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Fundamental User Needs (FUN) Scales User Guide

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Fundamental User Needs (FUN) Scales

User Guide



Fundamental User Needs (FUN) Scales

2025

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User Guide

Preface

Despite the ever-changing wishes and desires accompanying today's rapid pace of technological innovation, basic psychological needs remain enduring sources for human functioning, development, and well-being. A shared language of needs, further with design-oriented measurement tools, can inform and inspire initiatives in user-centred and/or human-centred design research and practice.

Drawing on a design-focused need typology developed by Desmet and Fokkinga (2020), which identifies thirteen distinct psychological needs– autonomy, beauty, comfort, competence, community, fitness, impact, morality, purpose, recognition, relatedness, security, and stimulation– we developed the *Fundamental User Needs (FUN) Scales* (Huang, Desmet & Mugge, 2025). These scales are tailored to evaluate the satisfaction and frustration of these needs in design-mediated interactions¹.

This user guide aims to provide an overview of the new instrument, including a complete list of items and detailed instructions for scoring and analysis. We hope it serves as a practical resource to support the effective use of the *FUN Scales* in various different research projects.

If you're interested in adapting the *FUN Scales* to other languages or exploring collaboration opportunities—whether in academia or industry—please feel free to contact us at <u>siyuan.huang@polimi.it</u> and <u>P.M.A.Desmet@tudelft.nl</u>.

¹By 'design', we refer to a spectrum of artifacts or structures. This includes HCI designs such as smart devices, mobile applications, and interactive media, as well as objects, services, systems, and built environments.

Fundamental User Needs (FUN) Scales

The *FUN Scales* consist of two independent yet complementary scales: the *Need Satisfaction Scale* and the *Need Frustration Scale*. Each scale includes thirteen sub-scales, with each sub-scale represented by three items. You can choose to use a single scale, a combination of specific sub-scales, or the entire instrument, depending on the specific aims of your research.

Instructions

Below, we ask you about your experience and/or feelings when using/interacting with_____. Please read each of the following statements carefully and choose from "not true at all" to "extremely true" to indicate the degree to which each statement applies to you.

| When using/interacting with, | Not true at all | | | | | | Extre mely true |
|--|-----------------------|---|---|---|---|---|-----------------------|
| 1. I can do things my way. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2. I can express myself freely. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3. I have the freedom to be myself. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4. I have <i>no</i> freedom to do what I want to do. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5. my self-expression is constrained. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6. I have <i>no</i> freedom to be myself. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7. I experience something as aesthetically attractive. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| 8. I experience something as aesthetically pleasant. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|---|---|---|---|---|---|---|---|
| 9. I experience something as well-balanced. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10. I experience something as aesthetically unattractive. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11. I experience something as aesthetically unpleasant. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12. I experience something as out of balance. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13. I feel relaxed. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14. I feel comfortable. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15. I feel at ease. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16. I feel stressed. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17. I feel anxious. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18. I experience tension. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19. I feel accepted by society. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20. I identify myself with my community. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21. I experience social harmony. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22. I feel excluded from society. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23. I do <i>not</i> identify myself with my community. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24. I experience social discord. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25. I have the skills to perform well. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26. I feel able to overcome challenges. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27. I can develop my skills. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | |

| 28. I lack the skills to perform well. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|--|---|---|---|---|---|---|---|
| 29. I feel unable to overcome challenges. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30. I am unable to develop my skills. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31. I feel energized. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 32. I am full of energy. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 33. I am strong. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 34. I feel exhausted. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35. I am drained of energy. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 36. I am weak. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 37. what I do matters to someone. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 38. my actions make a difference in the world. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 39. my contributions are meaningful. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 40. my actions make <i>no</i> contribution. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 41. what I do is insignificant. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 42. my actions make <i>no</i> difference in the world. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43. I act in line with my moral principles. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 44. I act responsibly. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 45. I am treated fairly. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 46. I contradict my moral principles. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 47. I am treated unfairly. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| 48. my values are disrespected. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|---|---|---|---|---|---|---|---|
| 49. I have a sense of direction in life. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 50. I know what I want to accomplish. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 51. my actions add value to my life. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 52. I have <i>no</i> sense of direction in life. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 53. I have <i>no</i> idea what I want to accomplish. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 54. my actions add <i>no</i> value to my life. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 55. I am appreciated by others. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 56. I am recognized for my efforts. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 57. I receive the respect that I deserve. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 58. I am unappreciated by others. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 59. my efforts are disregarded. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 60. I do <i>not</i> receive the respect that I deserve. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 61. I engage in friendly contact with others. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 62. I have access to people that I can rely on. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 63. there is someone who cares about me. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 64. I do <i>not</i> bond with loved ones. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 65. I have <i>no</i> one that I can rely on. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| 66. there is <i>no</i> one who cares about me. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|--|---|---|---|---|---|---|---|
| 67. I can let my guard down. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 68. I am protected from danger. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 69. I find myself in stable conditions. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 70. I have to stay vigilant. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 71. I am exposed to danger. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 72. I find myself in unstable conditions. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 73. there are things to discover. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 74. I experience sensory excitement. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 75. I feel engaged. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 76. I feel bored. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 77. I have <i>no</i> sensory excitement. | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 78. I feel disengaged | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Scoring

General scoring

The statements in the *FUN Scales* are evaluated using a seven-point unipolar Likert scale, with ratings ranging from "1 (not true at all)" to "7 (extremely true)" for each statement. Each sub-scale in the two scales, comprised of three items, needs to be treated as an integrated unit.

Autonomy Satisfaction Score: average the scores on items 1, 2, 3. Autonomy Frustration Score: average the scores on items 4, 5, 6. Beauty Satisfaction Score: average the scores on items 7, 8, 9. Beauty Frustration Score: average the scores on items 10, 11, 12. Comfort Satisfaction Score: average the scores on items 13, 14, 15. Comfort Frustration Score: average the scores on items 16, 17, 18. Competence Satisfaction Score: average the scores on items 19, 20, 21. Competence Frustration Score: average the scores on items 22, 23, 24. Community Satisfaction Score: average the scores on items 25, 26, 27. Community Frustration Score: average the scores on items 28, 29, 30. Fitness Satisfaction Score: average the scores on items 31, 32, 33. Fitness Frustration Score: average the scores on items 34, 35, 36. Impact Satisfaction Score: average the scores on items 37, 38, 39. Impact Frustration Score: average the scores on items 40, 41, 42. Morality Satisfaction Score: average the scores on items 43, 44, 45. Morality Frustration Score: average the scores on items 46, 47, 48. Purpose Satisfaction Score: average the scores on items 49, 50, 51. Purpose Frustration Score: average the scores on items 52, 53, 54. Recognition Satisfaction Score: average the scores on items 55, 56, 57. Recognition Frustration Score: average the scores on items 58, 59, 60. Relatedness Satisfaction Score: average the scores on items 61, 62, 63. Relatedness Frustration Score: average the scores on items 64, 65, 66. Security Satisfaction Score: average the scores on items 67, 68, 69. Security Frustration Score: average the scores on items 70, 71, 72. Stimulation Satisfaction Score: average the scores on items 73, 74, 75. Stimulation Frustration Score: average the scores on items 76, 77, 78.

The total score for each scale can be calculated using the summated score of the mean values of all sub-scales as follows:

Need Satisfaction Score = Autonomy Satisfaction mean + Beauty Satisfaction mean + Comfort Satisfaction mean + Competence Satisfaction mean + Community Satisfaction mean + Fitness Satisfaction mean + Impact Satisfaction mean + Morality Satisfaction mean + Purpose Satisfaction mean + Recognition Satisfaction mean + Relatedness Satisfaction mean + Security Satisfaction mean + Stimulation Satisfaction mean

For the *Need Satisfaction Scale*, a higher summated score on each scale indicates greater perceived need satisfaction.

Need Frustration Score = Autonomy Frustration mean + Beauty Frustration mean + Comfort Frustration mean + Competence Frustration mean + Community Frustration mean + Fitness Frustration mean + Impact Frustration mean + Morality Frustration mean + Purpose Frustration mean + Recognition Frustration mean + Relatedness Frustration mean + Security Frustration mean + Stimulation Frustration mean

For the *Need Frustration Scale*, no items are reverse-coded. Therefore, a higher summated score indicates greater perceived need frustration.

Percentage-converted scoring

Each scale consists of thirteen sub-scales, thus allowing for a minimum possible score of 13 and a maximum of 91. To produce a more understandable and comparable metric, as described in *Section 4* of the original paper (Huang, Desmet & Mugge, 2025), the summated score of each scale can be converted into a percentage score using the following equation:

 $y = 100 \times (x - 13)/(91 - 13)$

The equation calculates *y* (the percentage-converted value of the *Need Satisfaction Scale* or the *Need Frustration scale*) by first subtracting 13 from *x* (the summated score of the mean values of all sub-scales) and then multiplying the result by a scaling factor of 100 divided by (91 - 13).

A similar approach can be applied to convert the scores ranging from 1 to 7 in each of the sub-scales to a percentage-based metric using the following equation:

 $y = 100 \times (x - 3)/(21 - 3)$

Likewise, the equation calculates y (the percentage-converted value of a sub-scale within the *Need Satisfaction Scale* or *Need Frustration Scale*) by first subtracting three from x (the summated score of the three items in a sub-scale) and then multiplying the result by a scaling factor of 100 divided by (21 - 3).

Colophon

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References

Huang, S., Desmet, P.M.A. & Mugge, R. (2025). Introducing the Fundamental User Needs (FUN) Scales: Assessing Need Satisfaction and Frustration in Design-Mediated Interactions. *International Journal of Human-Computer Interaction*, 1-18. https://doi.org/10.1080/10447318.2025.2450415.

Desmet, P.M.A., & Fokkinga, S.F. (2020). Beyond Maslow's Pyramid: Introducing a typology of thirteen fundamental needs for human-centered design. *Multimodal Technologies and Interactions*, 4(3), 38. https://doi.org/10.3390/mti4030038

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