



## Measuring ICD-11 Adjustment Disorder: The Development and Initial Validation of the International Adjustment Disorder Questionnaire

Shevlin, M., Hyland, P., Ben-Ezra, M., Karatzias, T., Cloitre, M., Vallieres, F., Bachem, R., & Maercker, A. (2019). Measuring ICD-11 Adjustment Disorder: The Development and Initial Validation of the International Adjustment Disorder Questionnaire. *Acta Psychiatrica Scandinavica*. Advance online publication. <https://doi.org/10.1111/acps.13126>

[Link to publication record in Ulster University Research Portal](#)

### Published in:

Acta Psychiatrica Scandinavica

### Publication Status:

Published (in print/issue): 03/12/2019

### DOI:

[10.1111/acps.13126](https://doi.org/10.1111/acps.13126)

### Document Version

Author Accepted version

### General rights

Copyright for the publications made accessible via Ulster University's Research Portal is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

### Take down policy

The Research Portal is Ulster University's institutional repository that provides access to Ulster's research outputs. Every effort has been made to ensure that content in the Research Portal does not infringe any person's rights, or applicable UK laws. If you discover content in the Research Portal that you believe breaches copyright or violates any law, please contact [pure-support@ulster.ac.uk](mailto:pure-support@ulster.ac.uk).

Title

Measuring ICD-11 Adjustment Disorder: The Development and Initial Validation of the International Adjustment Disorder Questionnaire

Running Head

ICD-11 ADJUSTMENT DISORDER

Authors

Mark Shevlin

Ulster University, School of Psychology, Coleraine, Northern Ireland.

Philip Hyland

Department of Psychology, Maynooth University, Kildare, Ireland.

Menachem Ben-Ezra

School of Social Work, Ariel University, Ariel, Israel.

Thanos Karatzias

NHS Lothian, Rivers Centre for Traumatic Stress, Edinburgh, UK  
Edinburgh Napier University, School of Health & Social Care, Edinburgh, UK.

Marylène Cloitre

National Center for PTSD Dissemination and Training Division, VA Palo Alto Health Care System, Palo Alto, CA USA; Department of Psychiatry and Behavioural Sciences, Stanford University, Stanford, CA, USA.

Frédérique Vallières

Trinity Centre for Global Health, Trinity College Dublin, Dublin, Ireland.

Rahel Bachem

School of Social Work, Tel Aviv University, Tel Aviv, Israel.

Andreas Maercker

Department of Psychology, Psychopathology and Clinical Intervention, University of Zürich, Zurich, Switzerland

Corresponding author: Mark Shevlin, Ulster University, School of Psychology, Coleraine, Northern Ireland. Email: [m.shevlin@ulster.ac.uk](mailto:m.shevlin@ulster.ac.uk)

Abstract

**Background:** Adjustment disorder (AjD) is one of the most frequently used diagnoses in psychiatry but a diagnostic definition for AjD was only introduced in release of the ICD-11. This study sought to develop and validate a new measure operationalizing the ICD-11's narrative description of AjD, and to determine the current rate of people meeting the symptoms indicative of AjD in the general population of the Republic of Ireland.

**Methods:** The *International Adjustment Disorder Questionnaire* (IADQ) was constructed to measure the core diagnostic criteria of ICD-11 AjD: stressor exposure, preoccupations with, and failure to adapt to, the stressor, timing of symptom onset, and functional impairment. A nationally representative sample ( $N = 1,020$ ) of adults from Ireland completed the IADQ.

**Results:** Confirmatory factor analysis supported construct validity and the reliability estimates were excellent. The IADQ correlated strongly with depression, anxiety, and posttraumatic stress. The criteria were met by 7.0% of the sample, adjusted for other exclusionary disorders.

**Discussion:** The IADQ is a measure based on the ICD-11's description and produces reliable scores, however it should not be used for clinical assessment until validated with clinical interviews.

**KEY WORDS:** Adjustment disorder (AjD); ICD-11; The International Adjustment Disorder Questionnaire.

## Measuring ICD-11 Adjustment Disorder: The Development and Initial Validation of the International Adjustment Disorder Questionnaire

The *International Classification of Diseases and Related Health Problems* (ICD) is a global diagnostic system produced by the World Health Organization (WHO). The WHO recently released the eleventh version of the ICD (*ICD-11*) that includes a chapter on ‘Mental, behavioural or neurodevelopmental disorders’ (06). The ‘Disorders specifically associated with stress’ section includes Adjustment Disorder (AjD; code 6B43) where a narrative description is provided to guide diagnosis, and exclusionary diagnoses are identified. The key diagnostic requirements for AjD are that (1) there is an identifiable psychosocial stressor(s), (2) symptoms are indicative of preoccupation with the stressor or its consequences, and a failure to adapt to the stressor, (3) symptoms emerge within one month of the stressor, and (4) the symptoms cause significant functional impairment. The narrative description also states that the “*symptoms are not of sufficient specificity or severity to justify the diagnosis of another Mental and Behavioural Disorder*”, and the exclusionary disorders are separation anxiety disorder of childhood, recurrent depressive disorder, single episode depressive disorder, prolonged grief disorder (PGD), uncomplicated bereavement, burn-out, and acute stress reaction.<sup>1</sup> Bachem and Casey<sup>2</sup> provided a review of the concept and measurement of AjD and noted that ICD-11 represents the first attempt to represent AjD as a stand-alone disorder with an explicit diagnostic framework.

There have been some studies that have aimed to estimate the prevalence of AjD, although it should be noted that “...epidemiological studies on its prevalence in the general population are extremely rare”.<sup>3</sup> Maercker et al.<sup>4</sup> used data from a nationally representative sample ( $N = 2,524$ ) of the German population and assessed the prevalence of AjD using a diagnostic algorithm consistent with the ICD-10 criteria. Symptoms were required from three clusters (intrusions, avoidance, and failure to adapt) along with evidence of functional

impairment. The rates of AjD were 1.4% without fulfilling the impairment criterion, and 0.9% fulfilling the impairment criterion; and no cases were excluded based on meeting criteria for another disorder. The rate of AjD was reported to be much higher in a representative sample ( $N = 1,003$ ) of the Israeli general population where 17.5% met criteria using a diagnostic algorithm including symptoms of preoccupations, failure to adapt, and functional impairment.<sup>4</sup> Perkonigg et al.<sup>3</sup> estimated AjD prevalence in a sample of Swiss adults who had involuntarily lost their job using a diagnostic algorithm including endorsement of at least one preoccupation symptom and at least two failure to adapt symptoms. The AjD symptom criteria were met by 29.4% of the participants and this rate fell to 16.6% when exclusions relating to recurrent or single episode depression were applied. Overall, it is clear that there has been considerable variability in the prevalence estimates of AjD, likely to be due to inconsistent choices regarding what symptoms were used to assess AjD, whether or not the functional impairment criterion was applied, and use of exclusions relating to other disorders.

Kazlauskas et al.<sup>5</sup> reviewed more recent developments in ICD-11 AjD research relating and noted that all studies used the 'Adjustment Disorder New Module' (ADNM) to measure ICD-11 AjD. The ADNM<sup>6,7</sup> is a self-report measure developed prior to the formulation of the ICD-11 narrative description for AjD. The ADNM includes a life stressor event list (18 life events or problems) and a symptom list representing intrusive (5 items), avoidance (7 items), and failure to adapt (5 items) symptoms. There are also secondary symptom groups measuring depressed mood (6 items), anxiety symptoms (3 items) and impulse control difficulties (3 items). A revised and abbreviated version of the scale, the ADNM-20<sup>8</sup> was developed to more closely align to the ICD-11 proposals for AjD and this is reflected in its focus on the two core symptom clusters of preoccupations (4 items) and failure to adapt (4 items). However, it also includes four associated symptom clusters of avoidance (4 items), depression (3 items), anxiety (2 items), and impulsivity (3 items). There

have been further abbreviations of the ADNMs, namely an 8-item version (ADNM-8)<sup>9</sup> and an ‘ultra-brief’ 4-item version (ADNM-4)<sup>10</sup> both intended to focus specifically on the core AjD symptoms of preoccupations and failure to adapt.

There are, however, a number of limitations with the ADNMs-20, and its abbreviated versions, in the context of the new ICD-11 narrative description of AjD. First, the ADNMs-20 include 12 symptoms that are not reflected in the ICD-11 description. Second, the wording of the preoccupation items do not capture the ‘excessive worry’ or ‘constant rumination about its implications’ elements, and only capture the ‘recurrent and distressing thoughts’ element of the description. Third, one item (‘All in all, the situation causes serious impairment in my social or occupational life, my leisure time, and other important areas of functioning’) is used as an indicator of both failure to adapt and as an assessment of functional impairment. Fourth, the diagnostic algorithm for the identification of probable AjD is more complicated than for other ICD-11 stress-related disorders including posttraumatic stress disorder (PTSD) and Complex PTSD (CPTSD).<sup>11</sup> Finally, the ADNMs life events list comprises 19 potential stressors and requires the month and year of when the event occurred and ended. These limitations are not consistent with the guiding principles of ICD-11 that diagnoses should be focused on a limited but central set of symptoms, and maximise clinical utility and ease of use.<sup>12</sup>

In light of the limitations with existing measures of AjD and their associated diagnostic algorithms, we developed a new self-report measure of ICD-11 AjD (the *International Adjustment Disorder Questionnaire* [IADQ]) that (1) captures all elements of the ICD-11 narrative description of AjD in a brief manner, (2) provides a quick-and-easy assessment of potential stressors, (3) explicitly separates the assessment of failure to adapt and functional impairment, and (4) provides a simple and clinically useful diagnostic algorithm. To accomplish this, a nine-item, broad-based stressor list was developed along with six items measuring the two core symptom groups of preoccupation with the stressor

and failure to adapt to the stressor. The performance of these items was tested using data from a nationally representative sample of the adult population of the Republic of Ireland. The factorial validity of the IADQ was assessed using confirmatory factor analysis (CFA) to determine if the scale is unidimensional or, as hypothesised, comprised of two correlated dimensions reflecting the symptom groups of preoccupations and failure to adapt. Additionally, the concurrent validity of the IADQ was assessed by correlating the IADQ scores with symptom measures of PTSD/CPTSD, depression, and generalized anxiety. We hypothesised that strong, positive associations would be observed between the IADQ scores and these other measure of psychopathology. Simple diagnostic rules, consistent with ICD-11 PTSD and CPTSD, were developed and applied to estimate the current rate of AjD in the Irish population; and similar to Lorenz et al.<sup>4</sup>, we acknowledge that the rate is ‘tentative’ (p. 67) given the lack of a gold-standard criterion. Indicative AjD was calculated based on the symptom, time of onset, and functional impairment criteria, and also when exclusions for depression and PGD were applied. Finally, the associations between AjD and PTSD/CPTSD were examined, and we hypothesised that high levels of association would be observed given that these are all stress-related disorders.

## **Methods**

### **Participants**

Participants ( $N = 1,020$ ) were recruited from an online research panel that is representative of the general adult population of the Republic of Ireland. Participants were selected using stratified, random probability sampling methods to ensure that the sample characteristics of sex, age, and regional distribution matched information obtained from the 2016 census of the Republic of Ireland. Data were collected in February 2019. Respondents had to be aged 18 years or older at the time of the survey and capable of completing the survey in English. Participants were contacted by the survey company and requested to

participate. If consenting, participants completed the survey online (median time of completion = 22 minutes). Panel members are reimbursed by the survey company for their time. Ethical approval for the study was granted by the ethical review board of Maynooth University. The mean age of the sample was 43.10 years ( $Mdn = 42.00$ ,  $SD = 15.12$ , range 18-87), and 51.0% were female ( $n = 520$ ). The majority of respondents were in a committed relationship (69.5%,  $n = 709$ ), and 59.4% ( $n = 606$ ) had children. Regarding one's highest level of educational achievement, 16.9% ( $n = 172$ ) had completed a postgraduate degree, 36.9% ( $n = 376$ ) had completed an undergraduate degree, 39.2% ( $n = 400$ ) had completed secondary school, and 7.1% ( $n = 72$ ) did not complete secondary school. Nearly half of the respondents were in full-time employment (45.8%,  $n = 467$ ), 17.8% ( $n = 182$ ) were in part-time employment, 27.7 ( $n = 283$ ) were retired, home making, or a student, and 8.6% ( $n = 88$ ) were currently unemployed and seeking work.

## Procedures

Table 1 shows the content of the IADQ and how each section maps on to the ICD-11 narrative description of AjD. The 'ICD-11 Narrative Description' is taken directly from the '6B43 Adjustment disorder' section from the ICD-11 online browser.<sup>1</sup>

Table 1 here

The content of the 'Psychosocial Stressor' list was developed to reflect the types of problems listed in the narrative description and these general areas of stress are presented with exemplars. Respondents are instructed to identify those stressors "that are currently applicable to you". The preoccupation items were derived directly from the ICD-11 narrative description with items designed to measure 'excessive worry', 'recurrent and distressing thoughts', and 'constant rumination about its implications'. The ICD-11 narrative description does not provide a precise description of what 'failure to adapt' represents, however, the Chair of the ICD-11 working group for 'disorders specifically associated with stress' (author

AM) clarified that this symptom group was intended to reflect an inability to recover and find emotional equilibrium following exposure to a stressor or multiple stressors. The emergence of symptoms within one month of the stressor(s) was measured using a single item, and the functional impairment criterion was assessed using the same items as those in the International Trauma Questionnaire, <sup>11</sup> a validated self-report measure of ICD-11 PTSD and CPTSD.

## Measures

**Adjustment Disorder:** The IADQ (available from <https://www.traumameasuresglobal.com/iadq> (and in Appendix 1<sup>1</sup>) consists of three main sections. First, the psychosocial stressor checklist is answered using a binary response format (*Yes* = 1 or *No* = 0). Second, the symptom list consists of three items measuring preoccupation symptoms and three items measuring failure to adapt symptoms. These items are answered using a five-point Likert scale ranging from 0 (*Not at all*) to 4 (*Extremely*) and a symptom was deemed to be present based on a score of  $\geq 2$  (*Moderately*). Respondents are also asked, “Did these problems start within one month of the stressful event?” and answer using a binary format (*Yes* = 1 or *No* = 0). Finally, functional impairment in the domains of social, occupational/educational, and other important areas caused by these symptoms are assessed using three items.

The indicative algorithm used to identify probable cases of AjD was as follows: (i) a psychosocial stressor score  $\geq 1$ , (ii) endorsement of at least one preoccupation symptom and at least one failure to adapt symptoms, (iii) onset of the AjD symptoms within one month of the stressor, and (iv) endorsement of at least one functional impairment criteria met (a score of  $\geq 2$  on any of the three functional impairment items). The decision to require a symptom of preoccupations and failure to adapt was made due to the wording of the narrative description that specifies preoccupations “as well as” failure to adapt (underlined for emphasis): “*The*

*disorder is characterized by preoccupation with the stressor or its consequences, including excessive worry, recurrent and distressing thoughts about the stressor, or constant rumination about its implications, as well as by failure to adapt to the stressor”.*<sup>1</sup>

**PTSD and CPTSD:** The ITQ<sup>11</sup> is a self-report measure of ICD-11 PTSD and CPTSD symptoms. Respondents complete the ITQ in relation to their worst traumatic event. Six items measure PTSD symptoms, and six items measure ‘Disturbance in Self-Organization’ (DSO) symptoms. The PTSD items are completed in terms of how much the respondent has been bothered by each symptom in the past month, and the DSO items are completed in terms of how the respondent typically feels, thinks about oneself, and relates to others. The PTSD and DSO symptoms are accompanied by three items measuring functional impairment caused by these symptoms. All items are answered on a five-point Likert scale, ranging from 0 (*Not at all*) to 4 (*Extremely*) with possible scores on the PTSD and DSO scale ranging from 0 to 24. A symptom is considered present where a score of  $\geq 2$  (*Moderately*) is achieved. The psychometric properties of the ITQ have been demonstrated in multiple general population<sup>13,14</sup> and clinical<sup>15-17</sup> samples. The reliability (Cronbach’s alpha) of the PTSD ( $\alpha = .90$ ) and DSO ( $\alpha = .93$ ) items in the current sample was excellent. PTSD diagnosis requires traumatic exposure, at least one symptom present from each PTSD symptom cluster (Re-experiencing, Avoidance, and Sense of Threat), and endorsement of at least one indicator of functional impairment. CPTSD diagnosis is made if all of the PTSD criteria are met, at least one symptom is present from each DSO cluster (Affective Dysregulation, Negative Self-Concept, and Disturbed Relationships), and at least one indicator of functional impairment related to these symptoms is endorsed. The ICD-11 diagnostic rules permit a diagnosis of PTSD or CPTSD, but not both.

**PGD:** The Inventory of Complicated Grief-Revised (ICG-R)<sup>18</sup> was used to measure the ICD-11 symptoms of PGD. Respondents are first asked, “At any time in your life, has

someone close to you died (e.g., a partner, parent, child, friend)?” and respond on a ‘Yes’ (1) or ‘No’ (0) basis. They are then asked how long ago the bereavement occurred. Seven items measure each ICD-11 PGD symptom, and one item measures functional impairment associated with these symptoms. These items are answered using a five-point Likert scale (0-4), and based on previous research,<sup>18</sup> a symptom is considered present if rated  $\geq 3$ . The diagnostic algorithm of ICD-11 PGD requires endorsement of ICG-R1 or ICG-R2 and the presence of any other three symptoms (ICG-R3 to ICG-R7). In this sample, 81.4% ( $n = 830$ ) of respondents experienced a bereavement, and the internal reliability of the symptom scale was excellent ( $\alpha = .89$ ).

**Depression:** Nine symptoms of depression were measured using the *Patient Health Questionnaire-9* (PHQ-9).<sup>19</sup> Respondents indicate how often they have been bothered by each symptom over the last two weeks using a four-point Likert scale ranging from 0 (*Not at all*) to 3 (*Nearly every day*). Possible scores range from 0 to 27, with higher scores indicative of higher levels of depression. To identify participants likely to meet the criteria for depressive disorder, a cut-off score of 15 was used as a meta-analysis reported that this score produces specificity of .96.<sup>20</sup> The psychometric properties of the PHQ-9 scores have been widely supported,<sup>21</sup> and the reliability of the scale among the current sample was excellent ( $\alpha = .93$ ).

**Generalized Anxiety:** Symptoms of generalized anxiety were measured using the *Generalized Anxiety Disorder 7-item Scale* (GAD-7).<sup>22</sup> Like the PHQ-9, respondents indicate how often they have been bothered by each symptom over the last two weeks on a four-point Likert scale (0 = *Not at all*, to 3 = *Nearly every day*). Possible scores range from 0 to 21, with higher scores indicative of higher levels of anxiety. The GAD-7 has been shown to be a reliable and valid measure in multiple studies<sup>23</sup>, and exhibited excellent reliability among the current sample ( $\alpha = .94$ ).

## Data Analysis

The analyses were conducted in four linked phases. First, the IADQ psychosocial stressor list was used to identify participants who had endorsed at least one life stressor. Second, the descriptive statistics and endorsement rates for each of the six symptom indicators of AjD were calculated. Third, the latent structure of the symptom scores was tested using CFA. Two models were specified, a one-factor model and a two-factor model. The one-factor model specified all six AjD indicators to load on a single latent variable labelled 'Adjustment Disorder'. The two-factor model specified a 'Preoccupation' latent variable on which the three preoccupation items loaded, and a 'Failure to Adapt' latent variable on which the three failure to adapt items loaded. The latent variables were correlated and all unique variances (measurement errors) were uncorrelated. The models were first fitted using the five-point Likert scale data, treating the indicators as continuous, and using robust maximum likelihood (MLR) estimation. As the items were also used to estimate probable AjD based on the cut-off of  $\geq 2$  (*Moderately*), the two models were also fitted to the recoded binary variables representing symptom endorsement, and these models were estimated using robust weighted least squares estimator (WLSMV) based on the polychoric correlation matrix of latent continuous response variables.

For both methods of estimation, standard recommendations were followed to assess model fit<sup>24</sup>: a non-significant chi-square result ( $\chi^2$ ) indicates good model fit, Comparative Fit Index (CFI)<sup>25</sup> and Tucker Lewis Index (TLI)<sup>26</sup> values above .95 reflect excellent fit and values above .90 reflect acceptable fit; Root-Mean-Square Error of Approximation with 90% confidence intervals (RMSEA 90% CI)<sup>27</sup> and Standardized Root-Mean-Square Residual (SRMR)<sup>28</sup> values of .06 or less reflect excellent fit and values less than .08 reflect acceptable fit. For the models based on MLR estimation, the Bayesian Information Criterion (BIC)<sup>29</sup> was used to evaluate and compare models with the smallest value indicating the best fitting model. Raftery<sup>30</sup> suggested that a 2-6 point difference offers evidence of model superiority, a

6-10 point difference indicates strong evidence of model superiority, and a difference greater than 10 points indicates very strong evidence of model superiority. For models based on WLSMV estimation, models were compared using the DIFFTEST.<sup>31</sup> These analyses were performed using Mplus version 8.2.<sup>32</sup>

The third phase involved assessing concurrent validity by correlating the total scores from the preoccupation and failure to adapt items, as well as the total IADQ scale score, with scores from the PTSD and DSO subscales of the ITQ, as well as depression and generalized anxiety symptoms scores from the PHQ-9 and GAD-7, respectively.

Finally, indicative AjD was calculated based on the stressor, symptom endorsement, time of onset, and functional impairment criteria, and also based on the exclusion of depression and PGD cases. The association between these adjusted AjD diagnostic cases and PTSD/CPTSD diagnostic cases was examined using a Pearson  $\chi^2$  test.

### Results

Most of the participants ( $n = 910$ , 89.2%) endorsed at least one item from the psychosocial stressor list. The most commonly endorsed stressors related to financial problems (45.5%), work/employment problems (37.7%), and personal health problems (35.1%). The range of total stressor endorsement ranged from 0 to 8 with a mean of 2.30 ( $SD = 1.84$ ) and a median of 2.00. Subsequent factor analytic and concurrent validity analyses were based on the 910 participants who endorsed at least one stressor. This sub-sample did not differ from those who did not meet the stressor criterion in terms of sex ( $\chi^2(1) = 3.36$ ,  $p = .07$ ) or age ( $t(1018) = 0.22$ ,  $p = .83$ ). The mean scores, and endorsement rates, for the IADQ items are reported in Table 2. The preoccupations and failure to adapt items all had a mean of approximately 1, corresponding to 'Rarely' on the Likert scale, and the endorsement rates ranged from 23.9% to 38.2%. The mean scores and endorsement rates were generally slightly higher for the preoccupation items compared the failure to adapt items.

Table 2 here

The fit statistics for the one- and two-factor models are reported in Table 3. When the five-point Likert data were used and the models were estimated using MLR, the one- and two-factor models provided acceptable fit to the data. The two-factor model provided superior fit as the  $\chi^2$  statistic was significant for the one-factor model while non-significant for the two-factor model, the RMSEA and SRMR were closer to zero for the two-factor model, and the CFI and TLI were closer to 1 for the two-factor model. Additionally, the BIC was lower for the two-factor model, and the difference was greater than 10 points which suggests it was statistically superior to the one-factor model. This was also indicated by the scaled  $\chi^2$  difference test that showed that the two-factor model was significantly better than the one-factor model ( $\Delta\chi^2$  ( $\Delta df = 1$ ) = 43.29,  $p < .01$ ). The standardised factor loadings for the preoccupation (.82, .86, .87) and the failure to adapt (.86, .91, .90) items were all high, positive, and statistically significant ( $ps < .01$ ). The correlation between the factors was high ( $r = .94$ ).

Table 3 here

When the item scores were recoded to be binary, and the models were estimated using WLSMV, the results were similar. Both models provided acceptable fit to the data, and the two-factor model was judged to be significantly better based on the DIFFTEST ( $\Delta\chi^2$  ( $\Delta df = 1$ ) = 8.34,  $p < .01$ ). The standardised factor loadings for the preoccupation (.88, .92, .92) and failure to adapt (.92, .96, .96) items were all high, positive, and statistically significant ( $ps < .01$ ). The correlation between the factors was high ( $r = .97$ ). The reliability, based on Cronbach's alpha, of the preoccupation items ( $\alpha = .88$ ), failure to adapt ( $\alpha = .92$ ), and the total scale scores ( $\alpha = .94$ ) were all excellent.

The preoccupation, failure to adapt, and total IADQ scores were highly and positively correlated with symptom scores of PTSD, DSO, depression, and generalized anxiety (see

Table 4). The magnitude of the correlations were similar across all criterion variables and did not differ greatly for preoccupation and failure to adapt.

Table 4 here

The indicative algorithm of ICD-11 AjD produced an rate for the entire sample ( $N = 1020$ ) of 15.6% (95% CI = 13.4%, 17.8%). There was a significant sex difference with a higher rate for females (19.2%) compared to males (11.8%) ( $\chi^2(1) = 10.70, p < .01, OR = 1.78$  [95% CI = 1.26, 2.52]). When participants who also screened positive for depression (15.8%) and PGD (3.3%) were excluded, as per the ICD-11 exclusion rules, the overall rate for AjD was 7.0% ( $n = 71$ ) and the differences between males and females was not significant ( $\chi^2(1) = 0.87, p = .35$ ).

Although PTSD and CPTSD are not exclusions for AjD, they are all stress related disorders, and significant associations were expected. Of the 71 participants that were indicative for AjD, 25.4% also met the criteria for PTSD or CPTSD; and the association between AjD status and PTSD/CPTSD/no disorder status was significant ( $\chi^2(2) = 11.35, p < .01$ ). If PTSD and CPTSD were exclusions, the rate of AjD would be 5.2% ( $n = 53$ ) with no significant sex difference ( $\chi^2(1) = 1.26, p = .26$ ).

### Discussion

A global survey of nearly 5,000 psychiatrists and psychologists in 44 countries found that AjD was the sixth most frequently utilised diagnosis, with more than 50% of clinicians using the diagnosis at least once per week.<sup>33</sup> The introduction of a precise, stand-alone diagnosis of AjD in ICD-11<sup>2</sup> represents an important development for the fields of psychiatry and clinical psychology. Nonetheless, a clear diagnostic description of AjD without a reliable and valid method of assessing and diagnosing the disorder is futile. As such, we developed a brief, easy-to-use, and psychometrically sound self-report measure of AjD in-line with the guiding principles of ICD-11 of focusing on core symptoms and maximising clinical utility.<sup>12</sup> As illustrated in Table 1, the IADQ captures each component of

the ICD-11 narrative description of AjD, and provides a simple diagnostic algorithm. The IADQ was also designed in a manner consistent with the ITQ<sup>11</sup> so that each of these ‘Disorders specifically associated with stress’ in ICD-11 can be measured in a highly consistent manner.

The factorial and concurrent validity analyses of the IADQ were encouraging. The one- and two-factor models provided very close fit to the sample data, irrespective of whether the items were treated as continuous or categorical variables. The two-factor model, which recognises the distinct but correlated dimensions of preoccupations and failure to adapt symptoms, provided statistically superior fit compared to the one-factor model, however, the correlation between these two factors was extremely high. Much of the existing literature on ICD-11 AjD indicates that AjD is very probably a unidimensional latent construct,<sup>4,7,8,34</sup> and current results are reasonably consistent with this conclusion. However, for diagnostic purposes, the ICD-11 narrative description is clear in its requirement of preoccupation *and* failure to adapt symptoms, meaning it was necessary to design the scale in a manner that captured these two symptom sets. The CFA results indicated that the IADQ effectively measures these two symptom groups and can therefore be used with confidence for diagnostic purposes. However, in a research setting, a unidimensional scoring scheme is likely to be more advantageous so as to avoid issues of multicollinearity. Indeed, the concurrent validity results supports this conclusion. The preoccupations and failure to adapt subscales correlated similarly strongly with symptoms of PTSD, DSO, depression, and generalized anxiety, and the correlations for the total AjD score did not vary meaningfully from those at the subscale level. That the AjD symptom scores were robustly associated with symptom scores from other ICD-11 stress related constructs (i.e., PTSD and CPTSD), as well as two common, non-stress-related disorders (i.e., depression and generalized anxiety), is good evidence of the scale’s concurrent validity. Furthermore, the internal reliability of the IADQ total and subscale scores were excellent.

In the current study, we found that 15.6% of the sample met indicative criteria for ICD-11 AjD based on our proposed algorithm, and following the removal of cases that also met criteria for depression and PGD, the rate dropped to 7.0%. If cases of PTSD and CPTSD were also excluded (however this is not required by ICD-11), the rate fell further to 5.2%. These results are difficult to put into context given the different methods used across studies. For example, the two previous general population based studies reported very different rates; 0.9% in the German population<sup>35</sup> and 17.5% in the Israeli population<sup>4</sup>. The rate of AjD in the Irish population, at 7.0%, was roughly in the middle of these estimates. The main problem in comparing these rates, however, is that the core symptoms and diagnostic algorithms used were different, and the use of exclusionary rules have not been applied consistently. We suggest that the symptoms, diagnostic algorithms, and exclusionary requirements used in this study are by far the most closely aligned to the current ICD-11 description of AjD, and therefore, the current results of 7.0% represents the closest approximation of the true population prevalence rate of ICD-11 AjD that has thus far been adduced. In the absence of any established gold-standard method of assessing AjD, and until an appropriate clinician-administered interview scale is developed, the IADQ likely provides the most effective method currently available to assess ICD-11 AjD.

This study contains several limitations that should be acknowledged. First, the AjD rate of 7.0% may be an overestimate as we were unable to apply all the exclusions in ICD-11; we did not have measures of separation anxiety disorder of childhood, uncomplicated bereavement, burn-out, or acute stress reaction, and so were unable to adjust for these disorders. Second, as this study was the initial validation of a newly developed measure based on recently released diagnostic algorithm of a pre-existing diagnosis, future research is needed, particularly to establish the agreement between clinical interview assessment and IADQ scores; the authors recommend that, whenever possible, until the level of agreement is established the use of scale scores to assess severity are used. Third, we included a broad-

based measure of exposure to psychosocial stressors rather than including a set of specific stressors as we believed the latter approach would have led to an unwieldy measure given the sheer number of potentially stressful life events that a person could encounter. It remains to be seen if this approach is overly general and lacking in specificity. Fourth, while the sample was representative of the Irish adult general population in terms of sex, age, and regional distribution, we cannot be sure if the sample characteristics are representative of other population parameters. For example, it was not possible to include members of the population who were imprisoned or institutionalised. Finally, the generalizability of these findings to culturally distinct, and non-English speaking populations is unknown. The ICD-11 diagnoses are intended to be globally applicable (First et al., 2015), thus it is important that similar work is conducted in non-western settings.

In conclusion, the introduction of a specific, stress-response based diagnosis of AjD in ICD-11 has the potential to substantially improve the scientific integrity of one of the most frequently used diagnoses in psychiatry and clinical psychology. The IADQ provides researchers and clinicians with a method of measuring AjD that produces reliable scores. The availability the IADQ can facilitate improvements in the field by offering a systematic method of assessing AjD symptom indicators, and therefore leading to improvements in knowledge regarding its risk factors and outcomes, and assessments of the effectiveness of different clinical interventions to prevent and/or treat AjD. This study has shown that approximately 1-in-14 adults in the general population of Ireland are currently affected by AjD, that 1-in-4 of these individuals also suffers from a more serious stress-related disorder (PTSD or CPTSD), and that AjD is strongly associated with symptoms of depression and anxiety.

#### Data Availability Statement

Research data are not shared but are available upon request from corresponding author.



## References

1. World Health Organization. International statistical classification of diseases and related health problems, 11th Revision. 2018.
2. Bachem R, Casey P. Adjustment disorder: A diagnosis whose time has come. *Journal of Affective Disorders*. 2018;227:243-253.
3. Perkonig A, Lorenz L, Maercker A. Prevalence and correlates of ICD-11 adjustment disorder: Findings from the Zurich Adjustment Disorder Study. *International Journal of Clinical and Health Psychology*. 2018;18(3):209-217.
4. Lorenz L, Hyland P, Perkonig A, Maercker A. Is adjustment disorder unidimensional or multidimensional? Implications for ICD-11. *International Journal Of Methods in Psychiatric Research*. 2018;27(1).
5. Kazlauskas E, Zelviene P, Lorenz L, Quero S, Maercker A. A scoping review of ICD-11 adjustment disorder research. *European Journal of Psychotraumatology*. 2018;8(sup7):1421819-1421819.
6. Maercker A, Einsle F, Kollner V. Adjustment disorders as stress response syndromes: a new diagnostic concept and its exploration in a medical sample. *Psychopathology*. 2007;40(3):135-146.
7. Einsle F, Kollner V, Dannemann S, Maercker A. Development and validation of a self-report for the assessment of adjustment disorders. *Psychology, Health & Medicine*. 2010;15(5):584-595.
8. Glaesmer H, Romppel M, Brahler E, Hinz A, Maercker A. Adjustment disorder as proposed for ICD-11: Dimensionality and symptom differentiation. *Psychiatry Research*. 2015;229(3):940-948.
9. Kazlauskas E, Gegieckaite G, Eimontas J, Zelviene P, Maercker A. A Brief Measure of the International Classification of Diseases-11 Adjustment Disorder: Investigation

- of Psychometric Properties in an Adult Help-Seeking Sample. *Psychopathology*. 2018;51(1):10-15.
10. Ben-Ezra M, Mahat-Shamir M, Lorenz L, Lavenda O, Maercker A. Screening of adjustment disorder: Scale based on the ICD-11 and the Adjustment Disorder New Module. *Journal of Psychiatric Research*. 2018;103:91-96.
  11. Cloitre M, Shevlin M, Brewin CR, et al. The International Trauma Questionnaire: development of a self-report measure of ICD-11 PTSD and complex PTSD. *Acta psychiatrica Scandinavica*. 2018;138(6):536-546.
  12. First MB, Reed GM, Hyman SE, Saxena S. The development of the ICD-11 Clinical Descriptions and Diagnostic Guidelines for Mental and Behavioural Disorders. *World psychiatry : official journal of the World Psychiatric Association (WPA)*. 2015;14(1):82-90.
  13. Ben-Ezra M, Karatzias T, Hyland P, et al. Posttraumatic stress disorder (PTSD) and complex PTSD (CPTSD) as per ICD-11 proposals: A population study in Israel. *Depression and Anxiety*. 2018;35(3):264-274.
  14. Cloitre M, Hyland P, Bisson JI, et al. ICD-11 PTSD and Complex PTSD in the United States: A population-based study. *Journal of Traumatic Stress*. in press.
  15. Hyland P, Shevlin M, Brewin CR, et al. Validation of post-traumatic stress disorder (PTSD) and complex PTSD using the International Trauma Questionnaire. *Acta psychiatrica Scandinavica*. 2017;136(3):313-322.
  16. Karatzias T, Shevlin M, Fyvie C, et al. An initial psychometric assessment of an ICD-11 based measure of PTSD and complex PTSD (ICD-TQ): Evidence of construct validity. *Journal of Anxiety Disorders*. 2016;44:73-79.
  17. Vallieres F, Ceannt R, Daccache F, et al. ICD-11 PTSD and complex PTSD amongst Syrian refugees in Lebanon: the factor structure and the clinical utility of the

- International Trauma Questionnaire. *Acta Psychiatrica Scandinavica*. 2018;138(6):547-557.
18. Maciejewski PK, Maercker A, Boelen PA, Prigerson HG. "Prolonged grief disorder" and "persistent complex bereavement disorder", but not "complicated grief", are one and the same diagnostic entity: an analysis of data from the Yale Bereavement Study. *World psychiatry : official journal of the World Psychiatric Association (WPA)*. 2016;15(3):266-275.
  19. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *Journal of General Internal Medicine*. 2001;16(9):606-613.
  20. Manea L, Gilbody S, McMillan D. Optimal cut-off score for diagnosing depression with the Patient Health Questionnaire (PHQ-9): a meta-analysis. *CMAJ : Canadian Medical Association journal = journal de l'Association medicale canadienne*. 2012;184(3):E191-196.
  21. Manea L, Gilbody S, McMillan D. A diagnostic meta-analysis of the Patient Health Questionnaire-9 (PHQ-9) algorithm scoring method as a screen for depression. *General Hospital Psychiatry*. 2015;37(1):67-75.
  22. Spitzer RL, Kroenke K, Williams JB, Lowe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of internal medicine*. 2006;166(10):1092-1097.
  23. Kertz S, Bigda-Peyton J, Bjorgvinsson T. Validity of the Generalized Anxiety Disorder-7 scale in an acute psychiatric sample. *Clinical Psychology & Psychotherapy*. 2013;20(5):456-464.
  24. Hu L, Bentler PM. Cutoff criteria for fit indices in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*. 1999;6:1-55.

25. Bentler PM. Comparative fit indexes in structural models. *Psychological Bulletin*. 1990;107(2):238-246.
26. Tucker LR, Lewis C. A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*. 1973;38(1):1-10.
27. Steiger JH. Structural Model Evaluation and Modification: An Interval Estimation Approach. *Multivariate Behavioral Research*. 1990;25(2):173-180.
28. LISREL 8: Structural equation modelling with the SIMPLIS command language. [computer program]. Chicago, Illinois: Scientific Software International; 1993.
29. Schwarz G. Estimating the Dimension of a Model. *The Annals of Statistics*. 1978;6(2):461-464.
30. Raftery AE. Bayesian model selection in social research. . *Sociological Methodology*. 1995;5:111-163.
31. Asparouhov T, Muthén B. Robust chi square difference testing with mean and variance adjusted test statistics. *Mplus Web Notes: No. 10. 2006*. .  
<http://statmodel.com/download/webnotes/webnote10.pdf>2006.
32. *Mplus user's guide (8th ed.)* [computer program]. Los Angeles, CA: Muthén & Muthén; 2017.
33. Reed GM, Mendonca Correia J, Esparza P, Saxena S, Maj M. The WPA-WHO Global Survey of Psychiatrists' Attitudes Towards Mental Disorders Classification. *World psychiatry : official journal of the World Psychiatric Association (WPA)*. 2011;10(2):118-131.
34. Zelviene P, Kazlauskas E, Eimontas J, Maercker A. Adjustment disorder: Empirical study of a new diagnostic concept for ICD-11 in the general population in Lithuania. *European Psychiatry : The Journal of the Association of European Psychiatrists*. 2017;40:20-25.

35. Maercker A, Forstmeier S, Pielmaier L, Spangenberg L, Brahler E, Glaesmer H.

Adjustment disorders: prevalence in a representative nationwide survey in Germany.

*Social Psychiatry and Psychiatric Epidemiology*. 2012;47(11):1745-1752.

Table 1. International Adjustment Disorder Questionnaire Items and ICD-11 Narrative Description.

IADQ Items	ICD-11 Narrative Description
<b>Psychosocial Stressors</b>	
<ol style="list-style-type: none"> <li>1. Financial problems (e.g., difficulty paying bills, being in debt).</li> <li>2. Work problems (e.g., unemployment, redundancy, retirement, problems/conflicts with colleagues, change of job role).</li> <li>3. Educational problems (e.g., difficulty with course work, deadline pressure).</li> <li>4. Housing problems (e.g., stressful home move, difficulty finding a secure residence, lack of secure residence).</li> </ol>	<p>Adjustment disorder is a maladaptive reaction to an identifiable psychosocial stressor or multiple stressors (e.g., divorce, illness or disability, socio-economic problems, conflicts at home or work).</p>

<p>5. Relationship problems (e.g., break-up, separation or divorce, conflict with family or friends, intimacy problems).</p> <p>6. My own health problems (e.g., illness onset or deterioration, medication issues, injury or disability).</p> <p>7. A loved one's health problems (e.g., illness onset or deterioration, medication issues, injury or disability).</p> <p>8. Caregiving problems (e.g., emotional stress, time demands).</p> <p>9. Some other problem not mentioned above.</p>	
<p><b>Adjustment Disorder Symptoms</b></p>	
<p><b>Preoccupation</b></p>	<p>The disorder is characterized by....</p>
<p>1. I worry a lot more since the stressful event(s).</p>	<p>...preoccupation with the stressor or its consequences, including excessive worry, recurrent and distressing thoughts about the stressor, or constant rumination about its implications...</p>
<p>2. I can't stop thinking about the stressful event(s).</p>	
<p>3. I often feel afraid about what might happen in the</p>	

future since the stressful event(s).	
<b>Failure to Adapt</b>	
4. I find it difficult to adapt to life since the stressful event(s).	...as well as by failure to adapt to the stressor.
5. I find it difficult to relax and feel calm since the stressful event(s).	
6. I find it difficult to achieve a state of inner peace since the stressful event(s).	
<b>Symptom Time Criterion</b>	
Did these problems start within one month of the stressful event(s)?	...that usually emerges within a month of the stressor.
<b>Functional Impairment</b>	
1. Affected your relationships or social life?	... that causes significant impairment in personal, family, social, educational, occupational or other important areas of functioning.
2. Affected your ability to work or your educational life?	

3. Affected any other important part of your life?	
--	--

Table 2. Mean scores, and endorsement rates ( $\geq 2$ ), for the AjD and functional impairment items ( $n = 910$ ).

<b>Adjustment Disorder Symptoms</b>	Mean (SD)	% Endorsement
<b>Preoccupation</b>		
I worry a lot more since the stressful event(s).	1.39 (1.22)	390 (38.2%)
I can't stop thinking about the stressful event(s).	1.04 (1.17)	282 (27.6%)
I often feel afraid about what might happen in the future since the stressful event(s).	1.26 (1.27)	350 (34.3%)
Subscale score	3.96 (3.32)	
<b>Failure to Adapt</b>		
I find it difficult to adapt to life since the stressful event(s).	0.94 (1.16)	244 (23.9%)
I find it difficult to relax and feel calm since the stressful event(s).	1.08 (1.23)	285 (27.9%)
I find it difficult to achieve a state of inner peace since the stressful event(s).	1.14 (1.27)	308 (30.2%)
Subscale score	3.39 (3.44)	
Total scale score	7.35 (6.50)	
<b>Symptom Time Criterion</b>		
Did these problems start within one month of the stressful event(s)?	--	466 (45.7%)

<b>Functional Impairment</b>		
Affected your relationships or social life?	0.90 (1.17)	247 (24.2%)
Affected your ability to work or your educational life?	0.65 (1.06)	182 (17.8%)
Affected any other important part of your life?	0.81 (1.10)	220 (21.6%)

Table 3. Fit statistics for the one- and two-factor model of adjustment disorder items ( $n = 920$ )

Model	$\chi^2$	df	RMSEA	CFI	TLI	SRMR	BIC
Estimator		p	(90% CI)				
1 factor MLR	55.864	9 p < .01	.076 (.057 - .095)	.980	.967	.018	13343.230
2 factor MLR	12.576	8 p = .127	.025 (.000 - .050)	.998	.997	.008	13272.200
1 factor WLSMV	22.676	9 p < .01	.041 (.020 - .062)	.999	.998	.015	
2 factor WLSMV	10.335	8 p = .242	.018 (.000 - .045)	1.00	1.00	.010	

Table 4. Correlations between study variables ( $n = 920$ )

	Depression (PHQ-9)	Generalized Anxiety (GAD-7)	PTSD (ITQ)	DSO (ITQ)
Preoccupation	.634*	.677*	.574*	.586*
Failure to Adapt	.689*	.709*	.598*	.634*
Total Score	.689*	.721*	.610*	.634*

Note: GAD-7 = Generalized Anxiety Disorder 7-item Scale; PHQ-9 = Patient Health Questionnaire; ITQ = International Trauma Questionnaire. \* $p <$

.01.

Appendix 1.

Below is a list of stressful life events that you may have experienced. Please indicate **any of the following events that are currently applicable to you:**

I am currently experiencing...	Yes	No
1. Financial problems (e.g., difficulty paying bills, being in debt).		
2. Work problems (e.g., unemployment, redundancy, retirement, problems/conflicts with colleagues, change of job role).		
3. Educational problems (e.g., difficulty with course work, deadline pressure).		
4. Housing problems (e.g., stressful home move, difficulty finding a secure residence, lack of secure residence).		
5. Relationship problems (e.g., break-up, separation or divorce, conflict with family or friends, intimacy problems).		
6. My own health problems (e.g., illness onset or deterioration, medication issues, injury or disability).		
7. A loved one's health problems (e.g., illness onset or deterioration, medication issues, injury or disability).		
8. Caregiving problems (e.g., emotional stress, time demands).		
9. Some other problem not mentioned above.		

This section should be completed only if you have answered 'Yes' to at least one of the events above. The following statements reflect problems that people sometimes experience in relation to a stressful life event(s). Thinking about the stressful life event(s) you identified above, please indicate **how much you have been bothered by each of the following problems in the past month:**

	Not at all	A little bit	Moderately	Quite a bit	Extremely
10. I worry a lot more since the stressful event(s).	0	1	2	3	4
11. I can't stop thinking about the stressful event(s).	0	1	2	3	4
12. I often feel afraid about what might happen in the future since the stressful event(s).	0	1	2	3	4

13. I find it difficult to adapt to life since the stressful event(s).	0	1	2	3	4
14. I find it difficult to relax and feel calm since the stressful event(s).	0	1	2	3	4
15. I find it difficult to achieve a state of inner peace since the stressful event(s).	0	1	2	3	4

16. Did these problems start within one month of the stressful event(s)?	<b>Yes</b>		<b>No</b>
--	------------	--	-----------

	<b>Not at all</b>	<b>A little bit</b>	<b>Moderately</b>	<b>Quite a bit</b>	<b>Extremely</b>
<b>In the past month have the above problems:</b>	0	1	2	3	4
17. Affected your relationships or social life?		1	2	3	4
18. Affected your ability to work or your educational life?	0	1	2	3	4
19. Affected any other important part of your life?	0	1	2	3	4

Note: Minor stylistic changes have been made to the original scale. Item 2 changed from “difficult colleagues” to “problems/conflicts with colleagues”, and item 4 “moving home” to “stressful home move”.