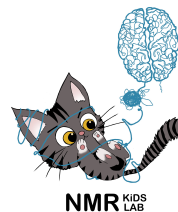


Brain correlates and mental well-being in adults, mothers and children in the first ten months of Covid-19

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Link to manuscripts:



Scientific Reports
02.September 2021

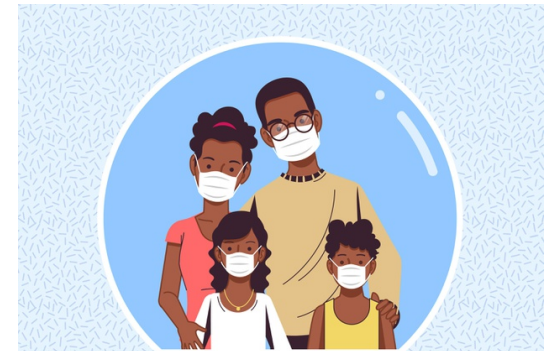


Under review @ SCAN
Preprint available



Effects of Covid-19 & associated restrictions

- Negative effects highest in younger individuals, those with chronic disease or pre-existing mental and physical health conditions, females, those living alone or in socioeconomic adversity (Adams-Prassl et al., 2020; de Quervain et al., 2020; Kwong et al., 2020; Ozamiz-Etxebarria et al., 2020, O'Connor, 2021)
- Families may be particularly impacted
(Wang et al., 2020; Chu et al., 2020)
- Parents' psychological distress → child's well-being & ability to cope
(Griffith, 2020; McRae et al., 2020)



Participants and assessments

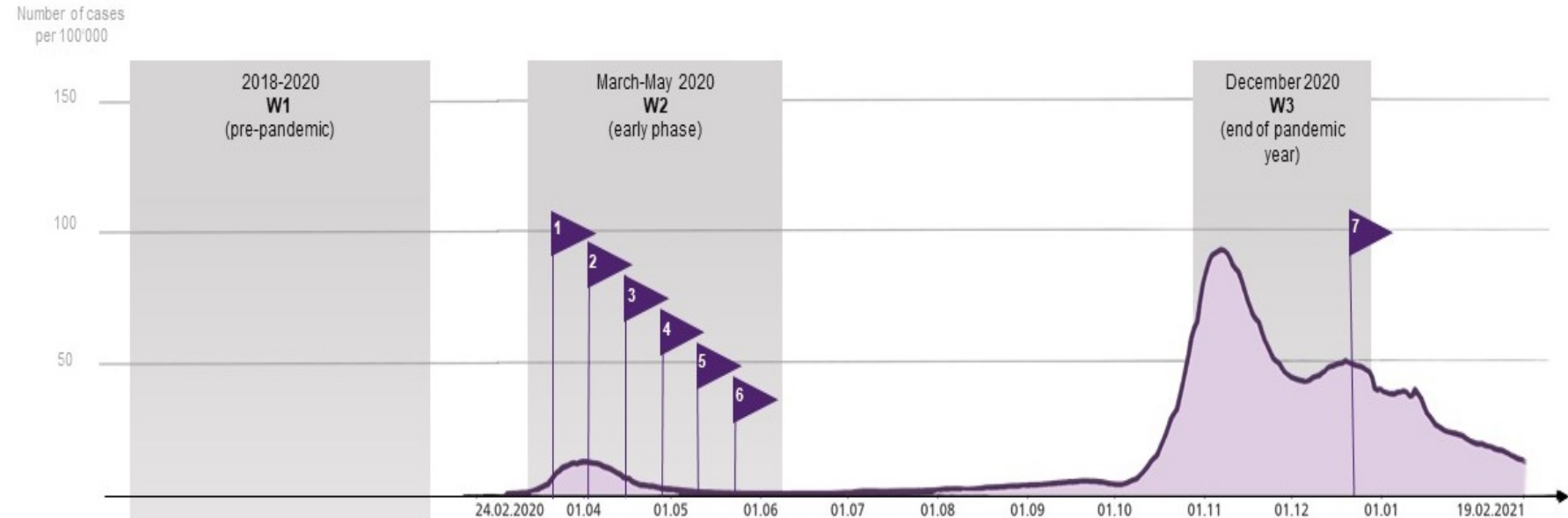
Schweizerische Eidgenossenschaft, Bundesamt für
Gesundheit, COVID-19 Informationen:
<https://www.covid19.admin.ch/de/epidemiologic/case>
Stand: 04.02.2020, 07.48h

69 participants

- **43 adults:** 31 ♀ / 12 ♂;
35.14 ± 9.20y, range 22-51y
- **26 children:** 10 ♀ / 16 ♂; 10.69
± 2.52y, range 7-17y

3 assessments waves

- 8 assessment timepoints
- pre-pandemic (W1)
- during restrictions (W2) – 11
weeks
- end of the year (W3)



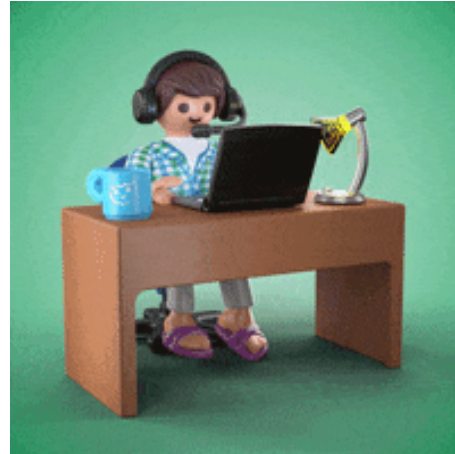
Structural brain data

Mental health variables &
cognitive emotion regulation
strategy use





Short-term effects (11 weeks)



Mental well-being during the first months of Covid-19 in adults and children: behavioral evidence and neural precursors



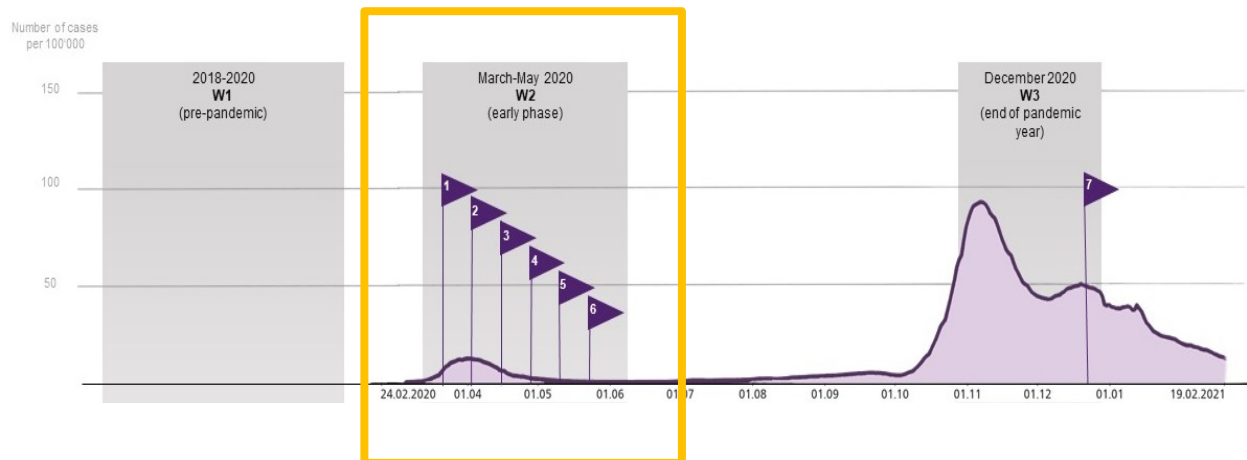
Methods and aims I: short-term effects

Mental health variations in children

- Mood, emotional & behavioral problems
- Linear mixed effects models

Mother-child associations

- Mothers' depression/anxiety/experienced burden → children's mood/emotional & behavioral problems
- Multiple regression (controlling for children's age and sex)



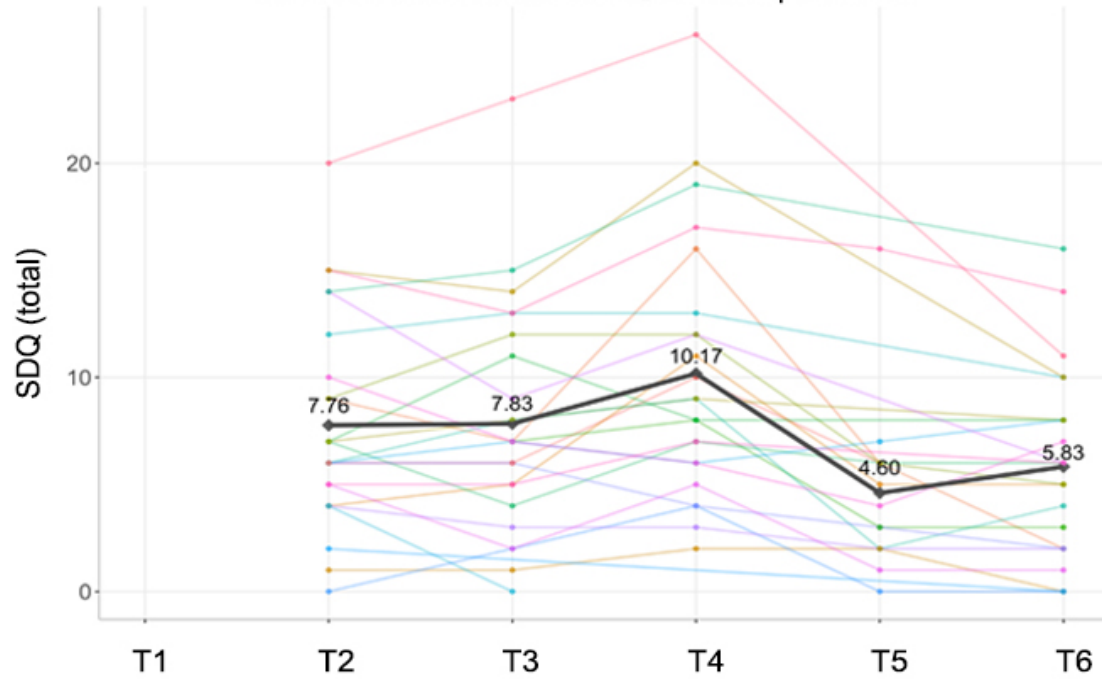
Short-term effects: impact on children in the first two months

- Decrease of emotional and behavioral problems across 11 weeks ($\beta = -0.04, p = .001$)
 - After returning to school well-being improved
 - Prolonged school-closure → physical and mental health with potential long-term consequences
(Morgül et al., 2020; Spinelli et al., 2020)
- Significant change in reported mood ($\chi^2=13.425, p = 0.020$)
- Post-hoc measures: meeting friends (yes/no) explained 35.5% of variations in mood
 - Model: $R^2=0.380$ (adjusted $R^2 = 27.8\%$; $F(3, 22) = 4.499, p = 0.013$)



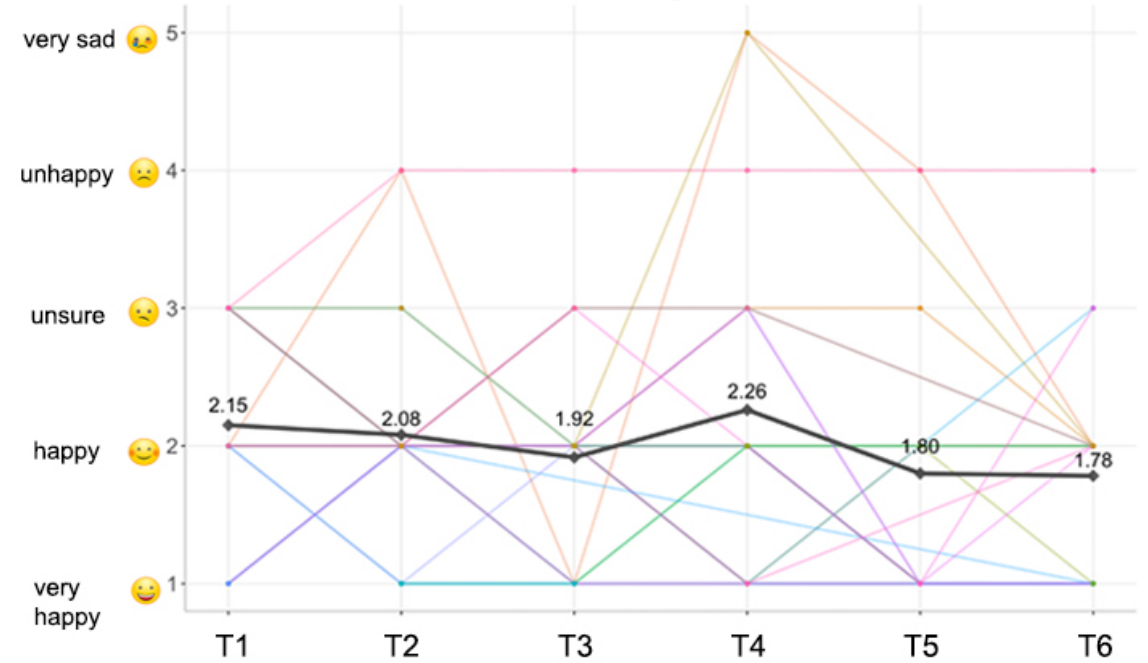
Children's mental well-being (March-May 2020)

Children's emotional and behavioral problems



SDQ \geq 13
significant level of problems

Children's mood



Short-term effects: mother-child associations

Children's **emotional and behavioral problems** and mothers' well-being

- mothers' subjective burden of caregiving explained 52.7% ($\beta = 0.763$, $t(22) = 4.762$, $p < 0.001$) of the variance

Children's **mood** and mothers' well-being

- Depression scores explained 45.2% of variance in children's mood ($\beta = 0.660$, $t(22) = 4.136$, $p < 0.001$)

- Possible disadvantages, e.g., vicarious fear conditioning in dyads (Marin et al., 2020)
- Mental health intervention with a systematic focus (Marcus et. al, 2001)

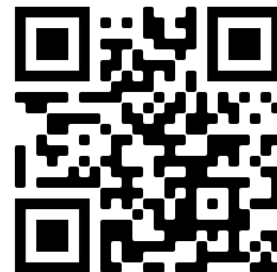




Long-term effects



Direct and indirect effects of dorsolateral prefrontal cortex and emotion regulation strategy use on mental health during Covid-19



Coping and mental health

- Emotion regulation

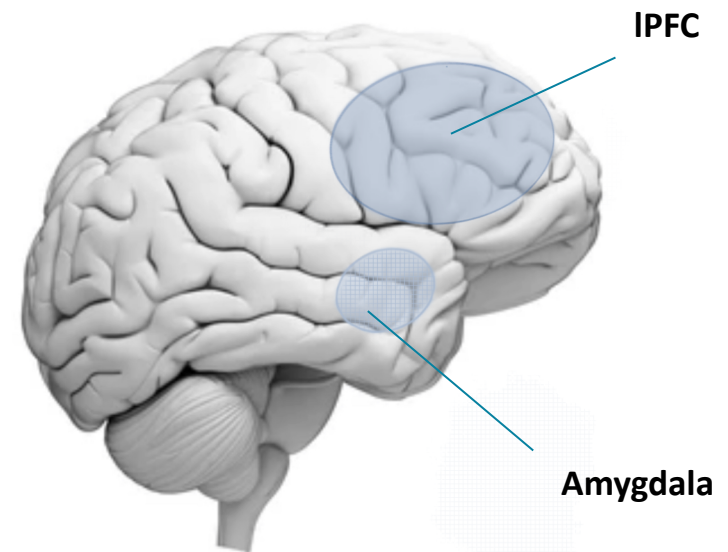
- Can be buffering or aggravating depending on strategy
- Adaptive versus maladaptive strategies → context-dependent?
(Aldao et al., 2012, 2014; Kobylińska and Kusev, 2019)

Adaptive strategies:

- positive reappraisal
- acceptance
- putting into perspective
- refocus on planning
- positive refocus

Maladaptive strategies:

- self-blame
- catastrophizing
- other-blame
- rumination

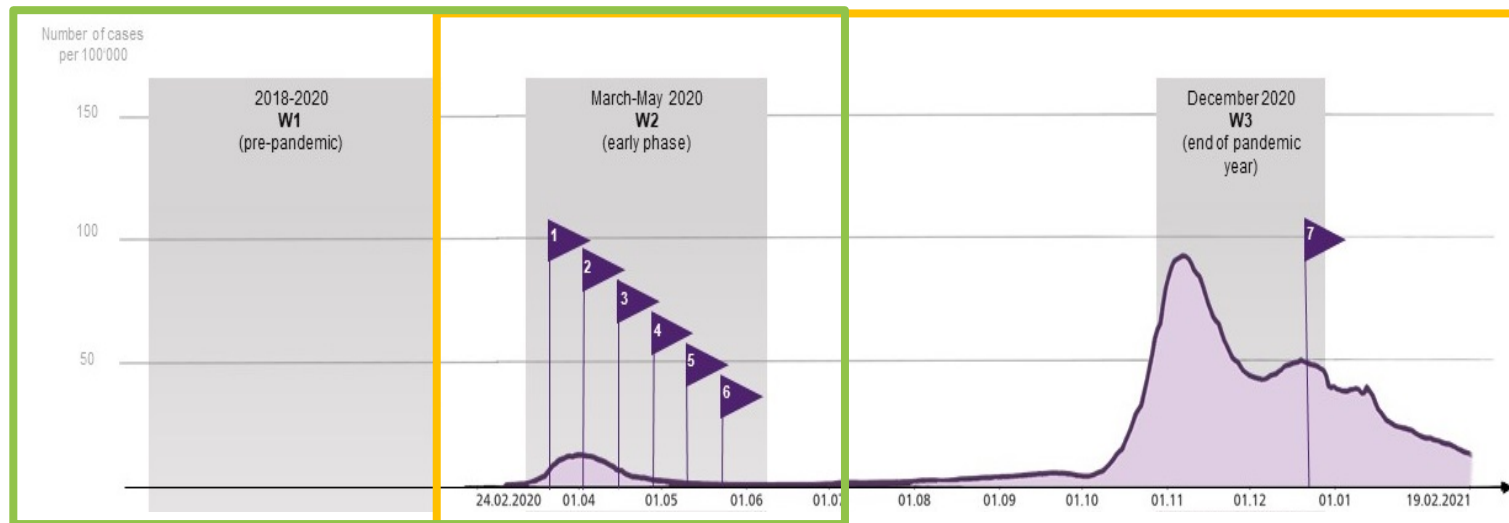


- 📖 Lateral prefrontal cortex (IPFC) and amygdala
- 📖 Network alterations – behavioral dysfunctions

(Buhle et al., 2014, Zhang et al., 2018, Raschle et al., 2019)

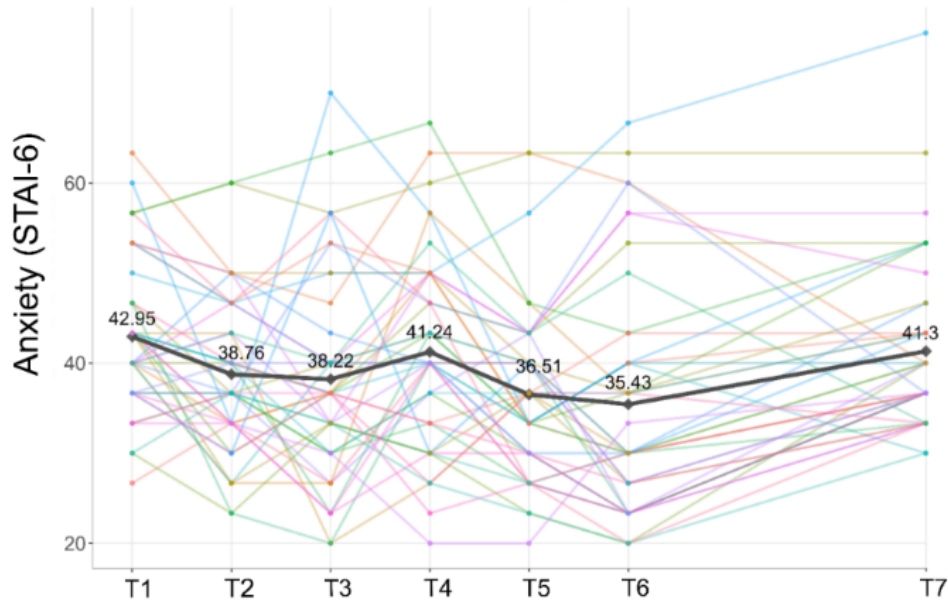
Methods and aims: long-term

- ❖ **Mental health variations in adults**
 - Polynomial mixed effects models
- ❖ **Emotion regulation strategies and psychological well-being**
 - Emotion regulation strategies → depression/anxiety
- ❖ **Pre-pandemic brain correlates and psychological well-being**
 - Mediation models : structural brain measures' association with mental health through ER strategies



Adult mental health across the first ten months (March-December 2020)

Anxiety



Anxiety

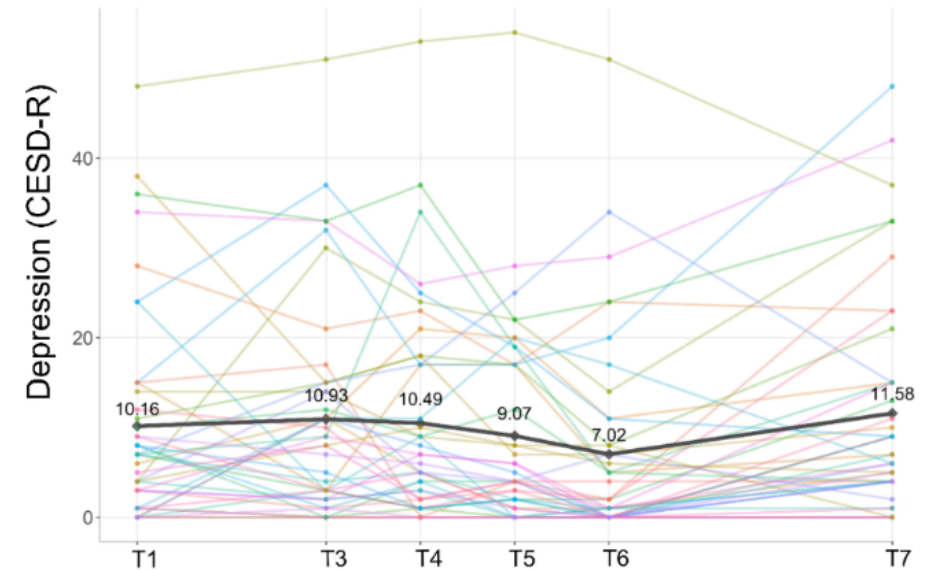
Changes best described by a quadratic model

$$B_{\text{linear}} = -0.02, \beta_{\text{quadratic}} = 0.0005$$

STAI \geq 40

clinically significant level of anxiety

Depression



Depression

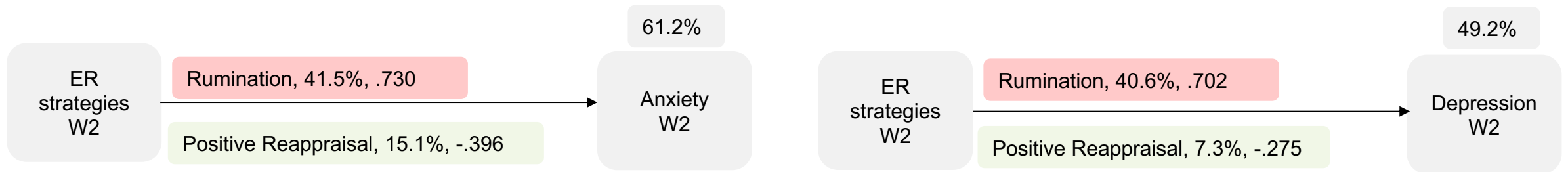
Changes best described by a cubic model

$$B_{\text{linear}} = 0.12, \beta_{\text{quadratic}} = -0.02, \beta_{\text{cubic}} = 0.0005$$

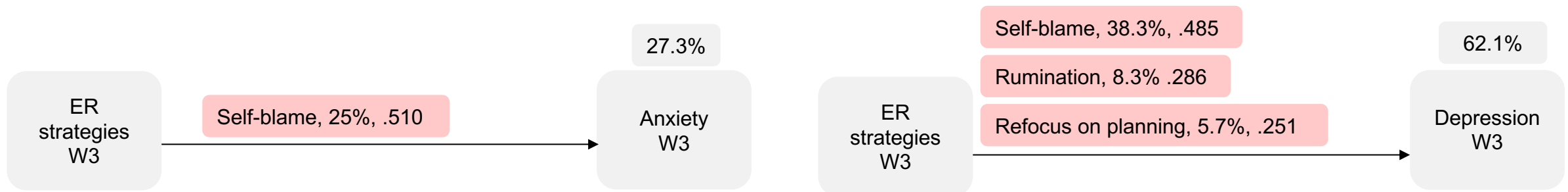
CESD-R \geq 16

subthreshold depression

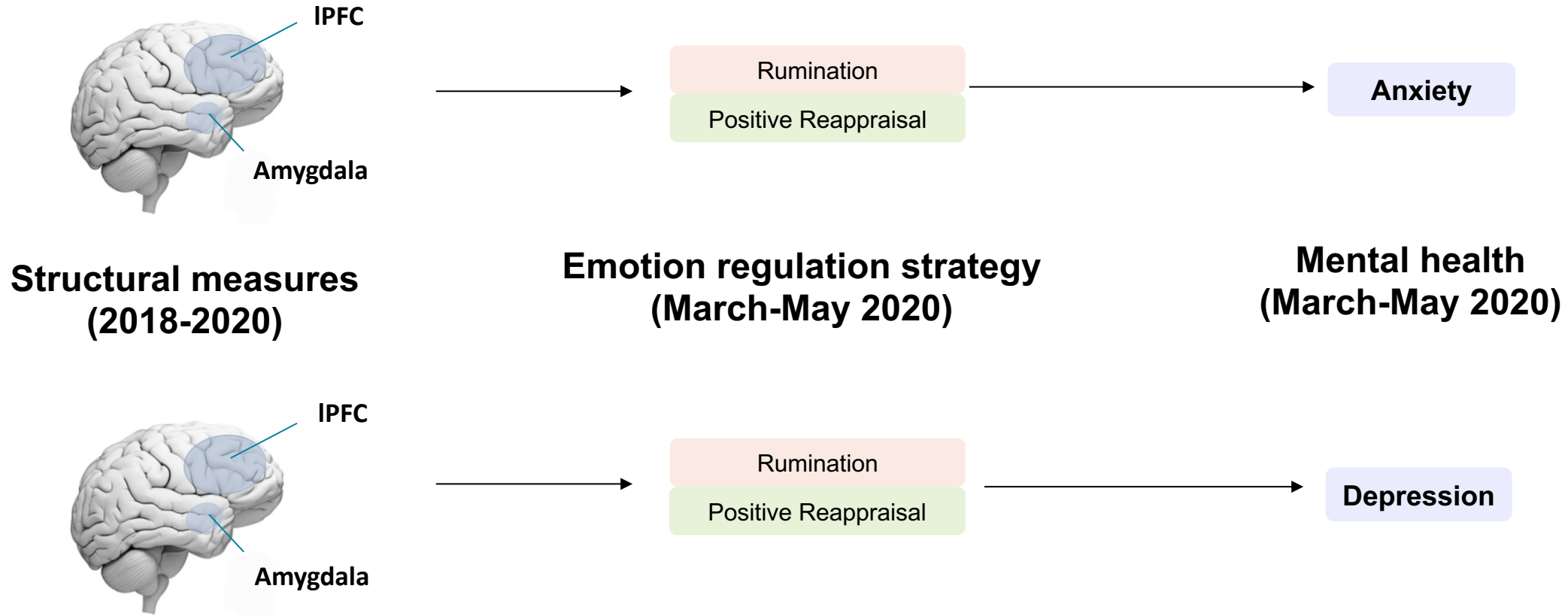
ER strategy use and mental health during W2 (March-May 2020)



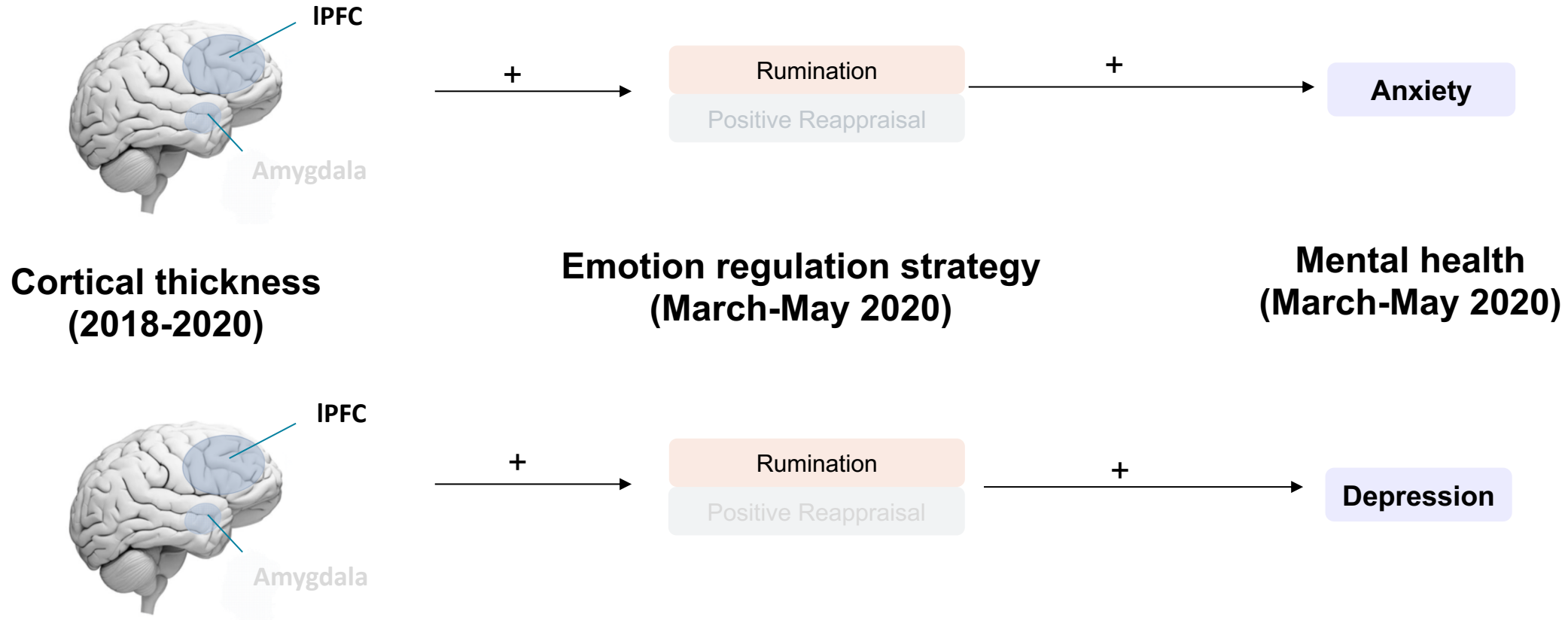
ER strategy use and mental health during W3 (December 2020)





Structural brain correlates, ER strategies and mental health





Structural brain correlates, ER strategies and mental health




 non-linear changes in mental health, large interindividual differences

 mothers' depressive symptoms and experienced burden affects children's well-being

 meeting friends significantly improved children's mood during restrictions

 maladaptive strategies more strongly associated with mental health and contextual strategy use

 ER-related structural brain features indirectly affect well-being through ER strategy use

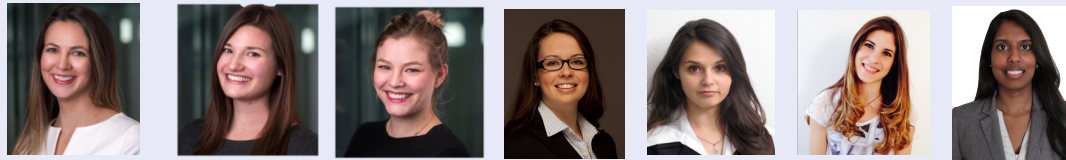


University of
Zurich ^{UZH}



Jacobs Center for Productive Youth Development

Thank you for your attention!



scientific reports

OPEN Mental well-being during the first months of Covid-19 in adults and children: behavioral evidence and neural precursors

Reka Borbás^{1,2}, Lynn Valerie Feilhaber^{1,2}, Flaminia Dimanova^{1,2}, Alessia Negri¹, Janani Arudchelvan¹, Cilly Bernardette Schneider¹ & Nora Maria Raschle^{1,2,3,4}

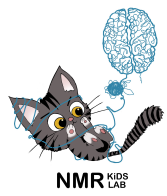
Parenting such as the Covid-19 pandemic has shown to impact our physical and mental well-being, with particular challenges for children and families. We describe data from 13 studies (12, ages 2-12, 12 mothers and 12 children; 11, ages 1-12 years involving 96 adolescents) that changes in child and adult well-being, 12 months after associations of mental well-being, and 12 associations between pre-pandemic brain activation during mentalizing and later face or burden, in which the prevalence of clinically significant anxiety levels was 19.80% and antidepressant depression 22.20%. Long-term burden in parents was moderately elevated. Overall, scores of depression, anxiety, and long-term burden decreased across the 12 months after Covid-19 onset. Children's behavioral and emotional problems during Covid-19 did not significantly differ from pre-pandemic levels and decreased during restrictions. Mothers' subjective burden of care was associated with children's emotional and behavioral problems, while depression levels in mothers were related to children's mood. Furthermore, parenting from ages 1-12 years was a significant predictor of children's mood during early restrictions. The pandemic neural correlates of mentalizing in prefrontal regions provided later development of fear of illness and viruses in all participants, while temporalis activation provided higher subjective burden in mothers.

The global onset of the coronavirus disease 2019 (Covid-19) pandemic has been recognized as a significant threat to our physical and mental well-being. Worldwide efforts have been undertaken including preventive health measures to slow down its spread. In child populations, the most common symptoms have been increased school absence, worry, fears, fears, and social withdrawal. Fear and accompanying evidence includes that restrictions (e.g., school closure, lockdown, social distancing) may have a significant effect on individuals' psychosocial functioning, possibly through increases in emotional distress¹. Evidence indicates that mental health consequences include an increase in neurophysiological responses of affect and behavior^{2,3}. Such increases in negative affect (e.g., stress, anxiety, depression, or emotion dysregulation) associated with Covid-19 and restrictions are reported globally^{4,5}. The duration of lockdown and associated increases have been linked to increased distress⁶. Negative effects tend to be higher in younger individuals, those with chronic disease or pre-existing health conditions, females and those living alone or in socioeconomically adverse settings⁷.

Children, parents, and families have been particularly affected by the Covid-19 pandemic. A reduction in social contacts is opposed to the human social nature and our existing nature^{8,9}. For children and adolescents, parents' perceived knowledge, the ability to engage children and adolescents' experiences are, availability and mental health responses (e.g., depression and anxiety) have been reported to increase during pandemics¹⁰. Moreover, parents' psychological distress affects children's ability to adjust to new situations, and may therefore prevent the development of behavioral and emotional problems¹¹. High anxiety or depression responses in parents have been associated with an increase in health spending (child abuse prevention) including urgent consultation for policy-makers to provide resources and support for at-risk families.

Jacobs Center for Productive Youth Development, University of Zurich, Switzerland, University Psychiatric Clinic Basel and University of Basel, Switzerland, Neuroimaging Center Zurich, University of Zurich and ETH Zurich, Zurich, Switzerland, *email: nora.raschle@jacobscenter.unizh.ch

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Direct and indirect effects of dorsolateral prefrontal cortex and emotion regulation strategy use on mental health during Covid-19

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Author assertions: Conflict of Interest: No Public Data: No Preregistration: No

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Abstract Background: Covid-19 and associated restrictions have been linked to negative mental health outcomes across the globe. Cognitive emotion regulation strategies constitute means to mitigate negative affect resulting from stressful life events, possibly offering an opportunity to change negative consequences associated with pandemics. Neuroanatomy...

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