**抑郁问卷的异质性：基于对27个抑郁测量问卷的内容分析**

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**Assessing the heterogeneity of 27 scales for measuring depression**

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**CrediT Author Statement**

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摘要

关键词

# 1. 引言

[第一段的主旨句]

抑郁障碍的严重性（患病率、社会成本等），青少年期和成年早期是关键的时间。

[第二段的主旨句]

自评量表在抑郁症的研究中广泛使用，也是各类关于青少年与学生政策的基础（中国、世界范围内大规范调查的的数据）

[第三段的主旨句]

但抑郁自评量表数量繁多，被广泛使用的量表也不在少数，有潜在的重大影响（如影响到心理健康问题的检出率）。

[第四段的主旨句]

当前研究发现不同抑郁问题可能在测量不同的内容。Fried（2017年）的研究表明，不同的抑郁量表不能互相替代使用，这给抑郁研究带来了挑战。

[第六段的主旨句]

上述问题可能也延伸到发展中国家，但目前没有实证的数据进行评估，本研究将对用于学生的抑郁自评量表进行分析。

# 2. Methods

We took three steps to extract symptoms from all scales that measure depressions among students population. Firstly, we identified all scales that has been used for screening depression among students and screen the scales for completedness of their items information. Secondly, we identified symptoms of each scale by combining different items that measures the same symptom. Thirdly, we compared the symptoms between different scales. The latter two steps were first proposed by Fried (2017) but slighted modified here (see details) below. The flowchart of our data extraction and content analysis can be found in fig 1.

## 2.1 Identify and screen scales

We identified scales that measure depression from four recent meta-analyses which synthesized the prevalence of different mental health problems among four students populations: elementary school, middle school, high school, and college (于晓琪等, 2022; 黄潇潇等, 2022; 张亚利等, 2022; 陈雨濛等, 2022). We focused on the scales used for screening depression and identified 34 scales from these four meta-analysis.

We carefully selected the version of each scales to ensure the authenticity of the items of each scale included in our final analysis. We first retrieved all 470 articles that included in the above-mentioned four meta-analyses and that were used for screening depression. Then, we compared different versions of the scales with the same name. The main reason for scales share same names is that they were translated by different translators from roginal scales in English or other languages. We employed the following criteria for choose the best version when there are multiple versions: (1), whether or not the version of the scale have been revised, if yes, we usually use the revised version; (2), whether the version of the scale has been validated in at least one Chinese students sample and psychometric indices were reported in the valiation studies; (3), whether symptom names are available for the version of the scale; (4) number of empirical studies, among all 470 papers, that used that specific version. For instance, the 20th item of CES-D, "I could not get going", was translated as “我走路很慢” ("I walk very slowly" as directly back translated into English) by 汪向东等(1999) but was revised by 章婕等(2010), we included the version by 章婕等(2010), where the translation is “我提不起劲儿来做事” ("I lack the motivation to do things" as directly back translated into English).

Among these 34 scales, the items of four scales, the Mini International Neuropsychiatric Interview for children and adolescents (Mini-KID), WHO-CIDI 3.0, Psychological Health Inventory (PHI), and the Symptom Checklist 45, were not findable. The citation of two scales, the Beck Depression Inventory (Zhang Yuxin Revised Edition) and Short Depression Scale, could not be identified and thus the items of them can not be identified. As a result, these six scales were excluded from furthere analysis. Both 'Gu & Chen (2020) 'and 'Ji (2007)' measured depression using a single item, “During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing your usual activities?”. The only difference between them was the language – one was in Chinese and the other was in English. We treated them as one scale, with name 'Ji (2007)' for short. We also combined the boys and girls version of the Child Behavior Checklist (CBCL) as one scale. Finally, 27 scales were included in the analysis (see Table 1).

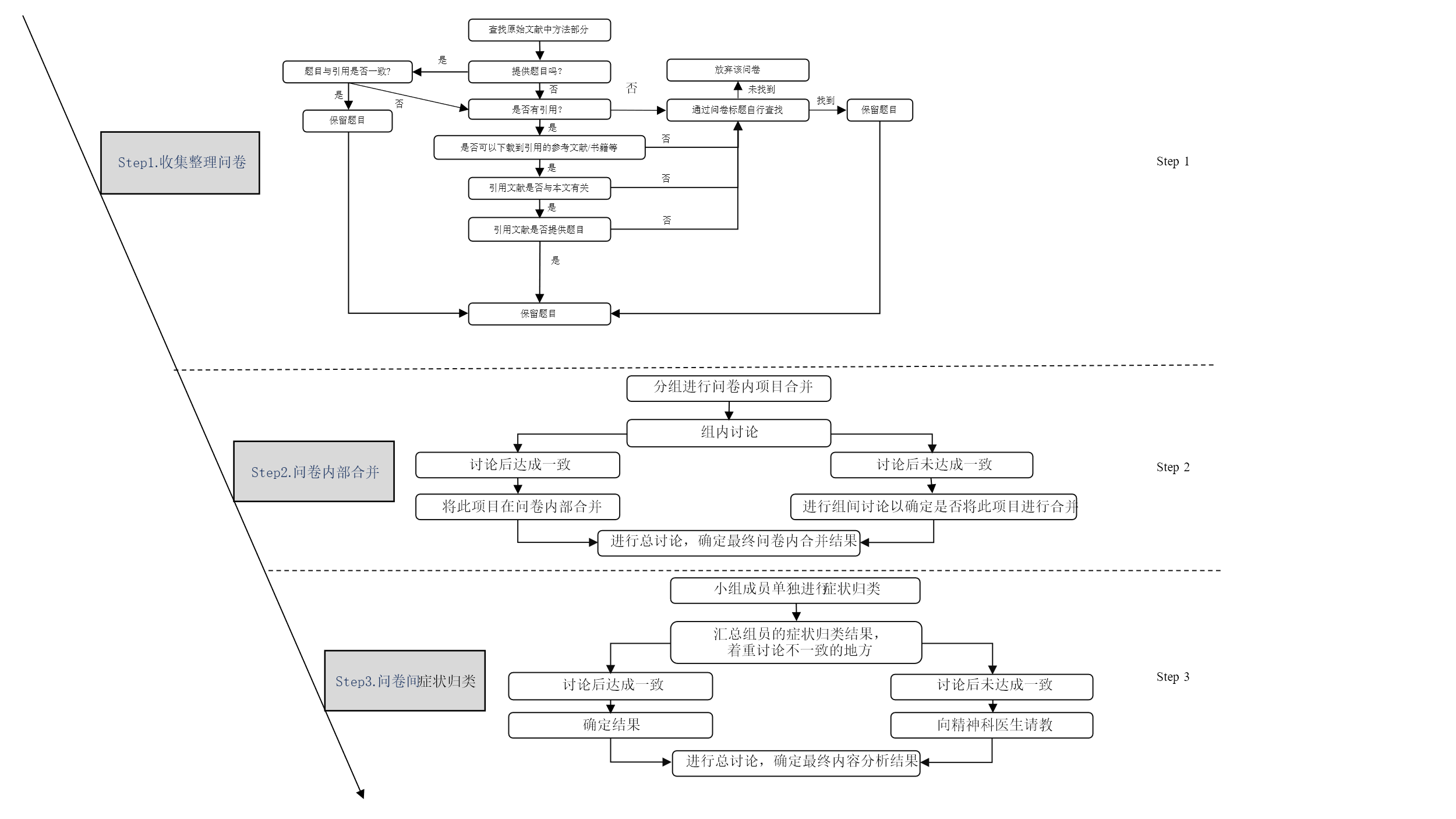
图1 内容分析流程图

表1 量表题目的具体来源及收集情况

| 量表名称27个(共34个，排除7个)  The total number of scales' names is 27 (out of a total of 34, excluding Mini-KID, WHO-CIDI 3.0, PHI, SCL-45, Beck Depression Inventory (Zhang Yuxin Revised Edition), Short Depression Scale, and Gu & Chen (2020)). | 元分析数据中该量表来源 | 元分析中使用该量表的文章数量 | 本文量表直接来源 | 备注 |
| --- | --- | --- | --- | --- |
| Self- Rating Depression Scale (SDS) | 汪向东等(1999)39篇, 张明园(1998)15篇, 陈姜等(2000)1篇, Jordan et al.(2000)2篇, 王汝展等(2009)1篇, Zung(1965)18篇, 任艳峰等(2015)1篇, 苏春燕等(2003)1篇, 张作记(2005)8篇,姚树桥和孙学礼(2008)1篇, 戴晓阳(2010)2篇, 王俊等(2013)1篇, 崔庆霞和王在翔(2014)1篇, 段泉泉和胜利(2012)1篇, 郑世华等(2016)1篇, 王征宇和迟玉芬(1984)1篇, 张明园等(2015)1篇, Zung(1969)1篇, 崔杰诚和陈国生(1998)。 | 135 | 张明园(1998)20题 | Jordan et al.(2000)、王汝展等(2009)、王俊等(2013)、崔庆霞和王在翔(2014)、段泉泉和胜利(2012)、郑世华等(2016)、Zung(1969)未提供题目。  陈姜等(2000、任艳峰等(2015)、苏春燕等(2003)的与本量表无关。  相对汪向东等(1999)，张明园(1998)在提供条目的同时也直接提供症状，更方便内容分析。  崔杰诚和陈国生(1998)无法获取。 |
| Symptom Checklist 90（SCL-90） | 汪向东等(1999)16篇, 戴晓阳(2010),戴海崎等(2007),仲稳山(2009)1篇, 王征宇(1984),高成阁等(1997), Derogatis et al.(1976)1篇, 陈树林和李凌江(2003)2篇, 张明园(1998)2篇, 黄赐英和裴利华(2005)1篇, 陈国鹏(2005), Mensah & Kiernan(2010)1篇, 金华等(1986)2篇, 张作记(2005)1篇, Derogatis(1973)1篇, Derogatis(1977)1篇, Hoffmann & Overall(1978)1篇 | 114 | 汪向东等(1999)13题 | 戴海崎等(2007)、高成阁等(1997)、王征宇(1984)、Derogatis et al.(1976)、陈树林和李凌江(2003)、黄赐英和裴利华(2005)、陈国鹏(2005)、Mensah & Kiernan(2010)、金华等(1986)、Hoffmann & Overall(1978)未提供题目。  Derogatis(1973)、Derogatis(1977)、仲稳山(2009)未获得。 |
| The Center for Epidemiological Studies Depression Scale (CES-D) | 汪向东等(1999)14篇, 史从戎等(2011)1篇, Radloff(1991)1篇, 戴晓阳(2010)2篇, 张作记(2005)1篇, 章婕等(2010)5篇  Cheng et al.(2012)4篇, Lee et al.(2008)2篇, Cheung & Bagley(1998)1篇, 陈祉妍等(2009)4篇, Wang et al.(2013)2篇, Yang et al.(2015)1篇, Radloff(1977)10篇, 潘丝媛等(2018)1篇, 1篇, Jiang et al.(2019)1篇, 刘平(1999)1篇 | 68 | 章婕等(2010) 20题 | 史从戎等(2011)、Cheng et al.(2012)、Yang et al.(2015)、陈祉妍等(2009)、潘丝媛等(2018)、刘琰等(2015)、Jiang et al.(2019)未提供题目，刘平(1999)未能获得全文。 |
| Children's Depression Inventory (CDI) | Kovacs(1992)6篇, Beck et al.(1961)1篇, 洪忻等(2012)1篇, 陈海燕等(2012)1篇, 俞大维和李旭(2000)3篇, 吴文峰等(2010)2篇, Samm et al.(2008)1篇, Kovas(1985) | 38 | 俞大维和李旭(2000)27题 | Beck et al.(1961)实际是 BDI-I的文章并不是CDI。  洪忻等(2012)、陈海燕等(2012)、吴文峰等(2010)未提供题目。  俞大维和李旭(2000)提供的是症状名，可以用于内容分析，但是无法用于实际测量。  Kovacs(1992)、Kovas(1985)无法获取。 |
| ﻿Depression Self-rating Scale for Children (DSRSC) | 苏林雁等(2003)11篇, 王凯等(2002)4篇。 | 18 | 苏林雁等(2003)18题 | 王凯等(2002)是焦虑的常模与抑郁无关。  苏林雁等(2003)提供的是症状名，可以用于内容分析，但是无法用于实际测量。 |
| Beck Depression Inventory（BDI-I） | 周德新(2006)1篇, 汪向东等(1999)3篇, Beck & Beck(1972)2篇, Beck et al.(1988)1篇, Beck et al.(1961)1篇, Beck & Beamesderfer(1974)1篇 | 16 | 汪向东等(1999)21题 | 徐俊冕(1991)、Beck et al.(1988)未提供题目。  周德新(2006)与本量表无关。 |
| Mental Health Inventroy of Middle-school students（MSSMHS） | 王极盛等(1997)8篇 | 15 | 王极盛(1998)5题 | 王极盛等(1997)未提供题目 |
| Beck Depression Inventory-II（BDI-II） | 杨文辉等(2014), 王振等(2011), Wang et al.(2009), Dere et al.(2015) | 11 | 王振等(2011)21题 | 杨文辉等(2014)、Dere et al.(2015)未提供题目。  Wang et al.(2009) 与本量表无关。 |
| Patient Health Questionnaire-9 items (PHQ-9) | Spitzer et al.(1999)3篇, Kroenke & Spitzer(2002)3篇, Sun et al.(2017)1篇 | 11 | 张明园等(2015)9题 | Sun et al.(2017)未提供题目。  Spitzer et al.(1999),和Kroenke & Spitzer(2002)题目一致。 |
| The Depression Anxiety Stress Scale，DASS -21 (DASS-21) | 苑新群(2014)1篇, Lovibond & Lovibond(1995)3篇, 龚栩等(2010)1篇 | 9 | 龚栩等(2010)7题 | 龚栩等(2010) 提供的是症状名，可以用于内容分析，但是无法用于实际测量。 |
| Child Behavior Checklist (CBCL) | 汪向东等(1999)1篇, 苏林雁等(1998)1篇, 忻仁娥(1994)1篇, Achenbach & Edelbrock(1987)1篇 | 6 | 汪向东等(1999)  男16题，女18题 | 苏林雁等(1998)未提供题目。  汪向东等(1999)提供的抑郁维度男生跟女生的题目不一样。  忻仁娥(1994)、Achenbach & Edelbrock(1987)未获取全文。 |
| Mood and Feelings Questionnaire (MFQ-C) | Wood et al.(1995)1篇 | 3 | 曹枫林等(2009)33题 | Wood et al.(1995)未提供题目。  曹枫林等(2009)中为情绪问卷MFQ，推测是MFQ-C。 |
| Middle school students' depression scale (CSSSDS) | 王极盛等(1997)2篇 | 3 | 王极盛(1998)20题 | 王极盛等(1997)未提供题目。 |
| Center for Epidemiologic Studies Depression Scale for Children (CES-D-C) | William Li et al.(2010) | 2 | William Li et al.(2010)20题 |  |
| Adolescent Depression Inventory（ADI） | Huang & Hsu(2003)1篇 | 1 | 楊雅惠(2003)31题 | Huang & Hsu(2003)未获得全文 |
| Brief Symptom Rating Scale (BSRS-5) | Lee et al.(1990)1篇 | 1 | Lee et al.(1990)7题 |  |
| Short version of Center for Epidemiologic Studies Depression Scale (CES-D-13) | Li et al.(2016), 张宝山和李娟(2011) | 1 | 张宝山和李娟(2011)13题 |  |
| CEPS-constructed scale (CEPS) | Ma et al.(2020)1篇 | 1 | Ma et al.(2020)4题 |  |
| Depression Status Inventory (DSI) | 汪向东等(1999)1篇 | 1 | 汪向东等(1999)20题 |  |
| Hospital Anxiety and Depression Scale (HADS) | Zigmond & Snaith(1983)1篇 | 1 | 汪向东等(1999)7题 |  |
| Hamilton Depression Rating Scale for Depression (HAMD) |  | 1 | 汤毓华和张明园(1984)24题 |  |
| Comprehensive Survey Report on Health-Related/Risk Behaviors among Chinese Adolescents. (Ji\_2007) | 季成叶(2007)1篇 | 1 | 季成叶(2007)1题 |  |
| Kutcher Adolescent Depression Scale (KADS-11) | 周慧鸣等(2015)1篇 | 1 | 周慧鸣等(2015)11题 | 周慧鸣等(2015) 提供的是症状名，可以用于内容分析，但是无法用于实际测量。 |
| Sakuma et al.(2010) self-designed questionnaire (Sakuma\_2010) | Sakuma et al.(2010)1篇 | 1 | Sakuma et al.(2010)4题 | 自编 |
| Short Mood and Feelings Questionnaire (SMFQ) | 程培霞等(2009) | 1 | 程培霞等(2009)13题 |  |
| University Personality Inventory (UPI) | Yu & Cai(2007)1篇 | 1 | Huang et al.(2020)12题 | Yu & Cai(2007)未能获得全文，Huang et al.(2020)直接提供了题目，但引用的是Yu & Cai(2007) |
| Chinese College Student Mental Health Scale (CCSMHS) |  | 1 | 张华(2021)8题 |  |
| Mini International Neuropsychiatric Interview for children and adolescents (Mini-KID) \* | 刘豫鑫等(2010), 刘豫鑫等(2011) | 2 | 未获得 | 刘豫鑫等(2010), 刘豫鑫等(2011)未提供题目 |
| WHO-CIDI 3.0 (WHO-CIDI 3.0) \* | Kessler & Stün(2004)1篇 | 1 | 未获得 | Kessler & Stün(2004)未提供题目 |
| Psychological Health Inventory (PHI) \* | 宋维真和张建平(1993)1篇 | 1 | 未获得 | 宋维真和张建平(1993)未获得全文 |
| Symptom Checklist 45 (SCL-45) \* |  | 1 | 未获得 | 附录有题目，但无法得知用于测量抑郁的条目。 |
| Beck Depression Inventory, Zhang Yuxin Revised Edition\* |  | 1 | 未选择 | 没有具体引用的文章名，但在附录有题目。 |
| Short Depression Scale\* |  | 1 | 未选择 | 作者未提供简式抑郁量表(Andrensen (1994)具体的引文，自行搜索应为Andresen et al.(1994)一文，题目完全摘自CES-D，因此排除 |
| Gu & Chen(2020) self-designed questionnaire (Gu\_2020)\* |  | 1 | Gu & Chen(2020)1题 | 与（Ji\_2007）合并 |

\*These scales are excluded for Mini-KID, WHO-CIDI 3.0, PHI, SCL-45, Beck Depression Inventory (Zhang Yuxin Revised Edition), Short Depression Scale, and Gu & Chen (2020).

## 2.3 Merge the items as symptoms.

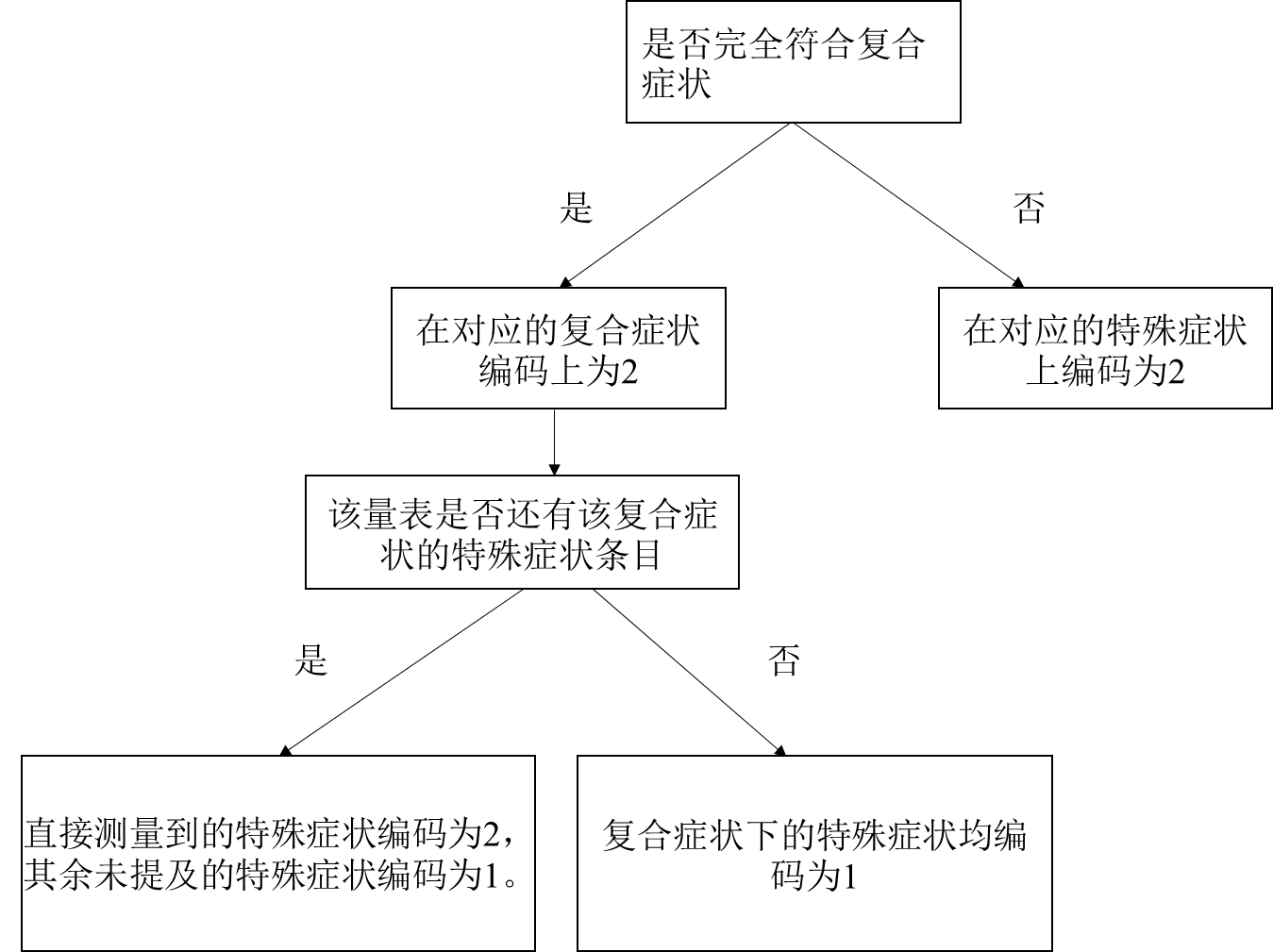
In this step, we merged items that assess the identical or similar symptom as a single symptom within each scale. Four trained coders independently merged items for each scale. Four coders were then grouped into two pairs and discussed their results and resolve discrepancies. Subsequently, the two groups and the corresponding author together resolved the discrepancies (if there were any) and created a unified version, which was then verified by a clinically certificated doctor (co-author \*\*\*) and revised accordingly.

## 2.4 Compare symptoms across different questionnaires.

In this step, we conducted symptoms comparison to determine the overlapping symptoms across all scales, as in Fried (2017). The process was also finished by the following procedure: individual comparision, separate discussion by pairs, group disccusion with all coders and corresponding author, and verification by the author with clinically certificated doctor.

As in Fried (2017), we retained both compound symptoms and specific symptoms, as in Fried (2017). Compound symptoms include a range of related symptoms, whereas specific symptoms are more concrete and describe specific patterns. For example, 'appetite changes' is a compound symptom, whereas 'appetite increased' and 'appetite decreased' are two specific symptoms of “appetite changes”. When comparing between scales, it is possible that one scale has an item that measures a compound symptom directly but another scale has items that measure one or more specific symptoms of that compound symptom. Because of this distinction, we coded the overlap of symptoms between scales at two levels: if two scales measured a symptom at the same level (compound or specific), we assigned number 2 for these two scales on this symptom, indicating that this symptom is measured directly; if a scale only has item for compound symptom but no items for specific symptom of that compound symptom, then, the compound symptom was coded as 2 and all its specific symptom were coded as 1; if one scale has items for both compound symptom and some of its specific symptoms (but not all of them), then the compound symptom was coded as 2, the directly measured specific symptom was also coded as 2, but other unmentioned specific symptoms were coded as 1. For instance, we coded the 18th item of CDI, “appetite changes” as 2 on the symptom “appetite changes”, while specific symptoms of this compound symptom, 'appetite increased' or 'appetite decreased', was coded as 1 because these two are not measured in CDI (see Supplementary Materials and Figure 2 for details).

图2 编码决策树



We employed an approach that maximize the amount of different symptoms. More specifically, if the items describe similar symptom using different words and that the words have significantly different meanings under the Chinese context, we treat them as belonging to the same compound symptom but are different specific symptoms. For instance, there are many different words for describe depressed mood in different scales, we used “depressed moods” as the compound symptom but distinguish different specifc symptoms such as: 'blue', 'low mood', 'sad', and 'anhedonia'. This approach is slightly different from Fried (2017), where he coded all these item as a specific symptom “Sad moods”.

## 2.5 Statistic analysis

We used Jaccard index for the degree of overlap between different questionnaires (Fried, 2017). The formal of Jaccard index or Jaccard is s/(u1 + u2 + s), where "s" represents the number of items shared by two questionnaires, and "u1" and "u2" denote the number of items that are exclusively present in each of the two scales. Jaccard index ranges from 0 (no overlap among scales) to 1 (complete overlap). We interpreted Jaccard index as in Fried (2017) guidelines: very weak 0.00–0.19, weak 0.20–0.39, moderate 0.40–0.59, strong 0.60–0.79, and very strong 0.80–1.0. In addition to the Jaccard Index, we also reported the following information of comparison: the proportions of idiosyncratic symptoms (symptoms not found on other scales), the respective proportions of compound and specific symptoms, and the proportions of DSM-5 depressive symptoms included.

# 3 Result

## 3.1 Combined results of items in the questionnaire

Among the 27 scales, 22 items were consolidated, with the 'MFQ-C' questionnaire featuring the highest number of merged items, specifically 8, which were combined into 3 symptoms. 7 questionnaires incorporated only 2 items each, whereas 19 questionnaires exhibited no consolidation of items. After merging the items, a total of 412 items were found in 27 scales (see Table 2). The ultimate tally of symptoms considered in the content analysis reached 383.

Among the 27 questionnaires, 22 items were merged, and the questionnaire with the most merged items was MFQ-C, which included 8 items and was merged into 3 symptoms. Seven questionnaires merged only two items, and 19 questionnaires merged no items. In total, 412 items were included for content analysis (see Table 2). Some scales had multiple questions measuring the same symptom. After coding, the final count of symptoms included in the content analysis amounted to 383.

Table2 Combined results of items in the questionnaire

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Scale | Number of items before combining | Number of items after combining | Item | Symptoms after combining |
| SDS | 20 | 19 | Q17: I feel like I'm a useful person, and someone needs me. & Q19: I believe that if I were to die, others might be better off. | Worthlessness |
| BDI-I | 21 | 20 | Q5: 0, I don't have a strong sense of guilt. 1, I feel guilty about many things I have done or should have done but didn't. 2, I feel guilty most of the time. 3, I feel guilty at any time. & Q8: 0, I don't blame or criticize myself any more than I did in the past. 1, I blame myself more than I used to. 2, Whenever I am at fault, I blame myself. 3, Whenever something bad happens, I blame myself. | Guilty/Self-accusation |
| BDI-II | 21 | 20 | Q5: Guilty & Q8: Self-accusation | Guilty/Self-accusation |
| CBCL男生 | 16 | 15 | Q18: Intentionally harming oneself or attempting suicide. & Q91：Expressing the intention to commit suicide. | Suicidal ideation |
| MFQ-C | 33 | 28 | Q6: Slower than usual in activities. & Q13: Speaking slower than usual. | Retardation |
| MFQ-C |  |  | Q16: Life is not worth living. & Q17：Thinking about death. & Q19：Thinking of suicide. | Suicidal ideation |
| MFQ-C |  |  | Q8: No longer a good person. & Q9: Feeling self-blame for things that aren't my fault. & Q24: Considering oneself a bad person. | Guilty/Self-accusation |
| CSSDS | 20 | 19 | Q4: I have no interest in studying. & Q8: I find studying dull and uninteresting. | Learning difficulties |
| CES-D-C | 20 | 19 | Q8: Was not happy & Q17: Was happy(R) | Happy |
| UPI | 12 | 11 | Q9: Lack of confidence & Q10: Feeling self-abased | Self-abased |

## 3.2 The symptoms of across the questionnaire

An analysis was conducted on a total of 383 symptoms across 27 scales, resulting in the identification of 84 depressive symptoms (refer to Figure 2). Among these, there are 8 symptoms that are compound symptoms. They include *Depressive mood* as the compound symptom, with its specific symptoms being *Blue*, *Low mood*, *Sad*, and *Anhedonia*; *Irritability* as the compound symptom, with its specific symptom being *Prone to anger towards parents*; *Self-abasement* as the compound symptom, with its specific symptoms being *Psychological inferiority* and *Negative body perception*; *Interest/pleasure loss* as the compound symptom, with its specific symptoms being *Interest loss* and *Pleasure loss*; *Somatization* as the compound symptom, with its specific symptoms being *Gastrointestinal*, *Sympathetic arousal*, and *General somatic symptoms*; *Appetite changes* as the compound symptom, with its specific symptoms being *Appetite increase* and *Appetite decrease*; *Somnipathy* as the compound symptom, with its specific symptoms being *Poor sleep*, *Hypersomnia*, *Early insomnia*, *Middle insomnia*, and *Late insomnia*; and *Reduced socialization* as the compound symptom, with its specific symptom being *I didn’t want to see my friends*. Symptoms appear in a mean of 5.62 of the 27 rating scales.

Among the 84 symptoms, 18 (21.42%) were idiosyncratic symptoms and only appeared in one scale. None of the symptoms were present on all scales. The symptom that occurred most frequently was *Sense of hopelessness*, observed in 21 out of the 27 scales. The second most prevalent symptom was *Interest loss*, which was present in 18 out of the 27 scales. Notably, *anhedonia*, a fundamental symptom of major depression, is differentiated into *loss of interest* and *loss of pleasure* in DSM-5. *Pleasure loss* was observed less frequently than *loss of interest*, appearing in only nine out of the 27 scales.

As mentioned earlier, this study retained several symptom descriptions related to depressive mood, including the compound symptom of *depressed mood*, and the specific symptoms of *blue*, *low mood,* *sad* and *anhedonia*. *Depressed mood* in 5 scales, *blue* appeared in 10 scales, *low mood* appeared in 15 scales, *sad* appeared in 13 scales, *anhedonia* appeared in 16 scales. If these symptoms were combined with *depressed mood*, this symptom would be the most frequent symptom among the 26 scales. Table 3 lists in how many scales each of the symptoms are listed; for instance, 12 of the 84 symptoms (14.29%) appear across a subset of 2 scales.

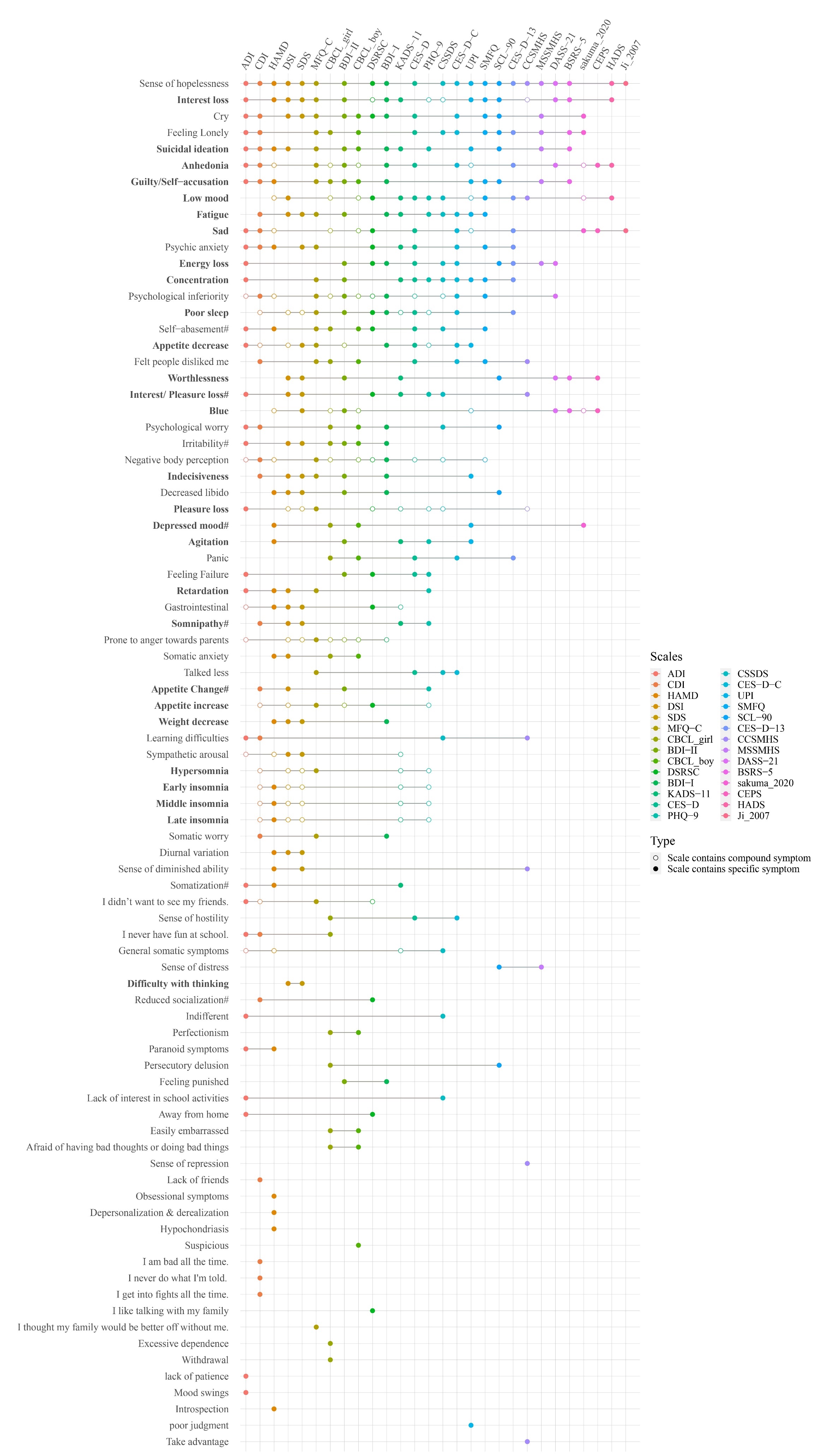


Table 3 Number of symptoms that appear across combinations of scales.

|  |  |  |
| --- | --- | --- |
| Symptoms | Scales | % |
| 18 | 1 | 21.43 |
| 12 | 2 | 14.29 |
| 6 | 3 | 7.14 |
| 7 | 4 | 8.33 |
| 7 | 5 | 8.33 |
| 7 | 6 | 8.33 |
| 3 | 7 | 3.57 |
| 4 | 8 | 4.76 |
| 2 | 9 | 2.38 |
| 1 | 10 | 1.19 |
| 5 | 11 | 5.95 |
| 2 | 12 | 2.38 |
| 2 | 13 | 2.38 |
| 3 | 14 | 3.57 |
| 2 | 15 | 2.38 |
| 1 | 16 | 1.19 |
| 1 | 18 | 1.19 |
| 1 | 21 | 1.19 |

## 3.3 Scale properties and performance

Table 4 provides a comprehensive overview of the symptom count encompassed by each scale, the adjusted scale length, the number of idiosyncratic symptoms and the ratios of compound and specific symptoms. Furthermore, it outlines the prevalence of DSM-5 depressive symptoms within each scale.

Among the scales analyzed, 19 did not include any idiosyncratic symptoms. The CSSMHS exhibited the highest percentage of idiosyncratic symptoms, with a prevalence of 22.22%, while the remaining scales showed varying rates of idiosyncratic symptom inclusion, ranging from 3.85% to 12.5%. Ten scales did not incorporate compound symptoms, with proportions for the remaining scales varying from 7.69% to 47.37%. The DSI exhibited the highest prevalence of DSM-5 depression symptoms, encompassing 71.42% of the total nine DSM-5 depression symptoms. Conversely, the Ji\_2005 scale demonstrated the lowest representation, comprising only 3.57% of the nine DSM-5 depression symptoms. It is also the least number of questions among the questionnaires included in this study.

Table4 Characteristics of the scales

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scale | Symptoms  captured  (No.) | Adjusted  scale  length  (No.) | Idiosyncratic  symptoms (%) | Specific  symptoms (%) | Compound  symptoms (%) | Scale captures X% of 9 DSM-5 MDD symptoms |
| SDS | 26 | 19 | 0 | 73.08 | 26.92 | 57.14 |
| SCL-90 | 12 | 13 | 0 | 100 | 0 | 17.86 |
| CES-D | 19 | 20 | 0 | 89.47 | 10.53 | 25 |
| CDI | 32 | 27 | 12.5 | 75 | 25 | 53.57 |
| DSRSC | 20 | 18 | 5 | 75 | 25 | 28.57 |
| BDI-I | 20 | 20 | 0 | 95 | 5 | 35.71 |
| MSSMHS | 7 | 5 | 0 | 100 | 0 | 10.71 |
| BDI-II | 23 | 21 | 0 | 86.96 | 13.04 | 53.57 |
| PHQ-9 | 19 | 9 | 0 | 52.63 | 47.37 | 64.29 |
| DASS-21 | 7 | 7 | 0 | 100 | 0 | 17.85 |
| CBCL\_boy | 22 | 15 | 4.55 | 68.18 | 31.82 | 25 |
| CBCL\_girl | 24 | 18 | 8.33 | 70.83 | 29.17 | 21.43 |
| MFQ-C | 26 | 28 | 3.85 | 100 | 0 | 46.43 |
| CSSDS | 18 | 19 | 0 | 77.78 | 22.22 | 25 |
| CES-D-C | 16 | 19 | 0 | 100 | 0 | 25 |
| ADI | 35 | 31 | 5.71 | 82.86 | 17.14 | 39.29 |
| BSRS-5 | 7 | 7 | 0 | 100 | 0 | 17.86 |
| CES-D-13 | 10 | 13 | 0 | 100 | 0 | 21.43 |
| CEPS | 4 | 4 | 0 | 100 | 0 | 14.29 |
| DSI | 29 | 20 | 0 | 68.97 | 31.03 | 71.42 |
| HADS | 4 | 7 | 0 | 100 | 0 | 10.71 |
| HAMD | 32 | 24 | 12.5 | 75 | 25 | 50 |
| Ji\_2007 | 2 | 1 | 0 | 100 | 0 | 3.57 |
| KADS-11 | 20 | 11 | 0 | 55 | 44 | 53.57 |
| Sakuma\_2010 | 7 | 4 | 0 | 57.14 | 42.86 | 17.86 |
| SMFQ | 13 | 13 | 0 | 92.31 | 7.69 | 17.86 |
| UPI | 15 | 11 | 6.67 | 73.33 | 26.67 | 46.43 |
| CSSMHS | 9 | 8 | 22.22 | 77.78 | 22.22 | 14.29 |

## 3.4 Scale overlap

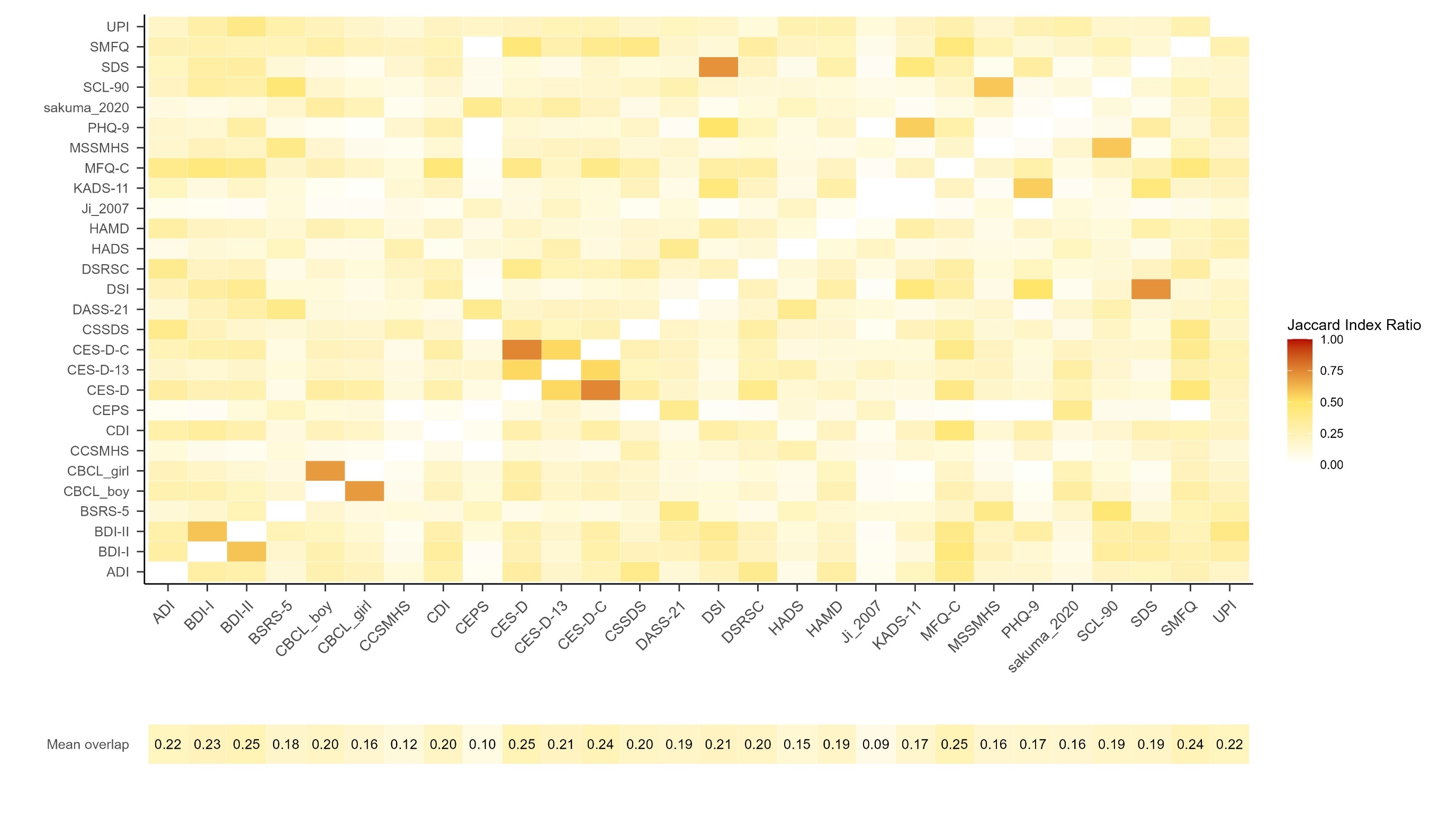
The degree of overlap between scales was calculated using the Jaccard coefficient. The average overlap across all scales was 0.19, indicating a very low level of similarity between these scales. For the specific degree of overlap between each pair of scales and the average overlap with other scales, refer to Figure 2.

None of the scales exhibited a mean overlap within the moderate range (0.40 - 0.59) with other scales. CES-D with other scale has the highest average degree of overlap, at 0.25, other scale of average degree of overlap between 0.08 to 0.25. The two scales with the highest overlap were CES-D and CES-D-C at 0.75, followed by DSI and SDS at 0.72.

There are a lot of scales that have zero overlap with each other, that is, they have nothing to do with each other. MSSMHS and CEPS exhibit no overlap; there is no overlap between PHQ-9 and both CEPS and Ji\_2005; CSSDS and CEPS lack overlap; CEPS, SMFQ, and CSSMHS do not overlap; Ji\_2005 and KADS-11 show no overlap.

The correlation coefficient between the mean Jaccard coefficient of each scale and the length of the scale is 0.55, while the correlation coefficient with the number of captured symptoms is 0.71 (Table 4, columns 1 and 2). This suggests that longer scales exhibit increased overlap with other scales, thus demonstrating enhanced representativeness.

图2 27个抑郁量表条目的重叠度



# 4 讨论

[第一段的主旨句]

研究分析了多个常用的抑郁量表，并发现它们在捕捉抑郁症状方面存在较大的异质性。这些量表之间的项目内容重叠度较低。这对于使用和解释相关数据有重要的启示作用。

[第二段的主旨句]

Fried (2017).的研究中Ces-d与其他量表有着最差的平均重叠率（0.27），而Ces-d在本研究中表现出最高的平均重叠率（0.25），可能是由于：1、本研究中除Ces-d以外还纳入了Ces-d简版以及Ces-d儿童版。2、在他的研究中Ces-d有33%的独特症状，而本研究中，随着纳入的量表增加，Ces-d的独特症状为0。

[第三段的主旨句]

抑郁量表的异质性来源可能是由于构念的不清晰，因此，在合并来自不同量表的研究结果时（例如元分析），特别是那些几乎没有重叠的量表时，可能不明智。

[第四段的主旨句]

不能认为低重叠就是糟糕的量表，高重叠就是好的量表。选择测量工具时应考虑多种因素，并根据评估的目的和目标进行选择。

[第五段的主旨句]

目前仍普遍认为量表可以互相替代，研究结果表明量表之间异质性非常强。因此在推广结果中应该强调这是某个量表的结果。

[第六段的主旨句]

确定哪些量表是合适的量表非常重要，我们团队正在使用cosmin系统对本次研究中涉及的量表进行评估。

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