*\*\*\*\*\* Stata Analyses for manuscript:* Exploring the Autism Spectrum: moderating effects of neuroticism on stress-reactivity and on the association between social context and negative affect \*\*\*\*\*

*\*\*\* Initial version of Stata syntax created on 23-01-2019 by Jeroen van Oosterhout, finalized 31-08-2020*

*\*\*\* Shared for transparency reasons. Questions regaring coding? Please contact Jeroen van Oosterhout, jeroen.van.oosterhout@ggze.nl*

*\*\*\*\*\*\*\*Variable labels:

\*Neuroticism = neo\_n\_rs

\*Group = group (0 = control group; 1 = ASD group)

\*Sex = sexe

\*Age = cur\_age (age at moment of testing)

\*Lifetime depression = depression\_life (0 = subject never had a depression, 1 = subject had at least one depressive episode in the past)

\*Negative affect = negaff

\*Activity-related stress = activity\_stress

\*Event-related stress = event\_stress

\*Social stress = social\_stress

\*Social context = soc\_who\_rx (0 = being alone, 1 = being with inner circle people, 2 = being with less familiar people for the outer circle)*

*\*\*\*\*\*\*\*\*\*\* Aim 1
\*\*\* Aim 1: Compare levels of neuroticism in daily life between adults with ASD and healthy controls.*

*\*\*\* Hypothesis 1: We expect a higher mean level of neuroticism in the ASD group, compared with the controls.

\*\*\* Way of testing the hypothesis: In order to test hypothesis 1, a linear regression analysis will be performed, with neuroticism (neo\_n\_rs) as dependent variable, group (group) as independent variable and sex (sexe), age (cur\_age) and lifetime depression (depression\_life) as covariates.*

*\*\*\*If the assumptions for linear regression are met, a linear regression analysis is performed using the following command:*

*regress neo\_n\_rs group sexe cur\_age depression\_life if firstobs ==1*

*\*\*\*If the assumptions are NOT met: consider non-parametric testing and/or consider assumption specific acting (for example, transform data)*

*\*\*\*\*\*\*\*\*\*\* Aim 2
\*\*\* Aim 2: Examine the interaction between neuroticism and appraised stress in models of negative affect for both adults with ASD and healthy controls.*

*\*\*\* Hypothesis 2: We expect an interaction between neuroticism and all three types of stress (event related stress, activity related stress and social related stress) in models of negative affect for both the ASD group and healthy controls. For healthy controls, we expect a stronger association between stress and negative affect for individuals high on neuroticism as compared with individuals low on neuroticism.
\* Even though no research has been done on this topic so far for individuals with ASD, we expect similar results for the ASD group.

\*\*\* Way of testing the hypothesis: In order to test hypothesis 2, 6 Multilevel regression analyses will be performed (3 analyses for the control group, and 3 analyses for the ASD group) ; each with depedent variable negative affect (negaff) en with independent variables: neuroticisme (neo\_n\_rs), the respectively stress variables: activity-related stress (activity\_stress), event-related stress (event\_stress) or social stress (social\_stress), and the corresponding interaction (stress x neuroticism). All 6 analyses use the following covariates: age (cur\_age), sex (sexe) and lifetime depression (depression\_life).

\*\*\*\*\*\*\*\*\*\*Multilevel analyses for the control group (group = 0)*

*\*\*\*1. Multilevel regression for activity\_stress*

*xtmixed negaff c.neo\_n\_rs##c.activity\_stress cur\_age sexe depression\_life if group==0||st\_subjid: activity\_stress, cov(un) reml*

*\*\*\*For interpretation, and visualisation: plotting the interaction*

*margins, dydx(activity\_stress) at(neo\_n\_rs=(12(1)60))*

*marginsplot, ytitle("Predicted slope of activity stress on NA", margin(medsmall)) title("Predicted marginal effects of activity stress on NA per neuroticism score") xlabel(12(8)60) xtitle(, margin(medsmall)) scheme(s2mono) graphregion(color(white))*

*\*\*\*2. Multilevel regression for event\_stress*

*xtmixed negaff c.neo\_n\_rs##c.event\_stress cur\_age sexe depression\_life if group==0||st\_subjid: event\_stress, cov(un) reml*

*\*\*\* For interpretation, and visualisation: plotting the interaction*

*margins, dydx(event\_stress) at(neo\_n\_rs=(12(1)60))*

*marginsplot, ytitle("Predicted slope of event stress on NA", margin(medsmall)) title("Predicted marginal effects of event stress on NA per neuroticism score") xlabel(12(8)60) xtitle(, margin(medsmall)) scheme(s2mono) graphregion(color(white))*

*\*\*\*3. Multilevel regression for social\_stress*

*xtmixed negaff c.neo\_n\_rs##c.social\_stress cur\_age sexe depression\_life if group==0||st\_subjid: social\_stress, cov(un) reml*

*\*\*\* For interpretation, and visualisation: plotting the interaction*

*margins, dydx(social\_stress) at(neo\_n\_rs=(12(1)60))*

*marginsplot, ytitle("Predicted slope of social stress on NA", margin(medsmall)) title("Predicted marginal effects of social stress on NA per neuroticism score") xlabel(12(8)60) xtitle(, margin(medsmall)) scheme(s2mono) graphregion(color(white))*

*\*\*\*\*\*\*\*\*\*\*Multilevel analyses for the ASD group (group = 1)*

*\*\*\*4. Multilevel regression for activity\_stress*

*xtmixed negaff c.neo\_n\_rs##c.activity\_stress cur\_age sexe depression\_life if group==1||st\_subjid: activity\_stress, cov(un) reml*

*\*\*\* For interpretation, and visualisation: plotting the interaction*

*margins, dydx(activity\_stress) at(neo\_n\_rs=(12(1)60))*

*marginsplot, ytitle("Predicted slope of activity stress on NA", margin(medsmall)) title("Predicted marginal effects of activity stress on NA per neuroticism score") xlabel(12(8)60) xtitle(, margin(medsmall)) scheme(s2mono) graphregion(color(white))*

*\*\*\*5. Multilevel regression for event\_stress*

*xtmixed negaff c.neo\_n\_rs##c.event\_stress cur\_age sexe depression\_life if group==1||st\_subjid: event\_stress, cov(un) reml*

*\*\*\* For interpretation, and visualisation: plotting the interaction*

*margins, dydx(event\_stress) at(neo\_n\_rs=(12(1)60))*

*marginsplot, ytitle("Predicted slope of event stress on NA", margin(medsmall)) title("Predicted marginal effects of event stress on NA per neuroticism score") xlabel(12(8)60) xtitle(, margin(medsmall)) scheme(s2mono) graphregion(color(white))*

*\*\*\*6. Multilevel regression for social\_stress*

*xtmixed negaff c.neo\_n\_rs##c.social\_stress cur\_age sexe depression\_life if group==1||st\_subjid: social\_stress, cov(un) reml*

*\*\*\* For interpretation, and visualisation: plotting the interaction*

*margins, dydx(social\_stress) at(neo\_n\_rs=(12(1)60))*

*marginsplot, ytitle("Predicted slope of social stress on NA", margin(medsmall)) title("Predicted marginal effects of social stress on NA per neuroticism score") xlabel(12(8)60) xtitle(, margin(medsmall)) scheme(s2mono) graphregion(color(white))*

*\*\*\*\*\*\*\*\*\*\* Aim 3
\*\*\* Aim 3: Examine the interaction between neuroticism and social context on negative affect in ASD.

\*\*\* Hypothesis 3: We expect that individuals with ASD and higher neuroticism levels report higher levels of negative affect in social interaction with outer circle people, compared with individuals with ASD and lower neuroticism. We do not expect a difference on negative affect between the higher and lower neuroticism ASD groups in other social contexts (i.e. being alone, being with inner circle people).

\*\*\* Way of testing the hypothesis: In order to test hypothesis 3,* for each group, *one Multilevel regression analysis will be performed, with dependent variable negative affect (negaff) and as independent variables neuroticism (neo\_n\_rs), social context (soc\_who\_rx) and the corresponding interaction neuroticism x social context. In these analyses, the following covariates are taken into account: age (cur\_age), sex (sexe) and lifetime depression (depression\_life). The LINCOM and WALD commands are used to further test the differences in sloped and to in interpret in case of an interaction.*

*\*\*\*\*\*\*\*\*\*\*Multilevel analyses for the ASD group (group = 1)

mixed negaff c.neo\_n\_rs##i.soc\_who\_rx cur\_age sexe depression\_life ||st\_subjid: soc\_who\_rx, cov(un) reml, if group==1*

*\*\*\*Visualisation*

*margins soc\_who\_rx, at(neo\_n\_rs=(12(1)60))*

*marginsplot*

*\*\*Interpreting the interaction*

*margins, dydx(neo\_n\_rs) over (soc\_who\_rx) vsquish*

*margins, dydx(neo\_n\_rs) over (r.soc\_who\_rx) vsquish*

*margins, dydx(neo\_n\_rs) over (a.soc\_who\_rx) vsquish*

*mixed negaff c.neo\_n\_rs##i.soc\_who\_rx cur\_age sexe depression\_life ||st\_subjid: soc\_who\_rx, cov(un) reml, if group==1*

*\* 2. Run Lincom and Wald test*

*\* A. Test for differences in intercepts between the different social contexts i.e., alone (0), inner circle (1), and outer circle (2)*

 *test \_b[0bn.soc\_who\_rx] = \_b[1.soc\_who\_rx]*

 *test \_b[1.soc\_who\_rx] = \_b[2.soc\_who\_rx]*

 *test \_b[0bn.soc\_who\_rx] = \_b[2.soc\_who\_rx]*

 *\* Lincom command (= linear combinations) will give the confidence intervals*

 *\* for the difference in intercepts*

 *lincom \_b[0bn.soc\_who\_rx] - \_b[1.soc\_who\_rx]*

 *lincom \_b[1.soc\_who\_rx] - \_b[2.soc\_who\_rx]*

 *lincom \_b[0bn.soc\_who\_rx] - \_b[2.soc\_who\_rx]*

*\* B. Test for differences in slopes between the different social contexts*

 *test \_b[1.soc\_who\_rx#c.neo\_n\_rs] = \_b[0bn. soc\_who\_rx#c.neo\_n\_rs]*

 *test \_b[2.soc\_who\_rx#c.neo\_n\_rs] = \_b[0bn. soc\_who\_rx#c.neo\_n\_rs]*

 *test \_b[2.soc\_who\_rx#c.neo\_n\_rs] = \_b[1bn. soc\_who\_rx#c.neo\_n\_rs]*

 *\* Lincom will give the confidence intervals for the difference in slopes*

 *lincom \_b[1.soc\_who\_rx#c.neo\_n\_rs] - \_b[0bn. soc\_who\_rx#c.neo\_n\_rs]*

 *lincom \_b[2.soc\_who\_rx#c.neo\_n\_rs] - \_b[0bn. soc\_who\_rx#c.neo\_n\_rs]*

 *lincom \_b[2.soc\_who\_rx#c.neo\_n\_rs] - \_b[1bn. soc\_who\_rx#c.neo\_n\_rs]*

*\*\*\*\*\*\*\*\*\*\*Multilevel analyses for the control group (group = 0)*

*mixed negaff c.neo\_n\_rs##i.soc\_who\_rx cur\_age sexe depression\_life ||st\_subjid: soc\_who\_rx, cov(un) reml, if group==0*

*\*\*\*Visualisation*

*margins soc\_who\_rx, at(neo\_n\_rs=(12(1)60))*

*marginsplot*

*\*\*Interpreting the interaction*

*margins, dydx(neo\_n\_rs) over (soc\_who\_rx) vsquish*

*margins, dydx(neo\_n\_rs) over (r.soc\_who\_rx) vsquish*

*margins, dydx(neo\_n\_rs) over (a.soc\_who\_rx) vsquish*

*mixed negaff c.neo\_n\_rs##i.soc\_who\_rx cur\_age sexe depression\_life ||st\_subjid: soc\_who\_rx, cov(un) reml, if group==0*

*\* 2. Run Lincom and Wald test*

*\* A. Test for differences in intercepts between the different social contexts i.e., alone (0), inner circle (1), and outer circle (2)*

 *test \_b[0bn.soc\_who\_rx] = \_b[1.soc\_who\_rx]*

 *test \_b[1.soc\_who\_rx] = \_b[2.soc\_who\_rx]*

 *test \_b[0bn.soc\_who\_rx] = \_b[2.soc\_who\_rx]*

 *\* Lincom command (= linear combinations) will give the confidence intervals*

 *\* for the difference in intercepts*

 *lincom \_b[0bn.soc\_who\_rx] - \_b[1.soc\_who\_rx]*

 *lincom \_b[1.soc\_who\_rx] - \_b[2.soc\_who\_rx]*

 *lincom \_b[0bn.soc\_who\_rx] - \_b[2.soc\_who\_rx]*

*\* B. Test for differences in slopes between the different social contexts*

 *test \_b[1.soc\_who\_rx#c.neo\_n\_rs] = \_b[0bn. soc\_who\_rx#c.neo\_n\_rs]*

 *test \_b[2.soc\_who\_rx#c.neo\_n\_rs] = \_b[0bn. soc\_who\_rx#c.neo\_n\_rs]*

 *test \_b[2.soc\_who\_rx#c.neo\_n\_rs] = \_b[1bn. soc\_who\_rx#c.neo\_n\_rs]*

 *\* Lincom will give the confidence intervals for the difference in slopes*

 *lincom \_b[1.soc\_who\_rx#c.neo\_n\_rs] - \_b[0bn. soc\_who\_rx#c.neo\_n\_rs]*

 *lincom \_b[2.soc\_who\_rx#c.neo\_n\_rs] - \_b[0bn. soc\_who\_rx#c.neo\_n\_rs]*

 *lincom \_b[2.soc\_who\_rx#c.neo\_n\_rs] - \_b[1bn. soc\_who\_rx#c.neo\_n\_rs]*