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Short communication

Cognitive reappraisal and types of skin picking – A longitudinal study with pre-pandemic and COVID-19 pandemic data

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ABSTRACT

During the COVID-19 pandemic many individuals are exposed to stress of unknown duration, and due to prolonged stay-at-home period they are cut off from access to many effective coping strategies. This situation may exaggerate the use of maladaptive coping methods that are triggered by stress and boredom, and may be adopted in isolation, such as pathological skin picking. The aim of our study was to investigate the change in skin picking behaviours during the pandemic in comparison with the time prior to the pandemic onset. We also tested whether applying cognitive reappraisal as an coping strategy may affect skin picking. Self-report questionnaires measuring: automatic and focused skin picking, cognitive reappraisal, the experience of stress and loneliness were administered online to a non-clinical sample three times: 1) before the pandemic, 2) during mandatory stay at home; 3) at the time when most strict restrictions were lifted. Linear mixed-effects models were used to analyse the data. Cognitive reappraisal was found to be negatively associated with focused skin-picking regardless of the time of the measurement. In case of automatic skin picking, the link with cognitive reappraisal was significant only at the baseline and disappeared during the pandemic.

1. Introduction

In 2013 skin picking was included in the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders as ‘Excoriation (Skin Picking) Disorder’ and is presently classified under ‘Obsessive Compulsive and Related Disorders’. The core symptoms of this disorder include repetitive and difficult to stop manipulation of the skin and appearance of picking-related tissue damage; also psychological distress or functioning impairment resulting from picking should be present (American Psychiatric Association, 2013).

Skin picking varies in terms of frequency and intensity. In the general population only a small proportion of actual picking behaviours is experienced as problematic and meets the diagnostic criteria for excoriating disorder, whereas a wide range of picking is not associated with efforts to stop skin manipulation and with noticeable distress or impairment (Bohne et al., 2002; Hayes et al., 2009; Prochwicz et al., 2016). Also different forms of skin picking, likely related to different underlying factors, were observed: some individuals engage in picking consciously (focused skin picking), whereas others pick the skin outside of awareness (automatic skin picking). Mixed type was also reported (Pozza et al., 2016; Walther et al., 2009).

Skin picking is a chronic condition, where periods of improvement are followed by periods of increased severity. Till now, some psychological factors have been identified as possibly influencing skin picking frequency. Among them negative emotional states associated with both exaggerated tension (e.g., anxiety) and abnormally low stimulation (e.g., boredom), have been confirmed as triggering picking and therefore shaping the skin picking disorder’s course (Penzel, 2003; Snorrason et al., 2010). From this point of view, skin picking may be perceived as a regulation strategy aimed at decreasing or increasing activation through performing repetitive behaviours (Penzel, 2003; Snorrason et al., 2010).

Although the disposition to respond with over- or under-activation is largely temperamental, some rare life events are so distressing, that they certainly evoke negative emotions in a large proportion of the community. One of such events is the current COVID-19 pandemic. It is not surprising, that there is substantial increase in anxiety and worry in response to the rapid spread of the disease (Limcaoco et al., 2020). Apart from the health hazard, sudden lifestyle changes associated with the COVID-19 disease prevention may also significantly affect the mental health of community members. Maintaining social distancing, staying at home for prolonged periods, and reducing physical activity, limits the range of assessable activates helping people to cope with distress.

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Therefore, it is likely, that under pandemic conditions the use of mal-adaptive coping strategies, such as skin picking, would increase. We may expect that individuals suffering from skin picking can exaggerate their repetitive behaviours in response to prolonged experiences of anxiety and worry (Penzel, 2003; Prochwicz et al., 2018; Twohig et al., 2006). Moreover, the advised, and in some cases obligatory stay at home narrows down the number of coping methods to indoor activities, which further increases the likelihood of skin-picking being chosen to gain relief from negative emotional states. On the other hand, the necessity to stay at home reduces the sources of stimulation-providing activities and may provoke specific feelings such as boredom or loneliness that are known to increase the urge to pick (Bohne et al., 2002). Therefore, individuals who pick the skin mostly in response to abnormally low stimulation (often representing automatic style of picking, Penzel, 2003; Walther et al., 2009) may also reveal the exaggeration of picking due to prolonged understimulation.

Furthermore, limited access to skin diseases assessment and therapy observed during the COVID-19 pandemic (Gentileschi et al., 2020; Litchman et al., 2020) may have the especially strong impact on people suffering from skin-picking, as they can be both inaccurately diagnosed and treated, as well as experience difficulties in seeking medical help due to skin picking consequences such as infections, scars, and disfigurement. Therefore, it is particularly important to understand the impact of the current situation on the frequency of skin picking.

The aim of our study was to investigate changes in skin picking in a non-clinical group of young adults during lockdown related to the COVID-19 epidemic. As a baseline we used the non-published data collected before the epidemic onset. The second survey was conducted when residents in Poland were required to stay at home except to carry out essential activities (health visits, purchasing medicines, food and beverages) or providing essential work. At that time restrictive measures based on physical distancing were strongly respected and were adopted long enough to affect individuals’ behaviours and comfort. The third survey was conducted two weeks after the strictest limitations associated with the stay-at-home mandate were lifted. This time most public places (e.g., restaurants, pubs, offices, shops, parks, playgrounds) were free to open.

Previous studies (Klosowska et al., 2019; Prochwicz et al., 2018) indicated that cognitive reappraisal, i.e. reinterpretation of emotionally valanced stimuli in the early stages of emotion processing (Gross, 1998a, 1998b; Gross & John, 2003) may efficiently reduce the general skin picking severity. Therefore, in the current study we also tested whether the disposition to apply cognitive reappraisal may decrease skin picking under pandemic conditions characterized jointly by: heightened anxiety, reduced number of accessible coping methods and limited number of external stimulation. Since cognitive reappraisal involves the change of the way one thinks, it may be applied without limitation also during the time of lockdown when other behaviourally-oriented coping methods are less accessible.

In the current study we predicted that focused and automatic skin picking would increase during the COVID-19 pandemic, i.e. that the skin picking level reported by participants during the stay-at-home period would be higher compared to baseline. We also hypothesised that the tendency to apply cognitive reappraisal would be negatively related to the level of both focused and automatic skin picking.

2. Methods

2.1. Participants

All participants were recruited through convenience sampling from a variety of websites and social media applications using advertisements. The study was conducted online, taken on a computer or mobile device. The advertisement to participate was provided to potential responders three times. As a baseline (conditions prior to pandemic) we adopted the data on skin picking behaviours obtained from an online survey conducted on 190 volunteers between June 2019 and February 2020 (the first case of COVID-19 disease in Poland was reported on March 4, 2020). The second measurement was made between April 19, 2020 and May 12, 2020, i.e. during the time of lockdown. The invitation to participate was sent again to the responders who took part in the first part of the research, however, this time only 49 of 190 individuals agreed to participate in the survey. The individuals who participated in the second part of the study were invited to fulfil the survey for the third time (between July 3, 2020 and July 11, 2020); 32 of them responded (see Table 1).

2.2. Measurements

2.2.1. The Milwaukee Inventory for the Dimensions of Adults Skin picking (MIDAS, Walther et al., 2009)

The MIDAS is a 12-item, self-administered scale developed to measure two skin-picking dimensions: focused (6-items, e.g. “I pick my skin because of something that has happened to me during the day”) and automatic (6-items, e.g. “I pick my skin when I am concentrating on another activity.”). Responses are given on a 5-point Likert scale (1-not true for any of my picking, 3-true for about half of my picking, 6-true for all of my picking). The Polish translation of the MIDAS was used in the current study. The Cronbach’s alphas calculated for the study sample were: α = 0.90 for the focused skin picking dimension, α = 0.84 for the automatic skin picking dimension.

2.2.2. Emotion Regulation Questionnaire (ERQ; Gross & John, 2003)

The ERQ is a self-report questionnaire of 10 items divided into two separate subscales measuring two emotion regulation strategies: expressive suppression (4-items, e.g. “When I am feeling negative emotions, I make sure not to express them.”) and cognitive reappraisal (6-items, e.g. “When I want to feel more positive emotion (such as joy or amusement), I change what I’m thinking about.”). Participants answer on a 7-point Likert scale (1- strongly agree to 7-strongly disagree). In the current study we utilized the Polish translation of the ERQ. Only the scores of the cognitive reappraisal subscale were analysed (the Cronbach’s alpha for the study sample was 0.82).

2.2.3. The Revised University of California and Los Angeles (R-UCLA) Loneliness Scale (Kwiatkowska et al., 2017; Russell et al., 1980)

The Revised UCLA Loneliness Scale is a 20-item self-report questionnaire designed to measure one’s subjective feelings of loneliness, as well as feelings of social isolation. It requires participants to indicate on a 4-point Likert scale (1-never to 4-often) how often each statement applies to them (sample questions: “I lack companionship” , “There is no one I can turn to”). The scale has adequate reliability with a Cronbach’s alpha coefficient 0.87.

2.2.4. Perceived Stress Scale (PSS-10; Cohen et al., 1983; Juczyński, Oginska-Bulik, 2009)

The PSS contains 10 statements assessing the degree of stressful experiences during the previous 4 weeks (e.g. “In the last month, how often have you felt nervous and “stressed”?” “In the last month, how often have you felt that you were unable to control the important things in your life?”). Each item is rated on a 5-point scale (0-never, 4-very often). In the study we modified the instructions provided to participants by adding statements informing that they are asked to assess the perceived stress related to the COVID-19 pandemic. The reliability of this modified PSS-10 version was assessed with Cronbach’s alpha coefficients, resulting value 0.90.

2.2.5. Other measures

In the study we also collected data concerning (1) the demographic characteristics of the participants; (2) the number of people the respondents spend time with at home during the period of limited social contacts; (3) the type of relationship a participant has with the people
the he/she spends time with (e.g., parents, siblings, spouse, flatmate etc.); (4) the quality of this relationship assessed on a 5-point scale from 1-very bad to 5-very good.

2.3. Procedure

Before attending the study all participants were provided with short, written information concerning the purpose and length of the research. They were also asked to consent to participation by marking the appropriate box on the computerized study form. Individuals who agreed to participate fulfilled an online survey which included several questionnaires and questions on demographics. During the first measurement participants completed the ERQ, the MIDAS and questions about their demographic characteristics. During the second and third measurements the participants were provided with: the MIDAS, the PSS-10, the R-UCLA. Also, data on their demographic characteristics and housemates were gathered (see Fig. 1). The study was approved by the local Ethic Committee.

3. Results

3.1. Data analysis plan

The associations of cognitive reappraisal measured at baseline with automatic and focused skin picking longitudinal change were estimated using general linear mixed-effects models. Each type of skin-picking (automatic/focused) was entered separately as a dependent variable. In all of the models subject-specific intercept (random effect) was incorporated to account for within-subject dependencies. Sex and age were controlled for. Time and cognitive reappraisal were included as a fixed factors in the first model to check if there was a significant difference in skin picking intensity between different time periods and whether there was an association between cognitive reappraisal and skin picking. In the second model the reappraisal - time interaction was also included - this model tested whether the effect of cognitive reappraisal on skin picking changed over time. The nominal variables were dummy coded and continuous variables were centred around mean. The models were estimated using restricted maximum likelihood, and a Satterthwaite adjustment was used to compute the degrees of freedom. As a measure of model fit, conditional ($R^2_c$) and marginal ($R^2_m$)

### Table 1

Characteristics of the sample.

| category    | characteristics | time 1 | % of total sample (N = 190) | N | % of total sample (N = 49) | N | % of total sample (N = 32) |
|-------------|-----------------|--------|-----------------------------|---|---------------------------|---|---------------------------|
| sex         | women           | 142    | 74.7                        | 42 | 85.7                      | 28 | 75.5                      |
|             | men             | 47     | 24.7                        | 7  | 14.3                      | 4  | 12.5                      |
|             | diverse         | 1      | 0.5                         | 0  | 0                         | 0  | 0                         |
| employment  | student, not employed | 100    | 52.6                        | 36 | 73.5                      | 25 | 78.1                      |
|             | PhD student, not employed | 3     | 1.5                         | 1  | 2.00                      | 1  | 3.1                       |
|             | student, employed | 32     | 16.8                        | 8  | 16.3                      | 3  | 9.4                       |
|             | employed        | 53     | 27.9                        | 4  | 8.2                       | 3  | 9.4                       |
|             | not employed    | 2      | 1.1                         | 0  | 0                         | 0  | 0                         |
| place of origin | city > 100 000 | 73     | 38.4                        | 19 | 38.8                      | 16 | 50.0                      |
|             | city 2 000–9 999 | 41     | 21.6                        | 9  | 18.4                      | 5  | 15.6                      |
|             | city < 2 000    | 24     | 12.6                        | 7  | 14.3                      | 3  | 9.4                       |
|             | village         | 52     | 27.4                        | 14 | 28.6                      | 8  | 25.0                      |
| housemate   | mother          | -      | -                           | 37 | 75.5                      | 20 | 62.5                      |
|             | father          | -      | -                           | 31 | 63.3                      | 17 | 53.1                      |
|             | grandmother     | -      | -                           | 5  | 10.2                      | 3  | 9.4                       |
|             | grandfather     | -      | -                           | 3  | 6.1                       | 1  | 3.1                       |
|             | aunt            | -      | -                           | 2  | 4.1                       | 1  | 3.1                       |
|             | uncle           | -      | -                           | 1  | 2.1                       | 0  | 0.0                       |
|             | brother         | -      | -                           | 14 | 28.6                      | 5  | 15.6                      |
|             | sister          | -      | -                           | 15 | 30.6                      | 7  | 21.9                      |
|             | husband/wife    | -      | -                           | 2  | 4.1                       | 1  | 3.1                       |
|             | partner         | -      | -                           | 8  | 16.3                      | 8  | 25.0                      |
|             | other           | -      | -                           | 4  | 8.2                       | 6  | 18.8                      |
|             | living alone    | -      | -                           | 2  | 4.1                       | 1  | 3.1                       |

Note: time 1 – baseline, time 2 – pandemic + government restrictions, time 3 – pandemic + loosened restrictions.

Fig. 1. Procedure of the study.
coefficients of determination, based on the method proposed by Nakagawa and Schielzeth (2013) were estimated.

Before conducting the analysis we assessed the viability of a general linear mixed-effects model: a visual examination of the distribution of the standardized residuals using P–P plot showed that residuals had approximately normal distributions. Plotting the residuals against the fitted predicted values suggested variance heterogeneity, however, previous simulation studies (Jacqmin-Gadda et al., 2007) proved that inference for the fixed effects in a linear mixed effects model is not impaired when true error distribution is heteroscedastic. All tests were two-tailed. Analyses were performed using the open software Jamovi version 1.1.90 (Jamovi, 2018).

3.2. Descriptive statistics

Mean, standard deviation, maximum and minimum of the variables are presented in Table 2.

3.3. Model 1: The effects of time and cognitive reappraisal on skin picking types

In case of automatic skin picking, the main effect of cognitive reappraisal (F (1, 185.3) = 3.03, p = 0.08), as well as the main effect of time (F (2, 94.8) = 0.20, p = 0.82) were not significant. The estimated subject variance was 18.72, whereas the estimated residual variance was 6.02, and ICC (inter class correlation) was 0.76, indicating a substantial amount of between-subjects variability. Fixed effects (including controlled variables) explained 4% of automatic skin picking variance (R²m = 0.04) and full model (both the fixed and random effects) explained 77% of total variance (R² = 0.77).

For focused skin picking, the effect of time (F (2,87.7) = 0.70, p = 0.50) was also insignificant but the effect of cognitive reappraisal turned out to be statistically significant (F (1,183.9) = 8.16, p < 0.01) indicating that the higher the cognitive reappraisal, the lower the intensity of focused skin picking (b = −0.20, SE = 0.07, 95%CI: −0.34 to −0.06, p < 0.001). The estimated subject variance was 39.54, whereas the estimated residual variance was 8.09, and ICC was 0.83. Fixed effects explained 11% of focused skin picking variance and full model explained 85% of the total variance.

3.4. Model 2: Interactive effect of time and cognitive reappraisal on skin picking types

The second model showed a statistically significant interaction effect of time and cognitive reappraisal on automatic skin picking (F (2,89.8) = 11.34, p < 0.001). The fixed effects of this model explained approximately 6% of automatic skin picking variance, while the entire model explained 79% of total variance. A simple effects analysis showed that although there was a significant negative relationship between cognitive reappraisal and automatic skin picking measured before the pandemic (b = −0.14, SE = 0.05, 95%CI: −0.24 to −0.04, p < 0.01), this relationship was no longer significant during the period of strict restrictions introduced by the government at the beginning of the pandemic (b = 0.12, SE = 0.07, 95%CI: −0.01 to 0.26, p = 0.08) and later, when these restrictions were eased (b = 0.09, SE = 0.8, 95%CI: −0.07 to 0.24, p = 0.27). In case of focused skin picking the interaction effect of cognitive

Table 2

| Variable | Mean (SD) | Range | Mean (SD) | Range | Mean (SD) | Range |
|----------|----------|-------|----------|-------|----------|-------|
| Age      | 25.52 (8.09) | 19–63 | 21.30 (2.49) | 19–29 | 21.30 (2.60) | 19–28 |
| cognitive reappraisal | 27.01 (7.26) | 6–41 | - | - | - |
| focused skin picking | 7.42 (7.33) | 0–23 | 7.49 (7.06) | 0–20 | 8.28 (7.83) | 0–21 |
| automatic skin picking | 11.58 (4.99) | 0–24 | 12.06 (5.34) | 4–24 | 12.34 (5.40) | 5–22 |
| pandemic-related stress | - | - | 20.68 (7.16) | 6–32 | 19.06 (5.58) | 9–28 |
| loneliness | - | - | 43.27 (10.68) | 27–65 | 42.59 (10.91) | 28–71 |
| number of housemates | - | - | 2.59 (1.50) | 0–6 | 2.00 (1.16) | 0–5 |
| perceived level of closeness with housemates | - | - | - | - | 4.37 (0.72) | 3–5 |

Note: time 1: baseline, time 2 – pandemic + government restrictions, time 3 – pandemic + loosed restrictions; cognitive reappraisal was only measured at time 1; stress and loneliness were only measured at time 2 and time 3; perceived level of closeness with housemates was measured only at time 3; there was no significant differences (Wilcoxon signed-rank test) between stress measured at time 2 and time 3 (Z = −1.40, p = 0.16), as well as between sense of loneliness measured at time 2 and time 3 (Z = −0.51, p = 0.61).
reappraisal and time was insignificant (F(2,85.9) = 1.57, p = 0.21). Please see Table 3 and Fig. 2 for further details.

4. Discussion

The findings of the current study indicated that skin picking behaviours in the studied sample did not exaggerate during the period of the pandemic as compared to baseline. We also did not observe any changes in conscious and unconscious picking between the conditions of almost completely banned and limited mobility in public areas (Parts 2 and 3 of the study). Therefore, the assumption that stress, worry and isolation, being a possible psychological consequence of the COVID-19 pandemic, may lead to the increased use of skin picking as a method of activation adjustment, has not been confirmed. However, this result is not surprising, seeing that the subjective experience of stress and loneliness did not vary significantly between the two measurements conducted during the pandemic and was comparable to the typical results obtained in the PSS10 and the R-UCLA questionnaires (Juczyński, Ogitska-Bulik, 2009; Russel et al., 1980). The lack of expected skin picking aggravation may also be related to the fact, that almost all participants stayed at home with other persons, most frequently family members, and that none of them was strictly isolated due to a positive COVID-19 diagnosis. It is likely that in such conditions our responders retained access to social support, which could help them regulate tension effectively despite the limited possibility of leaving home.

Although in our study we did not notice increased skin picking related to the pandemic, we confirmed the previously observed relationship between skin picking and cognitive reappraisal (Kłosowska, Prochwicz, & Kalużna-Wielobob, 2019; Prochwicz et al., 2018). Our findings yielded that conscious picking is lower in individuals who apply cognitive reappraisal which is considered as an effective control strategy since it is applied before an emotion is triggered, and this way prevents the appearance of unpleasant tension (Gross, 1998a, 1998b; Gross, 2015; Gross, John, 2003). Therefore, individuals habitually using this regulation method experience negative emotions less frequently than those who allow an emotion to develop. Indeed, previous studies demonstrated that cognitive reappraisal may actually lessen physiological arousal (Gross, John, 2003), likely reducing the urge to pick the skin.

Admittedly, the reappraisal strategy was found to be particularly linked with focused, tension-related skin picking. Its efficiency was also observed in case of automatic picking, however, this relationship was only visible in the pre-pandemic period. Although recent studies demonstrated that automatic picking may occur in conditions of heightened tension (Prochwicz et al., 2018), and therefore may help to reduce arousal in a similar way as in the case of aware picking, usually this type of repetitive behaviour is thought to be related to low arousal and performed predominately in order to increase activation level (Penzel, 2003). As cognitive reappraisal can be used to cope with both over- and under-stimulation, it should be associated with a lower frequency of unconscious skin manipulation. This regulation strategy could be especially important in ameliorating boredom, because it may be able to change the value of the event (Nett et al., 2010) in such way, that it is perceived as more exciting, and thus increasing activation.

In case of unconscious excoriation the protective role of reappraisal was no longer present during the COVID-19 pandemic. It is possible, that during mandatory stay-at-home period the decrease in activation may be caused not only by negative emotional states, such as boredom or sadness, but it could be also a direct consequence of prolonged physical inactivity. In conditions when mobility outside one’s residence is almost totally banned for weeks or even months, the subjectively experienced level of physical stimulation may become abnormally low. In such circumstances the daily routine is also seriously affected, which can result in subsided activation pattern. Cognitive-oriented methods of emotion regulation may not be sufficient to regulate arousal reduced due to physical inactivity and behaviourally-oriented strategies such as skin picking could be more efficient in elevating this kind of under-stimulation. However, this is only a hypothesis and it needs to be explored in future studies.

The following shortcomings of the present study need to be considered. Firstly, potential limitations result from the fact that recruitment and assessment were conducted exclusively via the Internet, which narrowed down the possibility to control responders’ participation. Moreover, due to the sampling method, the participants could not be medically examined and their actual level of skin picking was not verified. The data were collected solely via self-reports, therefore, they may not exactly reflect the actual frequency of skin picking in the study sample, unconscious picking in particular, as well as its changes. Secondly, the low response rate for Part 2 and 3 of the study indicates that the present results may be biased towards individuals who were more interested in completing the survey. It should be mentioned, however, that imbalanced group sizes across the measurement were caused by the fact that at baseline we collected data over an 8-month period, whereas during Part 2 and 3 of the study the data were gathered within a few weeks due to the dynamically changing epidemiological situation in the country. Future studies on skin picking course may wish to use technology to ensure that the same participant responds to all administrations, which will allow to balance the number of days between measurements. Thirdly, at the baseline stress and loneliness were not measured, therefore, we were not able to state whether these experiences varied during the pandemic as compared to the previous period.

To sum up, the findings obtained in the study did not support our main prediction that experiencing stress and worry due to being exposed to infection and prolonged social isolation will result in skin picking aggravation. However, the data concerning participants’ stress, loneliness and the number of people they stayed with during mandatory stay at home period suggests, that they may not feel the need to exaggerate the intensity of habitually used coping methods, such as skin picking. Nevertheless, the study confirmed the previously observed (Prochwicz et al., 2018) negative relationship linking cognitive reappraisal and skin picking. We found, that participants using reappraisal to regulate emotional states revealed lower level of both focused and automatic skin picking at the time prior to the COVID-19 pandemic. What is more, at the pandemic conditions the protective role of reappraisal was still observed in case of conscious picking, suggesting the important role of cognitive emotional control on skin picking prevention.

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Declaration of competing interest

None.

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