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Znaczenie traumy wczesnodziecięcej u pacjentów z rozpoznaniem schizofrenii – adaptacja narzędzi oceny retrospektywnej i analiza związku z manifestacją kliniczną

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I. Streszczenie

Wstęp:

Schizofrenia zaliczana jest do ciężkich zaburzeń psychicznych o złożonej etiologii. W rozwoju schizofrenii istotną rolę mogą odgrywać stresujące wydarzenia życiowe, a w szczególności doświadczenia traumatyczne w dzieciństwie, takie jak przemoc fizyczna, emocjonalna i seksualna. Obecnie brak jest danych dotyczących związku cech wydarzeń traumatycznych w dzieciństwie (takich jak mnogość, nasilenie oraz wiek pierwszej ekspozycji) z poziomem funkcjonowania poznawczego i stosowanymi stylami radzenia sobie ze stresem u osób z rozpoznaniem schizofrenii. Nie oceniono także właściwości psychometrycznych kwestionariusza Doświadczenia Opieki i Przemocy w Dzieciństwie (ang. *the Child Experience of Care and Abuse Questionnaire*, CECA.Q) w Polsce.

Cel pracy:

Celem pracy była ocena związku deterioracji funkcji poznawczych oraz stylów radzenia sobie z cechami traumatycznych doświadczeń w dzieciństwie (liczba doświadczeń, wiek pierwszej ekspozycji oraz nasilenie) u osób z zaburzeniami ze spektrum schizofrenii oraz osób zdrowych wraz z określeniem właściwości psychometrycznych kwestionariusza CECA.Q w tej grupie zaburzeń.

Materiał i metody:

Do badania zakwalifikowano 127 pacjentów z zaburzeniami ze spektrum schizofrenii (ang. *schizophrenia spectrum disorders*, SSD) oraz 56 osób zdrowych bez obciążenia rodzinnego rozpoznaniem schizofrenii. Nasilenie objawów psychopatologicznych oraz stosowanie stylów radzenia sobie określono za pomocą wystandaryzowanych narzędzi. Funkcjonowanie poznawcze oceniono narzędziem RBANS (ang. *the Repeatable Battery for the Assessment of Neuropsychological Status*). Ponadto, w grupie osób z zaburzeniami ze spektrum schizofrenii dokonano oceny właściwości psychometrycznych CECA.Q

Wyniki:

U osób z SSD liczba doświadczeń traumatycznych w dzieciństwie i ich nasilenie były istotnie wyższe w porównaniu do osób zdrowych. W obu grupach uczestników, większa liczba doświadczeń traumatycznych wiązały się z niższym ogólnym poziomem funkcjonowania poznawczego oraz niższą punktacją w podskali pamięci odroczonej narzędzia RBANS. Dodatkowo, wyłącznie u osób z SSD stwierdzono, że wyższa liczba doświadczeń traumatycznych i młodszy wiek pierwszej ekspozycji były istotnie związane z niższą punktacją w podskali uwagi narzędzia RBANS. W zakresie specyficznych doświadczeń traumatycznych, stwierdzono istotnie częstsze raportowanie antypatii rodzicielskiej, przemocy fizycznej oraz seksualnej u osób z SSD. W grupie osób z SSD, wykazano częstsze stosowanie unikowych strategii radzenia ze stresem. Doświadczenie utraty rodzica w dzieciństwie było istotnie związane z częstszym stosowaniem tej strategii radzenia sobie ze stresem u osób z SSD. Analiza współczynników α Cronbacha dla poszczególnych podskal CECA.Q wykazała akceptowalną lub dobrą spójność wewnętrzną poszczególnych podskal. Korelacje polichoryczne pomiędzy wynikami dla pojedynczych pozycji z wynikami całkowitymi dla poszczególnych kategorii traumatycznych doświadczeń w dzieciństwie były

istotne statystycznie. Konfirmacyjna analiza czynnikowa potwierdziła strukturę czynnikową CECA.Q z akceptowalnymi wskaźnikami dopasowania.

Wnioski:

Traumatyczne doświadczenia w dzieciństwie są związane z deficytami funkcji poznawczych u osób z SSD oraz osób zdrowych. Istnieją jednak różnice w zakresie oddziaływania poszczególnych cech doświadczeń traumatycznych w dzieciństwie pomiędzy osobami z SSD oraz osobami zdrowymi. Najważniejszymi cechami doświadczeń traumatycznych w dzieciństwie z punktu widzenia wpływu na funkcjonowanie poznawcze są ich liczba oraz wiek pierwszej ekspozycji. Utrata rodzica w dzieciństwie może mieć wpływ na częstsze stosowanie unikowych strategii radzenia sobie ze stresem u osób z SSD. Kwestionariusz CECA.Q stanowi wystandaryzowane narzędzie do oceny traumy wczesnodziecięcej u osób z SSD i pozwala na prowadzenie badań w tym obszarze w populacji polskiej.

II. Abstract

Introduction

Schizophrenia is a severe and complex mental disorder. Stressful life events, in particular adverse childhood experiences (ACEs), such as physical, emotional and sexual abuse, might play an important role in the development of schizophrenia. Currently, the relationship between characteristics of ACEs (such as multiplicity, severity and age at first exposure) and cognitive impairments or coping strategies in schizophrenia spectrum disorder (SSD), remains unknown. Moreover, psychometric properties of the Child Experience of Care and Abuse Questionnaire (CECA.Q) questionnaire in Poland were not assessed.

Aim of the study

The aim of the study was to assess the association between cognition and coping styles and various characteristics of ACEs (multiplicity, age at first exposure and severity) in SSD and healthy controls (HCs), including assessment of the CECA.Q psychometric properties in subjects with SSD.

Materials and methods

A total of 127 individuals with SSD and 56 HCs with absent family history of psychotic disorders were enrolled. The severity of psychopathological symptoms and coping styles was determined using standardized tools. Cognitive performance was evaluated using the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). Moreover, psychometric properties of the CECA.Q were assessed in subjects with SSD.

Results

Multiplicity and severity of ACEs were significantly higher in patients with SSD compared to HCs. In both groups, greater multiplicity of ACEs was associated with lower scores of global cognition and delayed memory. Additionally, in subjects with SSD, greater multiplicity and younger age at first exposure were associated with lower scores of the RBANS attention domain. A history of parental antipathy, physical and sexual abuse was significantly more frequent in subjects with SSD compared to controls. Individuals with SSD had significantly higher odds of using avoidance coping. Additionally, individuals with SSD and a history of parental loss had significantly higher use of avoidance coping compared to controls. The Cronbach's α for specific CECA.Q subscales indicated acceptable-to-good internal consistency. Correlations of single item scores with the total scores of specific categories of ACEs were significant. The CFA confirmed factorial structure of the CECA.Q with acceptable goodness-of-fit indices.

Conclusions

ACEs are associated with cognitive impairments in SSD and healthy people. However, ACEs might exert differential impact on cognition in SSD and HCs. The present findings indicate that greater multiplicity and younger age at first exposure are the most important aspects of ACEs contributing to cognitive impairments observed in SSD. Moreover, the higher use of using avoidance coping by individuals with SSD might be related to a history of parental

loss. The CECA.Q questionnaire is a standardized tool for assessing ACEs in SSD and can be implemented by studies investigating ACEs in the Polish population.

III. Wstęp

Traumatyczne doświadczenia z dzieciństwa, takie jak przemoc lub zaniedbanie emocjonalne, przemoc fizyczna i seksualna, zwiększają ryzyko wystąpienia zaburzeń ze spektrum schizofrenii (Varese in, 2012). Szacuje się, że około jedna trzecia osób ze zdiagnozowaną psychozą doświadczyła w dzieciństwie przemocy fizycznej, seksualnej czy emocjonalnej (Bonoldi i In, 2013). Uważa się, iż różne procesy psychologiczne, w tym dysocjacja, objawy zespołu stresu pourazowego, dysregulacja emocjonalna i negatywne schematy pośredniczą w związku pomiędzy traumatycznymi doświadczeniami w dzieciństwie a ryzykiem wystąpienia psychozy (Bloomfield I in, 2021). Ponadto, traumatyczne doświadczenia w dzieciństwie są związane z szeregiem zmian biologicznych związanych ze stresem w przebiegu psychozy (Misiak i in, 2017). Wykazano także, iż traumatyczne doświadczenia z dzieciństwa mogą wpływać na ekspresję kliniczną zaburzeń ze spektrum schizofrenii. Mianowicie, niedawno opublikowana meta-analiza wykazała, iż traumatyczne doświadczenia z dzieciństwa są związane z większym nasileniem omamów i urojeń (Bailey i in, 2018). Dodatkowo, stwierdzono, że doświadczenie zaniedbania w dzieciństwie było skorelowane z objawami negatywnymi. Ponadto, traumatyczne doświadczenia z dzieciństwa mogą wiązać się z niekorzystnym rokowaniem klinicznym i funkcjonalnym w przebiegu psychozy (Misiak and Frydecka, 2016; Palmier-Claus i in, 2016). Inna meta-analiza wykazała, że traumatyczne doświadczenia z dzieciństwa u osób z tej populacji klinicznej są związane z deterioracją funkcji poznawczych, w tym pamięci roboczej (Vargas i in, 2019).

W związku z powyższym przebadanie traumatycznych doświadczeń w dzieciństwie u osób z psychozą może być istotne z perspektywy klinicznej i badawczej. Jednym z narzędzi stosowanych do oceny tychże przeżyć służy Kwestionariusz Doświadczenia Opieki i Przemocy w Dzieciństwie - CECA.Q (Bifulco i in. 2005), który określa różne aspekty opieki rodzicielskiej, przemocy fizycznej, a także wykorzystywania seksualnego w dzieciństwie. Niemniej jednak, właściwości psychometryczne kwestionariusza CECA.Q nie zostały szeroko zbadane w grupie osób z psychozą.

W badaniach wykazano, że traumatyczne doświadczenia w dzieciństwie u osób ze zdiagnozowaną psychozą mogą zwiększać skłonność do przeżywania trudnych okoliczności życia poprzez zwiększoną wrażliwość na stres i umiejętność przewidywania zagrożeń (Myin-Germeys i in, 2001; Howes and Murray, 2014; Reininghaus i in, 2016). W związku z tym, traumatyczne doświadczenia w dzieciństwie mogą wpływać na stosowanie określonych strategii radzenia sobie przez osoby z zaburzeniami ze spektrum schizofrenii. Zgodnie z modelem podatności/stresu schizofrenii, narażenie na stres przekraczające indywidualne możliwości radzenia sobie i/lub stosowanie nieefektywnego radzenia sobie może zainicjować szereg procesów psychobiologicznych, które wywołują początek i nawrót psychozy (Nuechterlein and Dawson, 1984, Nuechterlein i in, 1994). W badaniach wykazano, że osoby z zaburzeniami ze spektrum schizofrenii preferują unikający styl radzenia sobie niż adaptacyjny (Allott in, 2014; Corrigan and Toomey, 1995; Horan i in, 2007; Lysaker i in, 2005; Ritsner i in, 2006; Ventura i in, 2004). Ponadto, mniejsze preferencje aktywnego stylu radzenia sobie a z drugiej strony do podejmowania dysfunkcyjnych stylów radzenia sobie są związane z większym nasileniem objawów pozytywnych i depresyjnych, a także deterioracji funkcji poznawczych (Meyer, 2001; Moritz i in, 2016; Stramecki i in, 2019). Niemniej jednak, istnieje

niewiele badań dotyczących związku między traumatycznymi doświadczeniami w dzieciństwie a stylami radzenia sobie u osób ze zaburzeniami ze spektrum schizofrenii. Ponadto, wykazano, że wykorzystywanie emocjonalne i seksualne w dzieciństwie wiąże się z biernym i unikającym stylem radzenia sobie u osób z zaburzeniami psychotycznymi i ich zdrowym rodzeństwem (Renkema i in., 2020). W innym badaniu dowiedziono, że wykorzystywanie seksualne w dzieciństwie wiąże się z mniejszym prawdopodobieństwem pozytywnego radzenia sobie u osób z wysokim ryzykiem wystąpienia psychozy (Schmidt i in., 2017). Ered i in. (2017) wykazali, że wyższy poziom dezadaptacyjnego stylu radzenia sobie pośredniczy w związku między traumatycznymi wydarzeniami życiowymi a doświadczeniami podobnymi do psychotycznych w próbie nieklinicznej. Należy zauważyć, że badania te nie obejmowały porównania do grupy osób zdrowych. Stąd nie wiadomo, czy związek między traumatycznymi doświadczeniami w dzieciństwie a stylem radzenia sobie jest specyficzny dla osób z psychozą. Co więcej, inne cechy traumatycznych doświadczeń w dzieciństwie, poza ich typami, takie jak wiek w chwili pierwszego narażenia, nasilenie i liczba, mogą odgrywać ważną rolę w moderowaniu ich wpływu. Schalinski i in. (2019) wykazali, że traumatyczne doświadczenia w dzieciństwie są związane z nasileniem objawów psychotycznych w sposób zależny od dawki oraz że doświadczenie zaniedbania w wieku 10 lat jest jednym z najważniejszych predyktorów nasilenia objawów psychotycznych.

Zaburzenia funkcji poznawczych należą do podstawowych objawów klinicznych zaburzeń ze spektrum schizofrenii, pojawiających się w fazie przedchorobowej i występujących u większości pacjentów (Keefe i Fenton, 2007; Bora i in., 2010). Zaburzenia te obejmują deficyty w wielu domenach funkcji poznawczych, takich jak IQ, biegłość semantyczna, pamięć werbalna i robocza, hamowanie funkcji uwagi i odpowiedzi (Bora i in., 2010). Deteriorację funkcji poznawczych u osób z zaburzeniami ze spektrum schizofrenii można przypisać różnym zmianom neuroanatomicznym i elektrofizjologicznym, w tym redukcji objętości przyśrodkowego płata skroniowego, hipokampa i kory przedczołowej (Honea i in., 2005). Zgodnie z teoriami neurorozwojowymi, początek rozwoju zaburzeń ze spektrum schizofrenii wraz z ich podstawowymi objawami klinicznymi stanowi konsekwencję różnych zmian genetycznych i środowiskowych, które wpływają na rozwój mózgu na różnych etapach życia (Murray i in., 2017). Jednakże, konsekwencje tych zmian mogą być szczególnie szkodliwe, gdy mają miejsce w trakcie „okresów krytycznych” rozwoju mózgu (Marín, 2016).

IV. Cel i założenia pracy

Zbadanie historii traumatycznych doświadczeń z dzieciństwa u osób z psychozą może być ważne z perspektywy klinicznej i badawczej. Kwestionariusz CECA.Q służy do oceny traumatycznych doświadczeń z dzieciństwa w odniesieniu do różnych aspektów opieki rodzicielskiej, przemocy fizycznej czy wykorzystywania seksualnego. Niemniej jednak właściwości psychometryczne CECA.Q nie zostały dotychczas zbadane na gruncie polskim, jak również w kontekście osób z psychozą. Ponadto, traumatyczne doświadczenia w dzieciństwie mogą być predyktorami nasilenia objawów psychotycznych. Badania analizujące związki traumy wczesnodziecięcej z funkcjonowaniem poznawczym u osób z rozpoznaniem schizofrenii uwzględniały jedynie perspektywę wpływu konkretnych doświadczeń, takich jak nadużycia lub zaniedbania emocjonalne, przemoc fizyczna i seksualna. W badaniach tych nie podjęto jednak próby spojrzenia na charakterystykę tych doświadczeń z perspektywy neurorozwojowej, uwzględniającej wiek pierwszej ekspozycji, nasilenie oraz liczbę wydarzeń traumatycznych. Dodatkowo, niewiele wiadomo na temat wpływu traumatycznych doświadczeń w dzieciństwie na stosowanie specyficznych strategii radzenia sobie ze stresem.

W związku z powyższym, w pracy doktorskiej przyjęto następujące cele szczegółowe:

1. ocena związku deterioracji funkcji poznawczych z cechami traumatycznych doświadczeń w dzieciństwie (w tym wiek przy pierwszej ekspozycji, liczba doświadczeń i ich nasilenie) u osób z zaburzeniami ze spektrum schizofrenii oraz osób zdrowych.
2. określenie związku pomiędzy różnymi aspektami traumatycznych doświadczeń w dzieciństwie (wiek w momencie narażenia, nasilenie, mnogość, w tym rodzaj niekorzystnych doświadczeń w dzieciństwie) a preferencjami strategii radzenia sobie u osób z zaburzeniami ze spektrum schizofrenii i zdrowej kontroli.
3. ocena właściwości psychometrycznych polskiej wersji Kwestionariusza Doświadczania Opieki i Przemocy w Dzieciństwie (CECA.Q) u osób z zaburzeniami ze spektrum schizofrenii.

V. Materiał i metody badań

W niniejszym podrozdziale zaprezentowano zarys metodologii przeprowadzonych badań. Szczegółowy opis zawarty jest w załączonych publikacjach, na podstawie których opracowano pracę doktorską.

Do badania zakwalifikowano 127 pacjentów z rozpoznaniem zaburzeń ze spektrum schizofrenii (schizofrenia, zaburzenia schizoafektywne, zaburzenie schizofrenoidalne, krótkotrwałe zaburzenie psychotyczne) oraz 56 osób zdrowych bez obciążenia rodzinnego rozpoznaniem schizofrenii. Do diagnostyki zaburzeń psychotycznych zastosowano narzędzie OPCRIT (ang. *the Operational Criteria for Psychotic Illness Checklist*) (McGuffin i in, 1991). Nasilenie objawów psychopatologicznych określono za pomocą Skali Objawów Zespołu Pozytywnego i Negatywnego (ang. *the Positive and Negative Syndrome Scale, PANSS*) (Kay i in, 1987). Do oceny traumatycznych doświadczeń z dzieciństwa w odniesieniu do różnych aspektów opieki rodzicielskiej, przemocy fizycznej czy wykorzystywania seksualnego zastosowano Kwestionariusz Doświadczenia Opieki i Przemocy w Dzieciństwie (ang. *The Child Experience of Care and Abuse Questionnaire, CECA.Q*) (Bifulco i in, 2005). W części pierwszej do oceny funkcji poznawczych wykorzystano narzędzie RBANS (ang. *the Repeatable Battery for Assessment of Neuropsychological Status*) (Randolph i in, 1998). Natomiast w części drugiej do oceny stylów radzenia sobie użyto Wielowymiarowego Inwentarza do Pomiaru Radzenia Sobie ze Stresem COPE (ang. *Coping Orientations to Problems Experienced, COPE*) (Carver i in, 1989). W części trzeciej w grupie osób z rozpoznaniem ze spektrum schizofrenii oceniono właściwości psychometryczne Kwestionariusza Doświadczenia Opieki i Przemocy w Dzieciństwie (ang. *The Child Experience of Care and Abuse Questionnaire, CECA.Q*) (Bifulco i in, 2005). Spójność wewnętrzną oceniano za pomocą współczynnika α -Cronbacha i korelacji polichorycznych. Konfirmacyjną analizę czynnikową (CFA) przeprowadzono przy użyciu metody estymacji nieważonej najmniejszych kwadratów. Analizy związku pomiędzy doświadczeniami traumatycznymi a funkcjonowaniem poznawczym i stosowanymi strategiami radzenia sobie ze stresem przeprowadzono wykorzystując następujące testy: 1) test χ^2 ; 2) statystyki parametryczne (test t-Studenta, analiza kowariancji i analiza regresji liniowej) oraz 3) statystyki nieparametryczne (test Manna-Whitneya U oraz współczynniki korelacji Spearmana). Wyniki badań poddano analizie statystycznej z użyciem pakietu SPSS, wersja 20.

VI. Cykl publikacji

Podstawą niniejszej pracy doktorskiej jest cykl trzech publikacji:

- **Justyna Kasznia**, Aleksandra Pytel, Bartłomiej Stańczykiewicz, Jerzy Samochowiec, Joanna Preś, Karolina Rachubińska, Błażej Misiak.: Adverse childhood experiences and neurocognition in schizophrenia spectrum disorders: age at first exposure and multiplicity matter. *Frontiers in Psychiatry*. 2021. 12:684099.
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- **Justyna Kasznia**, Aleksandra Pytel, Bartłomiej Stańczykiewicz, Jerzy Samochowiec, Katarzyna Waszczuk, Małgorzata Kulik, Agnieszka Cyran, Błażej Misiak.: The impact of adverse childhood experiences on coping strategies in schizophrenia spectrum disorders: a case-control study. *Psychology Research and Behavior Management*. 2021. 14:1315-1323.
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- **Justyna Kasznia**, Bartłomiej Stańczykiewicz, Aleksandra Pytel, Krzysztof Szczygieł, Błażej Misiak. Psychometric properties of the Childhood Experience of Care and Abuse Questionnaire (CECA. Q) in a sample of individuals with schizophrenia from Poland. *Archives of Psychiatry and Psychotherapy Online First* Nr 7: 1–7.
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Adverse Childhood Experiences and Neurocognition in Schizophrenia Spectrum Disorders: Age at First Exposure and Multiplicity Matter

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Adverse childhood experiences (ACEs) might be related to cognitive impairments observed in schizophrenia spectrum disorders (SSD). However, it remains unknown what aspects of ACEs are associated with cognitive impairments in SSD. Therefore, we aimed to investigate the association between various characteristics of ACEs (age at first exposure, severity, and multiplicity) and cognition in SSD and healthy controls (HCs). We enrolled 127 individuals with SSD and 56 HCs. Cognitive performance was assessed using the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). The Childhood Experience of Care and Abuse Questionnaire was administered to record a history of ACEs. The following characteristics of ACEs were analyzed: multiplicity, severity, and age at first exposure. Individuals with SSD had significantly lower scores on all RBANS domains. Multiplicity and severity of ACEs were significantly higher in patients with SSD compared to HCs. In both groups, greater multiplicity of ACEs was associated with lower scores of global cognition and delayed memory. Additionally, in subjects with SSD, greater multiplicity and younger age at first exposure were associated with lower scores of attention. The present findings indicate that greater multiplicity and younger age at first exposure are the most important aspects of ACEs contributing to cognitive impairments observed in SSD. Moreover, ACEs might exert differential impact on cognition in SSD and HCs.

Keywords: stress, psychosis, childhood trauma, brain development, childhood maltreatment

INTRODUCTION

Convincing evidence indicates that a history of adverse childhood experiences (ACEs), such as emotional abuse or neglect, physical and sexual abuse, increase a risk of schizophrenia spectrum disorders (SSD) (1). It has been estimated that about one third of individuals with psychosis report childhood physical, sexual or emotional abuse (2). Various psychological processes have been recognized to mediate the association between ACEs and psychosis risk, including dissociation, post-traumatic stress disorder symptoms, emotional dysregulation, and negative schemas (3). Moreover, ACEs have been associated with a number of stress-related biological alterations in psychosis (4).

It has been shown that ACEs can also impact clinical expression of SSD. For instance, a recent meta-analysis revealed that ACEs are mainly related to higher severity of hallucinations and delusions (5). Only childhood neglect was found to be correlated with negative symptoms. Additionally, ACEs might be related to unfavorable clinical and functional outcomes of psychosis (6, 7). Another meta-analysis demonstrated that ACEs are associated with worse general cognition and working memory impairments in this clinical population (8). Vargas et al. (8) also tested a number of potential moderators, including age, gender, the use of first-episode psychosis populations and covariates (age, gender, and premorbid IQ). However, none of them was found to correlate with effect size estimates. Moreover, this meta-analysis did not include a number of moderators that were not recorded by eligible studies, including timing, severity and multiplicity of exposure.

Cognitive impairments represent core clinical characteristics of SSD that appear in the premorbid phase and are present in the majority of patients (9, 10). These impairments include deficits across a number of cognitive domains, such as current IQ, category fluency, verbal and working memory, attention and response inhibition (10). Cognitive impairments in SSD can be attributed to various neuroanatomical and electrophysiological alterations, of which, volume deficits in the medial temporal lobe, including the hippocampus, and the prefrontal cortex have been widely reported (11). According to neurodevelopmental considerations, the onset of SSD together with their core clinical characteristics represent the final consequence of various genetic and environmental insults that affect the brain development at different stages (12). However, the consequences of these insults can be deleterious when they act at “critical windows” of the brain development (13).

In light of the neurodevelopmental theory of SSD, considering the effects of ACEs on cognition as a dichotomous insult without detailed recognition of their characteristics might be insufficient to understand the impact of early-life stress. Therefore, in the present study, we investigated whether the extent of cognitive impairments in SSD is associated with such characteristics of ACEs as age at first exposure, multiplicity, and severity. Furthermore, we tested the hypothesis that the impact of these characteristics might be different in subjects with SSD compared to healthy controls.

METHOD

Participants

Inpatients with SSD were recruited at two university hospitals (Department and Clinic of Psychiatry at Wrocław Medical University, Wrocław, Poland; Department and Clinic of Psychiatry at Pomeranian Medical University, Szczecin, Poland) and one general hospital (Inpatient Psychiatric Unit, Municipal General Hospital, Ostrów Wielkopolski, Poland) in the years 2016 – 2020 ($n = 127$). Among them, there were 42 inpatients admitted for the first time. This subgroup of participants met the criteria of schizophrenia, schizoaffective disorder, schizophreniform disorder and brief psychotic disorder. In patients who were not admitted for the first time were diagnosed

with schizophrenia or schizoaffective disorder. A diagnosis of SSD was based on the DSM-IV criteria, using the Operational Criteria for Psychotic Illness (OPCRIT) checklist (14). A severity of clinical manifestation was recorded using the Positive and Negative Syndrome Scale (PANSS) (15). The majority of them ($n = 125$) were receiving antipsychotic treatment with mean chlorpromazine equivalent dosage (CPZeq) of 357.7 mg/day (SD = 388.7 mg/day).

Healthy controls ($n = 56$) were recruited at Wrocław Medical University (Wrocław, Poland) through advertisements. They had absent family history of mood and psychotic disorders in first- and second-degree relatives. The protocol of this study was approved by the Ethics Committee at Wrocław Medical University, Wrocław, Poland. All participants provided written informed consent.

Assessment of Cognitive Performance

The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) was used to examine cognitive performance (16). The RBANS consists of 12 cognitive tasks grouped into five indexes: (1) immediate memory (list learning and story memory); (2) visuospatial/constructional abilities (figure copy and line orientation); (3) language (picture naming and semantic fluency); (4) attention (digit span and coding) and (5) delayed memory (list recall, list recognition, story memory, and figure recall). Higher scores indicate better cognitive performance.

Assessment of ACEs

The Childhood Experience of Care and Abuse Questionnaire (CECA.Q) was administered to obtain data on a history of ACEs (17). The CECA.Q is a self-report that records a history of the following ACEs before the age of 17 years: (1) parental loss; (2) mother antipathy; (3) mother neglect; (4) mother psychological abuse; (5) father antipathy; (6) father neglect; (7) father psychological abuse; (8) role reversal; (9) physical abuse and (10) sexual abuse. The subscales for parental psychological abuse and role reversal were not validated against interview, and thus they were excluded from data analysis in the present study.

In our study, three measures of ACEs were analyzed: (1) age at first exposure; (2) multiplicity and (3) severity. Age at first exposure was defined as the age when the first stressful experience appeared. Multiplicity was included as the number of ACEs reported by each participant (range: 0–7). In turn, severity was calculated for all ACEs together, except for parental loss, as the CECA.Q does not include the severity score for this category of ACEs. More specifically, we divided reported severity of exposure by the maximum severity score that can be obtained for specific category of ACEs. Next, all severity scores were summarized and divided by a number of ACEs categories ($n = 6$).

Data Analysis

Data analyses were carried out using the Statistical Package for Social Sciences, version 20 (SPSS Inc., Chicago, Illinois, USA). Normality of data distribution was assessed using the Kolmogorov-Smirnov test. Bivariate comparisons were performed using the χ^2 test or the Mann-Whitney U -test, where

TABLE 1 | General characteristics of the sample.

	SSD, <i>n</i> = 127	Controls, <i>n</i> = 56	Statistics
Age, years	39.1 ± 13.8	38.3 ± 6.8	<i>U</i> = 3,366.5, <i>p</i> = 0.566
Gender, males (%)	61 (48.0)	24 (42.8)	$\chi^2 = 0.4, p = 0.518$
Education, years	13.2 ± 2.8	16.0 ± 2.4	<i>U</i> = 889.5, <i>p</i> < 0.001
CECA.Q—age at first exposure	9.5 ± 4.6	9.0 ± 4.6	<i>U</i> = 1,037.5, <i>p</i> = 0.616
CECA.Q—multiplicity	2.3 ± 1.8	1.1 ± 1.3	<i>U</i> = 4,940.5, <i>p</i> < 0.001
CECA.Q—severity	0.45 ± 0.28	0.34 ± 0.36	<i>U</i> = 4,965.5, <i>p</i> < 0.001
CECA.Q—multiplicity > 0, <i>n</i> (%)	101 (79.5)	32 (57.1)	$\chi^2 = 10.4, p = 0.001$
CECA.Q—parental loss, <i>n</i> (%)	38 (29.9)	12 (21.4)	$\chi^2 = 1.5, p = 0.223$
CECA.Q—mother antipathy, <i>n</i> (%)	42 (33.1)	8 (14.3)	$\chi^2 = 7.2, p = 0.007$
CECA.Q—mother neglect, <i>n</i> (%)	35 (27.6)	4 (7.1)	$\chi^2 = 9.9, p = 0.002$
CECA.Q—father antipathy, <i>n</i> (%)	45 (35.4)	9 (16.1)	$\chi^2 = 7.7, p = 0.006$
CECA.Q—father neglect, <i>n</i> (%)	36 (28.3)	15 (26.8)	$\chi^2 = 0.1, p = 0.733$
CECA.Q—physical abuse, <i>n</i> (%)	55 (43.3)	13 (23.2)	$\chi^2 = 6.9, p = 0.009$
CECA.Q—sexual abuse, <i>n</i> (%)	29 (22.8)	3 (5.4)	$\chi^2 = 8.3, p = 0.004$
RBANS—immediate memory	37.4 ± 9.9	51.5 ± 6.2	<i>U</i> = 690.0, <i>p</i> < 0.001
RBANS—visuospatial/constructional abilities	31.7 ± 6.4	37.9 ± 2.3	<i>U</i> = 1,073.0, <i>p</i> < 0.001
RBANS—language	25.7 ± 5.6	33.6 ± 6.5	<i>U</i> = 1,080.0, <i>p</i> < 0.001
RBANS—attention	38.2 ± 8.2	68.9 ± 8.9	<i>U</i> = 424.0, <i>p</i> < 0.001
RBANS—delayed memory	38.4 ± 11.0	55.5 ± 4.7	<i>U</i> = 476.0, <i>p</i> < 0.001
First admission, <i>n</i> (%)	42 (33.1)	-	-
PANSS total score	85.7 ± 30.3	-	-
CPZeq, mg/day	357.7 ± 388.7	-	-

CECA.Q, the Childhood Experience of Care and Abuse Questionnaire; CPZeq, chlorpromazine equivalent dosage; PANSS, the Positive and Negative Syndrome Scale; RBANS, the Repeatable Battery for the Assessment of Neuropsychological Status; SSD, schizophrenia spectrum disorders.

Significant differences (*p* < 0.05) were marked with bold characters.

appropriate. Spearman rank correlation coefficients were used to analyze bivariate correlations. The association between the measures of ACEs and cognitive performance was tested using the linear regression analyses. Due to non-normal distribution, the scores of specific RBANS domains were transformed to *z*-scores. Similarly, the measures of ACEs were transformed to *z*-scores to limit potential collinearity. Subsequently, interaction terms between the group status (SSD vs. healthy controls) and the measures of ACEs (*z*-scores) were created. The RBANS *z*-scores were included as a dependent variable. Group status, the measures of ACEs (age at exposure onset, severity, and multiplicity) and interaction terms were included as independent variables. Age and gender were added as covariates. Given that lower educational achievement might be strongly associated with SSD and account for cognitive impairment (18), the number of education years was added as a covariate in a hierarchical manner. The variance inflation factor (VIF) was assessed as the measure of collinearity. The VIF > 4 was considered to indicate significant multicollinearity (19). Linear regression lines were plotted according to the following equation (B refers to unstandardized coefficients): $y = B$ (constant) + B (effect of group status)*group status + B (the effect of ACEs measure) + B (interaction term)*group status. The group status was dummy coded with the value of “1” assigned to individuals with SSD and the value of “0” assigned to healthy controls. Linear regression lines were plotted for the model that included the number of education years if a

significant R^2 change was observed. Otherwise, the plot was prepared for the model without the number of education years. Results were considered statistically significant if the *p*-value was < 0.05.

RESULTS

Main characteristics of the sample are reported in **Table 1**. There were no significant between-group differences with respect to age (*U* = 3,366.5, *p* = 0.566) and gender ($\chi^2 = 0.4, p = 0.518$). As expected, individuals with SSD had significantly lower education level (*U* = 889.5, *p* < 0.001) and showed worse performance on all RBANS domains (immediate memory: *U* = 690.0, *p* < 0.001; visuospatial/constructional abilities: *U* = 1,073.0, *p* < 0.001; language: *U* = 1,080.0, *p* < 0.001; attention: *U* = 424.0, *p* < 0.001; delayed memory: *U* = 476.0, *p* < 0.001). Individuals with SSD had significantly higher multiplicity ($\chi^2 = 10.4, p = 0.001$) and severity scores (*U* = 4,965.5, *p* < 0.001) of ACEs compared to healthy controls. At least one category of ACEs ($\chi^2 = 10.4, p = 0.001$) as well as a history of mother antipathy ($\chi^2 = 7.2, p = 0.007$), mother neglect ($\chi^2 = 9.9, p = 0.002$), father antipathy ($\chi^2 = 7.7, p = 0.006$), physical abuse ($\chi^2 = 6.9, p = 0.009$), and sexual abuse ($\chi^2 = 8.3, p = 0.004$) were significantly more frequent in subjects with SSD compared to healthy controls. However, both groups did not differ significantly in terms of age at first exposure to ACEs (*U* = 1,037.5, *p* = 0.616).

TABLE 2 | Bivariate correlations between the measures of ACEs and cognitive performance scores.

Group	Variable	1.	2.	3.	4.	5.	6.	7.	8.
SSD	1. ACEs—age at first exposure	-							
	2. ACEs—multiplicity	$r = -0.230$	-						
	3. ACEs—severity	$r = -0.047$	$r = 0.772^c$	-					
	4. Immediate memory	$r = 0.222$	$r = -0.183$	$r = -0.038$	-				
	5. Visuospatial/constructional	$r = 0.338^b$	$r = -0.271^b$	$r = -0.134$	$r = 0.568^c$	-			
	6. Language	$r = 0.243^a$	$r = -0.190$	$r = -0.035$	$r = 0.623^c$	$r = 0.418^c$	-		
	7. Attention	$r = 0.426^c$	$r = -0.301^b$	$r = -0.108$	$r = 0.643^c$	$r = 0.661^c$	$r = 0.539^c$	-	
	8. Delayed memory	$r = 0.357^b$	$r = -0.293^b$	$r = -0.156$	$r = 0.740^c$	$r = 0.594^c$	$r = 0.596^c$	$r = 0.626^c$	-
	9. Global cognition	$r = 0.435^c$	$r = -0.302^b$	$r = -0.121$	$r = 0.851^c$	$r = 0.745^c$	$r = 0.724^c$	$r = 0.880^c$	$r = 0.626^c$
HCs	1. ACEs—age at first exposure	-							
	2. ACEs—multiplicity	$r = -0.175$	-						
	3. ACEs—severity	$r = -0.253$	$r = 0.810^c$	-					
	4. Immediate memory	$r = 0.126$	$r = -0.336^a$	$r = -0.235$	-				
	5. Visuospatial/constructional	$r = 0.133$	$r = -0.120$	$r = 0.001$	$r = 0.195$	-			
	6. Language	$r = 0.198$	$r = -0.271^a$	$r = -0.134$	$r = 0.368^b$	$r = 0.250$	-		
	7. Attention	$r = 0.014$	$r = -0.183$	$r = -0.282^a$	$r = 0.444^b$	$r = 0.444^b$	$r = 0.198$	-	
	8. Delayed memory	$r = -0.102$	$r = -0.307^a$	$r = -0.234$	$r = 0.673^c$	$r = 0.298^a$	$r = 0.298^a$	$r = 0.335^a$	-
	9. Global cognition	$r = -0.127$	$r = -0.316^b$	$r = -0.216$	$r = 0.767^c$	$r = 0.387^b$	$r = 0.640^c$	$r = 0.741^c$	$r = 0.749^c$

ACEs, adverse childhood experiences; HCs, healthy controls; SSD, schizophrenia spectrum disorders.

^a $p < 0.05$.

^b $p < 0.01$.

^c $p < 0.001$.

Bivariate correlations between the measures of ACEs and the RBANS scores are shown in **Table 2**. Younger age at first exposure was associated with significantly lower RBANS scores (visuospatial/constructional abilities: $r = 0.338$, $p < 0.01$; language: $r = 0.243$, $p < 0.05$; attention: $r = 0.426$, $p < 0.001$; delayed memory: $r = 0.357$, $p < 0.01$; global cognition: $r = 0.435$, $p < 0.001$), except for the score of immediate memory ($r = 0.222$, $p > 0.05$) in subjects with SSD but not in healthy controls (immediate memory: $r = 0.126$, $p > 0.05$; visuospatial/constructional abilities: $r = 0.133$, $p > 0.05$; language: $r = 0.198$, $p > 0.05$; attention: $r = 0.014$, $p > 0.05$; delayed memory: $r = -0.102$, $p > 0.05$; global cognition: $r = -0.127$, $p > 0.05$). Greater multiplicity of ACEs was also related to significantly lower RBANS scores (visuospatial/constructional abilities: $r = -0.271$, $p < 0.01$; attention: $r = -0.301$, $p < 0.01$; delayed memory: $r = -0.293$, $p < 0.01$ and global cognition: $r = -0.302$, $p < 0.01$ in subjects with SSD as well as immediate memory: $r = -0.336$, $p < 0.05$; language: $r = -0.271$, $p < 0.05$; delayed memory: $r = -0.307$, $p < 0.05$, and global cognition: $r = -0.316$, $p < 0.01$ in healthy controls). There was a significant negative correlation between overall severity of ACEs and the score of attention in healthy controls ($r = -0.282$, $p < 0.05$). In both groups of participants, overall severity and multiplicity of ACEs were significantly and positively correlated (SSD: $r = 0.772$, $p < 0.001$, healthy controls: $r = 0.810$, $p < 0.001$).

Results of linear regression analyses controlling for the effects of age, the number of education years and gender are presented in **Table 3**. Significant main and interaction effects are shown in **Figure 1**. There were significant main effects

of multiplicity of ACEs on delayed memory ($B = -0.201$, $p = 0.040$) and global cognition scores ($B = -0.187$, $p = 0.031$), even if the number of education years was added to independent variables. Additionally, significant effects of interactions between group and age at first exposure ($B = 0.650$, $p = 0.018$) as well as between group and multiplicity ($B = -0.440$, $p = 0.017$) on attention scores were observed. More specifically, younger age at first exposure and greater multiplicity of ACEs were associated with worse performance of attention in subjects with SSD but not in healthy controls, after controlling for the effects of age, gender, and the number of education years.

DISCUSSION

Findings from the present study imply that ACEs might contribute to cognitive impairments observed in patients with SSD. Notably, we found that greater multiplicity of ACEs might be associated with impairments of delayed memory and global cognition in both groups of participants—individuals with SSD and healthy controls. However, the association between characteristics of ACEs (age at first exposure and multiplicity) and attention scores was found only in patients with SSD. No significant associations with cognition were found for the overall severity of ACEs.

It is important to note that the RBANS attention index is composed of scores from two cognitive tasks (digit span

TABLE 3 | Results of linear regression analyses.

	Independent variable	Immediate memory	Visuospatial/constructional	Language	Attention	Delayed memory	Global cognition	VIF
Model 1	Age	$B = -0.014$, $\rho = 0.305$	$B = -0.033$, $\rho = 0.018$	$B = -0.024$, $\rho = 0.097$	$B = -0.022$, $\rho = 0.009$	$B = -0.012$, $\rho = 0.278$	$B = -0.021$, $\rho = 0.040$	1.726
	Gender	$B = 0.459$, $\rho = 0.085$	$B = 0.057$, $\rho = 0.915$	$B = 0.782$, $\rho = 0.010$	$B = 0.238$, $\rho = 0.128$	$B = 0.298$, $\rho = 0.206$	$B = 0.377$, $\rho = 0.078$	1.113
	Group	$B = -0.724$, $\rho = 0.014$	$B = -0.224$, $\rho = 0.543$	$B = -0.697$, $\rho = 0.016$	$B = -0.310$, $\rho < 0.001$	$B = -0.311$, $\rho = 0.020$	$B = -0.341$, $\rho = 0.004$	1.419
	Age at first exposure	$B = -0.078$, $\rho = 0.565$	$B = -0.048$, $\rho = 0.661$	$B = -0.191$, $\rho = 0.213$	$B = -0.190$, $\rho = 0.566$	$B = -0.068$, $\rho = 0.376$	$B = -0.120$, $\rho = 0.384$	2.984
	Multiplicity	$B = 0.311$, $\rho = 0.162$	$B = 0.523$, $\rho = 0.785$	$B = -0.405$, $\rho = 0.176$	$B = 0.046$, $\rho = 0.387$	$B = -0.201$, $\rho = 0.040$	$B = -0.187$, $\rho = 0.031$	3.597
	Severity	$B = 0.026$, $\rho = 0.560$	$B = 0.048$, $\rho = 0.759$	$B = -0.087$, $\rho = 0.724$	$B = -0.066$, $\rho = 0.377$	$B = 0.037$, $\rho = 0.744$	$B = -0.015$, $\rho = 0.906$	2.257
	Group \times age at first exposure	$B = 0.304$, $\rho = 0.068$	$B = -0.038$, $\rho = 0.753$	$B = 0.188$, $\rho = 0.353$	$B = 0.613$, $\rho = 0.024$	$B = 0.157$, $\rho = 0.529$	$B = 0.114$, $\rho = 0.164$	4.000
	Group \times multiplicity	$B = -0.274$, $\rho = 0.772$	$B = -0.741$, $\rho = 0.438$	$B = 0.412$, $\rho = 0.281$	$B = -0.340$, $\rho = 0.019$	$B = -0.210$, $\rho = 0.937$	$B = -0.113$, $\rho = 0.981$	3.874
	Group \times severity	$B = 0.045$, $\rho = 0.803$	$B = 0.114$, $\rho = 0.759$	$B = 0.034$, $\rho = 0.981$	$B = 0.074$, $\rho = 0.497$	$B = 0.045$, $\rho = 0.800$	$B = 0.166$, $\rho = 0.664$	2.325
	R^2	0.295	0.225	0.359	0.594	0.361	0.435	-
	R^2 change (p)	0.295 (0.012)	0.225 (0.080)	0.359 (0.001)	0.594 (< 0.001)	0.361 (0.001)	0.435 (< 0.001)	-
Model 2	Age	$B = -0.015$, $\rho = 0.233$	$B = -0.036$, $\rho = 0.009$	$B = -0.026$, $\rho = 0.064$	$B = -0.024$, $\rho = 0.003$	$B = -0.013$, $\rho = 0.253$	$B = -0.023$, $\rho = 0.021$	1.745
	Education years	$B = 0.076$, $\rho = 0.121$	$B = 0.103$, $\rho = 0.043$	$B = 0.101$, $\rho = 0.084$	$B = 0.077$, $\rho = 0.008$	$B = 0.030$, $\rho = 0.501$	$B = 0.079$, $\rho = 0.040$	1.283
	Gender	$B = 0.404$, $\rho = 0.120$	$B = -0.018$, $\rho = 0.897$	$B = 0.709$, $\rho = 0.015$	$B = 0.183$, $\rho = 0.199$	$B = 0.276$, $\rho = 0.241$	$B = 0.320$, $\rho = 0.117$	1.128
	Group	$B = -0.560$, $\rho = 0.077$	$B = 0.001$, $\rho = 0.864$	$B = -0.480$, $\rho = 0.092$	$B = -0.210$, $\rho = 0.009$	$B = -0.567$, $\rho = 0.054$	$B = -0.242$, $\rho = 0.037$	1.638
	Age at first exposure	$B = -0.085$, $\rho = 0.551$	$B = -0.044$, $\rho = 0.640$	$B = -0.200$, $\rho = 0.200$	$B = -0.180$, $\rho = 0.529$	$B = -0.158$, $\rho = 0.376$	$B = -0.127$, $\rho = 0.362$	2.985
	Multiplicity	$B = 0.353$, $\rho = 0.932$	$B = 0.580$, $\rho = 0.500$	$B = -0.461$, $\rho = 0.310$	$B = 0.020$, $\rho = 0.155$	$B = -0.238$, $\rho = 0.038$	$B = -0.220$, $\rho = 0.044$	3.739
	Severity	$B = 0.027$, $\rho = 0.832$	$B = 0.051$, $\rho = 0.794$	$B = -0.085$, $\rho = 0.686$	$B = -0.064$, $\rho = 0.316$	$B = 0.022$, $\rho = 0.443$	$B = -0.013$, $\rho = 0.860$	2.258
	Group \times age at first exposure	$B = 0.308$, $\rho = 0.239$	$B = 0.044$, $\rho = 0.749$	$B = 0.200$, $\rho = 0.346$	$B = 0.650$, $\rho = 0.018$	$B = 0.158$, $\rho = 0.532$	$B = 0.129$, $\rho = 0.153$	4.000
	Group \times multiplicity	$B = -0.299$, $\rho = 0.932$	$B = -0.775$, $\rho = 0.293$	$B = 0.445$, $\rho = 0.387$	$B = -0.440$, $\rho = 0.017$	$B = 0.277$, $\rho = 0.957$	$B = -0.200$, $\rho = 0.702$	3.912
	Group \times severity	$B = 0.010$, $\rho = 0.832$	$B = 0.039$, $\rho = 0.790$	$B = -0.040$, $\rho = 0.795$	$B = 0.018$, $\rho = 0.792$	$B = 0.022$, $\rho = 0.889$	$B = 0.113$, $\rho = 0.918$	2.388
	R^2	0.325	0.280	0.393	0.643	0.367	0.476	-
R^2 change (p)	0.030 (0.121)	0.055 (0.043)	0.034 (0.084)	0.049 (0.008)	0.006 (0.501)	0.041 (0.040)	-	

Significant results ($p < 0.05$) were marked with bold characters.

and digit coding) that also enable to assess cognitive domains other than attention. The score of digit span reflects working memory performance, while the digit coding task enables to record processing speed. Impairments of working memory have been widely reported in patients with SSD, also at the onset of psychosis, and may reflect neurostructural and neurofunctional alterations of the prefrontal cortex (20–22). Similarly, impairments measured by the digit coding are already present in individuals at risk of psychosis, those with first-episode psychosis and subjects with chronic schizophrenia, with poor

response to treatment (23–25). Our findings are also in line with those obtained by previous studies, including most recent meta-analysis (8). As similar to the present study, Schalinski et al. (26) aimed to examine the association between various aspects of ACEs (duration, multiplicity and severity) and cognitive performance in psychosis. The authors found that abuse at the age of 3 years might be related to impairments of attention, learning and working memory. Additionally, neglect at the age of 3 years was associated with worse performance of attention. No significant associations of duration and multiplicity with

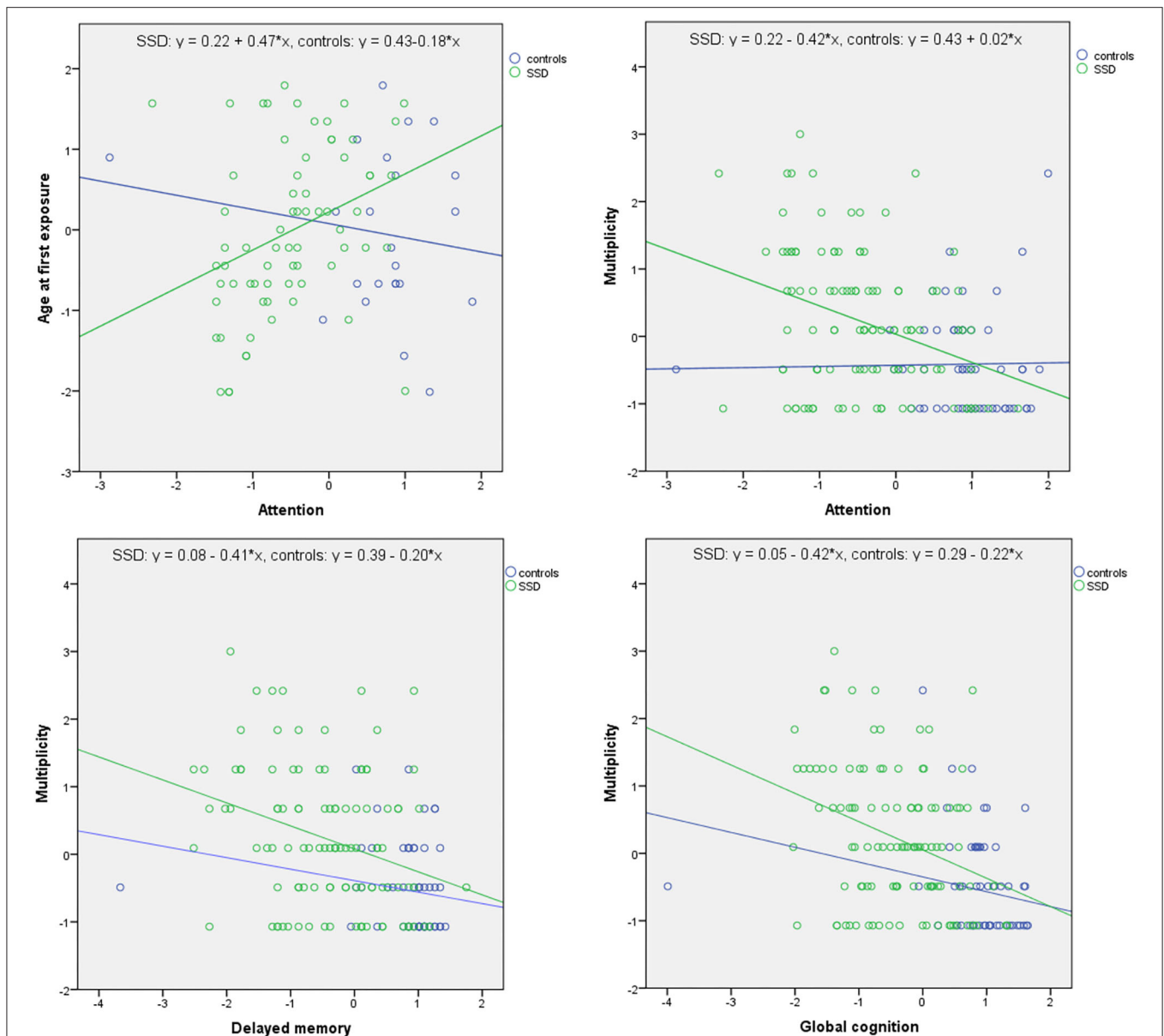


FIGURE 1 | Significant associations between the measures of ACEs and cognition in linear regression analyses. Data expressed as z-scores. There were significant main effects of multiplicity of ACEs on delayed memory ($B = -0.201$, $p = 0.040$) and global cognition scores ($B = -0.220$, $p = 0.040$). Additionally, significant effects of interactions between group and age at first exposure ($B = 0.650$, $p = 0.018$) as well as between group and multiplicity ($B = -0.440$, $p = 0.017$) on attention scores were found. More specifically, younger age at first exposure and greater multiplicity of ACEs were associated with worse performance of attention in subjects with SSD but not in healthy controls.

neurocognition were reported. However, greater multiplicity and neglect experienced at the age of 11–12 years were associated with worse performance of social cognition. In turn, Li et al. (27) found that a history of various ACEs is associated with lower RBANS scores of language, attention and delayed memory. Other studies, although without insights into detailed characteristics of ACEs, also reported that ACEs are associated with impairments of attention and working memory in psychosis (28–30).

Previous studies did not investigate a differential impact of ACEs on cognition in subjects with psychosis and healthy controls. Therefore, it is difficult to establish unequivocal conclusion whether ACEs differentially impact cognition in these populations. Nevertheless, in both groups of participants, multiplicity of ACEs was correlated with cognition. Similarly, in both groups, multiplicity of ACEs was associated with worse performance of delayed memory and global cognition. Although the present study demonstrated that age at first exposure was

similar in both groups of participants, severity and multiplicity scores were significantly higher in subjects with SSD compared to healthy controls. This observation might explain worse cognitive performance in patients with SSD compared to healthy controls, taking into account previous reports that ACEs increase a risk of psychosis with a dose-response effect (31). However, it is still unclear whether specific characteristics of ACEs exert qualitatively differential impact on cognition in subjects with SSD and healthy controls. Moreover, it is warranted to investigate whether neurocognitive deficits attributable to ACEs contribute to other psychopathological symptoms of psychosis. Indeed, there is evidence that there are several cognitive mediators of the association between ACEs and psychopathology. These include, i.e., cognitive styles, negative core/internalized beliefs, negative attributions, evaluating and pathogenic beliefs and early maladaptive schemas (32).

The present findings should also be referred to potential neurobiological mechanisms that may explain the relationship between ACEs and cognition. The hypothalamic-pituitary-adrenal (HPA) axis serves as one of main biological systems responsible for stress response by releasing glucocorticoids. Notably, the hippocampus and prefrontal cortex contain high density of glucocorticoid receptors. These brain regions are responsible for learning and memory processes. Prolonged exposure to glucocorticoids may lead to reduced neurogenesis and synaptic plasticity in the hippocampus and prefrontal cortex (33, 34). Previous meta-analyses have revealed that patients with psychosis show dysfunction of the HPA axis in terms of elevated blood cortisol levels (35), attenuated cortisol awakening response (36) and blunted cortisol response to social stress (37). Moreover, there is evidence that ACEs might contribute to dysfunction of the HPA axis in psychosis (38–41). Our group has recently reported that elevated cortisol levels might be associated with deficits of delayed memory in subjects with SSD (42). In turn, Aas et al. (40) found that elevated hair cortisol levels are correlated with working memory deficits in individuals with schizophrenia and bipolar disorder.

Certain limitations of the present study need to be discussed. First, our sample size, especially with respect to healthy controls, was not large. The difference in sample sizes between individuals with psychotic disorders and healthy controls might also account for observed differences in the association between ACEs and cognition in these groups of participants. However, previous studies in this field were based on similar or even smaller sample sizes. Second, a recall bias should always be taken into consideration when interpreting the data from self-reports of ACEs. This might be of particular importance to ACEs that appear very early in the developmental period. Nevertheless, sufficient test-retest reliability and consistency have been demonstrated for self-reports of ACEs in subjects

with psychosis (43, 44). Another point is that the proportion of variance in cognitive performance explained by our linear regression analyses (22.5–64.3%) suggest that other factors might also contribute to cognitive performance, and were not explored in the present study. These might include duration of illness, factors related to overweight or obesity, medication effects and substance use.

In summary, our findings imply that greater multiplicity of ACEs might account for impairments of attention, delayed memory and global cognition, while earlier age of first exposure to ACEs might additionally contribute to impaired attention in subjects with SSD. The impact of ACEs on cognition in individuals with SSD and healthy controls might share some similarities, with multiplicity being the most important factor. These findings provide new support for the neurodevelopmental theory of schizophrenia. A differential impact on specific cognitive domains in individuals with SSD and healthy controls requires additional studies in larger samples. Moreover, the mechanisms underlying the relationship between ACEs and cognitive deficits in SSD also need to be established. Finally, future studies should further investigate whether cognitive impairments attributable to ACEs further shape specific symptoms of psychosis.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Ethics Committee at Wrocław Medical University, Poland. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

JK: study design, recruitment, and manuscript writing. AP: data collection and manuscript editing. BS: recruitment and manuscript editing. JS: manuscript writing. JP: recruitment and manuscript writing. KR: recruitment and data analysis. BM: recruitment, data analysis, and manuscript writing. All authors contributed to the article and approved the submitted version.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The Impact of Adverse Childhood Experiences on Coping Strategies in Schizophrenia Spectrum Disorders: A Case-Control Study

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Purpose: Several studies have shown that individuals with schizophrenia-spectrum disorders (SSD) employ ineffective coping styles. However, it remains unknown whether a history of adverse childhood experiences (ACEs), associated with a risk of SSD, contributes to these observations. Therefore, in this study, we aimed to investigate whether exposure to ACEs is associated with coping styles in subjects with SSD.

Patients and Methods: We recruited 127 inpatients with SSD and 56 healthy controls. Coping styles and ACEs were recorded using self-reports.

Results: Individuals with SSD had significantly higher use of using avoidance coping. A history of parental antipathy, physical and sexual abuse was significantly more frequent in subjects with SSD compared to controls. Subjects with SSD had significantly higher multiplicity and severity of ACEs. Individuals with SSD and a history of parental loss had significantly higher use of avoidance coping compared to controls with and without a history of parental loss. Other characteristics of ACEs (age at first exposure, severity and multiplicity) were not associated with using specific coping strategies.

Conclusion: These findings imply that higher use of using avoidance coping by individuals with SSD might be related to a history of parental loss.

Keywords: stress, psychosis, psychotic disorder, trauma, maltreatment

Introduction

Adverse childhood experiences (ACEs) are reported by about one-third of individuals with schizophrenia spectrum disorders (SSD).¹ There is convincing evidence that ACEs increase a risk of SSD, and are related to clinical expression of SSD.^{2,3} Indeed, individuals with SSD and positive history of ACEs tend to show higher levels of psychotic symptoms,⁴ greater cognitive deficits,⁵ worse response to anti-psychotic treatment⁶ and greater functional impairment.⁷ These observations suggest that ACEs exert a long-term impact on psychological processes that lead to the development of SSD. A recent systematic review and meta-analysis showed that processes mediating the association between ACEs and a risk of SSD include dissociation, emotional dysregulation, post-traumatic stress disorder (PTSD) symptoms and negative schemata (mental constructs of meaning).⁸

There is evidence that ACEs may make individuals more prone to experience subsequent adversities through increased stress sensitivity and threat anticipation.⁹⁻¹¹ These observations provide the rationale to assume that ACEs impact the use of specific coping strategies by individuals with SSD. According to the vulnerability/

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stress model of schizophrenia, exposure to stress that exceeds individual abilities to cope and/or the use of ineffective coping may initiate a number of psychobiological processes that trigger the onset and relapse of psychosis.^{12,13} Coping strategies capture a variety of trait-dependent activities approached to deal with challenges driven by stressful experiences. It has been reported that individuals with SSD tend to prefer avoidance coping than adaptive coping.^{14–19} Lower preference of active coping strategies and the preference of dysfunctional coping have also been associated with greater severity of positive and depressive symptoms as well as cognitive impairment.^{20–22}

However, little is known about the association between ACEs and coping strategies approached by individuals with SSD. It has been found that a history of childhood emotional and sexual abuse is associated with passive and avoidance coping in subjects with psychotic disorders and their unaffected siblings.²³ Another study demonstrated that childhood sexual abuse is related to lower likelihood of positive coping in subjects at clinical high risk of psychosis.²⁴ Finally, Ered et al²⁵ revealed that higher levels of maladaptive coping mediate the association between traumatic life events and psychotic-like experiences in a non-clinical sample. It should be noted that these studies did not include a comparison group of healthy controls. Therefore, it remains unknown whether the association between ACEs and coping is specific to individuals with psychosis. Moreover, other aspects of ACEs, beyond their types, such as age at first exposure, severity and multiplicity may play an important role in moderating their impact. For instance, Schalinski et al²⁶ found that ACEs are associated with a severity of psychotic symptoms in a dose-dependent manner. The authors also revealed that neglect at the age of 10 years was the most important predictor of the severity of psychotic symptoms. Taking into account these research gaps in the field, we aimed to investigate the association between various aspects of ACEs (age at exposure, severity, multiplicity and types of ACEs) and preference of coping strategies in subjects with SSD and healthy controls.

Materials and Methods

Participants

Individuals with SSD were enrolled at three inpatient units in Poland, in the years 2016–2020 ($n = 127$). The majority of them were during the treatment of psychotic relapse ($n = 85$, 66.9%), while others were admitted for the first time

($n = 42$, 33.1%). Individuals with SSD were diagnosed with schizophrenia, schizoaffective disorder, schizophreniform disorder and brief psychotic disorder. Inpatients who were admitted due to psychotic relapse met the criteria of schizophrenia or schizoaffective disorder. The DSM-IV criteria assessed using the Operational Criteria for Psychotic Illness (OPCRIT) checklist were implemented to diagnose the patients.²⁷ The majority of individuals with SSD ($n = 125$) were receiving antipsychotics with mean chlorpromazine equivalent dosage (CPZeq) of 357.7 mg/day ($SD = 388.7$ mg/day), while two individuals were antipsychotic-naïve on the day of assessment. The Positive and Negative Syndrome Scale (PANSS)²⁸ was used to examine a severity of psychopathological manifestation.

There were 56 healthy controls recruited at Wrocław Medical University (Wrocław, Poland) through advertisements. They reported negative family history of mood and psychotic disorders in first- and second-degree relatives. The protocol of this study was approved by the Ethics Committee at Wrocław Medical University, Wrocław, Poland. Written informed consent was collected from all participants. The study was conducted in accordance with the Declaration of Helsinki.

Assessment of ACEs

The Childhood Experience of Care and Abuse Questionnaire (CECA.Q) was used to collect data on exposure to ACEs.²⁹ The CECA.Q is a self-report that was developed to obtain information on the following types of ACEs before the age of 17 years:

1) Parental loss is defined as any death of mother or father before age 17 or any continuous separation from parents of at least one year.

2) Mother and father neglect is defined as a parent's lack of interest in material care, health, school activities and friendships. This category of ACEs is assessed for each biological parent or parent surrogate with whom the child lived for at least 12 months. There are 8 items scored between 1 ("no, not at all") and 5 ("yes definitely") to assess neglect of each parent. The maximum score is 40. In case of studies with disorder outcomes, the cutoff score is 25 for mother neglect and 26 for father neglect.

3) Mother and father antipathy is defined by hostility, coldness or rejection expressed by parents or surrogate parents towards the child. This category of ACEs is assessed for each biological parent or parent surrogate with whom the child lived for at least 12 months. There

are 8 items scored between 1 (“no, not at all”) and 5 (“yes definitely”) to assess antipathy expressed by each parent. The maximum score is 40. In case of studies with disorder outcomes, the cutoff score is 28 for mother antipathy and 30 for father antipathy.

4) Physical abuse is defined as repeated hitting by parents or other older household members. This category of ACEs is recorded by the following question:

When you were a child or teenager were you ever hit repeatedly with an implement (such as a belt or stick) or punched, kicked or burnt by someone in the household?

If the answer is “yes” (score: 1), further questions regarding characteristics of ACEs need to be answered: age at onset of physical abuse, how the child was hit (belt or stick or punched/kicked; score 1 if either present), whether any injuries occurred (bruises, black eyes or broken limb; score 1 if yes) and whether the perpetrator was out of control (score 1 if yes). The maximum score is 4. In case of studies with disorder outcomes, the cutoff score is 3.

5) Sexual abuse is defined by physical contact or approach of a sexual nature by any adult to the child. Willing sexual contacts with peers are excluded from this definition. Sexual abuse is recorded by the following questions: “When you were a child or teenager did you ever have any unwanted sexual experiences?”, “Did anyone force you or persuade you to have sexual intercourse against your wishes before age 17?” and “Can you think of any upsetting sexual experiences before age 17 with a related adult or someone in authority, eg, teacher?”. Possible answers to these questions include: “yes”, “no” and “unsure”. “Yes” and “unsure” responses are considered positive and scored as “1”. In case of these responses, 8 questions regarding the severity and age at onset of sexual abuse need to be answered separately for first experience and other experiences. All of these questions (except for age at onset) have “yes” (1 point) and “no” (0 points) responses. The maximum score for the severity of each exposure is 7. In case of studies with disorder outcomes, the cutoff for the severity score is 2.

Additionally, the CECA.Q includes subscales for parental psychological abuse and role reversal that were not validated against interview. Therefore, these categories of ACEs were not analyzed in this study.

Apart from the analysis of specific types of ACEs, three characteristics of ACEs were also analyzed: 1) age at first exposure; 2) multiplicity and 3) severity. Age at first exposure was defined as the age when the first

category of ACEs had been reported. Multiplicity was operationalized as the number of ACEs reported by each participant (parental loss, mother neglect, mother antipathy, father neglect, father antipathy, physical abuse and sexual abuse; range: 0–7). Severity was calculated for all ACEs together, except for parental loss, as the CECA.Q does not include the severity score for this category of ACEs. More specifically, we divided reported severity of exposure by the maximum severity score that can be obtained for specific category of ACEs. Next, all severity scores were summarized and divided by the number of ACEs categories ($n = 6$).

Coping Strategies

The COPE Inventory was administered to assess employment of specific coping strategies.³⁰ It is a self-report that includes 60 statements referring to the use of specific strategies that are based on a 4-point Likert scale (1 – “I usually don’t do this at all”; 2 – “I usually do this a little bit”; 3 – “I usually do this a medium amount” and “4 – I usually do this a lot”). Each single coping strategy is scored based on four items. Higher scores indicate greater employment of specific coping strategies. The COPE Inventory recognizes 15 coping strategies. In the present study, we used the Polish version validated by Jurczyński and Ogińska-Bulik.³¹ Factor analysis of the Polish version of the COPE Inventory revealed three clusters of coping strategies (Table 1).

Data Analysis

Analyses were performed using the Statistical Package for Social Sciences, version 20 (SPSS Inc., Chicago, Illinois, USA). Bivariate comparisons were assessed using the χ^2 test or the Mann–Whitney *U*-test, where appropriate. According to the Kolmogorov–Smirnov test, the majority of continuous variables (except for the scores of active coping and emotion-focused coping had non-normal distribution). The scores of avoidance coping were the only variable that appeared to have normal distribution after logarithmic transformation. Therefore, data analysis was based on both non-parametric and parametric tests. Correlations with the scores of coping strategies were tested using the linear regression analysis. The analysis of co-variance (ANCOVA) was performed to explore the effects of group (SSD vs controls) and types of ACEs on the scores of coping strategies. Age and sex were added as co-variates in linear regression analyses and ANCOVA. In case of significant interactions between group (SSD vs

Table 1 The COPE Inventory Clusters of Coping Strategies

Active Coping (Score Range: 20–80)	Avoidance Coping (Score Range: 24–96)	Emotion-Focused Coping (Score Range: 16–64)
-Active coping (items: 5, 25, 47, 58) -Planning (items: 19, 32, 39, 56) -Suppression of competing activities (items: 15, 33, 42, 55) -Positive reinterpretation and growth (items: 1, 29, 38, 59) -Restraint (items: 10, 22, 41, 49)	-Acceptance (items: 13, 21, 44, 54) -Denial (items: 6, 27, 40, 57) -Behavioral disengagement (items: 9, 24, 37, 51) -Mental disengagement (2, 16, 31, 43) -Substance use (items: 12, 26, 35, 53) -Humor (items: 8, 20, 36, 50)	-Seeking of emotional social support (items: 11, 23, 34, 52) -Seeking of instrumental social support (items: 4, 14, 30, 45) -Turning to religion (items 7, 18, 48, 60) -Focus on and venting of emotions (items 3, 17, 28, 46)

controls) and a history of ACEs, post-hoc comparisons were performed using the Games-Howell test. Due to the use of multiple tests ($n = 110$), the Benjamini-Hochberg correction with the 25% false discovery rate was applied. The level of significance was set at $p \leq 0.009$ after applying the correction for multiple testing.

Results

Individuals with SSD and healthy controls did not differ significantly in terms of age and sex (Table 2). As expected, the number of education years was significantly lower in subjects with SSD compared to healthy controls. The group of participants with SSD was significantly more likely to report a history of parental antipathy, physical abuse and sexual abuse in comparison with healthy controls. Multiplicity and severity of ACEs were significantly higher in subjects with SSD. No significant between-group

differences were found with respect to the rates of parental loss and parental neglect as well as age at first exposure. The use of avoidance coping was significantly higher in subjects with SSD compared to healthy controls, after adjustment for age and sex (Figure 1).

No significant correlations of coping strategies with continuous characteristics of ACEs were found (age at first exposure, severity and multiplicity) neither in individuals with SSD nor in healthy controls (Table 3). In turn, associations between a history of specific ACEs and coping strategies are presented in Table 4. There were significant main effects of group (SSD vs healthy controls) on the use of avoidance coping in almost all ANCOVA models (except for the one testing for the effects of sexual abuse). Importantly, in the model testing for the effects of parental loss, significant effects of interactions between group (SSD vs healthy controls) and ACEs on the use of

Table 2 General Characteristics of the Sample

	SSD, n = 127	Controls, n = 56	Statistics
Age, years	39.1 ± 13.8	38.3 ± 6.8	$U = 3366.5, p = 0.566$
Gender, males (%)	61 (48.0)	24 (42.8)	$\chi^2 = 0.4, p = 0.518$
Education, years	13.2 ± 2.8	16.0 ± 2.4	$U = 889.5, p < 0.001$
Parental loss, n(%)	38 (29.9)	12 (21.4)	$\chi^2 = 1.5, p = 0.223$
Parental antipathy, n(%)	68 (53.5)	16 (28.6)	$\chi^2 = 10.1, p = 0.002$
Parental neglect, n(%)	41 (32.3)	16 (28.6)	$\chi^2 = 0.3, p = 0.594$
Physical abuse, n(%)	55 (43.3)	13 (23.2)	$\chi^2 = 6.9, p = 0.009$
Sexual abuse, n(%)	29 (22.8)	3 (5.4)	$\chi^2 = 8.3, p = 0.004$
Age at first exposure	9.5 ± 4.6	9.0 ± 4.6	$U = 1037.5, p = 0.616$
Multiplicity	2.3 ± 1.8	1.1 ± 1.3	$U = 4940.5, p < 0.001$
Severity	0.4 ± 0.3	0.3 ± 0.4	$U = 4965.5, p < 0.001$
PANSS-P	19.9 ± 10.0	–	–
PANSS-N	24.4 ± 9.8	–	–
First admission, n (%)	42 (33.1)	–	–
CPZeq, mg/day	357.7 ± 388.7	–	–

Note: Significant differences ($p \leq 0.009$) were marked with bold characters.

Abbreviations: CECA.Q, the Childhood Experience of Care and Abuse Questionnaire; CPZeq, chlorpromazine equivalent dosage; MADRS, the Montgomery-Asberg Depression Rating Scale; PANSS, the Positive and Negative Syndrome Scale; SSD, schizophrenia spectrum disorders; YMRS, the Young Mania Rating Scale.

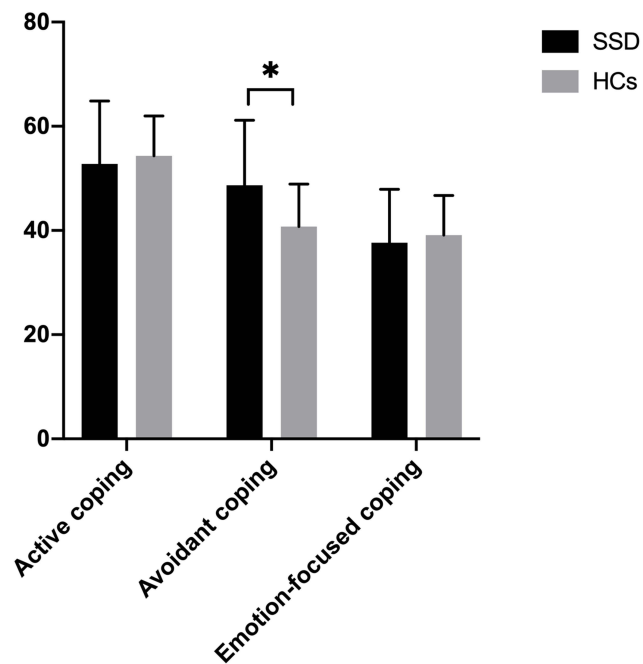


Figure 1 Coping strategies in individuals with SSD and healthy controls. Mean values are shown. Error bars represent standard deviation. *The use of avoidance coping was significantly higher in subjects with SSD compared to healthy controls after adjustment for age and sex [$F(1182) = 17.096$, $\eta_p^2 = 0.123$, $p < 0.001$; 48.7 ± 12.5 vs 40.7 ± 8.2 , respectively]. No significant differences between individuals with SSD and healthy controls with respect to using active coping [$F(1182) = 1.099$, $\eta_p^2 = 0.009$, $p = 0.297$; 52.8 ± 12.1 vs 54.3 ± 7.6 , respectively] and emotion-focused coping [$F(1182) = 0.041$, $\eta_p^2 < 0.001$, $p = 0.840$; 37.6 ± 10.3 vs 39.1 ± 7.6 , respectively].

avoidance coping were found. Post-hoc analyses revealed that the use of avoidance coping was significantly higher only in individuals with SSD and a history of parental loss compared to healthy controls with and without a history of parental loss (Figure 2).

Discussion

The present study confirms previous findings that individuals with SSD tend to rely on avoidance coping.^{32,33} More interestingly, we found significantly higher use of avoidance coping only in subjects with SSD and a history

of parental loss, compared to healthy controls with and without a history of parental loss. However, we did not find any significant associations of other characteristics of ACEs (age at first exposure, multiplicity and severity) with the use of coping strategies.

Coping refers to a range of cognitive and behavioral strategies that are used to meet the demands driven by stressful situations.³⁴ These processes are activated by appraisals of external and internal demands against individual resources.³⁵ Appraisals can be largely influenced by lifetime experiences.³⁵ Among them, there is an important role of parental support that enhances the development of more adaptive coping strategies.³⁶ Early parental loss may exceed individual cognitive capacity to understand and cope with this experience as well as it may disrupt further development of coping strategies.³⁷ Adults who experienced early parental loss have been shown to report more substance use, behavioral disengagement and emotional eating.³⁸

Our findings are also consistent with those reported by Tait et al³⁹ in subjects during recovery from psychosis. The authors demonstrated that participants with sealing-over recovery styles report lower levels of parental care during childhood. A meta-analysis of eight studies revealed that parental loss is related to 1.70-fold higher risk of developing psychosis.³ More recently, Misra et al⁴⁰ confirmed these results in a large, six-country case-control study (OR: 1.54, 95% CI: 1.18–4.37). However, the authors noticed that single experience of early parental death is rather insufficient to cause psychosis, and it is likely that certain antecedents and consequences of parental loss might be causative. First, a risk of parental loss and its consequences might be higher in socially disadvantaged populations. Examples of consequences might include quality of care and support after parental loss, engagement in risky behaviors (eg, substance use), subsequent stressors and changes in economic status.³⁵

Table 3 Bivariate Correlations Between Coping Strategies and Symptomatic Manifestation

	Group	Active Coping	Avoidance Coping	Emotion-Focused Coping
Age at first exposure	SSD	B = -0.657, p = 0.241	B = -0.016, p = 0.046	B = -0.390, p = 0.419
	Controls	B = 0.400, p = 0.403	B = 0.001, p = 0.747	B = 0.773, p = 0.076
Multiplicity	SSD	B = 0.648, p = 0.454	B = 0.011, p = 0.076	B = 0.549, p = 0.447
	Controls	B = 0.390, p = 0.620	B = -0.008, p = 0.098	B = -0.462, p = 0.562
Severity	SSD	B = -2.941, p = 0.494	B = 0.033, p = 0.367	B = -2.730, p = 0.447
	Controls	B = -2.315, p = 0.413	B = -0.006, p = 0.862	B = 1.668, p = 0.561

Table 4 Associations Between a History of Various Types of ACEs and Coping Strategies

Model	Independent Variable	Active Coping	Avoidance Coping	Emotion-Focused Coping
1	Age	F(1,182) = 0.592, η_p^2 = 0.005, p = 0.443	F(1,182) = 1.825, η_p^2 = 0.004, p = 0.180	F(1,182) = 1.005, η_p^2 = 0.008, p = 0.318
	Sex	F(1,182) = 0.100, η_p^2 = 0.001, p = 0.753	F(1,182) = 0.011, η_p^2 < 0.001, p = 0.995	F(1,182) = 4.488, η_p^2 = 0.036, p = 0.036
	Group	F(1,182) = 0.555, η_p^2 = 0.005, p = 0.458	F(1,182) = 25.003 , η_p^2 = 0.211 , p < 0.001	F(1,182) = 0.035, η_p^2 < 0.001, p = 0.853
	Parental loss	F(1,182) = 0.224, η_p^2 = 0.002, p = 0.637	F(1,182) = 0.141, η_p^2 = 0.001, p = 0.706	F(1,182) = 3.613, η_p^2 = 0.029, p = 0.060
	Group x parental loss	F(1,182) = 0.266, η_p^2 = 0.002, p = 0.607	F(1,182) = 8.679 , η_p^2 = 0.080 , p = 0.004	F(1,182) = 1.734, η_p^2 = 0.014, p = 0.190
	R ²	0.017	0.195	0.097
	Adjusted R ²	-0.024	0.151	0.059
2	Age	F(1,182) = 0.80, η_p^2 = 0.007, p = 0.373	F(1,182) = 0.982, η_p^2 = 0.008, p = 0.324	F(1,182) = 0.796, η_p^2 = 0.007, p = 0.374
	Sex	F(1,182) = 0.14, η_p^2 = 0.001, p = 0.711	F(1,182) = 0.002, η_p^2 < 0.001, p = 0.961	F(1,182) = 3.994, η_p^2 = 0.032, p = 0.048
	Group	F(1,182) = 0.66, η_p^2 = 0.005, p = 0.417	F(1,182) = 16.668 , η_p^2 = 0.122 , p < 0.001	F(1,182) = 0.004, η_p^2 < 0.001, p = 0.947
	Parental antipathy	F(1,182) = 0.29, η_p^2 = 0.002, p = 0.588	F(1,182) = 0.305, η_p^2 = 0.003, p = 0.582	F(1,182) = 0.129, η_p^2 = 0.001, p = 0.720
	Group x parental antipathy	F(1,182) = 0.54, η_p^2 = 0.004, p = 0.464	F(1,182) = 0.627, η_p^2 = 0.005, p = 0.430	F(1,182) = 0.095, η_p^2 = 0.001, p = 0.759
	R ²	0.020	0.135	0.044
	Adjusted R ²	-0.021	0.099	0.004
3	Age	F(1,182) = 0.596, η_p^2 = 0.005, p = 0.442	F(1,182) = 1.142, η_p^2 = 0.009, p = 0.287	F(1,182) = 0.782, η_p^2 = 0.006, p = 0.378
	Sex	F(1,182) = 0.089, η_p^2 = 0.001, p = 0.766	F(1,182) = 0.034, η_p^2 < 0.001, p = 0.855	F(1,182) = 3.859, η_p^2 = 0.031, p = 0.052
	Group	F(1,182) = 1.488, η_p^2 = 0.012, p = 0.225	F(1,182) = 19.826 , η_p^2 = 0.142 , p < 0.001	F(1,182) = 0.003, η_p^2 < 0.001, p = 0.957
	Parental neglect	F(1,182) = 0.309, η_p^2 = 0.003, p = 0.580	F(1,182) = 0.078, η_p^2 = 0.001, p = 0.780	F(1,182) = 0.164, η_p^2 = 0.001, p = 0.686
	Group x parental neglect	F(1,182) = 0.394, η_p^2 = 0.003, p = 0.531	F(1,182) = 2.684, η_p^2 = 0.022, p = 0.104	F(1,182) = 0.098, η_p^2 = 0.001, p = 0.755
	R ²	0.016	0.146	0.044
	Adjusted R ²	-0.025	0.111	0.005
4	Age	F(1,182) = 0.662, η_p^2 = 0.005, p = 0.418	F(1,182) = 1.150, η_p^2 = 0.009, p = 0.286	F(1,182) = 0.814, η_p^2 = 0.007, p = 0.369
	Sex	F(1,182) = 0.113, η_p^2 = 0.001, p = 0.738	F(1,182) = 0.012, η_p^2 < 0.001, p = 0.914	F(1,182) = 4.052, η_p^2 = 0.033, p = 0.046
	Group	F(1,182) = 0.362, η_p^2 = 0.003, p = 0.549	F(1,182) = 13.467 , η_p^2 = 0.101 , p < 0.001	F(1,182) = 0.125, η_p^2 = 0.001, p = 0.724
	Physical abuse	F(1,182) < 0.001, η_p^2 < 0.001, p = 1.000	F(1,182) = 0.254, η_p^2 = 0.002, p = 0.615	F(1,182) = 0.004, η_p^2 < 0.001, p = 0.952
	Group x physical abuse	F(1,182) = 0.981, η_p^2 = 0.008, p = 0.324	F(1,182) = 0.059, η_p^2 < 0.001, p = 0.809	F(1,182) = 2.614, η_p^2 = 0.021, p = 0.109
	R ²	0.020	0.130	0.066
	Adjusted R ²	-0.021	0.094	0.027
5	Age	F(1,182) = 0.796, η_p^2 = 0.007, p = 0.374	F(1,182) = 1.044, η_p^2 = 0.009, p = 0.309	F(1,182) = 0.724, η_p^2 = 0.006, p = 0.396
	Sex	F(1,182) = 0.034, η_p^2 = 0.001, p = 0.854	F(1,182) = 0.042, η_p^2 < 0.001, p = 0.839	F(1,182) = 4.318, η_p^2 = 0.035, p = 0.040
	Group	F(1,182) = 0.151, η_p^2 = 0.001, p = 0.698	F(1,182) = 5.899, η_p^2 = 0.047, p = 0.017	F(1,182) = 0.633, η_p^2 = 0.005, p = 0.428
	Sexual abuse	F(1,182) = 1.060, η_p^2 = 0.009, p = 0.305	F(1,182) = 0.630, η_p^2 = 0.005, p = 0.429	F(1,182) = 0.097, η_p^2 = 0.001, p = 0.756
	Group x sexual abuse	F(1,182) = 0.011, η_p^2 < 0.001, p = 0.917	F(1,182) = 0.012, η_p^2 < 0.001, p = 0.912	F(1,182) = 0.851, η_p^2 = 0.007, p = 0.358
	R ²	0.022	0.133	0.056
	Adjusted R ²	-0.018	0.097	0.017

Note: Significant associations (p ≤ 0.009) were marked with bold characters.

Post hoc comparisons:

SSD, parental loss(+) vs. SSD, parental loss(-): $p = 0.048$
 Controls, parental loss(+) vs. Controls, parental loss(-): $p = 0.078$
 SSD, parental loss(+) vs. Controls, parental loss(+): **$p < 0.001$**
 SSD, parental loss(-) vs. Controls, parental loss(-): $p = 0.201$
 SSD, parental loss(+) vs. Controls, parental loss(-): **$p = 0.001$**
 SSD, parental loss(-) vs. Controls, parental loss(+): $p = 0.051$

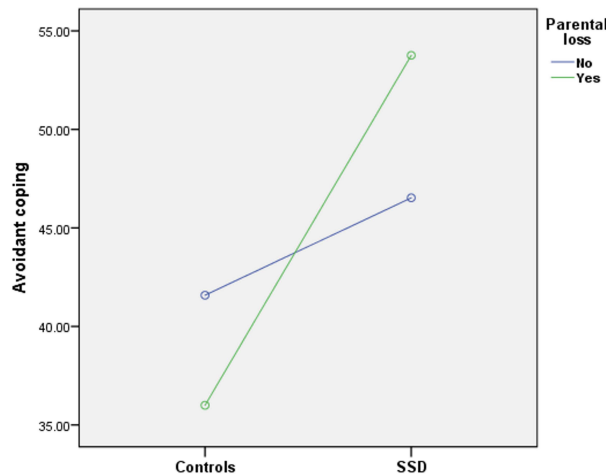


Figure 2 Effects of parental loss on avoidance coping in individuals with SSD and healthy controls. Significant differences ($p \leq 0.009$) were marked with bold characters.

Abbreviations: parental loss(+), participants with a history of parental loss; parental loss(-), participants without a history of parental loss.

The present study has important limitations requiring further comments. First, the sample size was not large. This might explain as to why we did not find significantly higher rates of parental loss in individuals with SSD compared to healthy controls. Additionally, we did not perform a more detailed analysis of parental loss. It is likely that the impact of this adversity is related to several characteristics, eg, the number of parents lost, causes and circumstances of death and age at parental loss. Another important point is that the percentage of variance explained by the ANCOVA models was relatively low, and thus it is likely that other factors, not recorded by the present study, also impact coping strategies. Moreover, we did not measure potential antecedents and consequences of ACEs. Therefore, this study does not provide mechanistic insights into the association between parental loss and coping styles. Finally, it should be noted that assessment of ACEs was based on self-reports, and the recall bias should be taken into consideration.

Conclusion

In conclusion, this study indicates that the use of avoidance coping is higher among individuals with SSD compared to

healthy controls. This phenomenon might be associated with parental loss. The present findings have certain research and clinical implications. Future studies in this field need to provide a closer look at the role of antecedents and consequences of parental loss in shaping individual coping strategies. This might be achieved by detailed analysis of socioeconomic status, parental bonding and attachment styles as well as engagement in risky health behaviors over time. Given that coping styles have previously been shown to impact clinical manifestation of SSD, it is important to focus psychological interventions on strengthening adaptive coping in this population. However, these interventions need to take into consideration the impact of ACEs, especially parental loss.

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Psychometric properties of the Childhood Experience of Care and Abuse Questionnaire (CECA.Q) in a sample of individuals with schizophrenia from Poland

Justyna Kasznia, Bartłomiej Stańczykiewicz, Aleksandra Pytel, Krzysztof Szczygieł, Błażej Misiak

Abstract

Aim of the study: The Childhood Experience of Care and Abuse Questionnaire (CECA.Q) is a semi-structured self-report that has been developed to record a history of adverse childhood experiences (ACEs). Moreover, the CECA.Q has been widely used in subjects with psychotic disorders. In this study, we aimed to investigate psychometric properties of the Polish version of the CECA.Q in individuals with schizophrenia spectrum disorders.

Material and methods: The CECA.Q was administered to 127 individuals with schizophrenia spectrum disorders (aged 39.1 ± 13.8 years, 48.0% males). Internal consistency was assessed using the Cronbach's α and polychoric correlations. Confirmatory factor analysis (CFA) was performed using the unweighted least squares estimation method.

Results: The Cronbach's α was as follows: 0.835 for mother antipathy, 0.780 for mother neglect, 0.845 for father antipathy, 0.849 for father neglect, 0.787 for mother physical abuse, 0.831 for father physical abuse and 0.870 for sexual abuse, indicating acceptable-to-good internal consistency. Correlations of single item scores with the total scores of specific categories of ACEs were significant. The CFA confirmed factorial structure of the CECA.Q with acceptable goodness-of-fit indices.

Conclusions: The present study indicates good psychometric properties of the CECA.Q in subjects with schizophrenia spectrum disorders. This self-report can be implemented by studies investigating ACEs in this clinical population in Poland.

childhood maltreatment; stress; psychosis; self-report; questionnaire

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INTRODUCTION

Adverse childhood experiences (ACEs), including sexual, physical and emotional abuse are reported by more than one third of individuals with psychotic disorders [1]. The meta-analysis performed by Varese et al. [2] demonstrated that ACEs increase a risk of psychosis; and

this association was significant regardless of the study design. Convincing evidence also indicates that a history of ACEs might be strongly associated with clinical characteristics of psychosis in adults. Indeed, it has been found that individuals with psychotic disorders reporting ACEs show higher severity of psychopathological symptoms [3] and cognitive impairments as well as worse clinical [4] and functional outcomes [5].

The mechanisms linking ACEs and psychosis risk remain complex. A history of ACEs has been associated with a number of biological alterations related to dopaminergic neurotransmission, pro-inflammatory state, metabolic dysregulation or dysfunction of the hypothalamic-pituitary-adrenal (HPA) axis that appear in individuals with psychosis [6]. Moreover, various psychological mechanisms have been reported to mediate the association between ACEs and psychosis. According to a recent meta-analysis, these include dissociation, emotional dysregulation, post-traumatic stress disorder symptoms and negative schemata [7]. However, it is unlikely that this association follows a simple pathogenetic pathway. First, it should be noted that ACEs also contribute to the development of other mental disorders. Second, the majority of patients with psychosis do not report a history of ACEs. One hypothesis providing explanation for these observations is that ACEs act upon other vulnerabilities that make individuals more prone to develop psychosis. These vulnerabilities might include genetic backgrounds and environmental factors that affect critical periods of brain development. For instance, it has been shown that certain genetic polymorphisms may impact a risk of psychotic-like experiences or overt psychosis [8]. These include, *i.e.*, variants located in genes encoding proteins involved in dopaminergic neurotransmission and functioning of the hypothalamic-pituitary-adrenal (HPA) axis. Furthermore, there is evidence that ACEs interact with other environmental insults, such as obstetric complications, substance use or stressors in the adulthood. Another possible scenario is that ACEs only mask the effects of their antecedents (*e.g.*, social disadvantage) or cascading consequences (*e.g.*, those related to poor support after experiencing ACEs). Consequently, it has been postulated that adopting more complex models

may better explain or predict the development of psychosis than investigating single risk factors.

Nevertheless, recording a history of ACEs in subjects with psychosis might be important from clinical and research perspectives. Therefore, a number of self-reports have been developed and are being widely administered in this field of research. These tools are represented by the Childhood Experience of Care and Abuse Questionnaire (CECA.Q) [9]. The CECA.Q records a number of ACEs with respect to various aspects of parental care, physical abuse and sexual abuse. However, psychometric properties of the CECA.Q have not been widely investigated and little is known about them from samples of individuals with psychosis. Moreover, the Polish version of the CECA.Q has not been investigated so far. Therefore, in this study, we aimed to investigate psychometric properties of the Polish version of the CECA.Q in individuals with schizophrenia spectrum disorders.

METHODS

Participants

Participants were 127 inpatients with schizophrenia spectrum disorders recruited in the years 2016 – 2020 at three clinical sites: 1) Department and Clinic of Psychiatry at Wrocław Medical University, Wrocław, Poland; 2) Department and Clinic of Psychiatry at Pomeranian Medical University, Szczecin, Poland and 3) Inpatient Psychiatric Unit, Municipal General Hospital, Ostrów Wielkopolski, Poland. Among them, there were 42 individuals admitted due to first-episode psychosis and 85 individuals hospitalized because of psychotic exacerbation during schizophrenia and schizoaffective disorder. Participants with first-episode psychosis were diagnosed with schizophrenia, schizoaffective disorder, schizophreniform disorder, delusional disorder or brief psychotic disorder. The DSM-IV criteria were implemented to establish psychiatric diagnoses. Additionally, the Operational Criteria for Psychotic Illness (OPCRIT) checklist was used to validate DSM-IV diagnoses [10]. There were following exclusion criteria: 1) age below 18 or over 65 years; 2) comorbid substance

dependence (except for nicotine dependence); 3) severe somatic conditions and 4) inability to provide written informed consent.

PROCEDURES

Permission was obtained from the original author of the CECA.Q. The protocol of this study was approved by the Ethics Committee at Wrocław Medical University (Wrocław, Poland).

Two independent translators were involved in translation of the CECA.Q into Polish language. Both translators discussed all discrepancies and reached the consensus about the final version of the CECA.Q. Next, the backward translation was performed by another translator. The back-translated version was compared to the original version of the CECA.Q and necessary corrections were made. Face validity of the final version was assessed qualitatively after administration of the CECA.Q to 20 patients with schizophrenia. They were interviewed about any difficulties in completing the CECA.Q. No corrections were made to the CECA.Q version used among this group of individuals with schizophrenia.

Before recruitment of all participants, aims of the study were explained and all of them signed in written informed consent. Participants were requested to fill in the CECA.Q. Additionally, information about age, sex and education level was obtained. Clinical manifestation on the day of recruitment was recorded using the Positive and Negative Syndrome Scale (PANSS) [11]. The majority of participants ($n = 125$) were medicated on the day of recruitment (mean chlorpromazine equivalent dosage was 357.7 ± 388.7 mg/day).

The CECA.Q – contents and scoring

The CECA.Q is a semi-structured, self-report that was developed to record several categories of ACEs before the age of 17 years. These categories are as follows:

1. Mother and father neglect refers to a parent's lack of interest in material care, health, school activities and friendships. This category is evaluated for each biological parent or parent surrogate with whom the child lived for at least 12 months. There are 8 items (item numbers: 2, 3, 5, 7, 12-15) scored between 1 ("no, not at all") and 5 ("yes definitely") to record neglect of each parent (the maximum score is 40). Items 2, 3, 5, 12, 13 and 14 should be reversed before summing. Higher scores indicate higher levels of parental neglect.
2. Mother and father antipathy can be described as hostility, coldness or rejection expressed by parents or surrogate parents towards the child. This category of ACEs is recorded for each biological parent or parent surrogate with whom the child lived for at least 12 months. There are 8 items (item numbers: 1, 4, 6, 8-11 and 16) scored between 1 ("no, not at all") and 5 ("yes definitely") to evaluate each parent's antipathy (the maximum score is 40). Items 8 and 11 should be reversed before summing. Higher scores reflect higher levels of parental antipathy.
3. Physical abuse refers to repeated hitting by parents or other older household members. This category is assessed by the question: "When you were a child or teenager were you ever hit repeatedly with an implement (such as a belt or stick) or punched, kicked or burnt by someone in the household?" If the answer is "yes", additional questions about physical abuse need to be answered: age at onset of physical abuse, whether the child was hit on more than one occasion (score 1 if the answer is "yes"), how the child was hit (belt or stick or punched/kicked; score 1 if either present), whether any injuries were present (bruises, black eyes or broken limb; score 1 if yes) and whether the perpetrator was out of control (score 1 if yes). These questions need to be answered separately for each parent. The total score ranges between 0 and 4 for each parent. Higher scores indicate higher levels of physical abuse.
4. Sexual abuse can be defined as a physical contact or approach of a sexual nature by any adult to the child. Willing sexual contacts with peers are not captured by this definition. Sexual abuse is recorded by three screening questions: "When you were a child or teenager did you ever have any

unwanted sexual experiences?”, “Did anyone force you or persuade you have sexual intercourse against your wishes before age 17?” and “Can you think of any upsetting sexual experiences before age 17 with a related adult or someone in authority, e.g., teacher?”. There are three possible answers to these questions: “yes”, “no” and “unsure”. “Yes” and “unsure” responses are considered to indicate a history of sexual abuse. If these answers are recorded, 8 questions about the severity and age at exposure onset need to be answered separately for first experience and other experiences. Answers to these questions have dichotomous responses (“yes” – 1 point and “no” – 0 points). The severity score of each exposure ranges between 0 and 7. Higher scores indicate higher severity of sexual abuse.

Additionally, the CECA.Q includes subscales for parental loss, parental psychological abuse and role reversal. Parental loss is defined as any death of mother or father or any continuous separation of at least one year before the age of 17. Parental loss is assessed by six items of various categories evaluating age at parental loss, reasons and duration of separation. Due to this diversity psychometric properties of them were not assessed. In turn, parental psychological abuse and role reversal were not validated against interview, and were also excluded from data analysis.

STATISTICS

Internal consistency was assessed by calculating the Cronbach’s alpha and polychoric correlations. The following levels of internal consistency were considered: acceptable ($0.08 > \alpha > 0.07$), good ($0.09 > \alpha > 0.08$) and excellent ($\alpha > 0.009$) [12]. The level of significance was set at $p < 0.05$ in case of polychoric correlations. Confirmatory factor analysis (CFA) was performed using unweighted least squares (ULS) estimation method. Several goodness of fit indices were analyzed, including the χ^2/df ratio, GFI and NFI. Model fit was considered acceptable if the χ^2/df ratio was ≤ 5 (13), GFI and NFI were > 0.09 (14,15). Data analysis was performed using the Statistical Package for Social Sciences (SPSS) and the AMOS, versions 27.

RESULTS

General characteristics of the sample are reported in Table 1. Out of 127 participants (aged 39.1 ± 13.8 years, there were 61 males and 66 females. Frequency rates of specific categories of ACEs were as follows: 79.5% for any ACEs, 33.1% for mother antipathy, 27.6% for mother neglect, 35.4% for father antipathy, 28.3% for father neglect, 27.6% for mother physical abuse, 37.8% for father physical abuse and 22.8% for sexual abuse.

Table 1. General characteristics of the sample.

	Mean \pm SD or n (%)
Age, years	39.1 \pm 13.8
Sex, males (%)	61 (48.0)
Education, years	13.2 \pm 2.8
CECA.Q – mother antipathy, severity score	21.3 \pm 8.2
CECA.Q – mother antipathy, yes	42 (33.1)
CECA.Q – mother neglect, severity score	16.8 \pm 7.4
CECA.Q – mother neglect, yes	35 (27.6)
CECA.Q – father antipathy, severity score	22.3 \pm 9.1
CECA.Q – father antipathy, yes	45 (35.4)
CECA.Q – father neglect, severity score	18.6 \pm 7.9
CECA.Q – father neglect, yes	36 (28.3)
CECA.Q – mother physical abuse, severity score	0.5 \pm 1.0
CECA.Q – mother physical abuse, yes	35 (27.6)
CECA.Q – father physical abuse, severity score	0.9 \pm 1.3
CECA.Q – father physical abuse, yes	48 (37.8)
CECA.Q – sexual abuse, severity score	0.4 \pm 1.2
CECA.Q – sexual abuse, yes	29 (22.8)
CECA.Q – any ACEs, yes	101 (79.5)
PANSS – total score	85.7 \pm 30.3
CPZeq, mg/day	357.7 \pm 388.7

Abbreviations: CECA.Q – the Childhood Experience of Care and Abuse Questionnaire; CPZeq – chlorpromazine equivalent dosage; PANSS – the Positive and Negative Syndrome Scale

Results of reliability analysis and confirmatory factor analysis are shown in Table 2.

Table 2. Results of reliability analysis and confirmatory factor analysis.

Category of ACEs	Item	Cronbach's alpha after item removal	Correlation with total category score*	Standardized regression weights
Mother antipathy	1	0.803	0.733	0.732
	4	0.826	0.546	0.526
	6	0.809	0.669	0.682
	8	0.819	0.622	0.563
	9	0.801	0.719	0.750
	10	0.803	0.750	0.792
	11	0.830	0.420	0.484
	16	0.834	0.494	0.449
Mother neglect	2	0.746	0.652	0.613
	3	0.732	0.632	0.690
	5	0.746	0.668	0.603
	7	0.803	0.372	0.388
	12	0.746	0.606	0.669
	13	0.708	0.739	0.392
	14	0.751	0.516	0.907
	15	0.797	0.398	0.609
Father antipathy	1	0.823	0.688	0.686
	4	0.819	0.719	0.705
	6	0.813	0.746	0.772
	8	0.848	0.517	0.379
	9	0.807	0.758	0.813
	10	0.809	0.769	0.810
	11	0.851	0.481	0.363
	16	0.833	0.634	0.554
Father neglect	2	0.809	0.745	0.810
	3	0.811	0.784	0.841
	5	0.823	0.651	0.685
	7	0.862	0.605	0.363
	12	0.817	0.630	0.791
	13	0.807	0.759	0.848
	14	0.829	0.616	0.657
	15	0.872	0.579	0.157
Mother physical abuse	1	0.744	0.892	0.876
	3	0.741	0.913	0.916
	5	0.783	0.666	0.510
	7	0.794	0.636	0.469
Father physical abuse	2	0.724	0.901	0.950
	4	0.763	0.868	0.838
	6	0.842	0.681	0.523
	8	0.788	0.802	0.649

Sexual abuse	1	0.828	0.828	0.849
	2	0.826	0.830	0.901
	3	0.831	0.806	0.504
	4	0.821	0.854	0.789
	5	0.851	0.688	0.517
	6	0.854	0.591	0.427
	7	0.870	0.519	0.344

*all p-values < 0.001

Before removing specific items from the CECA.Q, Cronbach's alpha was as follows: 0.835 for mother antipathy, 0.780 for mother neglect, 0.845 for father antipathy, 0.849 for father neglect, 0.787 for mother physical abuse, 0.831 for father physical abuse and 0.870 for sexual abuse, indicating acceptable-to-good internal consistency. After removing item 7 from the mother neglect scale, Cronbach's alpha increased to 0.803. All polychoric correlations between single item scores and total category scores were significant ($p < 0.001$). The CFA confirmed the primary structure of the CECA.Q, with fit indices indicating acceptable model fit (GFI = 0.093, NFI = 0.095 and the $\chi^2/df = 3.45$).

DISCUSSION

This study confirmed factorial structure of the CECA.Q and demonstrated that this questionnaire is characterized by acceptable-to-good internal consistency. Acceptable-to-good internal consistency were also reported in a sample of 171 London by Bifulco et al. (9), who developed the CECA.Q. The authors showed that the Cronbach's alpha was 0.81 for parental antipathy and 0.80 for parental neglect. Rates of specific ACEs found in our study were also similar to those found in previous studies. For instance, the meta-analysis by Bonoldi et al. estimated the prevalence of childhood sexual, physical and emotional abuse in subjects with psychosis at 26%, 39% and 34%, respectively (1).

Findings from this study should be interpreted in light of potential limitations. Importantly, caution should always be taken to the way a history of ACEs is being collected. First, it is important to note that self-reports might be characterized by a recall bias, especially when de-

tailed information about exposure is being recorded. However, a research approach that is based on other sources of information, e.g., records of courts or other institutions, interviews with close relatives, can also be biased. For instance, close relatives might be directly or indirectly involved in the exposure to ACEs. In turn, records of courts or other institutions might be biased by a lack of reliable information. Indeed, it has been shown that victims not always disclose a history of ACEs because of the feelings related to shame, guilt and humiliation (16,17). These considerations indicate that there is no universal and reliable approach to investigating a history of ACEs in adulthood.

It is also important to note that we did not assess the test-retest reliability of the CECA.Q reports. At least theoretically, factors related to clinical manifestation, e.g., psychopathological symptoms and cognitive impairments might impact the stability of reports in individuals with psychosis. However, Fisher et al. (18) found that the CECA.Q reports of childhood sexual abuse, parental neglect, antipathy and physical abuse remain stable over a 7-year observation period in subjects with first-episode psychosis. The authors also demonstrated that psychopathological symptoms are not associated with reports of ACEs. Similar findings regarding test-retest reliability of the CECA.Q reports over 3 months were also provided by the study performed in subjects with schizophrenia spectrum disorders (19). Finally, Simpson et al. (20) found that reports of ACEs are stable over 3 months in subjects with first-episode psychosis and healthy controls when they are recorded by another self-report – the Childhood Trauma Questionnaire.

CONCLUSIONS

In conclusion, the present study indicates good psychometric properties of the CECA.Q in subjects with schizophrenia spectrum disorders. This questionnaire can be implemented by studies investigating ACEs in this clinical population. However, additional studies are needed to assess validity of the CECA.Q subscales that were not analyzed in this study, i.e., those recording parental psychological abuse and role reversal.

Conflict of interest
None to declare.

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VII. Podsumowanie wyników

Część pierwsza

Justyna Kasznia, Aleksandra Pytel, Bartłomiej Stańczykiewicz, Jerzy Samochowiec, Joanna Preś, Karolina Rachubińska, Błażej Misiak.: Adverse childhood experiences and neurocognition in schizophrenia spectrum disorders: age at first exposure and multiplicity matter. *Frontiers in Psychiatry*. 2021. 12:684099.

Grupa osób z zaburzeniami ze spektrum schizofrenii charakteryzowała się istotnie niższym poziomem wykształcenia ($U = 889,5$, $p < 0,001$) i uzyskała słabsze wyniki we wszystkich domenach RBANS (pamięć świeża: $U = 690,0$, $p < 0,001$; zdolności wzrokowo-przestrzenne: $U = 1\ 073,0$, $p < 0,001$; język: $U = 1\ 080,0$, $p < 0,001$; uwaga: $U = 424,0$, $p < 0,001$; pamięć odroczone: $U = 476,0$, $p < 0,001$) w porównaniu do grupy osób zdrowych. Ponadto, liczba ($\chi^2 = 10,4$, $p = 0,001$) i nasilenie ($U = 4965,5$, $p < 0,001$) traumatycznych doświadczeń z dzieciństwa były większe w grupie osób z zaburzeniami ze spektrum schizofrenii w porównaniu do grupy kontrolnej. Dodatkowo, większa liczba traumatycznych doświadczeń w dzieciństwie była związana ze znacznie niższymi wynikami w teście RBANS (zdolności wzrokowo-przestrzenne: $r = -0,271$, $p < 0,01$; uwaga: $r = -0,301$, $p < 0,01$; pamięć odroczone: $r = -0,293$, $p < 0,01$ i całościowy wynik dla funkcji poznawczych: $r = -0,302$, $p < 0,01$ u osób z zaburzeniami ze spektrum schizofrenii oraz pamięć świeża: $r = -0,336$, $p < 0,05$; język: $r = -0,271$, $p < 0,05$; pamięć odroczone: $r = -0,307$, $p < 0,05$, całościowy wynik dla funkcji poznawczych: $r = -0,316$, $p < 0,01$ u osób zdrowych). Ponadto, u osób z zaburzeniami ze spektrum schizofrenii większa liczba ($B = -0,440$, $p = 0,017$) oraz młodszy wiek przy pierwszej ekspozycji ($B = 0,650$, $p = 0,018$) traumatycznych doświadczeń z dzieciństwa wiązały się z niższymi wynikami w podskali uwaga testu RBANS.

Część druga

Justyna Kasznia, Aleksandra Pytel, Bartłomiej Stańczykiewicz, Jerzy Samochowiec, Katarzyna Waszczuk, Małgorzata Kulik, Agnieszka Cyran, Błażej Misiak.: The impact of adverse childhood experiences on coping strategies in schizophrenia spectrum disorders: a case-control study. *Psychology Research and Behavior Management*. 2021. 14:1315-1323.

Osoby z zaburzeniami ze spektrum schizofrenii znacznie częściej korzystały z unikającego stylu radzenia sobie ($F = 17,096$, $p < 0,001$). W życiorysie tychże osób znacznie częściej w porównaniu do grupy kontrolnej występowały elementy antypatii rodzicielskiej ($\chi^2 = 10,1$, $p = 0,002$), nadużyć fizycznych ($\chi^2 = 6,9$, $p = 0,009$) i seksualnych ($\chi^2 = 8,3$, $p = 0,004$). Ponadto, grupa osób z zaburzeniami ze spektrum schizofrenii charakteryzowała się znacznie wyższą liczbą ($U = 4940,5$, $p < 0,001$) i nasileniem ($U = 4965,5$, $p < 0,001$) traumatycznych doświadczeń w dzieciństwie. Dodatkowo, osoby z zaburzeniami ze spektrum schizofrenii, które doświadczyły utraty opieki rodzicielskiej znacznie częściej stosowały unikający styl radzenia sobie w porównaniu z grupą kontrolną z podobną stratą jak i bez niej ($F = 8,679$, $p = 0,004$). Nie stwierdzono związku innych cech traumatycznych doświadczeń w dzieciństwie (wiek przy pierwszej ekspozycji, nasilenie i liczba) z innymi strategiami radzenia sobie.

Część trzecia

Justyna Kasznia, Bartłomiej Stańczykiewicz, Aleksandra Pytel, Krzysztof Szczygieł, Błażej Misiak. Psychometric properties of the Childhood Experience of Care and Abuse Questionnaire (CECA.Q) in a sample of individuals with schizophrenia from Poland. Archives of Psychiatry and Psychotherapy Online First Nr 7: 1–7.

Współczynnik α Cronbacha dla poszczególnych podskal wynosił następująco: 0,835 dla antypatii matczynej, 0,780 dla zaniedbywania przez matkę, 0,845 dla antypatii ojcowskiej, 0,849 dla zaniedbywania przez ojca, 0,787 dla przemocy fizycznej stosowanej przez matkę, 0,831 dla przemocy fizycznej stosowanej przez ojca i 0,870 dla wykorzystywania seksualnego, co wskazuje na spójność wewnętrzną na poziomie akceptowalnym i dobrym. Korelacje polichoryczne pomiędzy wynikami dla pojedynczych pozycji z wynikami całkowitymi dla poszczególnych kategorii traumatycznych doświadczeń w dzieciństwie były istotne ($p < 0.001$). Konfirmacyjna analiza czynnikowa (CFA) potwierdził strukturę czynnikową CECA.Q z akceptowalnymi wskaźnikami dopasowania ($GFI=0.093$, $NFI=0.095$ i $\chi^2/df = 3.45$).

VIII. Wnioski

Uzyskane wyniki badań pozwalają na wyciągnięcie następujących wniosków:

1. Traumatyczne doświadczenia w dzieciństwie są związane z deficytami funkcji poznawczych oraz unikowym stylem radzenia sobie.
2. Większa liczba traumatycznych doświadczeń w dzieciństwie jest związana z deficytami funkcji poznawczych a w szczególności w zakresie uwagi, pamięci odroczonej u osób ze zdiagnozowanymi zaburzeniami ze spektrum schizofrenii.
3. Wcześniejszy wiek pierwszej ekspozycji na traumatyczne doświadczenia w dzieciństwie może przyczyniać się do zwiększonych deficytów w obszarze uwagi u osób z zaburzeniami ze spektrum schizofrenii.
4. Znaczącym czynnikiem dotyczącym związku między traumatycznymi doświadczeniami w dzieciństwie z deficytami funkcji poznawczych zarówno u osób ze zdiagnozowanym zaburzeniami ze spektrum schizofrenii oraz u osób zdrowych jest liczba takich przeżyć.
5. Stosowanie unikającego stylu radzenia sobie jest wyższe wśród osób z zaburzeniami ze spektrum schizofrenii w porównaniu do osób zdrowych, co może być związane z doświadczeniem utraty rodziców.
6. Kwestionariusz Doświadczenia Opieki i Przemocy w Dzieciństwie CECA.Q w wersji polskiej posiada dobre właściwości psychometryczne w przebadanej grupie osób z zaburzeniami ze spektrum schizofrenii i może być stosowany do badania traumatycznych doświadczeń w dzieciństwie w tej populacji klinicznej.
7. Niezbędne są dodatkowe badania, aby ocenić trafność podskal kwestionariusza CECA.Q, które nie zostały przeanalizowane w tym badaniu, tj. podskal opisujących przemoc psychiczną rodziców i odwrócenie ról.

IX. Piśmiennictwo

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X. Załączniki

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2. Oświadczenia współautorów prac

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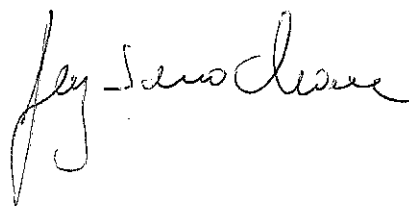
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Oświadczam, że w pracy: *Justyna Kasznia, Aleksandra Pytel, Bartłomiej Stańczykiewicz, Jerzy Samochowiec, Katarzyna Waszczuk, Małgorzata Kulik, Błażej Misiak.: The impact of adverse childhood experiences on coping strategies in schizophrenia spectrum disorders: a case-control study. Psychology research and behavior management. 2021. 14:1315-1323, DOI: 10.2147/PRBM.S324152*, brałem udział w przygotowaniu rekrutacji pacjentów i korekcie manuskryptu.



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Oświadczenie

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Oświadczenie

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Uniwersytet Szczeciński

Oświadczenie

Oświadczam, że w pracy: *Justyna Kasznia, Aleksandra Pytel, Bartłomiej Stańczykiewicz, Jerzy Samochowiec, Katarzyna Waszczuk, Małgorzata Kulik, Błażej Misiak.: The impact of adverse childhood experiences on coping strategies in schizophrenia spectrum disorders: a case-control study. Psychology research and behavior management. 2021. 14:1315-1323, DOI: 10.2147/PRBM.S324152*, brałam udział w przygotowaniu rekrutacji pacjentów i korekcie manuskryptu.

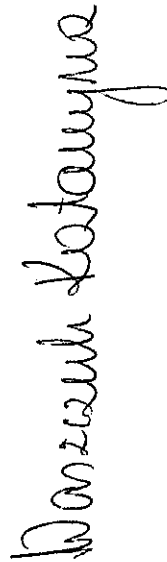
MM Kulik

Wrocław, dn. 10.11.2021 r.

lek. Katarzyna Waszczuk
Katedra I Klinika Psychiatrii
Pomorski Uniwersytet Medyczny w Szczecinie

Oświadczenie

Oświadczam, że w pracy: *Justyna Kasznia, Aleksandra Pytel, Bartłomiej Stańczykiewicz, Jerzy Samochowiec, Katarzyna Waszczuk, Małgorzata Kulik, Błażej Misiak.: The impact of adverse childhood experiences on coping strategies in schizophrenia spectrum disorders: a case-control study. Psychology research and behavior management. 2021. 14:1315-1323, DOI: 10.2147/PRBM.S324152*, brałam udział w przygotowaniu rekrutacji pacjentów i korekcie manuskryptu.



Wrocław, dn. 10.11.2021 r.

lek. Agnieszka Cyran
Zakład Psychiatrii Konsultacyjnej i Badań Neurobiologicznych
Katedra Psychiatrii
Uniwersytet Medyczny we Wrocławiu

Oświadczenie

Oświadczam, że w pracy: *Justyna Kasznia, Aleksandra Pytel, Bartłomiej Stańczykiewicz, Jerzy Samochowiec, Katarzyna Waszczuk, Małgorzata Kulik, Agnieszka Cyran, Błażej Misiak.: The impact of adverse childhood experiences on coping strategies in schizophrenia spectrum disorders: a case-control study. Psychology research and behavior management. 2021. 14:1315-1323, DOI: 10.2147/PRBM.S324152*, brałam udział w przygotowaniu rekrutacji pacjentów i korekcie manuskryptu.

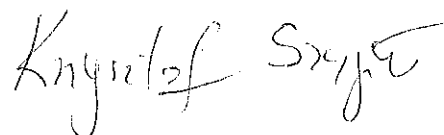


Wrocław, dn. 10.11.2021 r.

lek. Krzysztof Szczygieł
Katedra i Klinika Psychiatrii
Pomorski Uniwersytet Medyczny w Szczecinie

Oświadczenie

Oświadczam, że w pracy: *Justyna Kasznia, Bartłomiej Stańczykiewicz, Aleksandra Pytel, Krzysztof Szczygieł, Błażej Misiak. Psychometric properties of the Childhood Experience of Care and Abuse Questionnaire (CECA. Q) in a sample of individuals with schizophrenia from Poland. Archives of Psychiatry and Psychotherapy Online First Nr 7: 1–7, DOI: 10.12740/APP/APP/141861*, brałem udział w przygotowaniu bazy danych oraz korekcie manuskryptu.



3. Nota biograficzna

Justyna Kasznia urodziła się 04.03.1973 roku w Ostrowcu Świętokrzyskim. W 1999 roku ukończyła studia na kierunku lekarskim na Wydziale Lekarskim Akademii Medycznej w Poznaniu. W 2007 roku uzyskała tytuł specjalisty psychiatrii, a w 2010 roku specjalisty psychiatrii dzieci i młodzieży. W latach 1999 – 2020 pracowała w Oddziale Psychiatrycznym w Zespole Zakładów Opieki Zdrowotnej w Ostrowie Wielkopolskim. Jest członkiem Polskiego Towarzystwa Psychiatrycznego. Obecnie prowadzi prywatną praktykę specjalistyczną w zakresie psychiatrii oraz psychiatrii dzieci i młodzieży. Justyna Kasznia jest współautorem 6 pełnotekstowych publikacji o sumarycznej liczbie punktów MNiSW/KBN: 620 (IF: 24.176). W trzech z nich jest pierwszym autorem.

4. Wykaz publikacji autorki

Sumaryczny Impact Factor: 24.176

- **Justyna Kasznia**, Bartłomiej Stańczykiewicz, Aleksandra Pytel, Krzysztof Szczygieł, Błażej Misiak. Psychometric properties of the Childhood Experience of Care and Abuse Questionnaire (CECA. Q) in a sample of individuals with schizophrenia from Poland. Archives of Psychiatry and Psychotherapy Online First Nr 7: 1–7. DOI: 10.12740/APP/APP/141861
- **Justyna Kasznia**, Aleksandra Pytel, Bartłomiej Stańczykiewicz, Jerzy Samochowiec, Katarzyna Waszczuk, Małgorzata Kulik, Błażej Misiak.: The impact of adverse childhood experiences on coping strategies in schizophrenia spectrum disorders: a case-control study. Psychology Research and Behavior Management. 2021;14:1315-1323. DOI: 10.2147/PRBM.S324152
- **Justyna Kasznia**, Aleksandra Pytel, Bartłomiej Stańczykiewicz, Jerzy Samochowiec, Joanna Preś, Karolina Rachubińska, Błażej Misiak.: Adverse childhood experiences and neurocognition in schizophrenia spectrum disorders: age at first exposure and multiplicity matter. Frontiers in Psychiatry. 2021;12:684099. DOI: 10.3389/fpsy.2021.684099
- Błażej Misiak, Filip Stramecki, **Justyna Kasznia**, Michał Lis, Bartłomiej Stańczykiewicz.: Adiponectin levels in patients with bipolar disorder: a systematic review and meta-analysis. Psychoneuroendocrinology. 2019;104:74-79. DOI: 10.1016/j.psyneuen.2019.02.019
- Błażej Misiak, Francesco Bartoli, Filip Stramecki, Jerzy Samochowiec, Michał Lis, **Justyna Kasznia**, Konrad Jarosz, Bartłomiej Stańczykiewicz.: Appetite regulating hormones in first-episode psychosis: a systematic review and meta-analysis. Neuroscience and Biobehavioral Reviews 2019;102:362-370. DOI: 10.1016/j.neubiorev.2019.05.018.
- Błażej Misiak, Dorota Frydecka, Olga Loska, Ahmed A. Moustafa, Jerzy Samochowiec, **Justyna Kasznia**, Bartłomiej Stańczykiewicz.: Testosterone, DHEA and DHEA-S in patients with schizophrenia: a systematic review and meta-analysis. Psychoneuroendocrinology. 2018;89(3):92-102. DOI: 10.1016/j.psyneuen.2018.01.007