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Signal detection in pathological skin picking. Findings from non-clinical sample

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Summary

Aim of the study. The present study investigated the role of general impulsivity in pathological skin picking (PSP).

Material and methods. Three groups of participants: university students who pick their skin and experience distress and/or functional impairment caused by picking (n = 27), students who pick their skin but do not experience distress and/or functional impairment caused by picking (n = 19), and students without history of skin picking (n = 43) were administered the task based on the search for the emotionally neutral signal hidden among distractors. It was predicted that individuals suffering from PSP should present an impulsive reaction style, i.e. they should search for the signal faster than individuals without history of PSP and should react to irrelevant stimuli rather than missing the correct reaction.

Results. Participants with severe picking performed as quickly and correctly as controls, thus not revealing an impulsive reaction pattern. Students with milder forms of picking reacted more slowly than the others gradually diminishing their performance as the task was extended.

Discussion. Individuals with severe PSP symptoms are not characterized by general impulsiveness defined as a tendency to react quickly and carelessly. Skin picking behaviors of different severity may be associated with different signal detection patterns.

Conclusions. The results of the current study indicate that skin picking is not a homogeneous condition. They also provide that skin picking behavior in 'severe' pickers and non – 'severe' ones may have different underlying psychological mechanisms.

pathological skin picking / signal detection / impulsiveness

INTRODUCTION

Pathological skin picking (PSP) is defined as a repetitive and ritualistic picking, digging or scratching of skin which leads to visible tissue damages [1, 2, 3]. Pathological skin picking could leads to social isolation, and in some cases, to the avoidance of any activity which could expose skin damages [3, 4, 5]. Medical complications of skin picking involve scaring, bleeding, soreness, skin hyperpigmentation and re – current infections which oftentimes might require antibiotic treatment. In severe cases visible disfigurement of one's skin warrants surgical intervention [4]. Clinical levels of skin picking as defined by emotional distress or functional impairment occur in approximately 1.4–5.4% of the general population [6, 7, 8].

One of the most important aspects of the skin picking is its impulsiveness considered as an ineffective or failing control resulting in uninhibited behavior. Impulsiveness could be well seen in a course of picking episode. Individuals with

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PSP start to pick their skin immediately after feeling an urge to pick. The short time interval between cognitive process and motor behavior is a characteristic trait of skin picking which differentiate it from obsessive-compulsive disorders [9]. Furthermore, individuals with PSP report that they are not able to hold picking back or even delaying it, what could be caused by the underlying motor inhibition deficit. Impaired motor inhibition in PSP was also confirmed in the experimental research use of the Stop Signal Task [10].

The study concerns the question whether skin picking behaviors are related to general impulsiveness defined as a tendency to react in conditions when the reaction is not really required rather than inhibit performance in situations when acting is necessary. Particularly, it was assumed that individuals with PSP symptoms should perform faster in a simple signal detection task than participants who are not engaged in any form of picking. Furthermore, they should reveal the tendency to make more 'false – alarm' mistakes compared with mistakes relying on missing reactions, responding to irrelevant stimuli rather than inhibit their reaction to a correct signal [11].

METHODS

Participants

Participants were recruited on the basis of their answers obtained in the Skin Picking Scale (see below). Skin Picking Scale [12] is a paper – pen method which allows one to measure the number and intensity of skin picking symptoms. The SPS was administered to the large group undergraduate Pedagogical University students during the classes. The three groups of participants were to be distinguished on the basis of PSP score: the severe skin picking one, the pickers with mild form of picking, and the control group. Participants were determined to suffer from severe forms of skin picking when they reported to pick the skin, experience the urge of picking, experience at least some distress caused by picking or some functional impairment. In the current study 27 individuals (26 female and 1 male), mean age 20.73 years old, SD=1.91, range 19–29 years old) met study – defined criteria for severe forms of skin picking and were included in subsequent analyses as the 'skin pickers' group. Participants were determined to suffer from mild forms of picking when they reported to pick the skin, experience the urge of picking and denying experience distress caused by picking and functional impairment. In the current study 19 participants (18 women, 1 man, mean age 20.10 years old, SD=0.73, range 19–21 years old) were reported to demonstrate milder forms of skin picking. Participants within the control group were recruited after completing the SPS scale scoring 0, denying thus experiencing any skin picking symptoms. The control group consisted of 43 students (39 female and 4 male, mean age 20.16 years old, SD=0.97 range 19–23 years old). Within the group with severe skin picking the mean score obtained in SPS scale was 11.77 (SD=3.98), whereas in the group with milder forms of picking the mean score was 4.52 (SD=1.66). The difference between mean scores was statistically significant ($t[44]=7.44$; $p = 0.0001$). The three groups of participants did not differ in respect of age $F[2,86] =1.74$; $p=0.17$).

All participants signed informed consent after being provided with a description of the task. All participants completed the study voluntarily.

Measures

The Skin Picking Scale, SPS [12].

SPS is a self – reported scale that allows us to asses the severity of skin picking behaviors during its last week of occurrence. It contains six items referring to the picking urge frequency, picking urge intensity, time spent on picking, functioning impairment caused by picking, distress, if prevented from picking and avoidance behavior caused by picking. SPS version used in the current research was the Polish version of the scale translated by authors. Cronbach's alpha was calculated to assess the internal consistency of SPS. In a current sample Cronbach's alpha was 0.88 and showed adequate psychometric properties.

The experimental task

All participants were presented the sheet of paper composed of 400 icons, each represents a clock face, set horizontally (20 lines with 20 icons in each line). Clock icons represent only full hours (i.e. 1.00), and the number of clock faces showing specific hour was well – balanced [13]. Clock faces corresponding to one pre – defined hour are used as a signal. The task requires an individual to detect as many signals as possible during a short – time interval. There were 40 signals on the sheet of paper. The remaining icons constitute information noise or distractors. The test provides five measures which represent efficiency of analyzing and selecting information process: the number of icons analyzed; the number of mistakes relies on marking an icon other than a signal (FA), the number of mistakes relies on missing the correct signal (OM); the total number of mistakes (D); and the proportion of different types of mistakes (β = FA/D).

Procedure

All participants were administered the experimental task. They were asked to detect as many icons representing 5.00 pm as possible in a 2 minute period and mark them in any manner. The participants started their search from the left side of the sheet to the right one. Once the time was over, each participant marked the icon which he/she analyzed as the last one. All the participants performed the task three times with short intervals (lasting about 1 minute) in between.

RESULTS

Number of icons analyzed by participants

To evaluate whether participants with PSP differ from the control group in respect of number of icons analyzed, a 3 (task performances) x 3 (groups) ANOVA was conducted. The analysis revealed a significant interaction effect between group and task performance ($F[2,86]=4.40$; $p=0.01$) indicating that the three groups of participants differed in the number of icons analyzed. The direct comparisons reveal that the individuals with severe picking did not differ significantly from the control group, whereas the results of participants with milder form of picking differed significantly from both the 'severe pickers' ($F[1,86]=8.48$; $p=0.004$) and from students who do not pick the skin ($F[1.86]=5.30$, $p=0.002$). The analysis of the number of icons being analyzed made separately for each execution of the task revealed that the differences between the groups occurred only in the second ($F[2,86]=3.75$; $p=0.02$) and the third ($F[2,86]=4.92$; $p=0.001$) execution of the test. On the second task performance the group with mild picking form search for the signal significantly slower in comparison to both the controls ($F[1,86]=5.80$; $p=0.01$) and the 'severe pickers' ($F[1,86]=6.37$; $p=0.01$). The same result pattern occurred during the third task execution ($F[1,86]=6.71$; $p=0.001$; $F[1.86]=9.10$; $p=0.003$ respectively). (Fig. 1).

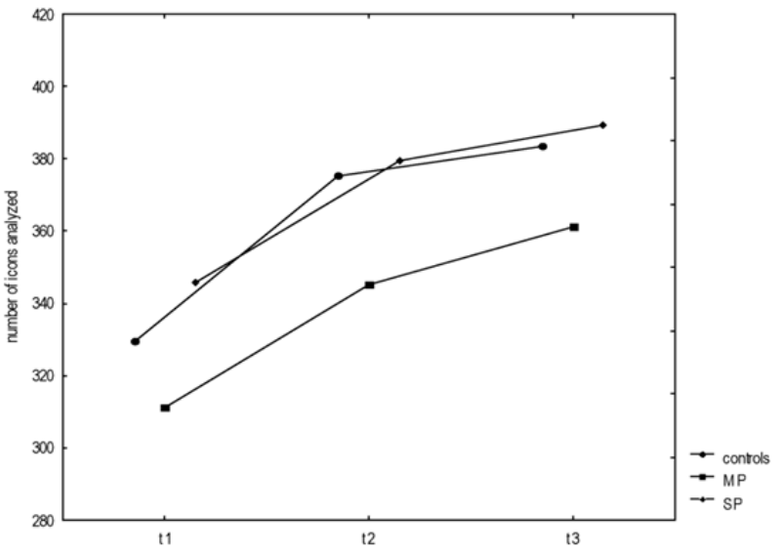


Figure 1. The numbers of icon analyzed in the three experimental tasks by participants with severe forms of picking (SP, n=27), participants with mild forms of picking (MP, n=19) and control group (n=43)

Accuracy analyzes

The analysis of the number of mistakes made by participants (D) did not reveal any significant differences (ANOVA, 3 task performances x 3 groups, $F < 1$). The com-

parisons made separately for both the 'false alarms' and the omitting mistakes did not reveal the main effect of group either (ANOVA, 3 task performances x 3 groups, F < 1); however, direct comparisons revealed that during the second task execution individuals with mild picking made more 'false alarm' mistakes than the controls (F[1.86]=3.87; p=0.05) and 'severe pickers' (F[1.86]=4.57; p=0.03). The analysis of omitting mistakes did not reveal any significant differences (F<1).

distractors. Instead, the results show differences in the efficiency of signal detection between the group of students who pick their skin only occasionally and the two other groups of participants. Within the group of individuals with milder forms of picking search for the signal was significantly slower than in the case of 'severe pickers' and the students who do not pick the skin. During the second execution of the task they also made more 'false – alarm' mistakes. This pattern of differences shows that the group

Table 1. The number of icons analyzed and the mean number of mistakes made in the three executions of the task by the group of participants with severe forms of skin picking (SP, n=27), mild forms of skin picking (MP, n=19) and control group (n=43)

	SP			MP			Controls		
	t1 M(SD)	t 2 M(SD)	t3 M(SD)	t1 M(SD)	t2 M(SD)	t3 M(SD)	t1 M(SD)	t2 M(SD)	t3 M(SD)
NI	345.59 (49.99)	379.40 (30.78)	389.33 (22.57)	311.15 (64.00)	345.05 (58.88)	361.10 (46.59)	329.27 (65.92)	375.20 (45.00)	383.41 (26.00)
D	12.03 (8.30)	9.85 (6.07)	8.62 (5.29)	10.63 (6.58)	12.63 (8.04)	11.47 (6.42)	11.90 (8.04)	11.27 (5.81)	10.69 (5.54)
OM	11.33 (7.63)	9.70 (6.17)	8.29 (5.34)	10.15 (6.45)	11.63 (7.41)	10.94 (6.31)	11.48 (7.81)	11.00 (5.68)	10.41 (5.36)
FA	0.70 (1.29)	0.14 (4.51)	0.33 (3.95)	0.47 (0.93)	1.00 (2.67)	0.52 (0.81)	0.41 (1.03)	0.27 (0.54)	0.27 (0.58)

NOTE. SP = participants with severe forms of picking; MP = participants with mild forms of picking; NI = number of icons analyzed, D = total number of mistakes; OM = omitting mistakes, FA = 'false alarm' mistakes; t 1 = task 1; t 2 = task 2; t 3 = task 3.

The strategies of test performances measured with the β parameter (ANOVA, 3 task performances x 3 groups) did not differ significantly between the groups (F < 1). All the participants searched for the signals carefully, they would rather miss the correct signal than mark the incorrect icon.

DISCUSSION

The results of the current study indicate that individuals who suffer from severe forms of skin picking are not characterized by general impulsivity defined as a tendency to react quickly and carelessly [11]. The group with 'severe picking' did not differ from individuals who did not declare any form of skin picking neither in the number of icons searched for nor in the number of 'false – alarms' being made. Since the results obtained in the study show that severe skin picking is not related to the impaired resistance for with mild skin picking generally reveals more problems in the task relying on the search for a non – verbal signal.

Although the experimental task used in the current study concerned only the signal detection ability, on the basis of the results obtained one could speculate of the emotional factors which influence the skin picking problem. The experimental task was composed of 400 similar icons, and it was administered three times in the same form. This procedure could be perceived as fatiguing and tedious, especially by participants with a low threshold of arousal. At the very start of the task, when the test was administered for the first time, the three groups of participants revealed the same level of performance. The significant differences in the effectiveness of the selection mechanism occurred in later stages of the experiment. These results suggest that multiple executions of the same test help controls and participants with severe picking to improve their performance, while for the group with mild

forms of picking the multiple repetition of the same material diminishes their acting. On the basis on this finding one could assume that the source of skin picking is different for the two groups of pickers mentioned: persons who exhibit more severe picking start to pick in order to diminish the high arousal states, whereas individuals who pick occasionally initiate this kind of behavior to elevate the low arousal. It suggests that in this second group of sufferers the skin picking behaviors could be most often triggered by boredom induced during the simple, recurrent activity [14], while in the former one – by anxiety or other emotions connected with high arousal [15]. It is also possible that some of 'mild pickers' share the same mechanisms as 'severe' ones, but with different intensity.

The participants belonging to the 'mild pickers' group made more 'false – alarms' than the other two groups, but only in conditions in which the task was administered for the second time. Simultaneously, during the first and the third execution of the task the number of 'false – alarm' mistakes did not differ between groups. These results suggest that at the beginning of the task, when the level of boredom is relatively low, individuals with milder forms of picking do not make the type of mistakes reflecting the impulsive reacting style. However, they become more prone to impulsive behaviors when they have to repeat the same activity in the second task performance. In the third execution of the task, when the level of boredom should be the highest, this group of participants paradoxically starts to react as correctly as healthy controls and individuals with severe picking. However, in this case the enhanced correctness might be the result of the fact that in the last search for the 5.00 pm icon the number of 'false alarms' was generally very low for all the participants.

CONCLUSIONS AND LIMITATIONS

The results obtained show that PSP is a heterogeneous phenomenon. They also indicate that different mechanisms could underlie the symptoms of PSP of different intensity, and that different forms of psychological needs are advisable for PSP sufferers. The results obtained push us towards a further hypothesis according to which individuals with more severe PSP symptoms are more anxious than individuals with milder forms of picking, and that the latest group are more prone to pick their skin as a reaction to boredom unlike the former ones. However, the nature of the relationship between those emotional disturbances and skin picking has not been properly explained in the current research. What is more, the participants who had comorbid diagnosis were not excluded, since we could not exclude the possibility that the differences between the groups were not caused by the presence of PSP symptoms but are associated with coexisting psychological disorders.

The current study has several limitations which should be addressed in future research. Firstly, this study involves a small sample size, and any conclusions based on this sample must therefore be made cautiously. The second important drawback of the study was that the individuals with severe skin picking were not diagnosed as suffering from pathological skin picking. The lack of formal diagnosis is a reason why the results of the current study should not be generalized for individuals with pathological skin picking and should be interpreted as a pilot investigation in the area of research on skin picking origin rather than as conclusive findings. In addition, the sample consisted primarily of female participants, thus it remains unclear whether the findings apply to males, who could differ from female in respect of impulsivity. Finally, the authors administered a Polish version of the Skin Picking Scale. It is noteworthy that scores could change significantly between languages which makes it difficult to estimate severity of PSP symptoms in comparison with earlier studies.

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