
|--|--|---|---|------------|----|---------|
| Part 1: Condition negatively affects Work and personal life | | | | | | |
| 1 | My condition means that I don't have as much energy at work as I would like. | 5 (5 – 5) | 4 (4 – 5) | 8.90 | 3 | 0.03* |
| 2 | The symptoms of my condition are unpredictable which creates stress at work. | 5 (4.75 – 5) | 4 (4 – 5) | 8.67 | 2 | 0.01** |
| 3 | Having my condition means that I work harder to compensate for it. | 5 (4.75 – 5) | 4 (4 – 5) | 10.09 | 2 | 0.01** |
| 4 | My condition makes it hard to perform some of my work tasks. | 5 (5 – 5) | 4 (4 – 5) | 10.85 | 2 | 0.01** |
| 5 | My condition affects my self-image at work. | 5 (4 – 5) | 4 (4 – 5) | 6.51 | 2 | 0.04* |
| 6 | Having my condition makes me look less competent to others. | 4.50 (3.75 – 5) | 4 (4 – 5) | 11.92 | 2 | 0.02* |
| 7 | I feel guilty for not doing as good a job as I would like. | 5 (4 – 5) | 4 (4 – 5) | 9.66 | 4 | 0.05* |
| 8 | Working with my condition means I've had to make sacrifices in other areas of my life. | 5 (5 – 5) | 4 (4 – 5) | 15.24 | 2 | 0.001** |

| Item no. | Item | Job skill level 1 and 2 | Job skill level 3 and 4 | Chi square | df | p |
|--|--|-------------------------|--------------------------|------------|----|--------|
| | | Median (IQR) (n=22) | Median (IQR) (n = 25) | | | |
| Part 2: Work and personal life affect Condition and its management. | | | | | | |
| 9 | Working means that I have no time to look after myself properly. | 5 (5 – 5) | 4 (4 – 5) | 10.76 | 2 | 0.01** |
| 10 | I feel guilty for not taking as much care of my health condition as I would like. | 5 (5 – 5) | 4 (4 – 5) | 13.44 | 3 | 0.01** |
| 11 | Working makes it hard to attend health appointments for my condition. | 4 (2 – 5) | 4 (3 – 4) | 12.27 | 4 | 0.02* |
| 12 | I have so much to do in my personal life that I don't have time to manage my condition. | 4 (3 – 5) | 4 (4 – 4) | 5.56 | 4 | 0.24 |
| 13 | I'm so tired with all the other things I have to do that I don't have the energy to take care of myself. | 5 (5 – 5) | 4 (4 – 5) | 15.35 | 3 | 0.01** |
| 14 | I feel like there are not enough hours in the day for me to deal with work, personal needs, and my health. | 5 (5 – 5) | 4 (4 – 5) | 11.65 | 2 | 0.01** |
| 15 | I worry about how I will deal with all the demands on my work, personal life, and health. | 5 (5 – 5) | 4 (4 – 5) | 11.65 | 2 | 0.01** |

| Item no. | Item | Job skill level 1 and 2 | Job skill level 3 and 4 | Chi square | df | p |
|------------------------------------|---|-------------------------|--------------------------|------------|----|--------|
| | | Median (IQR) (n=22) | Median (IQR) (n = 25) | | | |
| Part 3: Benefits of Working | | | | | | |
| 16 | Work keeps me moving and active which helps my condition. | 5 (4 – 5) | 4 (4 – 5) | 8.34 | 3 | 0.04* |
| 17 | Work gives me a purpose – a reason to get up. | 5 (4 – 5) | 4 (4 – 5) | 8.81 | 3 | 0.03* |
| 18 | My work is a part of who I am. | 5 (5 – 5) | 4 (4 – 5) | 15.29 | 3 | 0.01** |
| 19 | Work gives me something to focus on other than my health. | 5 (4 – 5) | 4 (4 – 5) | 8.83 | 3 | 0.03* |
| 20 | Work allows me to do something I really enjoy. | 5 (4 – 5) | 4 (4 – 4) | 6.72 | 3 | 0.08 |

Key: * $p \leq 0.05$, ** $p \leq 0.01$; Item relevance: 1 = not at all relevant; 5 = extremely relevant; IQR = inter-quartile range; Job skill level categories: 1 = elementary occupations, e.g., cleaner, refuse collector, shelf filler; 2 = requiring compulsory education/ work-related training; 3 = post-compulsory education (sub-degree) or longer work experience; 4 = degree education or equivalent experience.

Supplementary Figure S1: Recruitment Flowchart Phase 2



Key: axSpA = axial spondyloarthritis; FM = fibromyalgia; OA = osteoarthritis; PICs – Patient Identification Centres; RA = rheumatoid arthritis.

Supplementary Table S7: Frequency of missing items in the Long-Term Conditions Job Strain Scale.

| Item. no | LTCJSS items. How stressful..... | RA (n=297) n (%) | axSpA (n=202) n (%) | OA (n=176) n (%) | FM (n=156) n (%) |
|---------------------|--|-----------------------------|--------------------------------|-----------------------------|-----------------------------|
| 1 | ...do the symptoms of your condition (e.g., pain, fatigue) make your work? | 0 | 2 (0.99) | 0 | 0 |
| 2 | ...is the day-to-day uncertainty about how you will feel at work? | 0 | 2 (0.99) | 1 (0.57) | 0 |
| 3 | ... do your shifts or work hours, combined with your condition, make your work? | 1 (0.34) | 2 (0.99) | 0 | 0 |
| 4 | ... do the demands of your job, combined with your condition, make your work? | 3 (1.01) | 3 (1.49) | 0 | 0 |
| 5 | ... are thoughts about the impact of your condition on your finances, now or in the future? | 0 | 3 (1.49) | 0 | 0 |
| 6 | ... are managing any absences from work (e.g., sick leave, medical appointments) because of your condition? | 2 (0.67) | 2 (0.99) | 1 (0.57) | 0 |
| 7 | ... is a lack of information and/ or resources about how to manage your condition and work? | 1 (0.34) | 2 (0.99) | 0 | 0 |
| 8 | ... are thoughts about the impact of your condition on your ability to keep working? | 1 (0.34) | 2 (0.99) | 0 | 0 |
| 9 | ... is the impact of your condition on your ability to use (or not use) your skills and training in your employment? | 1 (0.34) | 0 | 1 (0.57) | 0 |
| 10 | ... are thoughts about the impact of your condition on your future work or career plans? | 1 (0.34) | 0 | 1 (0.57) | 0 |

LTCJSS, LTCWSS, and WHPLPS

| | | | | | |
|----|---|-----------|-----------|----------|---|
| 11 | ...is your relationship with your employer (or concerns about your future relationship with them), because of your condition? | 0 | 0 | 1 (0.57) | 0 |
| 12 | ...is your current relationship with your co-workers (or concerns about your future relationship with them) because of your condition? | 0 | 1 (0.5) | 1 (0.57) | 0 |
| 13 | ...does the "invisibility" of your condition make working (i.e., people can't tell how you feel)? | 1 (0.34) | 1 (0.5) | 1 (0.57) | 0 |
| 14 | ...is balancing your health, work and your personal life because of your condition? | 0 | 1 (0.5) | 1 (0.57) | 0 |
| 15 | ...is trying to accept the changes in your life because of your condition (i.e., changes in circumstances, your sense of identity, etc.)? | 0 | 1 (0.5) | 1 (0.57) | 0 |
| | Total no. missing items overall: | 11 (0.25) | 22 (0.73) | 9 (0.34) | 0 |
| | Total LTCJSS unable to score: | 2 (0.67%) | 1 (0.50) | 1 (0.57) | 0 |

Key: axSpA = axial spondyloarthritis; FM = fibromyalgia; LTCJSS = Long Term Condition Job Strain Scale; OA = osteoarthritis; RA = rheumatoid arthritis.

Supplementary Table S8: Frequency of “not applicable” and missing items in the Long-Term Conditions Work Spillover Scale.

| Item No. | LTCWSS items | RA (n=297) | | axSpA (n=202) | | OA (n=176) | | FM (n=156) | |
|----------|--|----------------|----------|----------------|---------|----------------|---------|----------------|---------|
| | | n (%) | | n (%) | | n (%) | | n (%) | |
| | | Not applicable | Missing | Not applicable | Missing | Not applicable | Missing | Not applicable | Missing |
| 1 | The demands of my work make it difficult for me to take good care of my condition. | 10 (3.37) | 0 | 7 (3.46) | 0 | 4 (2.27) | 0 | 0 | 0 |
| 2 | It takes a great deal of my energy and time to manage the demands of my work. | 6 (2.02) | 0 | 6 (2.97) | 0 | 5 (2.84) | 0 | 1 (0.64) | 0 |
| 3 | My condition suffers because of the demands of my work. | 8 (2.69) | 0 | 5 (2.47) | 0 | 5 (2.84) | 0 | 0 | 0 |
| 4 | The impact and management of my condition make it difficult for me to do a good job. | 5 (1.68) | 0 | 7 (3.46) | 0 | 5 (2.84) | 0 | 1 (0.64) | 0 |
| 5 | It takes a lot of my energy and time to manage my condition. | 5 (1.68) | 2 (0.67) | 5 (2.47) | 0 | 5 (2.84) | 0 | 1 (0.64) | 0 |
| 6 | My condition impacts the quality of my work. | 5 (1.68) | 2 (0.67) | 3 (1.49) | 0 | 5 (2.84) | 0 | 0 | 0 |
| | Total no. <i>unscored</i> items overall: | 39 (2.19) | 4 (0.22) | 33 (2.72) | 0 | 29 (2.75%) | 0 | 3 (0.32) | 0 |
| | Total LTCWSS unable to score: | 9 (3.03) | | 5 (2.48) | | 5 (2.84) | | 1 (0.64) | |

Key: axSpA = axial spondyloarthritis; FM = fibromyalgia; LTCWSS = Long-Term Conditions Work Spillover Scale; OA = osteoarthritis; RA = rheumatoid arthritis.

Supplementary Table S9: Frequency of missing items in the Work-Health-Personal Life Perceptions Scale.

| Item no. | WHPLPS items | RA (n=297) n (%) | axSpA (n=202) n (%) | OA (n=176) n (%) | FM (n=156) n (%) |
|--|--|---------------------|------------------------|---------------------|---------------------|
| Part 1 (CAW): | | | | | |
| 1 | My condition means that I don't have as much energy at work as I would like. | 1 (0.33) | 1 (0.50) | 1 (0.57) | 0 |
| 2 | The symptoms of my condition are unpredictable which creates stress at work. | 1 (0.33) | 1 (0.50) | 1 (0.57) | 0 |
| 3 | Having my condition means that I work harder to compensate for it. | 2 (0.67) | 1 (0.50) | 1 (0.57) | 0 |
| 4 | My condition makes it hard to perform some of my work tasks. | 1 (0.33) | 1 (0.50) | 1 (0.57) | 0 |
| 5 | My condition affects my self-image at work. | 2 (0.67) | 1 (0.50) | 1 (0.57) | 0 |
| 6 | Having my condition makes me look less competent to others. | 2 (0.67) | 2 (1.00) | 1 (0.57) | 0 |
| 7 | I feel guilty for not doing as good a job as I would like. | 2 (0.67) | 1 (0.50) | 1 (0.57) | 0 |
| 8 | Working with my condition means I've had to make sacrifices in other areas of my life. | 2 (0.67) | 1 (0.50) | 1 (0.57) | 0 |
| Total no. unscored items overall: | | 13 (0.55) | 9 (0.56) | 8 (0.57) | 0 |
| Total no. WHPLPS Part 1 unable to score = | | 2 (0.67) | 0 | 1 (0.57) | 0 |

| WHPLPS items | | RA (n=297) | axSpA (n=202) | OA (n=176) | FM (n=156) |
|--|--|-------------------|----------------------|-------------------|-------------------|
| | | n (%) | n (%) | n (%) | n (%) |
| Part 2 (WAC): | | | | | |
| 9 | Working means that I have no time to look after myself properly. | 1 (0.33) | 1 (0.50) | 1 (0.57) | 0 |
| 10 | I feel guilty for not taking as much care of my health condition as I would like. | 2 (0.67) | 1 (0.50) | 1 (0.57) | 0 |
| 11 | Working makes it hard to attend health appointments for my condition. | 1 (0.33) | 2 (1.00) | 1 (0.57) | 0 |
| 12 | I have so much to do in my personal life that I don't have time to manage my condition. | 2 (0.67) | 1 (0.50) | 1 (0.57) | 0 |
| 13 | I'm so tired with all the other things I have to do that I don't have the energy to take care of myself. | 1 (0.33) | 1 (0.50) | 0 | 0 |
| 14 | I feel like there are not enough hours in the day for me to deal with work, personal needs, and my health. | 1 (0.33) | 1 (0.50) | 0 | 0 |
| 15 | I worry about how I will deal with all the demands on my work, personal life, and health. | 1 (0.33) | 1 (0.50) | 0 | 0 |
| Total no. unscored items overall: | | 9 (0.43) | 8 (0.57) | 4 (0.32) | 0 |
| Total WHPLPS Part 2 unable to score = | | 1 (0.33) | 0 | 1 (0.57) | 0 |

| Item no. | WHPLPS items | RA (n=297) n (%) | axSpA (n=202) n (%) | OA (n=176) n (%) | FM (n=156) n (%) |
|--|---|---------------------|------------------------|---------------------|---------------------|
| Part 3 (BW): | | | | | |
| 16 | Work keeps me moving and active which helps my condition. | 1 (0.33) | 0 | 0 | 0 |
| 17 | Work gives me a purpose – a reason to get up. | 3 (1.01) | 0 | 1 (0.57) | 0 |
| 18 | My work is a part of who I am. | 2 (0.67) | 0 | 0 | 0 |
| 19 | Work gives me something to focus on other than my health. | 2 (0.67) | 0 | 0 | 0 |
| 20 | Work allows me to do something I really enjoy. | 1 (0.33) | 0 | 0 | 0 |
| Total no. missing items overall: | | 9 (0.61) | 0 | 1 (0.11) | 0 |
| Total WHPLPS Part 3 unable to score = | | 2 (0.67) | 0 | 0 | 0 |

Key axSpA = axial spondyloarthritis; FM = fibromyalgia; OA = osteoarthritis; RA = rheumatoid arthritis; WHPLPS = Work-Health-Personal Life Perceptions Scale (1. CAW = Condition negatively Affects Work and personal life; 2. WAC = Work and personal life affect Condition and its management; 3. BW = Benefits of Work)

Supplementary Table S10: Hierarchical analytical structure for achieving fit of the Long-Term Conditions Job Strain Scale, Long-Term Conditions Work Spillover Scale and Work-Health-Personal Life Perceptions Scale to the Rasch model.

| Level | Nature | Adjustments | Reporting | | |
|-------|----------------|--|-------------|-------------|-------------------------------|
| | | | Chi-Square | ECV ≥0.9 | Latent Correlation ≥0.9 |
| 1 | Item-based | None | Interaction | No | No |
| 2 | Item-Based | Clusters for Local Item Dependency | Interaction | Yes | No |
| 3 | Domain-based | On existing sub- scales >2 | Interaction | Yes | No |
| 4 | Parallel Form | On existing sub- scales ≤2 or 2 LD patterns or conceptual groups | Conditional | Yes | Yes |
| 5 | Parallel Form | On alternative Items | Conditional | Yes | Yes |
| 6 | Item Deletion | On all original items | Interaction | No | No |
| 7 | Mokken Scaling | On items if Unidimensional. Loevinger's coefficient H ≥0.4- moderate | No | No | No |
| 8 | Fail | No valid ordinal scale | No | No | No |

Key: ECV = Explained Common Variance. Interaction = Chi-Square Interaction fit statistic; Conditional = Conditional Chi-Square test of fit; Latent correlation is that between two items sets that are deemed to be parallel forms.

Supplementary Table S11 Summary of Level of Fit of the LTCJSS, LTCWSS and WHPLPS to the Rasch model.

| Condition /Scale | RA | OA | axSpA | FM | Combined | Equating |
|-------------------------|-----------|-----------|--------------|-----------|-----------------|-----------------|
| LTCJSS | 4 | 4 | 4 | 4 | 4 | 1 |
| LTCWSS | 5 | 5 | 4 | 4 | 4 | 1 |
| WHPLPS: | | | | | | |
| 1. CAW | 1 | 1 | 2 | 2 | 4 | 1 |
| 2. WAC | 4 | 2 | 1 | 2 | 4 | |
| 3. BW | 7 | 7 | 1 | 6 | 7 | |

Key: LTCJSS = Long Term Condition Job Strain Scale; LTCWSS = Long-Term Conditions Work Spillover Scale; WHPLPS = Work-Health-Personal Life Perceptions Scale (1. CAW = Condition negatively Affects Work and personal life; 2. WAC = Work and personal life affect Condition and its management; 3. BW = Benefits of Work).

Supplementary Table S12: Individual Scale conversion of the LTCJSS, LTCWSS and WHPLPS**Part 1 from raw score to interval metric.**

| Raw score | LTCJSS | LTCWSS | WHPLPS Part 1: CAW |
|------------------|---------------|---------------|---------------------------|
| 0 | 0.0 | 0.0 | 0.0 |
| 1 | 5.2 | 1.6 | 2.3 |
| 2 | 8.7 | 2.7 | 3.8 |
| 3 | 11.0 | 3.5 | 4.8 |
| 4 | 12.8 | 4.2 | 5.6 |
| 5 | 14.3 | 4.8 | 6.3 |
| 6 | 15.6 | 5.5 | 7.0 |
| 7 | 16.8 | 6.0 | 7.6 |
| 8 | 17.9 | 6.7 | 8.2 |
| 9 | 18.9 | 7.4 | 8.8 |
| 10 | 19.9 | 8.2 | 9.4 |
| 11 | 20.8 | 9.2 | 10.0 |
| 12 | 21.7 | 10.2 | 10.7 |
| 13 | 22.6 | 11.3 | 11.4 |
| 14 | 23.4 | 12.4 | 12.2 |
| 15 | 24.2 | 13.5 | 12.9 |
| 16 | 25.0 | 14.5 | 13.7 |
| 17 | 25.7 | 15.4 | 14.5 |
| 18 | 26.4 | 16.3 | 15.4 |
| 19 | 27.0 | 17.2 | 16.2 |
| 20 | 27.6 | 18.1 | 17.1 |
| 21 | 28.2 | 19.1 | 17.9 |
| 22 | 28.8 | 20.2 | 18.8 |
| 23 | 29.4 | 21.8 | 19.7 |
| 24 | 29.9 | 24.0 | 20.5 |
| 25 | 30.4 | | 21.4 |
| 26 | 30.9 | | 22.3 |
| 27 | 31.4 | | 23.2 |
| 28 | 31.8 | | 24.2 |
| 29 | 32.3 | | 25.4 |
| 30 | 32.7 | | 26.8 |
| 31 | 33.2 | | 28.9 |
| 32 | 33.6 | | 32.0 |
| 33 | 34.1 | | |

LTCJSS, LTCWSS, and WHPLPS

| | |
|----|------|
| 34 | 34.5 |
| 35 | 35.0 |
| 36 | 35.4 |
| 37 | 35.9 |
| 38 | 36.4 |
| 39 | 36.8 |
| 40 | 37.3 |
| 41 | 37.8 |
| 42 | 38.4 |
| 43 | 38.9 |
| 44 | 39.4 |
| 45 | 40.0 |
| 46 | 40.6 |
| 47 | 41.2 |
| 48 | 41.9 |
| 49 | 42.6 |
| 50 | 43.3 |
| 51 | 44.0 |
| 52 | 44.8 |
| 53 | 45.7 |
| 54 | 46.7 |
| 55 | 47.7 |
| 56 | 49.0 |
| 57 | 50.5 |
| 58 | 52.4 |
| 59 | 55.4 |
| 60 | 60.0 |

Key: LTCJSS = Long Term Condition Job Strain Scale; LTCWSS = Long-Term Conditions Work Spillover Scale; WHPLPS = Work-Health-Personal Life Perceptions Scale (1 CAW = Condition negatively affects Work and personal life).

Supplementary Table S13: Calibration of the LTCJSS, LTCWSS, WHPLPS (Part 1 CAW) with the Workplace Activity Limitations Scale, and Work Instability Scales on the Reference Metric.

| Raw score | Reference | WHPLPS: | | | | | |
|-----------|-----------|---------|--------|------------|------|--------|--------|
| | | LTCJSS | LTCWSS | Part 1 CAW | WALS | AS-WIS | RA-WIS |
| 0 | 0.0 | 25.9 | 27.7 | 23.9 | 26.9 | 24.8 | 23.8 |
| 1 | 9.7 | 29.7 | 30.4 | 27.0 | 31.8 | 29.3 | 29.3 |
| 2 | 15.5 | 32.2 | 32.3 | 29.0 | 35.2 | 32.3 | 33.0 |
| 3 | 19.0 | 33.9 | 33.7 | 30.4 | 37.6 | 34.4 | 35.3 |
| 4 | 21.4 | 35.2 | 34.9 | 31.6 | 39.5 | 36.0 | 37.1 |
| 5 | 23.2 | 36.3 | 36.0 | 32.5 | 41.2 | 37.4 | 38.5 |
| 6 | 24.6 | 37.2 | 37.1 | 33.4 | 42.7 | 38.7 | 39.7 |
| 7 | 25.7 | 38.1 | 38.1 | 34.2 | 44.1 | 39.8 | 40.7 |
| 8 | 26.6 | 38.9 | 39.2 | 35.0 | 45.5 | 40.9 | 41.7 |
| 9 | 27.5 | 39.7 | 40.5 | 35.9 | 46.9 | 42.0 | 42.6 |
| 10 | 28.2 | 40.4 | 41.9 | 36.7 | 48.2 | 43.1 | 43.5 |
| 11 | 28.8 | 41.1 | 43.5 | 37.6 | 49.5 | 44.1 | 44.4 |
| 12 | 29.4 | 41.7 | 45.3 | 38.5 | 50.7 | 45.2 | 45.4 |
| 13 | 29.9 | 42.4 | 47.2 | 39.5 | 51.9 | 46.3 | 46.3 |
| 14 | 30.4 | 43.0 | 49.1 | 40.5 | 53.1 | 47.5 | 47.4 |
| 15 | 30.8 | 43.5 | 50.9 | 41.5 | 54.2 | 48.8 | 48.6 |
| 16 | 31.3 | 44.1 | 52.6 | 42.6 | 55.4 | 50.2 | 50.0 |
| 17 | 31.7 | 44.6 | 54.3 | 43.7 | 56.5 | 51.8 | 51.6 |
| 18 | 32.0 | 45.1 | 55.8 | 44.8 | 57.7 | 53.9 | 53.5 |
| 19 | 32.4 | 45.6 | 57.4 | 46.0 | 58.8 | 57.0 | 55.8 |
| 20 | 32.7 | 46.0 | 58.9 | 47.2 | 60.0 | 61.6 | 58.6 |
| 21 | 33.1 | 46.5 | 60.6 | 48.3 | 61.2 | | 62.0 |
| 22 | 33.4 | 46.9 | 62.6 | 49.5 | 62.4 | | 67.0 |
| 23 | 33.7 | 47.3 | 65.4 | 50.7 | 63.6 | | 74.0 |
| 24 | 34.0 | 47.6 | 69.2 | 51.9 | 64.9 | | |
| 25 | 34.2 | 48.0 | | 53.1 | 66.2 | | |
| 26 | 34.5 | 48.4 | | 54.3 | 67.5 | | |
| 27 | 34.8 | 48.7 | | 55.6 | 68.9 | | |
| 28 | 35.0 | 49.1 | | 57.0 | 70.4 | | |
| 29 | 35.3 | 49.4 | | 58.5 | 71.9 | | |
| 30 | 35.5 | 49.7 | | 60.5 | 73.4 | | |
| 31 | 35.8 | 50.1 | | 63.4 | 75.1 | | |
| 32 | 36.0 | 50.4 | | 67.6 | 76.9 | | |

LTCJSS, LTCWSS, and WHPLPS

| | | | |
|----|------|------|------|
| 33 | 36.3 | 50.7 | 78.9 |
| 34 | 36.5 | 51.0 | 81.4 |
| 35 | 36.7 | 51.4 | 85.0 |
| 36 | 37.0 | 51.7 | 90.2 |
| 37 | 37.2 | 52.0 | |
| 38 | 37.4 | 52.4 | |
| 39 | 37.6 | 52.7 | |
| 40 | 37.8 | 53.1 | |
| 41 | 38.0 | 53.4 | |
| 42 | 38.2 | 53.8 | |
| 43 | 38.4 | 54.2 | |
| 44 | 38.7 | 54.6 | |
| 45 | 38.9 | 55.0 | |
| 46 | 39.1 | 55.5 | |
| 47 | 39.3 | 55.9 | |
| 48 | 39.5 | 56.4 | |
| 49 | 39.6 | 56.9 | |
| 50 | 39.8 | 57.4 | |
| 51 | 40.0 | 58.0 | |
| 52 | 40.2 | 58.5 | |
| 53 | 40.4 | 59.2 | |
| 54 | 40.6 | 59.9 | |
| 55 | 40.8 | 60.7 | |
| 56 | 41.0 | 61.6 | |
| 57 | 41.2 | 62.6 | |
| 58 | 41.4 | 64.1 | |
| 59 | 41.5 | 66.3 | |
| 60 | 41.7 | 69.6 | |
| 61 | 41.9 | | |
| 62 | 42.1 | | |
| 63 | 42.3 | | |
| 64 | 42.4 | | |
| 65 | 42.6 | | |
| 66 | 42.8 | | |
| 67 | 43.0 | | |
| 68 | 43.2 | | |
| 69 | 43.3 | | |
| 70 | 43.5 | | |
| 71 | 43.7 | | |
| 72 | 43.8 | | |

LTCJSS, LTCWSS, and WHPLPS

| | |
|-----|------|
| 73 | 44.0 |
| 74 | 44.2 |
| 75 | 44.4 |
| 76 | 44.5 |
| 77 | 44.7 |
| 78 | 44.9 |
| 79 | 45.0 |
| 80 | 45.2 |
| 81 | 45.4 |
| 82 | 45.5 |
| 83 | 45.7 |
| 84 | 45.9 |
| 85 | 46.0 |
| 86 | 46.2 |
| 87 | 46.3 |
| 88 | 46.5 |
| 89 | 46.7 |
| 90 | 46.8 |
| 91 | 47.0 |
| 92 | 47.2 |
| 93 | 47.3 |
| 94 | 47.5 |
| 95 | 47.7 |
| 96 | 47.8 |
| 97 | 48.0 |
| 98 | 48.1 |
| 99 | 48.3 |
| 100 | 48.4 |
| 101 | 48.6 |
| 102 | 48.8 |
| 103 | 48.9 |
| 104 | 49.1 |
| 105 | 49.2 |
| 106 | 49.4 |
| 107 | 49.5 |
| 108 | 49.7 |
| 109 | 49.9 |
| 110 | 50.0 |
| 111 | 50.2 |
| 112 | 50.3 |

LTCJSS, LTCWSS, and WHPLPS

| | |
|-----|------|
| 113 | 50.5 |
| 114 | 50.6 |
| 115 | 50.8 |
| 116 | 51.0 |
| 117 | 51.1 |
| 118 | 51.3 |
| 119 | 51.4 |
| 120 | 51.6 |
| 121 | 51.8 |
| 122 | 51.9 |
| 123 | 52.1 |
| 124 | 52.3 |
| 125 | 52.4 |
| 126 | 52.6 |
| 127 | 52.8 |
| 128 | 52.9 |
| 129 | 53.1 |
| 130 | 53.3 |
| 131 | 53.5 |
| 132 | 53.6 |
| 133 | 53.8 |
| 134 | 54.0 |
| 135 | 54.2 |
| 136 | 54.4 |
| 137 | 54.6 |
| 138 | 54.7 |
| 139 | 54.9 |
| 140 | 55.1 |
| 141 | 55.3 |
| 142 | 55.5 |
| 143 | 55.7 |
| 144 | 55.9 |
| 145 | 56.1 |
| 146 | 56.3 |
| 147 | 56.6 |
| 148 | 56.8 |
| 149 | 57.0 |
| 150 | 57.2 |
| 151 | 57.4 |
| 152 | 57.7 |

LTCJSS, LTCWSS, and WHPLPS

| | |
|-----|------|
| 153 | 57.9 |
| 154 | 58.2 |
| 155 | 58.4 |
| 156 | 58.7 |
| 157 | 58.9 |
| 158 | 59.2 |
| 159 | 59.5 |
| 160 | 59.7 |
| 161 | 60.0 |
| 162 | 60.3 |
| 163 | 60.6 |
| 164 | 61.0 |
| 165 | 61.3 |
| 166 | 61.6 |
| 167 | 62.0 |
| 168 | 62.4 |
| 169 | 62.7 |
| 170 | 63.1 |
| 171 | 63.6 |
| 172 | 64.0 |
| 173 | 64.5 |
| 174 | 65.0 |
| 175 | 65.5 |
| 176 | 66.1 |
| 177 | 66.7 |
| 178 | 67.3 |
| 179 | 68.0 |
| 180 | 68.7 |
| 181 | 69.4 |
| 182 | 70.2 |
| 183 | 71.1 |
| 184 | 72.0 |
| 185 | 73.0 |
| 186 | 74.0 |
| 187 | 75.2 |
| 188 | 76.4 |
| 189 | 77.7 |
| 190 | 79.3 |
| 191 | 81.1 |
| 192 | 83.4 |

LTCJSS, LTCWSS, and WHPLPS

| | |
|-----|-------|
| 193 | 86.5 |
| 194 | 91.6 |
| 195 | 100.0 |

Key: AS-WIS = Ankylosing Spondyloarthritis Work Instability Scale; LTCJSS = Long Term Condition Job Strain Scale; LTCWSS = Long-Term Conditions Work Spillover Scale; RA-WIS = Rheumatoid Arthritis Work Instability Scale; WALs = Work Activity Limitations Scale; WHPLPS = Work-Health-Personal Life Perceptions Scale (Part 1 CAW = Condition negatively affects Work and personal life).

Supplementary Table S14: RA-WIS and AS-WIS clinical cut points, across the LTCSS, LTCWSS, WHPLPS Part 1 (CAW) and WALs.

| For RA, OA and provisionally for FM: | | | | | |
|---|----------------------------------|---------------|---------------|-----------------------------|-------------|
| RA-WIS | Level of Work Disturbance | LTCJSS | LTCWSS | WHPLPS: Part 1 (CAW) | WALS |
| 0 – 9 | Low | 0 – 14 | 0 – 10 | 0 – 16 | 0 – 6 |
| 10 – 17 | Medium | 15 – 36 | 11 – 16 | 17 – 24 | 7 – 13 |
| 18 - 21 | High | 37 - 60 | 17 - 24 | 25 - 32 | 14 - 36 |

For axSpA:

| AS-WIS | Level of Work Disturbance | LTCJSS | LTCWSS | WHPLPS: Part 1 (CAW) | WALS |
|---------------|----------------------------------|---------------|---------------|-----------------------------|-------------|
| 0 – 10 | Low | 0 – 15 | 0 – 11 | 0 – 17 | 0 – 6 |
| 11 – 18 | Medium | 16 – 42 | 12 – 17 | 18 – 26 | 7 – 15 |
| 19 - 20 | High | 43 - 60 | 18 - 24 | 27 - 32 | 16 - 36 |

Key: AS-WIS = Ankylosing Spondyloarthritis Work Instability Scale; LTCJSS = Long Term Condition Job Strain Scale; LTCWSS = Long-Term Conditions Work Spillover Scale; RA-WIS = Rheumatoid Arthritis Work Instability Scale; WALs = Work Activity Limitations Scale; WHPLPS = Work-Health-Personal Life Perceptions Scale (Part 1 CAW = Condition negatively affects Work and personal life).

Supplementary Table S15: Concurrent validity of the Work-Health-Personal Life Perceptions Scale Part 3 (BW).

| | WHPLPS part 3 | | | |
|--------------------------------|----------------------|--------|----------------|--------|
| | RA | AxSpA | OA | FM |
| LTCJSS | -0.11 | -0.11 | -0.08 | -0.25 |
| LTCWSS | -0.22* | -0.07 | -0.20* | -0.26* |
| WHPLPS part 1 (CAW) | -0.05 | -0.05 | 0.00 | -0.18 |
| WHPLPS part 2 (WAC) | -0.12* | -0.11 | -0.02 | -0.19 |
| Work scales: | | | | |
| WALS | -0.01 | -0.13 | -0.11 | -0.16 |
| WLQ-25 | | | | |
| - Time Management Demands | -0.15* | -0.05 | -0.23 | -0.20 |
| - Mental Interpersonal Demands | -0.19* | -0.19* | -0.11 | -0.32* |
| - Output Demands | -0.11 | -0.08 | -0.13 | -0.30* |
| WIS | -0.01 | -0.08 | -0.13 | -0.21* |
| Health scales: | | | | |
| Pain NRS (0-10) | -0.04 | -0.10 | - ^a | -0.13 |
| Fatigue NRS (0-10) | -0.04 | -0.19* | -0.02 | -0.23* |
| Mood NRS (0-10) | -0.11 | -0.06 | -0.12 | -0.32* |
| <i>RA:</i> | | | | |
| - RAID | -0.10 | - | - | - |
| - HAQ20 | -0.03 | - | - | - |
| <i>axSpA:</i> | | | | |
| - BASDAI | - | -0.12 | - | - |
| - BASFI | - | -0.08 | - | - |
| <i>OA:</i> | | | | |
| - WOMAC Pain | - | - | -0.08 | - |
| - WOMAC Physical Function | - | - | 0.04 | - |
| <i>FM:</i> | | | | |
| - FIQR Symptoms | - | - | - | -0.22* |
| - FIQR Function | - | - | - | -0.13 |

Key: * $p \leq 0.01$; ^a= no pain NRS as WOMAC Pain scale reported; r_s = Spearman's correlations; axSpA = axial spondyloarthritis; BASDAI = Bath Ankylosing Spondylitis Disability Index; BASFI = Bath Ankylosing Spondylitis Function Index; FM = fibromyalgia; FIQR = Fibromyalgia Impact Questionnaire

LTCJSS, LTCWSS, and WHPLPS

Revised; HAQ = Health Assessment Questionnaire; LTCJSS = Long Term Condition Job Strain Scale; LTCWSS = Long-Term Conditions Work Spillover Scale; NRS = numeric rating scale; OA = osteoarthritis; RA = rheumatoid arthritis; RAID = Rheumatoid Arthritis Impact of Disease; WALs = Workplace Activity Limitations Scale; WHPLPS = Work-Health-Personal Life Perceptions Scale (1. CAW = Condition negatively Affects Work and personal life; 2. WAC = Work and personal life affect Condition and its management); WIS = Work Instability Scale; WLQ-25 = Work Limitations Questionnaire-25; WOMAC = Western Ontario McMaster Universities Osteoarthritis Index.

Supplementary Table S16: Discriminant validity of the LTCJSS, LTCWSS, and WHPLPS.

| Perceived health status: | Very poor/ poor | Fair | Good/ very good | Kruskal-Wallis H | df | p |
|---------------------------------|-----------------------------------|------------------------------------|------------------------------------|-----------------------------|-----------|----------|
| LTCJSS (0-60): | | | | | | |
| RA (n = 297) | 37.00 (27.00 – 48.50) (n = 45) | 28.00 (17.00 – 38.00) (n = 132) | 13.00 (7.75 – 19.25) (n = 118) | 85.38 | 2 | <0.001 |
| axSpA (n=202) | 43.00 (21.50 – 49.00) (n = 21) | 22.00 (11.00 – 34.50) (n = 77) | 10.00 (4.00 – 16.00) (n = 103) | 51.84 | 2 | <0.001 |
| OA (n=176) | 39.00 (27.50 – 46.50) (n = 37) | 23.50 (13.25 – 35.00) (n = 96) | 12.50 (4.00 – 24.00) (n = 42) | 44.84 | 2 | <0.001 |
| FM (n=156) | 49.00 (42.00 – 54.00) (n = 83) | 37.00 (22.00 – 44.00) (n = 63) | 30.50 (17.25 – 39.50) (n = 10) | 33.38 | 2 | <0.001 |
| LTCWSS (0-24): | | | | | | |
| RA (n = 297) | 16.50 (14.00 – 20.25) (n = 46) | 14.00 (10.00 – 17.00) (n = 129) | 9.00 (6.00 – 12 .00) (n = 113) | 74.04 | 2 | <0.001 |
| axSpA (n=202) | 18.00 (15.00 – 19.75) (n = 20) | 13.00 (10.00 – 16.00) (n = 75) | 7.00 (5.00 – 12.00) (n = 102) | 53.19 | 2 | <0.001 |
| OA (n=176) | 16.00 (14.50 – 18.50) (n = 37) | 13.00 (9.00 – 15.00) (n = 95) | 12.00 (6.00 – 14.00) (n = 39) | 21.24 | 2 | <0.001 |
| FM (n=156) | 18.00 (15.00 – 20.25) (n = 82) | 15.00 (13.00 – 17.00) (n = 63) | 15.00 (8.25 – 17.00) (n = 10) | 12.83 | 2 | 0.002 |
| WHPLPS part 1 (CAW:0-32) | | | | | | |
| RA (n = 297) | 26.00 (21.75 – 28.25) (n = 46) | 22.00 (18.00 – 26.00) (n = 132) | 16.00 (11.00 – 20.00) (n = 117) | 84.58 | 2 | <0.001 |

LTCJSS, LTCWSS, and WHPLPS

| | | | | | | |
|----------------------------------|-----------------------------------|------------------------------------|------------------------------------|-------|---|--------|
| axSpA (n=202) | 23.00 (20.00 – 29.00) (n = 21) | 20.00 (14.00 – 24.00) (n = 78) | 11.00 (6.00 – 17.00) (n = 103) | 63.16 | 2 | <0.001 |
| OA (n=176) | 25.00 (20.00 – 28.00) (n = 37) | 20.00 (15.00 – 24.00) (n = 96) | 14.00 (10.00 – 16.75) (n = 42) | 43.68 | 2 | <0.001 |
| FM (n=156) | 28.00 (23.00 – 30.00) (n = 83) | 23.00 (21.00 – 27.00) (n = 63) | 19.00 (15.75 – 24.25) (n = 10) | 17.94 | 2 | <0.001 |
| WHPLPS part 2 (WAC: 0-28) | | | | | | |
| RA (n = 297) | 17.50 (13.00 – 23.00) (n = 46) | 16.00 (11.00 – 19.50) (n = 132) | 11.00 (6.00 – 14.50) (n = 117) | 53.24 | 2 | <0.001 |
| axSpA (n=202) | 18.00 (14.50 – 22.00) (n = 21) | 14.00 (11.00 – 18.00) (n = 78) | 10.00 (7.00 – 15.00) (n = 103) | 34.03 | 2 | <0.001 |
| OA (n=176) | 19.00 (14.75 – 21.00) (n = 37) | 16.00 (9.00 – 19.75) (n = 96) | 13.00 (6.50 – 18.00) (n = 42) | 12.31 | 2 | <0.001 |
| FM (n=156) | 22.00 (19.00 – 25.00) (n = 83) | 20.00 (16.00 – 24.00) (n = 63) | 17.50 (13.25 – 20.25) (n = 10) | 11.02 | 2 | 0.004 |
| WHPLPS Part 3 (BW: 0-20) | | | | | | |
| RA (n = 297) | 15.00 (12.00 – 17.00) (n = 46) | 15.00 (13.00 – 16.75) (n = 132) | 15.00 (14.00 – 17.00) (n = 117) | 3.46 | 2 | 0.18 |
| axSpA (n=202) | 13.00 (10.00 – 15.00) (n = 21) | 13.50 (11.00 – 16.00) (n = 78) | 15.00 (12.00 – 18.00) (n = 103) | 7.51 | 2 | 0.23 |
| OA (n=176) | 14.00 (10.50 – 16.50) (n = 37) | 14.00 (12.00 – 17.00) (n = 97) | 15.00 (12.00 – 17.25) (n = 42) | 1/34 | 2 | 0.51 |
| FM (n=156) | 14.00 (10.00 – 17.00) (n = 83) | 15.00 (11.00 – 17.00) (n = 63) | 15.00 (15.00 – 16.75) (n = 10) | 2.25 | 2 | 0.33 |

Key: axSpA = axial spondyloarthritis; FM = fibromyalgia; LTCJSS = Long Term Condition Job Strain Scale; LTCWSS = Long-Term Conditions Work Spillover Scale; OA = osteoarthritis; RA = rheumatoid arthritis; WHPLPS = Work-Health-Personal Life Perceptions Scale (1. CAW = Condition negatively Affects Work and personal life; 2. WAC = Work and personal life affect Condition and its management, Part 3 BW = Benefits of Working).

Supplementary Table S17: Item test-retest reliability of the Long-Term Conditions Job Strain Scale (weighted kappa).

| Item. no | LTCJSS items. How stressful..... | RA (n=136) κ | axSpA (n=99) κ | OA (n=79) κ | FM (n=54) κ |
|---------------------|--|-------------------------|---------------------------|------------------------|------------------------|
| 1 | ...do the symptoms of your condition (e.g., pain, fatigue) make your work? | 0.70 | 0.79 | 0.74 | 0.69 |
| 2 | ...is the day-to-day uncertainty about how you will feel at work? | 0.76 | 0.79 | 0.64 | 0.50 |
| 3 | ... do your shifts or work hours, combined with your condition, make your work? | 0.68 | 0.72 | 0.72 | 0.68 |
| 4 | ... do the demands of your job, combined with your condition, make your work? | 0.70 | 0.81 | 0.70 | 0.71 |
| 5 | ... are thoughts about the impact of your condition on your finances, now or in the future? | 0.76 | 0.77 | 0.67 | 0.80 |
| 6 | ... are managing any absences from work (e.g., sick leave, medical appointments) because of your condition? | 0.67 | 0.77 | 0.70 | 0.58 |
| 7 | ... is a lack of information and/ or resources about how to manage your condition and work? | 0.53 | 0.69 | 0.71 | 0.69 |
| 8 | ... are thoughts about the impact of your condition on your ability to keep working? | 0.68 | 0.79 | 0.78 | 0.70 |
| 9 | ... is the impact of your condition on your ability to use (or not use) your skills and training in your employment? | 0.67 | 0.71 | 0.61 | 0.68 |
| 10 | ... are thoughts about the impact of your condition on your future work or career plans? | 0.66 | 0.74 | 0.68 | 0.67 |

LTCJSS, LTCWSS, and WHPLPS

| | | | | | |
|----|---|------|------|------|------|
| 11 | ...is your relationship with your employer (or concerns about your future relationship with them), because of your condition? | 0.71 | 0.71 | 0.69 | 0.74 |
| 12 | ...is your current relationship with your co-workers (or concerns about your future relationship with them) because of your condition? | 0.57 | 0.61 | 0.61 | 0.68 |
| 13 | ...does the "invisibility" of your condition make working (i.e., people can't tell how you feel)? | 0.71 | 0.81 | 0.78 | 0.79 |
| 14 | ...is balancing your health, work and your personal life because of your condition? | 0.71 | 0.82 | 0.67 | 0.72 |
| 15 | ...is trying to accept the changes in your life because of your condition (i.e., changes in circumstances, your sense of identity, etc.)? | 0.77 | 0.85 | 0.73 | 0.58 |

Key: axSpA = axial spondyloarthritis; FM = fibromyalgia; LTCJSS = Long Term Condition Job Strain Scale; OA = osteoarthritis; RA = rheumatoid arthritis; κ = Cohen's Kappa coefficient.

Supplementary Table S18: Item test-retest reliability of the Long-Term Conditions Work Spillover Scale (weighted kappa).

| Item No. | LTCWSS items | RA (n=130) κ | axSpA (n=97) κ | OA (n=76) κ | FM (n=54) κ |
|----------|--|-----------------|-------------------|----------------|----------------|
| 1 | The demands of my work make it difficult for me to take good care of my condition. | 0.69 | 0.62 | 0.75 | 0.59 |
| 2 | It takes a great deal of my energy and time to manage the demands of my work. | 0.74 | 0.66 | 0.58 | 0.72 |
| 3 | My condition suffers because of the demands of my work. | 0.73 | 0.72 | 0.65 | 0.55 |
| 4 | The impact and management of my condition make it difficult for me to do a good job. | 0.70 | 0.61 | 0.64 | 0.51 |
| 5 | It takes a lot of my energy and time to manage my condition. | 0.71 | 0.73 | 0.76 | 0.47 |
| 6 | My condition impacts the quality of my work. | 0.68 | 0.69 | 0.72 | 0.37 |

Key: axSpA = axial spondyloarthritis; FM = fibromyalgia; LTCWSS = Long-Term Conditions Work Spillover Scale; OA = osteoarthritis; RA = rheumatoid arthritis; κ = Cohen's Kappa coefficient.

Supplementary Table S19: Item test-retest reliability of the Work-Health-Personal Life Perceptions Scale (weighted kappa).

| Item no. | WHPLPS items | RA (n=136) K | axSpA (n=100) K | OA (n=79) K | FM (n=54) K |
|----------------------|--|-----------------|--------------------|----------------|----------------|
| Part 1 (CAW): | | | | | |
| 1 | My condition means that I don't have as much energy at work as I would like. | 0.65 | 0.60 | 0.58 | 0.60 |
| 2 | The symptoms of my condition are unpredictable which creates stress at work. | 0.73 | 0.73 | 0.66 | 0.63 |
| 3 | Having my condition means that I work harder to compensate for it. | 0.63 | 0.70 | 0.56 | 0.55 |
| 4 | My condition makes it hard to perform some of my work tasks. | 0.73 | 0.77 | 0.74 | 0.73 |
| 5 | My condition affects my self-image at work. | 0.72 | 0.77 | 0.65 | 0.58 |
| 6 | Having my condition makes me look less competent to others. | 0.61 | 0.57 | 0.77 | 0.61 |
| 7 | I feel guilty for not doing as good a job as I would like. | 0.73 | 0.75 | 0.75 | 0.71 |
| 8 | Working with my condition means I've had to make sacrifices in other areas of my life. | 0.63 | 0.65 | 0.64 | 0.56 |

| WHPLPS items | | RA (n=136) | axSpA (n=99) | OA (n=79) | FM (n=54) |
|----------------------|--|------------|--------------|-----------|-----------|
| | | κ | κ | κ | κ |
| Part 2 (WAC): | | | | | |
| 9 | Working means that I have no time to look after myself properly. | 0.71 | 0.60 | 0.77 | 0.76 |
| 10 | I feel guilty for not taking as much care of my health condition as I would like. | 0.69 | 0.69 | 0.65 | 0.67 |
| 11 | Working makes it hard to attend health appointments for my condition. | 0.61 | 0.52 | 0.64 | 0.57 |
| 12 | I have so much to do in my personal life that I don't have time to manage my condition. | 0.58 | 0.46 | 0.74 | 0.57 |
| 13 | I'm so tired with all the other things I have to do that I don't have the energy to take care of myself. | 0.74 | 0.49 | 0.74 | -/63 |
| 14 | I feel like there are not enough hours in the day for me to deal with work, personal needs, and my health. | 0.68 | 0.58 | 0.73 | 0.73 |
| 15 | I worry about how I will deal with all the demands on my work, personal life, and health. | 0.75 | 0.72 | 0.69 | 0.68 |

| Item no. | WHPLPS items | RA (n=136) κ | axSpA (n=99) κ | OA (n=79) κ | FM (n=54) κ |
|---------------------|---|-----------------|-------------------|----------------|----------------|
| Part 3 (BW): | | | | | |
| 16 | Work keeps me moving and active which helps my condition. | 0.59 | 0.38 | 0.41 | 0.41 |
| 17 | Work gives me a purpose – a reason to get up. | 0.55 | 0.78 | 0.71 | 0.69 |
| 18 | My work is a part of who I am. | 0.58 | 0.61 | 0.62 | 0.62 |
| 19 | Work gives me something to focus on other than my health. | 0.58 | 0.71 | 0.57 | 0.58 |
| 20 | Work allows me to do something I really enjoy. | 0.74 | 0.74 | 0.68 | 0.79 |

Key axSpA = axial spondyloarthritis; FM = fibromyalgia; OA = osteoarthritis; RA = rheumatoid arthritis; WHPLPS = Work-Health-Personal Life Perceptions Scale (1. CAW = Condition negatively Affects Work and personal life; 2. WAC = Work and personal life affect Condition and its management; 3. BW = Benefits of Work); κ = Cohen’s Kappa coefficient.

Supplementary Table S20: Floor and ceiling effects for the LTCJSS, LTCWSS, and WHPLPS.

| Condition | LTCJSS n (%) | | | LTCWSS n (%) | | | WHPLPS Part 1 n (%) | | | WHPLPS Part 2 n (%) | | | WHPLPS Part 3 n (%) | | |
|-----------|--------------|--------------|-------------|--------------|--------------|--------------|---------------------|-------------|-------------|---------------------|--------------|--------------|---------------------|-------------|--------------|
| | n | Floor | Ceiling | n | Floor | Ceiling | n | Floor | Ceiling | n | Floor | Ceiling | n | Floor | Ceiling |
| RA | 295 | 7 (2.40) | 1 (0.30) | 288 | 4 (1.30) | 7 (2.40) | 295 | 2 (0.70) | 8 (2.70) | 296 | 15 (5.10) | 4 (1.30) | 295 | 0 (0) | 25 (8.40) |
| axSpA | 201 | 14 (6.90) | 2 (1.00) | 197 | 14 (6.90) | 1 (0.50) | 202 | 6 (3.00) | 2 (1.00) | 202 | 11 (5.40) | 1 (0.50) | 202 | 2 (1.00) | 20 (9.90) |
| OA | 175 | 3 (1.70) | 3 (0.60) | 171 | 5 (2.80) | 3 (1.70) | 175 | 2 (1.10) | 4 (2.30) | 175 | 7 (4.00) | 2 (1.10) | 176 | 1 (0.60) | 16 (9.10) |
| FM | 156 | 0 (0) | 3 (1.90) | 155 | 1 (0.60) | 10 (6.40) | 156 | 0 (0) | 6 (3.80) | 156 | 0 (0) | 13 (8.30) | 156 | 0 (0) | 10 (6.40) |

Key: axSpA = axial spondyloarthritis; FM = fibromyalgia; LTCJSS = Long Term Condition Job Strain Scale (score range 0-60); LTCWSS = Long-Term Conditions Work Spillover Scale (score range = 0.24); OA = osteoarthritis; RA = rheumatoid arthritis; WHPLPS = Work-Health-Personal Life Perceptions Scale (Part 1 score range = 0 – 32; Part 2 = 0 – 28; Part 3 = 0 – 20).