

Incorporating Best-Worst Scaling into Attribute Selection for Stated Preference Research: A Study Based on Preference for Choosing Antidepressants

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INTRODUCTION

Growing Emphasis on Patient Preferences in Health Decision-Making: Patient preferences (SP) are increasingly recognized as vital in health policy and clinical decision-making. Integrating preferences can enhance treatment adherence, patient satisfaction, and health system efficiency.

Challenges in Attribute Development for Stated Preference Studies: The validity of SP methods hinges on the appropriate identification of attributes and levels. However, current approaches, primarily literature review and qualitative methods, lack standardization, often report insufficient methodological details, and face challenges in distinguishing attributes of similar perceived importance.

BWS-1 as a Promising Tool for Attribute Refinement: Object case BWS (BWS-1) offers a structured, quantitative approach to prioritizing attributes. Despite its potential, its application in attribute development for SP studies remains underexplored.

Therefore, this study aims to explore the use of BWS-1 in the attribute selection process of stated preference research, providing methodological guidance for researchers.

METHODS

Participant recruitment and selection

- Participants included adults (18-75 years) with self-reported diagnosis of depression, or currently or previously treated with antidepressants. Depression-prone individuals, identified using the Zung Self-Rating Depression Scale (SDS score ≥ 50) were also eligible.
- A web-based, anonymous survey was conducted using convenience sampling through WeChat.

Attributes Selection and Refinement

- Literature Review:** A comprehensive review of multiple databases identified essential attributes influencing antidepressant choice, including efficacy, treatment process factors, costs, and side effects.
- Expert Consultation:** A preliminary list of 18 attributes derived from the literature was refined through consultations with clinical experts. Thirteen key attributes were finally included in BWS-1 (Table 1).

Experimental Design

A balanced incomplete block design (BIBD) was employed to generate 13 BWS-1 choice sets (Figure 1). Each set contained 4 attributes, with each attribute appearing in all choice sets exactly 4 times.

What do you consider to be the "most important" and "least important" factors when choosing or taking antidepressant medications?		
Most important	Attributes	Least important
☐	Remission rate	☐
☐	Loss of appetite	☐
☐	Sexual dysfunction	☐
☐	Fatigue	☐

Figure 1 An example of a BWS-1 task

Statistical analysis

- The counting method computed best-worst scores and standardized values to indicate relative importance. The CL model estimated utility coefficients, with the least important attribute set as the reference. Correlation between the two methods was assessed.
- Preference heterogeneity was explored via K-means clustering, segmenting respondents into subgroups based on attribute preference patterns.

RESULTS

- A total of 180 participants were analyzed, including 44 with diagnosed depression and 136 depression-prone individuals ($\text{SDS} \geq 50$) but no clinical diagnosis.

Counting method

- Among diagnosed patients, the top-ranked attributes were liver/kidney injury, headache or dizziness, and sleep disturbance. Conversely, loss of appetite, sexual dysfunction, and weight change were the lowest ranked (Figure 2).
- Depression-prone individuals prioritized liver/kidney injury, recurrence rate, and headache or dizziness, whereas loss of appetite, weight change, and regimen duration were least favored.

CL model

- “Loss of appetite” was used as the reference attribute in the CLM, with all attributes showing statistical significance ($P < 0.05$). Similarly, liver/kidney injury emerged as the most valued attribute in both groups (Table 2).
- The BWS-1 results obtained from the counting method and modelling approach showed high consistency.

preference heterogeneity

- K-means clustering identified two subgroups of depression patients, with the greatest preference heterogeneity for monthly out-of-pocket costs (Figure 3).

Table 2 Results of CLM approaches.

Attributes	Depressed group			Depression-prone group		
	CLM coef.	Preference weight	Rank	CLM coef.	Preference weight	Rank
Liver/kidney injury	3.251 ^a	0.344	1	2.020 ^a	0.210	1
Headache/dizziness	2.183 ^a	0.118	2	1.296 ^a	0.102	3
Sleep disturbance	1.972 ^a	0.096	3	1.011 ^a	0.076	6
Recurrence rate	1.890 ^a	0.088	4	1.516 ^a	0.127	2
Fatigue	1.781 ^a	0.079	5	0.861 ^a	0.066	7
Nausea/vomiting	1.682 ^a	0.072	6	1.032 ^a	0.078	5
Regimen duration	1.085 ^a	0.039	7	0.486 ^a	0.045	11
Monthly out-of-pocket costs	0.984 ^a	0.036	8	1.087 ^a	0.083	4
Rhinitis/pharyngitis	0.956 ^a	0.035	9	0.589 ^a	0.050	8
Intestinal side effects	0.836 ^a	0.031	10	0.515 ^a	0.047	10
Weight change	0.820 ^a	0.030	11	0.378 ^a	0.041	12
Sexual dysfunction	0.356 ^b	0.019	12	0.560 ^a	0.049	9
Loss of appetite	0-ref	0.013	13	0-ref	0.028	13
Total score	-	1.000	-	-	1.000	-

a: $P < 0.01$; b: $P < 0.05$

CONCLUSION

- Based on qualitative research and BWS-1 results, six attributes, most of which ranked highly in BWS-1, were included in the subsequent SP study.
- BWS-1 provides valid and reliable evidence for attribute selection in SP research; however, it also should be complemented by qualitative methods to incorporate context-specific and stakeholder-relevant factors, thereby strengthening study rigor.

Table 1 A list of BWS-1 Study Attributes.

Category	Attribute
Treatment process	Regimen duration
Efficacy	Recurrence rate
Adverse reaction	Headache/dizziness
	Sleep disturbance
	Sexual dysfunction
	Nausea/vomiting
	Intestinal side effects
	Loss of appetite
	Weight change
	Fatigue
	Rhinitis/pharyngitis
Cost	Liver/kidney injury
	Monthly out-of-pocket costs

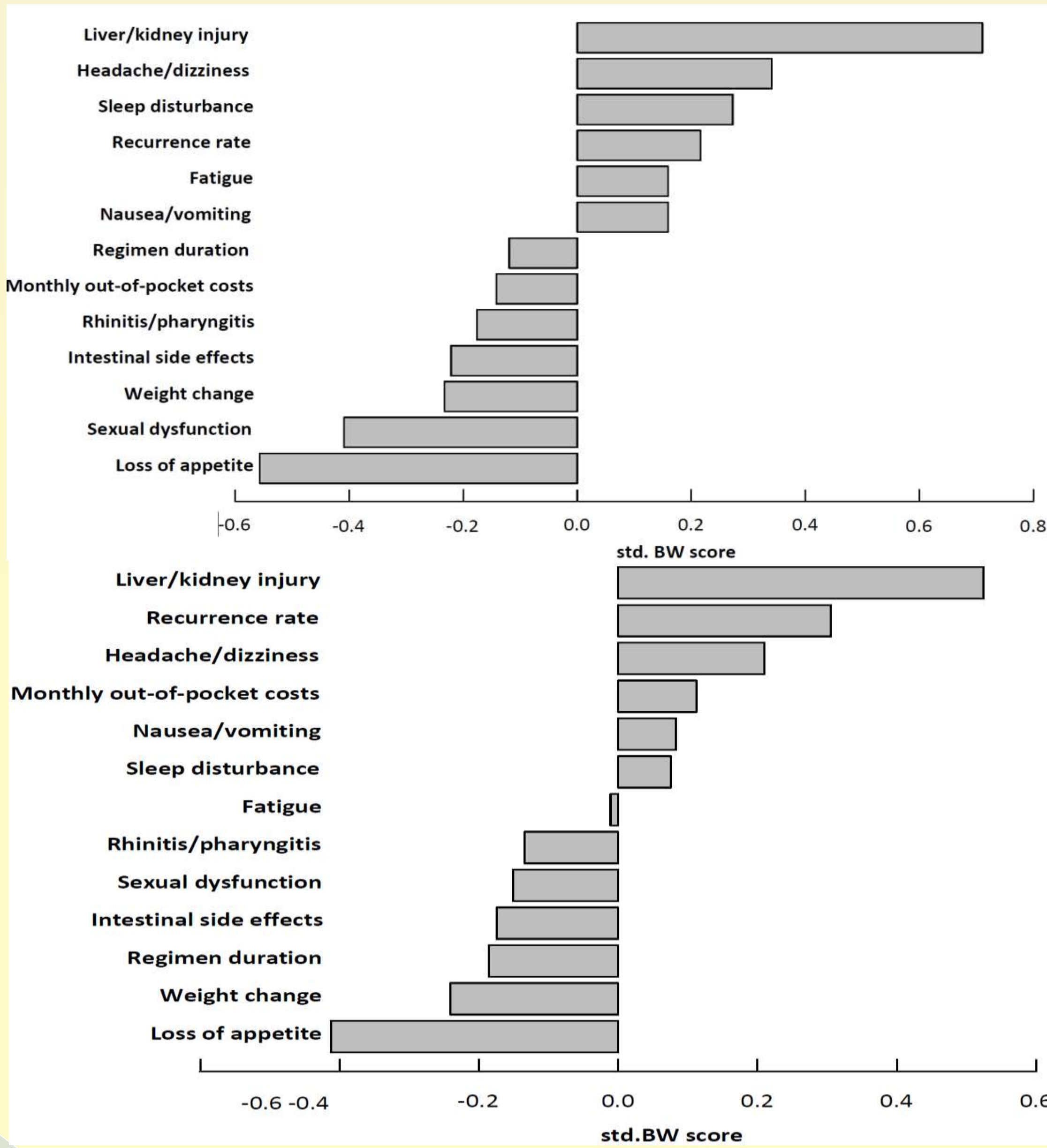


Figure 2 Standardized BW scores for the depressed group (up) and the depression-prone group (down).

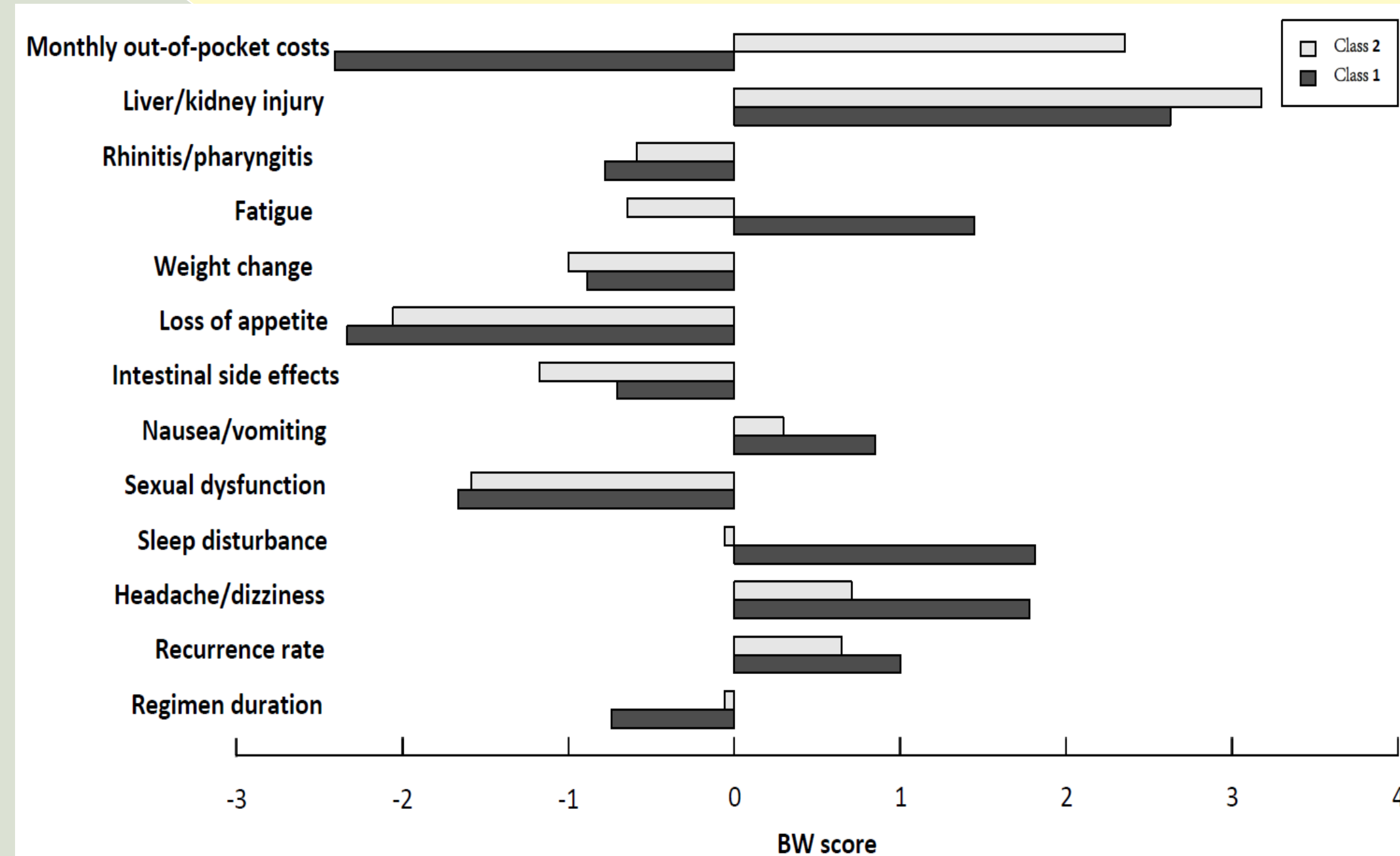


Figure 3 Preference heterogeneity for the depressed group