**Online Supplementary Material**

**Co-occurring Trajectories of Anxiety and Insistence on Sameness Behaviour in Autism Spectrum Disorder**

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**Supplementary Table 1: Preliminary Analyses Assessing Construct Validity**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **T1 Rotated Factor**  **Scores** | | | **T4 Rotated Factor Scores** | | **T8 Rotated Factor Scores** | |
| **Items** | Factor 1  Anxiety/  arousal | Factor 2  IS | Factor 3  Separation anxiety | Factor 1  Anxiety | Factor 2  IS | Factor 1  Anxiety | Factor 2  IS |
| **CBCL ages 1.5-5 years Anxiety Subscale** | | | | | | | |
| 10. Clings to adults or too dependent | 0.111 | 0.130 | **0.683** | **0.229** | 0.071 |  |  |
| 22. Doesn’t want to sleep alone | 0.142 | -0.068 | **0.401** | 0.056 | **0.244** |  |  |
| 28. Doesn’t want to go out of home | 0.216 | 0.243 | 0.102 | 0.280 | 0.260 |  |  |
| 32. Fears/ phobias | 0.292 | 0.227 | 0.318 | **0.365** | 0.187 |  |  |
| 37. Upset separated from parents | 0.079 | 0.152 | **0.715** | **0.464** | 0.153 |  |  |
| 47. Nervous, highstrung or tense | **0.477** | 0.130 | 0.183 | **0.585** | 0.079 |  |  |
| 48. Nightmares | **0.237** | 0.082 | 0.131 | **0.433** | 0.086 |  |  |
| 51. Shows panic for no good reason | **0.646** | 0.218 | 0.159 | **0.802** | 0.053 |  |  |
| 87. Too fearful or anxious | **0.716** | 0.102 | 0.140 | **0.788** | 0.073 |  |  |
| 99. Worries | **0.604** | 0.099 | 0.026 | **0.572** | 0.028 |  |  |
| **CBCL ages 6-18 years Anxiety Subscale** | | | | | | | |
| 11. Clings to adults or too dependent |  |  |  |  |  | **0.269** | 0.064 |
| 29. Fears/ phobias |  |  |  |  |  | **0.532** | 0.207 |
| 30. Fears going to school |  |  |  |  |  | **0.269** | 0.064 |
| 45. Nervous, highstrung, or tense |  |  |  |  |  | **0.675** | 0.037 |
| 50. Too fearful or anxious |  |  |  |  |  | **0.831** | -0.013 |
| 112. Worries |  |  |  |  |  | **0.449** | 0.053 |
| **ADI-R IS Subscale** | | | | | | | |
| 68. Circumscribed interests | 0.239 | **0.275** | -0.128 | 0.025 | **0.485** | -0.026 | **0.211** |
| 70. Compulsions/rituals | 0.085 | **0.375** | 0.015 | 0.033 | **0.370** | 0.028 | **0.520** |
| 72. Sensitivity to noise | 0.144 | **0.339** | 0.070 | 0.087 | **0.476** | 0.184 | **0.372** |
| 73. Idiosyncratic responses | 0.225 | 0.223 | 0.039 | 0.191 | **0.495** | 0.184 | **0.372** |
| 74. Difficulties with minor change | 0.081 | **0.743** | 0.060 | 0.191 | **0.523** | 0.184 | **0.585** |
| 75. Resistance to trivial change | 0.239 | **0.275** | -0.128 | 0.046 | **0.530** | 0.099 | **0.293** |

ADI-R IS = Autism Diagnostic Interview- Revised; CBCL = Child Behavior Checklist; IS = insistence on sameness. Note, exploratory factor analysis using unweighted least squares extraction and promax rotation was used to determine the extent to which the anxiety and insistence on sameness constructs on these measures were distinct at each time-point (T1 N = 346; T4 N = 228; and T8 N = 144 with complete data). Note item stems/ descriptors have been abbreviated. Bolded factor scores differed by 4 points or more from other factor loadings. Internal consistency of the CBCL anxiety subscale raw item scores in our ASD sample was found to be adequate, on both the preschool (mean Cronbach’s alpha T1 to T4 = 0.74, range 0.72 to 0.75) and school-aged versions (mean Cronbach’s alpha T5 to T8 = 0.72, range 0.66 to 0.77).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | T1 | T2 | T3 | T4 | T5 | T6 | T7 | T8 |
| N in study | 421 | 375 | 365 | 341 | 238 | 274 | 185 | 208 |
| Mean age – months (SD) | 40.1 (8.9) | 48.2 (9.6) | 54.4 (9.3) | 70.2 (4.0) | 92.9 (2.7) | 104.8 (2.5) | 116.3 (2.6) | 128.5 (2.6) |
| Mean age – years | 3.3 | 4.0 | 4.5 | 5.9 | 7.7 | 8.7 | 9.7 | 10.7 |
| N with ADI-R | 404 |  |  | 324 |  |  |  | 188 |
| Mean ADI-R IS score (SD) | 3.4 (2.8) |  |  | 4.3 (3.2) |  |  |  | 4.2 (2.7) |
| N with CBCL | 365 | 327 | 301 | 250 | 197 | 206 | 151 | 158 |
| Median CBCL Anxiety T-score (IQR) | 54  (50, 63) | 51 (50, 60) | 51  (50, 60) | 51  (50, 57) | 55  (51, 65) | 55  (51, 65) | 59  (51, 68) | 55  (51, 65) |
| Mean CBCL Anxiety T-score (SD) | 57.1 (8.6) | 55.9 (8.2) | 55.7 (8.0) | 55.5 (8.0) | 58.1 (7.7) | 58.3 (8.5) | 59.5 (8.5) | 57.5 (7.8) |
| N with CBCL Anxiety T-score = 50 (%) | 120 (32.9) | 123 (37.6) | 123 (40.9) | 102 (40.8) | 33 (16.75) | 41 (19.9) | 23  (15.2) | 37 (23.4) |
| Mean CBCL Anxiety T-score (SD) after imputation for those with score of 50 | 55.5 (10.2) | 54.0 (9.9) | 53.5 (10.0) | 53.3 (9.9) | 57.8 (8.0) | 58.1 (8.7) | 59.3 (8.7) | 57.1 (8.2) |
| Range of imputed T-scores | 41-92 | 41-89 | 41-89 | 41-86 | 43-77 | 46-77 | 46-77 | 46-78 |
| R2 CBCL raw score and T-scores after imputation | 0.998 | 0.998 | 0.998 | 0.998 | 0.940 | 0.959 | 0.960 | 0.947 |

**Supplementary Table 2: Longitudinal Demographic Data**

Note: ADI-R = Autism Diagnostic Interview – Revised; IS = Insistence on sameness subscale; CBCL = Child Behavior Checklist; SD = standard deviation.; T1 = time-point 1, at baseline.

**Supplementary Figure 1: Sample Scatter Plot of T1 CBCL Anxiety Subscale Total Raw Score vs. T-score (T-scores imputed below 50)**

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Note: T-scores for participants assigned a T-score of 50 by the proprietary software were subsequently imputed to extend the range of possible T-scores and maintain data variability (shaded area). This was done using single imputation with stochastic regression. The line indicates a linear best fit line. CBCL = Child Behavior Checklist.

**Supplementary Table 3: Comparison of Demographic Data by Missing Anxiety Data Status**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 0 or 1 missing anxiety outcomes (n=143) | 2 or 3 missing anxiety outcomes (n= 76) | 4 or more missing anxiety outcomes  (n= 149) | *P*- value |
| Age (months) at diagnosis mean (SD) | 38.8 (8.3) | 39.8 (9.8) | 37.3 (8.5) | 0.12 |
| Female n (%) | 26 (17.0%) | 10 (13.2%) | 25 (16.8%) | 0.73 |
| ADI-R restricted/repetitive behaviour mean score (T1) | 8.6 (4.3) | 9.4 (5.0) | 8.4 (4.7) | 0.35 |
| VABS-2 composite standard score mean (SD) | 73.5 (10.3) | 73.3 (10.8) | 72.4 (9.7) | 0.61 |
| Family income (in $1000 CAD) median (IQR) | 70 (50, >80) | 80 (60, <80) | 60 (40 >80) | 0.09 |
| Parenting Stress Index total stress score mean (SD) | 89.3 (20.1) | 90.7 (21.6) | 87.6 (22.2) | 0.57 |
| CBCL Anxiety T-score median (IQR)c | 54.0 (50.0, 60.0) | 55.5 (50.0, 63.0) | 54.0 (50.0, 63.0) | 0.33 |
| Merrill Palmer IQ mean (SD) | 60.6 (23.9) | 61.3 (27.3) | 57.9 (24.0) | 0.58 |
| PLS-4 median (IQR) | 60.0 (50.0, 76.0)b | 61.5 (50.0, 80.0)a | 54.0 (50.0, 67.5)ab | 0.005 |

Note: Means are presented for data that approximated a normal distribution. Medians are presented for non-normally distributed data, and proportions for categorical data. Demographic characteristics and baseline behavioural measures at T1 were compared between groups using analysis of variance (ANOVA) for continuous normally distributed data, the Kruskal-Wallis test for non-normally distributed data, and a Chi-squared or Fisher’s Exact Probability test for categorical data. ADI-R = Autism Diagnostic Interview – Revised; CBCL = Child Behavior Checklist; IQ = intelligence quotient as per the Merrill-Palmer-Revised Developmental Index standard score; IQR = Interquartile range; IS = insistence on sameness; PLS-4 = Preschool Language Scale – 4th ed. total standard score; PSI = Parenting Stress Index total stress score; T1 = time-period 1, at baseline; VABS-2 = Vineland Adaptive Behavior Scales, 2nd ed. composite standard score; CAD = Canadian dollars. ab = denotes groups that differed from each other at *p* < 0.05 for the specified test. c = CBCL non-imputed T-scores

**Supplementary Table 4: Comparison of Demographic Data by Missing ADI-R Data Status**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| T1 Variable | No missing ADI-R data (n=183) | 1 of 3 ADI-R outcomes missing (n=141) | 2 of 3 ADI-R outcomes missing (n=85) | *P*-value |
| Age (months) at diagnosis mean (SD) | 39.6 (8.6)a | 37.3 (9.2)a | 37.3 (8.0) | 0.03 |
| Female n (%) | 24 (13.1%) | 24 (17.0%) | 16 (18.8%) | 0.42 |
| ADI-R restricted/ repetitive behaviour mean score (T1) | 8.8 (4.4) | 8.6 (5.1) | 9.4 (4.9) | 0.45 |
| VABS-2 composite standard score mean (SD) | 74.1 (10.5)a | 72.1 (9.3) | 70.7 (10.4)a | 0.03 |
| Family income (in $1000 CAD) median (IQR) | 70 (50, >80) | 70 (40, >80) | 60 (40, >80) | 0.17 |
| Parenting Stress Index total stress score mean (SD) | 87.9 (20.5) | 92.6 (22.5) | 87.9 (22.1) | 0.16 |
| CBCL Anxiety T-score median (IQR)c | 54.0 (50.0, 60.0) | 54.0 (50.0, 63.0) | 54.0 (50.0, 63.0) | 0.58 |
| Merrill Palmer IQ mean (SD) | 60.1 (24.2) | 59.3 (26.7) | 56.1 (23.7) | 0.52 |
| PLS-4 median (IQR) | 60.0 (50.0, 80.0)a | 56.0 (50.0, 70.0) | 51.0 (50.0, 69.0)a | 0.03 |

Note: Means are presented for data that approximated a normal distribution. Medians are presented for non-normally distributed data, and proportions for categorical data. Demographic characteristics and baseline behavioural measures at T1 were compared between groups using analysis of variance (ANOVA) for continuous normally distributed data, the Kruskal-Wallis test for non-normally distributed data, and a Chi-squared or Fisher’s Exact Probability test for categorical data. ADI-R = Autism Diagnostic Interview – Revised; CBCL = Child Behavior Checklist; IQ = intelligence quotient as per the Merrill-Palmer-Revised Developmental Index standard score; IQR = Interquartile range; IS = insistence on sameness; PLS-4 = Preschool Language Scale – 4th ed. total standard score; PSI = Parenting Stress Index total stress score; T1 = time-period 1, at baseline; VABS-2 = Vineland Adaptive Behavior Scales, 2nd ed. composite standard score; CAD = Canadian dollars. ab = denotes groups that differed from each other at p < 0.05 for the specified test. c = CBCL non-imputed T-scores

**Supplementary Table 5: Trajectory Group Fit Parameters and Posterior Probabilities**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| N groups | **BIC** | **AIC** | **Loglikelihood** |
| Anxiety |  |  |  |
| 1 group quadratic | -7195.60 | -7187.64 | -7183.64 |
| 2 groups quadratic | -6806.34 | -6790.40 | -6782.40 |
| 3 groups quadratic | -6722.82 | -6698.91 | -6686.91 |
| 4 groups linear | -6697.66 | -6673.75 | -6661.75 |
| 4 groups quadratic | -6698.50 | -6666.67 | -6650.67 |
| 4 groups cubic | **-6695.45** | **-6655.61** | **-6635.61** |
| 4 groups quartic | -6696.90 | -6649.10 | -6625.10 |
| Average posterior probability of assignment | 4 group solution: Group 1: 0.87, Group 2: 0.74; Group 3: 0.79; Group 4: 0.95 | | |
| Odds of correct classification | 4 group solution: Group 1: 6.5, Group 2: 14.5, Group 3: 15.3, Group 4: 128.1 | | |
|  |  | | |
| Insistence on Sameness |  |  |  |
| 1 group quadratic | -2215.60 | -2207.5 | -2203.58 |
| 2 groups quadratic | -2180.58 | -2164.53 | -2156.53 |
| 3 groups linear | -2186.58 | -2168.52 | -2159.52 |
| 3 groups quadratic | **-2174.38** | **-2150.30** | **-2138.30** |
| 4 groups quadratic | -2171.06 | -2138.95 | -2122.95 |
| Average posterior probability of assignment | **3 group solution = Group 1: 0.78, Group 2: 0.79, Group 3: 0.87**  4 group solution = Group 1: 0.78, Group 2: 0.77, Group 3: 0.76, Group 4: 0.90 | | |
| Odds of correct classification | **3 group solution = Group 1: 5.0, Group 2: 3.4; Group 3: 100.2**  4 group solution = Group 1: 7.0, Group 2: 2.9, Group 3: 42.7, Group 4 = 141.0 | | |

Note: Bolded values indicate group solution that was selected for presentation in the main text. BIC = Bayesian information criterion; AIC = Akaike information criterion. For IS behaviour, both the 3- and 4- group solutions were comparable in terms of fit indices. The 3-group solution was selected given that the 4-group solution yielded small group sizes for two of the four trajectories (approaching the recommended limit of 5%).1 Small group sizes with the 4-group solution also limited further joint trajectory or predictor analyses due to data sparsity. Relative entropy values for IS = 0.60, and for anxiety = 0.69.

**Supplementary Figure 2: Trajectories of Anxiety in ASD using the CBCL Anxiety Mean Item Score**



Note: The red solid line with circles shows a low stable anxiety group (group 1, 16.5% of sample), the red dashed line with circles show a low-increasing group (group 2, 41.6%), the green line with diamonds shows the moderate-decreasing anxiety group (group 3, 9.6%), the blue line with triangles shows the moderate-increasing anxiety group (group 4, 20.9%), and the top violet trajectory with circles shows the high-increasing group (group 5, 11.3%). Dots (connected by lines) depict the predicted mean scores for each trajectory: ribbons and error bars show the 95% confidence interval for the mean predicted scores at each study time point. CBCL = Child Behavior Checklist.

**Supplementary Figure 3: All Data Points and LOESS Curve for each Anxiety Trajectory using the CBCL Anxiety T-Score**



Note: The lines show the LOESS (locally estimated scatterplot smoothing) curve for each anxiety trajectory group. The points show all available data, coloured by the assigned trajectory group (the 4-group solution using CBCL anxiety T-scores, presented in the main manuscript). Points have been jittered to minimize overlap and increase visibility. Point sizes vary according to the posterior probability of group assignment for the individual, with larger points indicating higher probabilities. CBCL = Child Behavior Checklist.

**Supplementary Figure 4: All Data Points and LOESS Curve for each Insistence on Sameness Trajectory**

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Note: The lines show the LOESS (locally estimated scatterplot smoothing) curve for each trajectory group. The points show all available data, coloured by trajectory group (the 3-group solution using the ADI-R IS total score, presented in the main manuscript). Points have been jittered to minimize overlap and increase visibility. Point sizes vary according to the posterior probability of group assignment for the individual, with larger points indicating higher probabilities. ADI-R = Autism Diagnostic Interview-Revised.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Insistence on Sameness (IS) Trajectories | | | | | | |  |
| Variable | | **IS Group 1**  **(low-stable)** | | **IS Group 2**  **(moderate-increasing)** | | **IS Group 3**  **(high-peaking)** | | | ***P*-value** |
| N total per group | | 166 | | 221 | | 22 | | |  |
| N with APPA > 0.90 (%) | | 54 (32%) | | 68 (31%) | | 12 (55%) | | |  |
| T1 Age mean (SD) | | 37.9 (8.1) | | 40.3 (8.7) | | 39.0 (8.5) | | | 0.29 |
| Female n (%) | | 9 (16.7%) | | 9 (13.2%) | | 1 (8.3%) | | | 0.76 |
| Median income (IQR) | | 80 (50, >80) | | 70 (40, >80) | | 70 (50, >80) | | | 0.64 |
| Merrill Palmer IQ Mean (SD) | | 60.0 (24.6) | | 62.5 (22.8) | | 78.2 (34.5) | | | 0.11 |
| PSI mean (SD) | | 83.8 (20.7)a | | 92.8 (20.0) | | 104.3 (19.6)a | | | **0.005** |
| VABS-2 mean (SD) | | 74.1 (9.9) | | 72.2 (10.6) | | 74.0 (12.6) | | | 0.60 |
| PLS-4 median (IQR) | | 61.0 (51.0, 80.0) | | 59.0 (50.0, 80.5) | | 56.5 (50.0, 82.5) | | | 0.87 |
| CBCL Anxiety T-score (IQR) | | 51.0 (50.0, 57.0)ab | | 57.0 (51.0, 67.0)a | | 63.0 (57.0, 73.0)b | | | **<.001** |
| CBCL Anxiety Imputed T-score (IQR) | | 51.0 (45.1, 57.0)ab | | 57.0 (51.0, 67.0)a | | 63.0 (57.0, 73.0)b | | | **<.001** |
| CBCL Anxiety raw score (SD) | | 3.1 (2.8)ab | | 5.6 (3.4)a | | 7.4 (3.2)b | | | **<.001** |
|  | |  | |  | |  | | |  |
|  | |  | |  | |  | | |  |
|  | **Anxiety Trajectories** | | | | | | | |  |
| Variable | **Anxiety Group 1**  **(low-increasing)** | | **Anxiety Group 2 (moderate-decreasing)** | | **Anxiety Group 3**  **(moderate-increasing)** | | | **Anxiety Group 4**  **(high-stable)** | ***P*-value** |
| N total per group | 201 | | 61 | | 69 | | 47 | |  |
| N APPA > 0.90 (%) | 145 (72%) | | 18 (29%) | | 32 (46%) | | 40 (85%) | |  |
| T1 Age mean (SD) | 36.8 (8.6) | | 36.2 (6.0) | | 39.4 (9.3) | | 40.5 (9.3) | | 0.06 |
| Female n (%) | 24 (16.0%) | | 2 (10.5%) | | 5 (15.2%) | | 12 (28.6%) | | 0.18 |
| Incomef (IQR) | 80 (60, >80) | | 70 (50, >80) | | 80 (60, >80) | | 60 (40, >80) | | 0.21 |
| IQ (SD) | 56.6 (24.2) | | 59.3 (18.1) | | 67.5 (19.1) | | 65.4 (35.8) | | 0.10 |
| PSI mean (SD) | 79.6 (19.1)abc | | 101.4 (19.8)a | | 93.0 (18.3)b | | 103.9 (21.5)c | | **<.001** |
| VABS-2 (SD) | 74.1 (9.7) | | 73.7 (8.0) | | 74.7 (11.7) | | 71.8 (12.4) | | 0.63 |
| PLS-4 median (IQR) | 57.0 (50.0, 69.0)a | | 64.0 (57.0, 88.0) | | 69.0 (56.0, 93.0)a | | 59.0 (50.0, 84.0) | | **0.007** |
| ADI-R IS mean (SD) | 2.4 (2.2)ab | | 3.7 (2.8) | | 4.2 (2.9) | | 4.9 (3.2)b | | **<.001** |
|  | |  | |  | |  | | |  |

**Supplementary Table 6: Demographic and Developmental Differences at T1 between Assigned Insistence on Sameness (IS) (top panel) and Anxiety Trajectory Groups (bottom panel) for participants with Average Posterior Probabilities of Assignment (APPA) > 0.90**

Note: Means are presented for data that approximated a normal distribution. Medians are presented for non-normally distributed data, and proportions for categorical data. Demographic characteristics and baseline behavioural measures at T1 were compared between participants across assigned trajectory groups using analysis of variance (ANOVA) for continuous normally distributed data, the Kruskal-Wallis test for non-normally distributed data, and a Chi-squared or Fisher’s Exact Probability test for categorical data. ADI-R = Autism Diagnostic Interview – Revised; APPA = Average posterior probability of assignment; CBCL = Child Behavior Checklist; IQ = intelligence quotient, as per the Merrill-Palmer-Revised Developmental Index standard score; IQR = Interquartile range; IS = insistence on sameness; PLS-4 = Preschool Language Scale – 4th ed. total standard score; PSI = Parenting Stress Index total stress score; T1 = time-point 1, at baseline; VABS-2 = Vineland Adaptive Behavior Scales, 2nd ed. composite standard score; CAD = Canadian dollars; CAD = Canadian dollars. abcde = denotes groups that differ from each other at p<0.05 for the specified test. f = family income is in units of $1000 Canadian dollars.

**Supplementary Table 7: Predictors of Trajectory Group Assignment**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Predictor Variable (T1) | Outcome Group (relative to reference group 1) | OR | Lower 95% CI | Upper  95% CI | *P*-value |
| Age at diagnosis (months) | Anxiety 2 (moderate-decreasing | 1.04 | 0.98 | 1.10 | 0.20 |
|  | Anxiety 3 (moderate-increasing) | 1.03 | 0.99 | 1.07 | 0.15 |
|  | Anxiety 4 (high-stable) | 1.04 | 1.00 | 1.08 | 0.09 |
| Female sex | Anxiety 2 (moderate-decreasing | 0.59 | 0.17 | 2.02 | 0.41 |
|  | Anxiety 3 (moderate-increasing) | 0.70 | 0.25 | 1.93 | 0.49 |
|  | Anxiety 4 (high-stable) | 2.27 | 1.06 | 4.88 | **0.03** |
| Low income | Anxiety 2 (moderate-decreasing | 2.16 | 0.32 | 14.46 | 0.43 |
|  | Anxiety 3 (moderate-increasing) | 4.26 | 0.91 | 20.05 | **0.05** |
|  | Anxiety 4 (high-stable) | 3.82 | 0.72 | 20.21 | 0.11 |
| VABS-2 Composite scorea | Anxiety 2 (moderate-increasing) | 1.01 | 0.99 | 1.03 | 0.12 |
|  | Anxiety 3 (high-stable) | 1.01 | 0.99 | 1.03 | 0.46 |
| Language impairment (PLS-4)a | Anxiety 2 (moderate-increasing) | 1.14 | 0.62 | 2.09 | 0.67 |
|  | Anxiety 3 (high-stable) | 0.75 | 0.38 | 1.46 | 0.41 |
| ADI-R IS | Anxiety 2 (moderate-decreasing) | 0.86 | 0.74 | 1.01 | 0.06 |
|  | Anxiety 3 (moderate-increasing) | 1.15 | 0.96 | 1.37 | 0.12 |
|  | Anxiety 4 (high-stable) | 1.22 | 1.04 | 1.43 | **0.02** |
|  |  |  |  |  |  |
| Age at diagnosis (months) | IS 2 (moderate-increasing) | 1.07 | 0.99 | 1.16 | 0.09 |
|  | IS 3 (high-peaking) | 1.02 | 0.94 | 1.10 | 0.62 |
| Female sex | IS 2 (moderate-increasing) | 0.67 | 0.28 | 1.62 | 0.37 |
|  | IS 3 (high-peaking) | 0.84 | 0.20 | 3.60 | 0.82 |
| Low income | IS 2 (moderate-increasing) | 3.16 | 1.10 | 9.10 | **0.03** |
|  | IS 3 (high-peaking) | 1.35 | 0.14 | 12.61 | 0.80 |
| Parenting Stress Index | IS 2 (moderate-increasing) | 1.04 | 1.02 | 1.06 | **<.001** |
|  | IS 3 (high-peaking) | 1.06 | 1.02 | 1.10 | **<.001** |
| VABS-2 Composite score | IS 2 (moderate-increasing) | 0.97 | 0.95 | 0.99 | **0.04** |
|  | IS 3 (high-peaking) | 0.91 | 0.88 | 0.95 | **<.001** |
| Language impairment (PLS-4) | IS 2 (moderate-increasing) | 3.03 | 1.36 | 6.78 | **0.007** |
|  | IS 3 (high-peaking) | 0.56 | 0.21 | 1.49 | 0.24 |
| CBCL Anxiety T-scoreb | IS 2 (moderate-increasing) | 1.12 | 1.07 | 1.17 | **<.001** |
|  | IS 3 (high-peaking) | 1.17 | 1.09 | 1.26 | **<.001** |

Note: The odds ratios indicate the odds of transitioning to the higher severity trajectory group (groups 2, 3, or 4, respectively) relative to the reference group (group 1), with increasing values of the given predictor variable at T1. The reference anxiety group (group 1), had low-increasing anxiety symptoms and the reference insistence on sameness behaviour group (group 1) had low stable symptoms. ADI-R IS= Autism Diagnostic Interview – Revised insistence on sameness subscale; CBCL = Child Behavior Checklist; IQ = intelligence quotient, as per the Merrill-Palmer-Revised Developmental Index standard score; IS = insistence on sameness; PLS-4 = Preschool Language Scale – 4th ed.; T1 = time-point 1, at baseline; VABS-2 = Vineland Adaptive Behavior Scales, 2nd ed. composite standard score. **a** For the four-group anxiety solution, inclusion of VABS-2 as a time-stable baseline predictor resulted in failure of the model to converge, and inclusion of the dichotomous variable ‘language impairment’ on the PLS-4 resulted in model overspecification. In these circumstances, the three-group anxiety solution was used instead. Other predictors that would not converge (IQ, PSI) are omitted. Income and language scores on the PLS-4 were dichotomized given skewed distributions (25% of participants had families with income below $40,000 per year, and 70% had language impairments with PLS-4 scores below a cut-off of 70). b = imputed T-score**.**

**Supplementary Table 8: Demographic Differences Between Select Joint Trajectory Groups**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Joint Trajectories (anxiety group number: IS group number) | | | |  |  |
| Variable | **1:1**  **Low-risk**  (low-increasing anxiety and low-stable IS) | **2:2**  **Incongruent**  (moderate-decreasing anxiety, moderate increasing IS) | **3:2**  **Congruent**  (moderate-increasing anxiety, moderate increasing IS) | **4:2**  **Persistently Anxious**  (high-stable anxiety, and moderate increasing IS) | ***P*- value** | ***P*-value APPA > 0.90** |
| N total per group | 139 | 58 | 38 | 43 |  |  |
| Estimated % of sample | 34.8% | 13.8% | 10.6% | 10.1% |  |  |
| N with APPA >0.90 (%) | 121 (87%) | 31 (53%) | 27 (71%) | 38 (88%) |  |  |
| T1 Age mean (SD) | 37.1 (8.7) | 38.4 (7.7) | 41.0 (8.9) | 39.2 (9.3) | 0.08 | 0.10 |
| Female n (%) | 25 (18.0%) | 7 (12.1%) | 5 (13.2%) | 12 (27.9%) | 0.18 | **0.02** |
| Median Incomef (IQR) | 70 (60, >80)a | 50 (30, 70)a | 70 (30, >80) | 60 (40, >80) | **0.005** | 0.095 |
| Merrill Palmer IQ (SD) | 59.1 (24.5) | 56.2 (18.7) | 64.0 (25.0) | 59.3 (30.3) | 0.58 | 0.89 |
| PSI mean (SD) | 81.8 (21.4)ab | 95.1 (18.6)a | 92.6 (20.7) | 102.5 (21.9)b | **<.001** | **<.001** |
| VABS-2 mean (SD) | 74.4 (9.9)a | 70.4 (9.5)a | 73.2 (10.4) | 70.5 (11.3) | **0.03** | 0.11 |
| PLS-4 median (IQR) | 57.0 (50.0, 73.0) | 56.5 (50.0, 71.0) | 63.0 (50.0, 82.0) | 58.0 (50.0, 76.0) | 0.44 | 0.47 |
|  |  |  |  |  |  |  |
| ADI-R IS mean (SD) | 1.6 (1.7)abc | 4.1 (2.5)b | 4.0 (2.4)a | 4.5 (2.8)c | **<.001** | **<.001** |
| CBCL Anxiety T-score (IQR) | 50.0  (50.0, 51.0)abc | 60.0  (57.0, 67.0)bd | 57.0  (51.0, 63.0)ae | 73.0  (67.0, 75.0)cde | **<.001** | **<.001** |
| CBCL Imputed T-score (IQR) | 48.0  (44.7, 51.0)abc | 60.0  (57.0, 67.0)bd | 57.0  (51.0, 63.0)ae | 73.0  (67.0, 75.0)cde | **<.001** | **<.001** |
| CBCL Anxiety raw total (SD) | 2.3 (1.9)abc | 6.5 (2.3)bd | 5.3 (2.9)ae | 9.6 (2.4)cde | **<.001** | **<.001** |
|  |  |  |  |  |  |  |

Note: Means are presented for data that approximated a normal distribution. Medians are presented for non-normally distributed data, and proportions for categorical data. Demographic characteristics and baseline behavioural measures at T1 were compared between participants across assigned trajectory groups using analysis of variance (ANOVA) for continuous normally distributed data, the Kruskal-Wallis test for non-normally distributed data, and a Chi-squared or Fisher’s Exact Probability test for categorical data. The omnibus p-value is presented for all participants (second last column) and also restricted to those with APPA >0.90 for their assigned group membership (last column). ADI-R = Autism Diagnostic Interview – Revised; CBCL = Child Behavior Checklist; IQ = intelligence quotient as per the Merrill-Palmer-Revised Developmental Index standard score; IQR = Interquartile range; IS = insistence on sameness; PLS-4 = Preschool Language Scale – 4th ed. total standard score; PSI = Parenting Stress Index total stress score; T1 = time period 1, at baseline; VABS-2 = Vineland Adaptive Behavior Scales, 2nd ed. composite standard score; CAD = Canadian dollars. abcde = denotes groups that differ from each other at p<0.05 for the specified test in the unrestricted sample (n = 278 with data at one or more time-points on both measures). f = family income is in units of $1000 Canadian dollars.

**References**

1. Andruff H, Carraro N, Thompson A, Gaudreau P, Louvet B. Latent class growth modelling: a tutorial. *Tutorials in Quantitative Methods for Psychology.* 2009;5(1):11-24.