Childhood Imaginary Companions and Schizotypy in Adolescents and Adults[1]

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Abstract: ***Objective:*** This study evaluated the association of Childhood Imaginary Companion (CIC) status and schizotypy levels of adolescents and adults within the framework of the Hierarchical Taxonomy of Psychopathology (HiTOP). ***Method:*** The sample included 255 Iranian adolescents and adults, grouped according to their CIC status, who responded mostly via e-questionnaires on a website. Schizotypy dimensions were compared between these two groups. Two measures compatible with the HiTOP model were also evaluated both in relation to the short scale of the Oxford-Liverpool Inventory of Feelings and Experiences (sO-LIFE) schizotypy dimensions and the CIC status of participants; one scale used exclusively with adolescents (i.e., the Achenbach System of Empirically-Based Assessment-Youth Self-Report [ASEBA-YSR]), and another with adults (i.e., the NEO-Five Factor Inventory [NEO-FFI]). ***Results:*** Scores on the unusual experiences (UnEx) the impulsive nonconformity (ImpNon) dimensions, and the total score of the sO-LIFE were higher for the CIC group. For adolescents, the UnEx dimension and the Thought Problems subscale of the ASEBA-YSR correlated. Scores on three subscales of the ASEBA-YSR (i.e., Thought Problems, Obsessive-Compulsive Problems, and PTSD Problems) were significantly higher for the CIC group. For adults, the neuroticism domain of the NEO-FFI correlated strongly with total score of the sO-LIFE and the cognitive disorganization (CogDis) dimension. This domain of the NEO-FFI was the only one in which CIC adults scored higher than the NIC group. ***Conclusion:*** CIC in adolescents and adults is associated with a set of schizotypy dimensions in line with the concept of the "happy schizotype."

Keywords: positive schizotypy, imaginary friend, psychosis spectrum

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Highlights

- Having imaginary companions (IC) relates to higher schizotypy scores
- Having IC matches with the adaptive aspect of schizotypy
- Schizotypy and IC status relate to higher classifications of mental phenomena

The childhood imaginary companion (CIC) is a fantasy character created by some children throughout development. As the term suggests, ICs are vivid pretend characters (e.g., people, animals, fictional creatures) that the children having them act as if they were real and interact with them (e.g., talk to them, refer to them by name) in their daily activities and play (Taylor, 1999). Svendsen (1934) defined an imaginary friend as: "an invisible character named and referred to in conversation with other persons or played with directly for a period of time, at least several months, having an air of reality for the child, but no apparent objective basis" (p. 988). Reports of ICs are as diverse and distinctive as children's personalities. As an example, Taylor (1999) described the ICs of a 4-year-old girl as "two invisible birds named Nutsy and Nutsy… lived in a tree outside her bedroom window… had brightly colored feathers… they [parents] regularly observed their daughter talking and playing with them" (p. 8). Svendsen's definition of ICs has been employed in most of the scientific literature ever since. However, this definition fails to take into consideration another very similar phenomenon: personified objects (POs). They are stuffed animals and dolls that children treat as if they were real and had a personality of their own (Davis, 2020). For POs to count as ICs, they must align with Svendsen's definition, which excludes transitional objects. A related fantasy play to ICs is impersonation (imaginary identities). Impersonation happens when children create imaginary characters and impersonate them on a regular basis (Taylor, 1999; Taylor et al., 2013). In addition to the phenomenological overlaps of the experiences, these two phenomena are similar to invisible ICs in regard to the higher level of theory of mind (ToM) of the children having them (Taylor & Carlson, 1997). Nevertheless, some studies show differences between invisible ICs and POs regarding the relationship children have with them (Gleason, 2002): relationship with the former being more like with peers (i.e., "horizontal"), while children interact with the latter in a more nurturing and care-giving style (i.e., "vertical"). This might be the reason why children with invisible ICs were found to receive more positive peer nominations than children having POs (Lin et al., 2018).

Scientific investigation of ICs has been through a turbulent history. Earlier studies associated them with an array of deficits in personality and problems (Vostrovsky, 1895). For instance, Svendsen (1934) described children having ICs as timid in the presence of other children, but more recent studies did not find such differences between children with and without ICs (Mauro, 1991), and even reported the adaptive role of ICs in the lives of children (Bender & Vogel, 1941). One explanation for these opposing findings is the recruitment of samples from outpatient clinics and without control groups in earlier studies (Taylor, 1999). Indeed, prevalence rates of children having ICs, 13 to 65 %, emphasize the normality of this phenomenon (Davis et al., 2019; Pearson, 1998; Svendsen, 1934; Taylor et al., 2004). Moreover, research into personality characteristics and behavioral correlates of IC play demonstrated a range of positive attributes. This type of imaginative play was reported to provide children with a more advanced theory of mind (Giménez-Dasí et al., 2014; Taylor & Carlson, 1997) and greater positive adjustment among high-risk pre-adolescents (Taylor et al., 2010).

Additionally, studies have found relations between having ICs and scoring higher on creativity scales (Hoff, 2005). Schaefer (1969) reported that adolescents with a history of IC play were more likely to belong to the creative group of their study compared with peers without it. This finding was shown among adults as well (Kidd et al., 2010). Another relevant line of research associated IC play with fantasy-oriented activities. In a longitudinal study, one-year-old toddlers showing tendency toward fantasy-based toys were more likely to engage in IC play at the age of four than those preferring reality-based toys (Acredolo et al., 1995). Furthermore, adult fiction writers tend to report more memories of childhood ICs than population norms (Taylor et al., 2003). Inclination toward fantasy and more advanced imaginative abilities among those with IC play experience was further explored in other studies (Firth et al., 2015) . Trionfi and Reese (2009) found that children with ICs are better able to tell detailed narratives about a story and a personal experience than their peers. In a study of 102 female students, Gleason et al. (2003) found associations between having ICs and more imagery use, as well as more vivid night dreams and violent daydreams. Similarly, children with ICs were reported by parents to be highly imaginative, use myth in their games, and refer to events as magical (Bouldin & Pratt, 1999). Relevantly, readiness for daydreaming was found to be the most reliable predictor for using a diary in the role of an imaginary friend among adolescent diarists (Seiffge-Krenke, 1997). Collectively, these studies found links between having ICs and showing higher fantasy-proneness among different age groups.

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Considering this proposed link, there have been studies on personality correlates of fantasy-proneness. In a recent meta-analysis of 132 articles comprising 24,007 participants, Merckelbach et al. (2021) demonstrated large effect sizes (rs > .50) for hallucination-like experiences, magical ideation, aberrant perceptions, dissociation, and daydreaming, as correlates of fantasy-proneness. Earlier studies showed better hallucinatory ability of fantasizers compared to those low and medium in fantasy-proneness (Lynn & Rhue, 1988).

Childhood IC status has been proposed to be related to the propensity to hallucinate (Pearson et al., 2001). This was shown using ambiguous auditory stimuli tasks (e.g., the Jumbled Speech task) in which IC children reported hearing more meaningful words than a control group (Fernyhough et al., 2007). Davis and colleagues (2019) demonstrated that adult reports of childhood IC predicted prodromal symptoms of hallucination with childhood adversity partially mediating this relation. Furthermore, using both an auditory signal detection task (needing participants to detect speech in embedded noise) and the Launay-Slade Hallucination Scale-revised (LSHS-revised; Bentall & Slade, 1985), Fernyhough and colleagues (2019) found a bias towards detecting speech in white noise as well as higher auditory verbal hallucination (AVH) scores in adults with a history of childhood ICs. It is necessary to mention that hallucinating per se is not an indicator of pathology (Bentall, 2014), around 10% of the general population experience hallucinations without necessarily being diagnosed with any mental disorder (Bentall & Slade, 1985; Posey & Losch, 1983; Van Os et al., 2000).

Relatedly, schizotypy is a multidimensional personality construct that, according to Claridge (1997), results from a combination of genetic, environmental and personality factors and has a normal distribution in the general population. It represents the underlying predisposition in a quasi/fully dimensional view of schizophrenia that expresses itself across a broad range of personality, subclinical, and clinical phenomenology (Kwapil & Chun, 2015). The quasi-dimensional perspective of schizotypy originates in the clinical tradition that identified mild symptoms of schizophrenia in the relatives of patients (Bleuler, 1950; Kraepelin, 1919). Later, Meehl (1962) described schizotypy as a personality organization that is taxonic in nature and shows liability for schizophrenia (Lenzenweger, 1998). It was shown (Morrison et al., 2002) that individuals at high risk for later developing psychosis also scored higher in a schizotypy inventory (Oxford-Liverpool Inventory of Feelings and Experiences [O-LIFE], Mason et al., 1995). There is also longitudinal evidence that those with an increased genetic risk of psychosis report higher levels of schizotypy than controls (Miller et al., 2002). However, a po-

tential risk of psychosis does not mean actual conversion to full-blown disorder in the majority of the cases reporting higher levels of schizotypy, and it may have adaptive manifestations as well (Claridge, 1997; Claridge & Beech, 1995). Claridge's model posited the dimensionality of schizotypy not only in the clinical and subclinical ranges (as in the quasi-dimensional view), but also as part of normal individual differences including healthy expressions such as creativity (Kwapil & Barrantes-Vidal, 2015). Longitudinal studies have reported that the majority of those scoring high in self-reported schizotypy scales never end up having a psychiatric disorder (Chapman et al., 1994; Gooding et al., 2005).

Ascribing both adaptive and pathological sides to schizotypy is relevant to the heterogenous nature of this construct, which manifests itself in its multidimensionality (Mohr & Claridge, 2015). The three-factor construct of schizotypy, as the most widely accepted view, comprises positive, negative, and disorganization dimensions, and has been established in factor analysis studies (Bentall et al., 1989; Raine, 1991). In addition to these three factors, Claridge and colleagues (Mason et al., 1995; Mason et al., 2005) suggested a fourth dimension -impulsive nonconformity- based on overlapping conditions between psychosis and bipolar disorder, proposing these two to lie on a continuum.

The positive dimension of schizotypy includes traits like unusual experiences (aberrant perceptions and hallucination-like experiences), eccentric ideas (magical and not based in consensual reality), and fantasy proneness (vivid imagination and immersion in inner experiences) (Claridge & Beech, 1995; Fonseca-Pedrero et al., 2021; Kotov et al., 2020). The previously mentioned links between schizotypy and creativity are mostly due to the positive dimension (and to impulsive nonconformity) (Batey & Furnham, 2008; Mohr et al., 2001); especially because positive schizotypy enhances convergent (Gianotti et al., 2001) and, more importantly, divergent (Jones et al., 2011) styles of thinking. This dimension is also linked to different enriching experiences (Mohr & Claridge, 2015). For example, in an experimental setting enhancing an altered state of consciousness (using shamanic-like techniques), high scorers on positive schizotypy experienced significant altered phenomenology, compared to low scorers (Rock et al., 2008). This experience along with other fairly uncommon experiences, believed to deviate from usual experience or from the consensually accepted view of reality, are collectively called anomalous experiences (AE) (Cardeña et al., 2014).

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Importantly, the association between subjective evaluation of AEs and schizotypy was shown to be moderated by the cognitive disorganization dimension (Schofield & Claridge, 2007) because cognitively disorganized participants showed a negative schizotypy/distressing experiences pattern, in contrast to organized ones who manifested a positive schizotypy/pleasant experiences relation. This finding emphasizes the adaptive value of positive schizotypy, specifically in the absence of negative and disorganized dimensions (Goulding, 2004; Holt et al., 2008; Mohr & Claridge, 2015; Tabak & Weisman de Mamani, 2013).

The negative or deficit dimension of schizotypy -introvertive anhedonia- is the interpersonal aspect of this construct, mainly characterized by social and physical anhedonia, lack of energy, and introversion (Mason et al., 2005). This dimension is mostly responsible for the diminished quality of life, social functioning, and wellbeing of those scoring high on schizotypy scales (Cohen & Davis, 2009; Horan et al., 2007). The third factor in schizotypy is cognitive disorganization, which describes poor attention and concentration, and lowered decision-making abilities (Mason et al., 1995). It was shown to be associated with weak cognitive control and increased emotionality (Kerns, 2006). Impulsive nonconformity is associated with antisocial behavior and affective episodes (Chapman et al., 1984); it relates to Eysenck's Psychoticism Scale and its moderate scores was shown to be related to the preference for a non-conforming way of life (Mason et al., 1995). Phenomenological aspects of childhood ICs, its association with creativity (Hoff, 2005; Kidd et al., 2010; Schaefer, 1969) and fantasy-proneness, and its direct relation with hallucination-like experiences seem to have overlaps with traits and correlates of positive schizotypy and as such, having ICs can be considered an early phenotype of tendency towards (positive) schizotypy later in adolescence and adulthood.

In our study, two different personality and behavioral scales (i.e., one for adolescents and another for adults), in accordance with Hierarchical Taxonomy of Psychopathology (HiTOP), were administered. These scales were used to explore possible personality traits and pathological tendencies: the Achenbach System of Empirically-Based Assessment-Youth Self-Report (ASEBA-YSR) and the NEO Five-Factor Inventory (NEO-FFI) for adolescents and adults, respectively. They were selected to address what Fonseca-Pedrero et al. (2021) mentioned as a challenge of future studies on schizotypy to integrate this construct's traits into personality and psychopathology classifications. The HiTOP model has emerged as a research-driven endeavor to address limitations of traditional taxonomies of psychopathology (Kotov et al., 2017). This system views mental maladap-

tive characteristics and phenomena dimensionally (i.e., psychological function ranging from normal to abnormal) and uses dimensional measures to assess its components, syndromes, and spectra. Psychosis, as one of its three main superspectra (along with emotional dysfunction and externalizing superspectra), includes two narrower spectra: thought disorder and detachment. The thought disorder spectrum captures individual differences ranging from ordinary and uncreative thinking to perceptive and cognitive style insubstantially based in reality. It comprises symptoms and traits of positive schizotypy. The detachment spectrum mostly represents affective expressions and sociability individual differences including introversion and negative schizotypy (Kotov et al., 2020).

Among adolescents in this study, Thought Problems and Withdrawn/Depressed subscales were hypothesized to be related to the positive and negative schizotypy scales, respectively, as it was found that these two dimensions of schizotypy map onto the two spectra of the psychosis superspectrum (Cicero et al., 2014; Moorman & Samuel, 2018). The relation of having childhood IC with different behavioral subscales of ASEBA-YSR was also explored by comparison with the NIC group to unpack possible pathological tendencies in this group of adolescents.

The NEO Five-Factor Inventory (NEO-FFI) (Costa & McCrae, 1992) is in harmony with the HiTOP model (Conway et al., 2019) and was administered in the adult sample to explore personality traits associated with schizotypy and childhood IC. Among the five factors of the FFM, positive relation of neuroticism with total schizotypy (Asai et al., 2011; Gurrera et al., 2005), and positive schizotypy (Asai et al., 2011; Shi et al., 2018) have been reported, whereas extraversion was shown to be negatively related to negative schizotypy (Rawlings & Freeman, 1997). Additionally, openness to experience is assumed to be positively associated with positive schizotypy (Edmundson et al., 2011; Ross et al., 2002).

To date, no studies have directly investigated the relation between having childhood ICs and schizotypy inventories among adolescents and adults. This study aimed to evaluate differences between CIC and NIC adolescents and adults. Because reports of positive schizotypy reduce with age after adolescence (Fonseca-Pedrero et al., 2018) and also due to overall decrease in schizotypal traits with increasing age (Fonseca-Pedrero et al., 2012), both adolescents and adults were included in this study to examine if any different patterns would be observed.

Hypotheses

1) Adolescents and adults with a history of IC play will score higher on the Unusual Experiences dimension and total score of sO-LIFE schizotypy scale than those without.

2) The Thought Problems and Withdrawn/Depressed subscales of the ASEBA-YSR will be positively correlated with scores on Unusual Experiences and Introvertive Anhedonia dimensions of sO-LIFE, respectively, among adolescents.

In addition, exploratory questions related to the relations between the four dimensions of the sO-LIFE schizotypy scale and five factors of the NEO-FFI among adults, IC status and ASEBA-YSR scores among adolescents, and IC status and NEO-FFI among adults.

Method

Participants

The target adolescent population were Iranian adolescents between 15 and 18 years of age, for a sample of 96 adolescents (61 females, 63.5%) aged 15-18 years old (M = 16.88, SD = .98). Sociodemographic data included age, gender, family order, and existence of current mental disorders. All participants completed this section.

Adult participants of the study (n = 159; 95 females, 59.7%) were between 19 and 67 years of age (M = 25.18, SD = 6.83). Overall, 255 adolescents and adults (156 females, 61.2%) participated in this study (M = 22.05, SD = 6.75). This study was approved by Iran's University of Social Welfare and Rehabilitation Sciences (USWR) research ethics committee.

Measures

The Imaginary Companion Questionnaire., a Persian researcher-made questionnaire to identify impersonation and the two types of ICs (i.e., invisible and POs), was created by the authors of this research paper (Appendix 1). It includes a description of what IC and its types are, written according to previous studies in the area (Svendsen, 1934; Taylor et al., 2004), as well as describing impersonation (Ames & Learned, 1946; Taylor, 1999). There were also questions querying about the characteristics of ICs (e.g., gender, appearance, personality traits). These questions were used to validate the status of IC.

The Short Scale of Oxford-Liverpool Inventory of Feelings and Experiences, sO-LIFE (Mason et al., 2005) was used to assess schizotypy dimensions, in a Persian translation by the authors of this study. This self-report scale includes 43 yes/no items covering four dimensions of schizotypy: Unusual Experiences (UnEx, 12 items), Cognitive Disorganization (CogDis, 11 items), Introvertive Anhedonia (IntAn, 10 items), and Impulsive Nonconformity (ImpNon, 10 items). The UnEx dimension describes perceptual anomalies, magical thinking, and hallucinations and measures 'positive schizotypy'. The CogDis subscale tap poor attention and concentration in addition to weak decision-making and social anxiety. Lack of enjoyment from sources of pleasure is captured by IntAn dimension which reflects negative schizotypy. The ImpNon scale describes impulsive and anti-social behavior. The alpha for the overall scale was .81, with alphas for the subscales between .53 (for IntAn, with two items deleted for lack of reliabillity) and .78 for cognitive disorganization.

The Achenbach System of Empirically-Based Assessment-Youth Self-Report, ASEBA-YSR (Achenbach & Rescorla, 2001) is a questionnaire that follows the HiTOP model and appropriate for school-aged children and adolescents (11 to 18 years of age). The syndromes section contains 112 items with three options (0 - 2), querying to what extent each item is true about the respondent. The ASEBA-YSR has nine subscales of behavioral problems and characteristics: Withdrawn/Depressed (8 items), Anxious/Depressed (13 items), Somatic Complaints (10 items), Social Problems (11 items), Thought Problems (12 items), Attention Problems (9 items), Rule-Breaking Behavior (15 items), Aggressive Behavior (17 items) and Other Problems (10 items, does not yield a sum score). Two higher order scales are also produced: Internalizing score (31 items) is estimated by the sum of Withdrawn/Depressed, Anxious/Depressed, and Somatic Complaints subscales; Externalizing score (32 items) is estimated by the sum of Rule-Breaking and Aggressive Behaviors subscales. The ASEBA-YSR was used only for the adolescent sample of this study.

The NEO-Five Factor Inventory, NEO-FFI (Costa & McCrae, 1992) was administered to assess personality traits of the adult sample. This measure consists of 60 items, each describing a statement rated on a Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). Each domain score of "Big Five" is derived from 12 items: neuroticism (N); extraversion (E); openness to experience (O); agreeableness (A); and conscientiousness (C).

Analysis

Scores of sO-LIFE schizotypy dimensions, ASEBA-YSR subscales, and NEO-FFI domains were compared between the two groups, using independent groups *t*-tests. The moderating role of gender and age category was assessed by ANOVAs. For ANOVAs, the Tukeys were used as post-hoc tests. No correction for multiple comparisons was applied. Pearson correlations were used to determine relations between sO-LIFE schizotypy dimensions and ASEBA-YSR subscales and NEO-FFI domains. Data were analyzed with IBM SPSS STATISTICS, version 26.

Procedure

This study was a survey-based comparison of participants with and without IC play history. Adolescent data were gathered through e-questionnaires uploaded on a Persian website dedicated to this study (www.theimaginal.net), and pen-and-paper questionnaires filled by high-school students. The online survey was advertised on social media outlets as a study on imaginary companions. A video clip was produced and uploaded on social media outlets (e.g., Instagram) to advertise the website dedicated to this study. Volunteers had to agree to an informed consent form prior to starting to fill in e-questionnaires. Answers to all of the questions were required (except for the descriptive ones) and participants could not move onto the next questionnaire before completing the previous one. Data were recorded only after all of the e-questionnaires were completed. Pen-and-paper participants were approached by TZ in person. They were informed about the aim of the study and asked if they wanted to participate in it.

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Results

Of the 255 participants, 34.5% reported IC play ($N = 88$) while growing up. Additionally, 23% reported impersonation ($N = 58$). Females ($N = 65$) reported significantly more IC play than males (χ^2 (255) = 9.11, $p < .01$). Adolescents and adults did not differ in CIC reporting ($p > .05$). Table 1 shows the frequency and percentage of participants based on their IC status and types.

Table 1

Frequency and Percentage of IC Status/Types Among all Participants

IC status/type	Gender	Frequency	Percentage
Without IC	Female	91	36
	Male	76	30
	Total	167	65.5
Invisible IC	Female	48	19
	Male	17	7
	Total	65	25.5
Personified Object IC	Female	17	7
	Male	6	2
	Total	23	9
Total	Female	156	61
	Male	99	39
	Total	255	100

The sO-LIFE was completed by all participants (Table 2), with overall mean score of 18.71 and standard deviation of 6.58. Females ($M = 20.03$, $SD = 6.14$) reported significantly higher scores than males ($M = 16.65$, $SD = 6.75$) on this scale ($t = 4.12$, $p < .001$) as they did in the UnEx dimension ($t = 3.7$, $p < .001$). The same gender difference was seen on the CogDis ($t = 3.24$, $p < .01$) and ImpNon ($t = 2.64$, $p < .01$) dimensions, but not on the IntAn dimension ($p > .05$).

The relation between having childhood IC and scoring higher on sO-LIFE dimensions among all participants was investigated by comparing means of schizotypy scores between these two groups. Table 2 contains means and standard deviations for overall schizotypy and its dimensions. Those with a history of childhood IC had higher overall schizotypy ($t = 5.05$, $p < .001$), as well as UnEx ($t = 4.14$, $p < .001$), CogDis ($t = 2.73$, $p < .01$), and ImpNon ($t = 4.81$, $p < .001$), but not IntAn ($p > .05$).

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Table 2

Descriptive Statistics for Demographics and sO-LIFE According to CIC status (N = 255)

Variables		CIC *n*		NIC *n*		Total
Age		88	20.42 (3.67)	167	22.91 (7.78)	22.05 (6.75)
Gender	Female	65	25.5%	91	35.7%	61.2%
	Male	23	9%	76	29.8%	38.8%
sO-LIFE	UnEx	88	7.10 (2.48)	167	5.65 (2.75)	6.15 (2.74)
	CogDis	88	6.99 (2.54)	167	5.97 (2.97)	6.32 (2.86)
	IntAn	88	2.45 (1.73)	167	2.03 (1.65)	2.18 (1.69)
	ImpNon	88	4.91 (1.98)	167	3.62 (2.07)	4.06 (2.13)
	Overall	88	21.45 (5.76)	167	17.27 (6.55)	18.71 (6.58)

An exploratory ANOVA with post-hoc tests were analysed to determine mean differences of overall sO-LIFE and the UnEx dimension between three groups: the CIC group, the NIC group without impersonation, and the NIC group with impersonation. The post-hoc tests revealed that for overall sO-LIFE and the UnEx dimension, the means of the CIC group did not differ from the NIC group with impersonation ($p > .05$), while means of both groups were significantly higher than the NIC group without impersonation ($p < .001$).

The ASEBA-YSR was completed by the adolescents, with Thought Problems subscale mean score of 6.96 (SD = 4.57). and for the Withdrawn/Depressed subscale $M = 5.25$ (SD = 3.1). Females scored higher in Thought Problems than males ($t = 3.24$, $p < .01$), but not in Withdrawn/Depressed ($p > .05$).

The correlation between Thought Problems and the UnEx dimension among all participants was relatively strong ($r = .59$, $p < .001$), the Withdrawn/Depressed and the IntAn dimension were moderately correlated ($r = .31$, $p < .01$). These correlations were partly seen in the two groups of adolescents, namely correlation between Thought Problems subscale and the UnEx dimension was $r = .57$ in the CIC group and $r = .52$ in the NIC group ($p < .001$). A weak significant correlation of $r = .28$ was found between the IntAn dimension and Withdrawn/Depressed subscale in the NIC group ($p < .05$), but uncorrelated in the CIC group of adolescents ($p > .05$).

Analyses of mean differences between the two groups of adolescents (i.e., CIC and NIC) in Thought Problems and Withdrawn/Depressed subscales, showed that those with childhood IC scored higher than the other group in Thought Problems and Withdrawn/Depressed. Table 3 contains the means and results of independent *t*-tests analyses.

Table 3

Comparison of Means and Independent Groups of ASEBA-YSR According to CIC Status

	CIC (*n*=36)		NIC (*n*=60)		*Comparison*	
	Mean	**SD**	**Mean**	**SD**	***t* value**	***p* value**
Internalizing	20.47	9.57	13.95	10.40	3.06	.003
Externalizing	16.69	8.20	12.97	6.81	2.40	.018
Anxious/Depressed	9.78	4.98	6.50	5.01	3.11	.002
Withdrawn/Depressed	6.25	2.98	4.65	3.04	2.51	.014
Somatic Complaints	4.44	3.69	2.80	3.60	2.15	.034
Social Problems	5.92	3.17	4.12	2.62	3.01	.003
Thought Problems	9.33	4.41	5.53	4.07	4.29	.001
Attention Problems	8.17	3.46	6.28	3.40	2.76	.007
Rule-Breaking Behavior	6.58	4.30	5.12	3.36	1.86	NS
Aggressive Behavior	10.11	5.24	7.85	4.51	2.24	.028
Obsessive-Compulsive Problems	8.42	3.22	5.72	3.39	3.85	.001
PTSD Problems	11.58	4.12	8.08	4.82	3.63	.001

With the exception of Rule-Breaking Behavior, there were significant differences in all other subscales between CIC and NIC groups. Post-hoc ANOVAs, considering both gender and IC status effects on these subscales, revealed that with the exception of Somatic Complaints subscale, the main effects of IC status were significant on these subscales, but not their interaction ($p > .05$). Correlation coefficients between five domains of NEO-FFI and schizotypy dimensions were estimated for all adult participants and according to their IC status (Table 4).

Table 4

Correlations Between NEO-FFI Domains and sO-LIFE Schizotypy Dimensions in Adults per CIC Status (CIC Group n = 52, NIC Group n = 107)

	Total sO-LIFE			UnEx			CogDis			IntAn			ImpNon	
	CIC	NIC	All	CIC	NIC	All	CIC	NIC	All	CIC	NIC	All	CIC	NIC
Neuro	.57**	.7**	.71**	NS	.32**	.31**	.61**	.67**	.66**	NS	.39**	.35**	.45**	.46**
Extrav	NS	-.5**	-.41**	NS	NS	NS	NS	-.45**	-.40**	-.36**	-.56**	-.51**	NS	-.21*
Op.Exp	NS	.3*	.28**	NS	.23*	.19*	.31*	NS	.16*	NS	NS	NS	NS	.37**
Agreea	NS	-.42**	-.34**	NS	NS	NS	NS	-.2*	-.16*	-.28*	-.49**	-.42**	-.33*	-.39**
Consc	-.35*	-.41**	-.38**	NS	NS	NS	-.55**	-.42**	-.46**	NS	-.24*	-.16*	-.32*	-.3**

$p < .05$, ** $p < .01$

As shown in Table 4, the neuroticism and openness to experience domains of the NEO-FFI showed positive correlations with sO-LIFE dimensions. This is in contrast to negative correlations for the other three domains with schizotypy dimensions. The neuroticism domain of the NEO-FFI was strongly correlated with overall schizotypy and CogDis dimension in all three groups. Extraversion was strongly correlated with IntAn dimension in the NIC group and all adults, and interestingly with overall schizotypy and CogDis dimension only in the NIC group. There were no strong correlations between openness to experience and schizotypy dimensions. Agreeableness showed moderate and negetive correlations with overall schizotypy, and IntAn dimension in the NIC group and all adults, and with ImpNon in all three groups. The same negative pattern of correlations was seen for conscientiousness, as it was moderately correlated with overall schizotypy, CogDis, and ImpNon dimensions, and had negative strong correlations with CogDis only in the CIC group.

Neuroticism was the only domain of the NEO-FFI showing significant mean difference ($t = 2.42$, $p < .05$) between the two groups of adults with ($M = 30.63$, $SD = 6.7$) and without IC ($M = 27.14$, $SD = 9.15$). As the assumption of homogeneity of variances was violated, the Mann-Whitney U test was also used and the mean difference was still significant at $p < .05$.

An exploratory ANOVA was conducted to determine the interaction of gender and IC status on overall sO-LIFE, UnEx, CogDis, and ImpNon dimensions among all participants. This is especially important to test whether the difference seen between the two groups of participants in these scales, was or was not moderated by gender. The interaction effect of gender and IC status on overall schizotypy score was significant ($F = 4.8$, $p = .029$). Similarly, main effect of both gender ($F = 4.64$, $p = .032$) and IC status ($F = 24.54$, $p < .001$) were significant. As a reminder, females scored higher than males on overall schizotypy score. On the UnEx dimension, the interaction of gender and IC status was not significant ($p > .05$), in contrast to the significance of main effects of IC status ($F = 15.87$, $p < .001$) and gender ($F = 4.09$, $p = .044$) on this dimension. Only the main effect of IC status was significant on the CgDis dimension ($F = 6.74$, $p = .01$). Likewise, the ImpNon dimension was influenced solely by the IC status main effect ($F = 23.18$, $p < .001$), and not gender main effect or the interaction of these two ($p > .05$). Consequently, gender moderated the effect of IC status on overall sO-LIFE schizotypy scores, but not the UnEx, CogDis and ImpNon dimensions.

A post-hoc univariate two-way ANOVA was computed to determine the interaction of age and IC status on overall sO-LIFE and the UnEx, CogDis, and ImpNon dimensions. Age was categorized as “under 18” and “over 18”. Test of homogeneity of subpopulations by Levene’s test produced the same results for this analysis as well ($p > .05$). An interaction on overall schizotypy was not significant ($p > .05$), while main effects for age ($F = 5.27$, $p < .05$), and IC ($F = 30.75$, $p < .001$) were significant. The same was true for the interaction of these two variables on the UnEx dimension ($p > .05$). In contrast, main effects of age and IC were significant on this dimension ($F = 13.09$, and 21.11, $p < .001$). On the CogDis dimension, main effects of both IC ($F = 11.03$) and age ($F = 10.47$) were significant ($p = .001$), but not their interaction ($p > .05$). The ImpNon was influenced only by IC ($F = 23.82$, $p < .001$).

With respect to the relation between age categories and schizotypy dimensions, *t*-test showed that adults (i.e., over 18) scored higher than adolescents in the UnEx ($t = 3.75$, $p < .001$) and CogDis dimensions ($t = 3.69$, $p < .001$), as well as in overall schizotypy ($t = 2.53$, $p < .05$). Table 5 shows that the scores of the CIC group in both age groups and genders are higher than the NIC group.

Table 5

Means of Overall sO-LIFE and UnEx According to IC, Age, and Gender

IC Status	Age Category	Gender	Overall sO-LIFE	UnEx	*N*
NIC	Under 18	female	18.03 (6.99)	5.82 (2.82)	34
		male	11.27 (4.62)	3.00 (2.65)	26
		total	15.10 (6.91)	4.60 (3.07)	60
	Over 18	female	19.60 (5.32)	6.60 (2.35)	57
		male	17.22 (6.58)	5.84 (2.35)	50
		total	18.49 (6.03)	6.24 (2.37)	107
	Total	female	19.01 (6.01)	6.31 (2.55)	91
		male	15.18 (6.59)	4.87 (2.79)	76
		total	17.27 (6.55)	5.65 (2.75)	167
CIC	Under 18	female	21.26 (6.14)	6.67 (2.65)	27
		male	21.00 (3.46)	6.33 (2.29)	9
		total	21.19 (5.55)	6.58 (2.53)	36
	Over 18	female	21.58 (6.13)	7.45 (2.39)	38
		male	21.79 (5.61)	7.50 (2.50)	14
		total	21.63 (5.94)	7.46 (2.40)	52
	Total	female	21.45 (6.09)	7.12 (2.51)	65
		male	21.48 (4.80)	7.04 (2.44)	23
		total	21.45 (5.76)	7.10 (2.48)	88
Total	Under 18	female	19.46 (6.77)	6.20 (2.76)	61
		male	13.77 (6.09)	3.86 (2.93)	35
		total	17.39 (7.06)	5.34 (3.03)	96
	Over 18	female	20.39 (5.71)	6.94 (2.39)	95
		male	18.22 (6.62)	6.20 (2.46)	64
		total	19.52 (6.16)	6.64 (2.44)	159
	Total	female	20.03 (6.14)	6.65 (2.56)	156
		male	16.65 (6.75)	5.37 (2.86)	99
		total	18.71 (6.58)	6.15 (2.74)	255

Discussion

The experience of interacting with an imaginary friend is a profound one for most children. Although most of the childhood memories are prone to being forgotten with age, many adolescents and adults are still able to recall the memory of their special friend. These companions can serve several other functions in addition to being partners in play for children; from channeling their anger and being blamed for mistakes to functioning as a mediator in communication between the child and their parents (Taylor, 1999). The presence of ICs in the lives of children goes to the extent of taking up space and sitting at dinner table with others (Ames & Learned, 1946). Furthermore, they are not always friendly and compliant or under the conscious control of the child (Taylor et al., 2007). Nevertheless, in most cases, children can tell that their ICs are make-believe and not real (Taylor & Mottweiler, 2008).

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Schizotypy, as a multidimensional construct, manifests distinct profiles as a result of the interaction of its dimensions (Holt et al., 2008). Adopting a fully dimensional perspective to schizotypy, as in Claridge's model (Claridge & Beech, 1995), results in considering both adaptive and potentially pathological sides to this multidimensional construct (Mohr & Claridge, 2015). The concept of "happy schizotypes" (McCreery & Claridge, 2002) arose from this view of schizotypy, plus considering the distinct profiles emerging from different interactions of its dimensions. It was observed, then, that "happy schizotypes" are the ones that score high on positive dimension (i.e., UnEx) and simultaneously low/average on negative (i.e., IntAn) and disorganization (i.e., CogDis) dimensions of schizotypy (Grant et al., 2018).

In this study, self-reported childhood ICs was associated with higher overall sO-LIFE, and UnEx scores in adolescents and adults, with gender moderating the former but not the latter. We also found that scores on the ImpNon dimension was also higher for the CIC group; a finding that we had not predicted. There was no significant difference observed between the two groups on the IntAn dimension.

In general, these findings suggest that CIC status in adolescents and adults indicates a profile of schizotypy in line with the concept of "happy schizotype". In other words, this group of adolescents and adults scored higher than the ones without such experience on positive schizotypy (i.e., measured by the UnEx dimension), and did not differ much from the NIC group on negative (i.e., IntAn) and disorganization (i.e., CogDis) dimensions. The higher score of the CIC group on the ImpNon dimension can be discussed in light of the literature on creativity, particularly given associations in the literature between CIC and creativity.

The association between having imaginary friends and being more creative was reported in several studies (Hoff, 2005; Kidd et al., 2010; Schaefer, 1969). Likewise, the ImpNon dimension of schizotypy, in addition to the UnEx dimension, was found to be associated with creativity (Batey & Furnham, 2008; Perchtold-Stefan et al., 2021). This relation was also reported in a meta-analysis (Acar & Sen, 2013). As such, it may be indirectly concluded that adolescents and adults with the CIC experience, as the more creative ones, score higher in the ImpNon dimension as well.

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Adolescents and adults of the NIC group who reported impersonation were not different from participants of the CIC group on overall sO-LIFE and UnEx. These two groups were significantly different from the NIC group without impersonation. This finding can be explained by the phenomenological (Ames & Learned, 1946) and personality (for example in the case of ToM and emotion understanding [Taylor et al., 2004]) overlaps between IC play and impersonation of imaginary characters. A crucial implication of this finding for future studies would be to measure imaginary identities along with invisible ICs and personified objects in order to better understand this related phenomenon.

The correlation of two subscales of the ASEBA-YSR (i.e., Thought Problems and Withdrawn/Depressed), and positive (UnEx) and negative (IntAn) dimensions of sO-LIFE was examined in adolescents. The strong correlation of the Thought Problems subscale with the UnEx dimension and the moderate correlation of the Withdrawn/Depressed subscale with the IntAn dimension were expected because they tap onto roughly the same domains (Kotov et al., 2020). The sharpest mean differences between the CIC and NIC groups of adolescents (with the CIC group scoring higher than the NIC group) were found on three subscales of the ASEBA-YSR; Thought Problems, Obsessive-Compulsive Problems, and PTSD Problems. The Thought Problems subscale captures symptoms (e.g., hearing voices and seeing things) similar to the items of the UnEx dimension and was introduced as a scale to measure positive schizotypy traits among children and adolescents (Kotov et al., 2020). As such, its observed difference between the two groups was in line with the findings of the main hypothesis. The Obsessive-Compulsive Problems subscale has four items in common with the Thought Problems subscale and they strongly correlated with each other among adolescents (r = .78).

The difference on the PTSD Problems subscale can have two explanations. First, teens with CIC history have been found to have hardship handling emotions and become more stressed about social interactions (Bonne et al., 1999), probably due to their higher attentiveness and inclination toward social situations (Gleason et al., 2003). Therefore, as four items of this subscale pertain to nervousness and tension, this might explain their higher experienced psychological distress compared to their peers. Second, one reason underlying the creation of ICs among children is in response to trauma (Taylor, 1999). This link has been discussed in the literature on dissociation as well (McLewin & Muller, 2006), albeit not necessarily meaning that having CICs predisposes

adolescents to pathological dissociation (Taylor et al., 2010). Although pathological tendencies were examined between the two groups of adolescents by comparing the scores of the ASEBA-YSR syndromes, we cannot put emphasis on the findings as a wellbeing measure was not employed in this study. Therefore, it seems crucial for the future studies of the kind to also include such measure for the purpose of reliably comparing participants with and without CIC experience according to their pathological tendencies.

The correlations of the NEO-FFI domains with sO-LIFE dimensions were examined among adults. The neuroticism domain was related to overall sO-LIFE and the CogDis dimension scores, in line with previous studies (Asai et al., 2011). This domain of the Five Factor Model (FFM) reflects vulnerability to distress (Widiger & Costa Jr, 2002), and was expected to be strongly correlated with the CogDis dimension that measures low concentration and decision-making abilities. The extraversion domain and the IntAn dimension are in many ways contrary to each other and expected to correlate negatively. Studies demonstrated that openness to experience and positive schizotypy are strongly related (Asai et al., 2011; Ross et al., 2002); a finding that was not replicated in this study. The agreeableness and conscientiousness domains showed a negative trend of correlations with sO-LIFE dimensions in this study.

The only domain of NEO-FFI that differed between the NIC and CIC group was neuroticism, where the CIC group scored significantly higher than the NIC group. This finding is in line with the aforementioned discussion (Bonne et al., 1999) of higher emotionality in this group of participants. Higher reactivity to negative emotional stressors can be one of the reasons that trigger playing with an IC in childhood.

The findings of this study can be interpreted in several ways: First, having imaginary friends in childhood can be associated with a set of personality characteristics in adolescents and adults. Capturing this set of characteristics, at least partially, in schizotypy dimensions helps us understand and explain this phenomenon more systematically. Second, considering schizotypy as a multi- and fully dimensional organization have implications for both health and psychopathology. In this regard, distinct profiles emerge from the interaction of this construct's dimensions. Third, integrating schizotypy into higher order classifications of mental phenomena aligned with the dimensional nature of this personality construct seems to improve its utility in both research and practice.

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The design of this study did not benefit from random sampling which is a notable limitation for generalizability of the findings to the population. Representative sample of the adolescent and adult populations will be needed to validate these results. Additionally, longitudinal research following children with IC through their adolescence and adulthood is needed to determine schizotypy levels for a better understanding of its developmental pathway. Furthermore, in this study, reports of CIC in adolescents and adults relied solely on their retrospective accounts of this experience, which may underestimate its true prevalence (McAnally et al., 2021).

By considering the relation of having imaginary friends in childhood and evaluating a profile of "happy schizotypy," future research can shed light on this association by investigating specific traits and states related to this profile according to IC status. Furthermore, the phenomenological accounts of IC experience with consideration of its different types (e.g., PO and invisible IC) might better capture the diversity and functions of this fanatsy play in the lives of children.

Data and Material Availability Statement

Data and study materials can be obtained by contacting the corresponding author.

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Appendix

(English Translation of Imaginary Companion Questionnaire)

Initial Description:

Imaginary friends are pretend characters or creatures that you might have played with, talked with, and referred to by a specific name for a long time (at least several months). Importantly, they were seen by you to be endowed with human-like attributes and you treated them as your friend or playmate. Imaginary friends could be invisible (unobservable by others), or toys/dolls that had an air of reality for you and you played and talked with.

Imaginary identities are impersonated characters that you regularly (part of everyday, for at least several months) acted out yourself in a way that you talked like that character and liked to be called by that character's name and be treated accordingly (this excludes those kinds of role-playing games with other children in which you played the role of a doctor or a firefighter, for example).

Main Question:

1) Based on these descriptions, have you ever had imaginary friends/identities while growing up? If yes, what kind?

Options: *Invisible/Toy* (personified object)/*Imaginary Identities*

Complementary Questions:

1) What was his/her name?

2) What did he/she look like?

3) What characteristics did he/she have?

4) Did he/she have a gender? What was it?

5) How often did you play with her/him?

6) Can you recall a situation of play or conversation with her/him? Describe it.