

Running head: RETROSPECTIVE CHILDHOOD FANTASY PLAY SCALE

Development and Validation of the Retrospective Childhood Fantasy Play Scale  
(RCFPS)

Julie Ann Kirkham

Department of Psychology, University of Chester, UK

Julian Lloyd

Department of Psychology, University of Chester, UK

Hannah Stockton

Department of Psychology, University of Chester, UK

Corresponding author

Dr Julie Ann Kirkham

Department of Psychology

University of Chester

Parkgate Road,

Chester

CH1 4JB

Research materials for this paper can be accessed by contacting the first author at  
[j.kirkham@chester.ac.uk](mailto:j.kirkham@chester.ac.uk)

### **Abstract**

The current article describes the development and initial psychometric properties of the Retrospective Childhood Fantasy Play Scale (RCFPS), a brief 11 item retrospective self-report measure of preference for, and engagement with, fantasy play during childhood. Five studies were conducted to: (1) develop the initial items for the scale ( $n=77$ ), (2) determine the underlying factor structure ( $n=200$ ), (3) test the fit of the model ( $n=530$ ), and (4) & (5) ascertain construct validity ( $n=200$  and  $n=263$ ). Overall, the results suggest that the RCFPS is a uni-dimensional measure with acceptable fit and preliminary validity. The RCFPS may prove useful in educational and developmental research as an alternative to longitudinal studies to further investigate how childhood fantasy play relates to individual differences in adulthood (e.g., in the areas of creativity, theory of mind and narrative skills).

Keywords: Fantasy play; imaginary companions, self-report measure

## Introduction

Fantasy play is a commonly occurring activity during childhood which involves an active, non-literal 'as if' transformation of the self, objects and environment through the projection of mental states onto reality (Garvey, 1990; Lillard, 2001). Theorists such as Vygotsky (2004) have asserted that fantasy play is a crucial learning mechanism during childhood because it provides opportunities to extend the child's thinking beyond the current context. This is an idea which is now widely accepted within Western educational curricula (Kwon, 2002; Singer, Golinkoff, & Hirsh-Pasek, 2006). Correlational and experimental research has suggested the value of fantasy play for development in a range of areas such as cognitive (Lillard, Pinkham & Smith, 2010), socio-emotional (Harris, 2000) and academic skills (Miller, 1998) (although see review by Lillard et al., 2013). Furthermore, the absence or limitation of fantasy play during childhood is widely regarded as an indicator of pathology, specifically of autism spectrum disorder (Jarrold, 2003).

The extent to which a child engages in fantasy play is thought to reflect a general imaginative disposition (Singer, 1973; 1977), which has been linked to fantasy proneness (Lynn & Rhue, 1986). Fantasy proneness refers to a personality type often displayed in people who have an extremely rich and vivid fantasy life. Fantasy prone individuals report vivid childhood memories, sometimes confuse imagination and real events, and report a wide range of paranormal experiences, psychic abilities or intense religious experiences (Wilson & Barber, 1981). Fantasy prone children are more likely to engage in highly imaginative play (e.g. role playing as a fairy or superhero), believe in fantastical beings (e.g. fairies, dragons) or fantastical powers (e.g. myth and magic), and create imaginary companions (Boudin, 2006; Golomb, 2011). Fantasy proneness

is closely related to fantasy play but is regarded as a broader aspect of cognition that does not necessarily involve action or projection of mental states (see Crespi et al., 2016 and Smith & Lillard, 2012). Similarly, imagination has been described as a wider ability to create images, ideas or senses within the mind, of which fantasising is one specific part (Hirsch & Holmes, 2007; Joseph, 2004).

Although early childhood has often been proposed as the golden age of fantasy play (e.g., Smilansky, 1968; Sutton-Smith, 1997) recent research suggests individuals in middle childhood and adolescence may continue to engage in this kind of activity, although it may become more private (Ariel, 2002; Smith & Lillard, 2012). This suggests that fantasy play is a life-span activity that changes form with age. Indeed, some researchers have argued that reading fiction, watching films and viewing artworks are adult forms of fantasy play involving a similar suspension of reality and the use of counterfactual and hypothetical thought (Walton, 1990; Lillard, 2002).

Despite this, there is a lack of longitudinal research investigating the development of fantasy play and its proposed correlates over time. Longitudinal studies in this area tend to have a limited follow up period of fewer than five years (e.g., Dore & Lillard, 2015; Kirkham, Stewart & Kidd, 2013; Mullineaux & Dilalla, 2009; Russ, Robins & Christiano, 1999;) and are restricted by prohibitive costs, participant attrition and methodological issues. As Smith and Lillard (2012) and Russ (2016) argue, fantasy play can be difficult to measure and observe as it takes time for children to develop and settle into play and it may be dependent upon the environment and provision of specific materials. Such play may also be particularly sensitive to observer effects and social desirability bias (i.e. children may be unlikely to engage in fantasy play when observed by someone that they are not familiar with).

An alternative to longitudinal designs are self-report retrospective surveys where adult participants are asked to reflect back on the fantasy play of their childhoods. Although this method has some limitations (e.g., pertaining to memory but see Wagenaar, 1986 and Usher & Neisser, 1993), Smith and Lillard (2012) suggest that this is a suitable method to increase our knowledge about fantasy play, with anonymity helping to mitigate against the influence of social desirability. Despite the assertion that childhood fantasy play may be an important foundation for later development (Russ, 2016), few studies have attempted to utilise this methodology to consider how individual differences in childhood fantasy play may relate to later functioning. Other studies have considered the presence of an imaginary companion (IC) during childhood as indicative of fantasy play (Taylor & Carlson, 1997; Boudlin & Pratt, 1999). ICs have been defined 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 objective basis”* (Svendsen, 1934: p988). More recent research has included personified objects within this definition (i.e. physical objects such as a teddy bear which are embodied with personality characteristics and treated as if they are a real entity, e.g., Roby & Kidd, 2008).

Several studies have used retrospective survey designs to investigate whether having an imaginary companion during childhood is related to personality characteristics and creativity as an adult (Gleason, Jarudi & Cheek, 2003; Kidd, Rogers & Rogers, 2010; Taylor, Hulette & Dishion, 2010). Similarly, research has suggested that creating an IC is an advanced form of fantasy play (Harris, 2000; Taylor, 1999), with children who have such companions scoring significantly higher on measures of fantasy predisposition and ability than those without (Boudlin & Pratt,

1999; Taylor & Carlson, 1997). Furthermore, children with ICs have been found to show advanced functioning in tests measuring theory of mind, narrative skills and referential communication (Taylor & Carlson, 1997; Roby & Kidd, 2008; Trionfi & Reese, 2008) thus mirroring the developmental advantages that have been linked to fantasy play overall (Ashabi, 2007).

Using a retrospective self-report method amongst undergraduate students, Gleason et al., (2003) and Kidd et al., (2010) found that individuals who reported having a childhood IC scored significantly higher on measures of imagination, internal state awareness, creativity, absorption and achievement during adulthood than those who did not report having an IC. Furthermore, in a longitudinal study of high risk school children, Taylor et al., (2010) reported that having an IC during the middle school period was related to greater positive adjustment at the end of high school. However, focusing upon the predictive power of ICs rather than fantasy play in general during childhood could be problematic. The incidence of ICs varies (estimates range from 6% to 65% of children during early and middle childhood depending upon the definition used; Manosevitz, Prentice & Wilson, 1973) suggesting that not all children who engage in or enjoy fantasy play create an IC. Such a creation is time consuming, may not be supported by parents and teachers (Gleason, 2005) and may carry more of a social stigma when revealed to others, particularly as ICs have previously been associated with psychological problems within the media and psychological literature (e.g., Ames & Leander, 1946; Taylor, 1999). Furthermore, categorical measures of ICs do not adequately capture the vividness with which children can describe their companions (e.g. Majors, 2013) and the intense emotions that can be associated with the presence of their IC (e.g., Seiffge-Krenke, 1993, 1997; Taylor, Hulette & Dishion, 2010).

Beyond asking adults to report the existence of a childhood IC as a yes / no categorical response (e.g., see Gleason et al., 2003; and Kidd et al., 2010), there are a lack of valid and reliable questionnaires aiming to measure childhood fantasy play involvement. Smith and Lillard (2012) conducted a retrospective survey, however this was primarily designed to investigate when engagement in fantasy play ceases and it was composed of a combination of open-ended and forced choice questions, many of which required coding by trained raters. Although the survey included some likert items relating to frequency of childhood fantasy play and general orientation towards fantasy during childhood, no statistics pertaining to the validity or reliability of these items were provided in the published study.

Within the wider personality literature there are some psychometric instruments designed and validated to measure general fantasy proneness. The Inventory of Childhood Memories and Imaginings (ICMI, Wilson & Barber, 1981; Lynn & Rhue, 1988) is a 52-item dichotomous (yes/no) self-report scale adapted from Wilson and Barber's (1981) 103-item Memory, Imagining and Creativity Interview Schedule which was used in their study of fantasy-prone personalities. The ICMI assesses imaginative activities and fantasies from childhood and includes items such as "*When I was younger, I enjoyed fairy tales*" and "*Now, I still live in a make-believe world some of the time*". There is also a 48-item version intended for use with children and adolescents (IMCIC; Myers, 1983).

The Children's Fantasy Inventory (Rosenfeldt, Huesmann, Erron & Thorney-Purta, 1982) is a 45-item scale capturing a wide range of children's fantasy activity including dreams, daydreams and imaginative play. It covers the content (e.g. aggressive themes, heroic themes), affective tone (e.g. scary, happy) and structural aspects (e.g., distractibility, absorption) of children's daydreams and includes items such as "*Did you*

*ever have a whole special pretend world with lots of people or animals that you thought about or played with?"* and *"Did you ever have a make-believe friend who you talked to and who went places with you?"* Finally, the Creative Experiences Questionnaire (CEQ; Merckel, Horselenberg, & Muris, 2001) is a 25-item self-report measure of fantasy proneness derived from the original ICMI (Wilson & Barber, 1983). It captures involvement in fantasy and daydreaming, the concomitants and consequences of fantasising, and the developmental antecedents of fantasy proneness (Merckel et al., 2001). Items include *"As a child, I strongly believed in the existence of dwarfs, elves, and other fairy tale figures,"* and *"Sometimes I act as if I am somebody else and I completely identify myself with that role."*

These measures of fantasy proneness tend to be lengthy (e.g., 52 items for the original ICMI) and both the ICMI and CEQ rely on dichotomous responding; this response format can increase the risk of polarised responses and is not suited to items of an ambiguous nature, which is the case for many fantasy proneness items. Similarly, although these measures include items about fantasy play during childhood, this is not their sole focus and numerous items refer both to childhood and current adult functioning. As such, these measures appear to capture fantasy proneness as a stable dimension of personality rather than capturing the tendency to have engaged in fantasy play as a child.

In addition, in order to measure a broader concept of fantasy proneness as identified by Wilson and Barber (1983), these instruments also include items outside of the realm of childhood fantasy play including paranormal and out-of-body experiences, intense religious experiences and hallucinations (e.g. item 23 of the CEQ states *"I sometimes feel that I have had an out of body experience,"*). Inclusion of such a broad range of phenomena is designed to tap into a suggested clinical relationship



between fantasy proneness and dissociativity, schizotypy and pseudomemories (e.g., Hyman & Billings, 1998; Kihlstrom, Glisky & Angiulo, 1994). However, Klinger, Henning & Janssen (2009) argue that such relationships could be accounted for by the similar wording of items on these fantasy proneness scales and measures such as the dissociative experiences scale (DEQ, Bernstein & Putnam, 1986) which highly resemble each other. A principle components analysis of the ICMI also suggests that although the measure has acceptable internal reliability, it is factorally complex and does not function well as a general measure of fantasy proneness (Klinger et al., 2009). Whilst an initial 18 dimensions were found within the ICMI, the two component solution investigated by Klinger et al. (2009) suggested a factor structure dividing the more pathological aspects of fantasy proneness (e.g., alterations of consciousness and weakened boundaries between mental imagery and reality) and the more typical features (e.g., reporting fantasy play as a child and high imagination as an adult). Thus, this second component is more representative of a general measure of fantasy, although it is not restricted to childhood functioning. A further limitation of this research is the use of PCA to determine factor structure. PCA and factor analysis are related but conceptually different; PCA is used for data reduction while retaining as much of the variance as possible, whereas factor analysis is used to determine the underlying structure of a set of variables. PCA does not identify the underlying factor structure (Basto & Pereira, 2012; Gaskin & Happell, 2014). Identifying factor structure is crucial to define and operationalise the overarching constructs which account for the relationships between a numbers of variables, helping to conceptually explain them and drive forward future research in a systematic manner (Kline, 1994).

In summary, it is apparent that the current psychological literature lacks a valid and reliable retrospective measure of engagement in and predisposition towards fantasy

play during childhood. As Smith and Lillard (2012) assert, such a measure would be useful from an educational and developmental perspective to inform how fantasy play during childhood might predict individual differences in a range of domains during adulthood. This would help to explore whether fantasy play helps to 'lay the scene' for later development (Russ, 2016). Difficulties with longitudinal and observational studies of fantasy play also support the creation of such a measure (Smith & Lillard, 2012). Since the majority of children show a sophisticated understanding of the fantasy-reality distinction in play from approximately 3-4 years of age (Wellman & Estes, 1986; Woolley & Wellman, 1993), it is additionally useful to construct a measure that is directed towards assessing a normative predisposition towards childhood fantasy play rather than including items related to more extreme forms of fantasy belief and engagement which aim to have a clinically differentiating function (Klinger et al, 2009).

The scale developed in the current research has been called the 'Retrospective Childhood Fantasy Play Scale' (RCFPS) to highlight its retrospective focus upon fantasy play as opposed to fantasy proneness or imagination. It is a more efficient measure than those already available and focuses on fantasy play during childhood in a typical population rather than exploring fantasy proneness throughout the life span. Similarly, it eliminates the confounding of dissociative experiences by excluding items that overlap with cognitive distortions characteristic of dissociation and more clinically relevant aspects of fantasy (e.g. paranormal and hallucinatory experiences).

## **Overview of Studies**

This paper reports the initial development and validation of the RCFPS. A five-stage process for developing and testing the scale was adopted. Study 1 was a pilot study that aimed to identify the best items for the initial scale. Study 2 used exploratory

factor analysis (EFA) to determine the underlying factor structure of the RCFPS. The third study used confirmatory factor analysis (CFA) to test the fit of the model (Van Prooijen & Van der Kloot, 2001; Schmitt, 2011; Izquierdo, Olea & Abad, 2014). Studies 4 and 5 investigated the preliminary construct validity of the RCFPS. Scores on the RCFPS were compared with those on the CEQ (Merckel, Horselenberg, & Muris, 2001) and on a ten item International Personality Item Pool (IPIP) representation ("International Personality Item Pool", 2018, Goldberg et al., 2006) of the fantasy facet of the openness to experience subscale of Costa & McCrae's (1992) Revised Neo personality inventory (NEO-PI-R). As a further test of the initial validity of the scale, participants in studies 2 and 3 were also asked to report whether or not they had an IC as a child (*'At any point during your childhood did you have an imaginary companion with whom you interacted and played with?'*) This previously unanalysed data was combined for study 4 to compare how participants who reported having or not having an IC in childhood scored on the RCFPS measure.

Each study followed British Psychological Society ethical guidelines (2014) and also received ethical approval from the Psychology department research ethics committee at the University of Chester. All participants provided informed consent before taking part. Alongside SPSS V.23, Factor 10.5.03 (Lorenzo-Seva & Ferrando, 2006) was used to perform the principal components analysis (PCA) in study 1 and exploratory factor analysis (EFA) in study 2. Study 3 used LISREL 8.8, which is specialised software for confirmatory factor analysis (CFA) (Jöreskog & Sörbom, 2006).

## **Study 1: Item Generation and Reduction**

### **Method**

### **Participants**

The sample consisted of 77 undergraduate psychology students attending the University of Chester. The mean age of this sample was 24.99 years (SD = 11.09; range = 18 to 60 years). Of these participants 58 (75%) were female, 16 (21%) were male and 3 (4%) did not report their gender.

### **Materials**

Fourteen items were developed for the scale by the first author and a group of 6 undergraduate students who were conducting a research project on fantasy play. The items were derived from a review of the research literature on play (e.g., Garvey, 1990; Lillard, 2001), childhood interview measures (e.g., Singer & Singer's (1990) Imaginative Play Predisposition Interview) and more general measures of fantasy proneness (e.g., the CEQ and ICMI). From this review, items were constructed relating to the following concepts; (1) enjoyment of fantasy play (e.g., *'I found fantasy play boring as a child'*), (2) frequency of fantasy play (e.g., *'I often treated my toys as if they were real'*), (3) preference for fantasy play over other kinds of play (e.g., *'I preferred constructive play such as board games & lego rather than fantasy play'*) and (4) participation in role play, impersonation and belief in fantasy entities (e.g., *'I enjoyed taking on the role of other people or creatures in my childhood play'*). To maintain focus on the assessment of fantasy play, no items were included about the specific creations of ICs, social encouragement to engage in fantasy play, or the specific age range within which such play took place. Rather, items were included referring to any experiences before 18 years of age. Participants rated each of the 14 items using a 5-point scale with 1 = *strongly disagree*, 2 = *disagree*, 3 = *neither agree nor disagree*, 4

= *agree* and 5 = *strongly agree*. Higher scores indicated a stronger preference for fantasy play.

### ***Procedure***

Participants were recruited face-to-face via convenience sampling in the library, Students Union and cafeterias at the University of Chester. They completed an anonymous paper version of the RCFPS. The scale instructions guided participants that they were going to be asked about fantasy play during childhood and that they should think back to their childhood when reading the statements and respond to each as accurately as possible. No payments or research credits were received for taking part in this study.

### ***Analysis Plan***

Internal consistency-reliability was used to reduce the number of items and to improve the overall quality of the initial scale (Stanton, Sinar, Balzer, & Smith, 2002). The score for each item was the mean response per item, and the item score was correlated with the sum of the score for the other items to compute the corrected item–total correlation coefficients for each item. ‘Corrected’ meant the score of the item under scrutiny was subtracted from the total score, to avoid inflated coefficients due to the item scores correlating with themselves in the total score (Field, 2017). Only items with corrected item-total correlation coefficients of .5 or greater were included in the final scale. The item with the lowest coefficient below .5 was removed from the analysis first, and then the coefficients were recalculated. This procedure was repeated until all remaining items had item-total correlations of .5 or above (Hulbert-Williams, Nicholls, Joy, Hulbert-Williams, 2014). After the items below .5 had been removed, the remaining

items were analysed by principal components analysis (PCA) to see whether they could be reduced any further whilst retaining as much of the variance as possible (Field, 2017).

## Results

Internal consistency-reliability of the 14-item RCFPS was assessed and used as the basis for item reduction; in other words, to maximise the internal consistency of the new scale. This procedure resulted in the removal of three items (*“I liked to believe in fantasy entities as a child, e.g., father Christmas and the tooth fairy”*, *“I enjoyed creative and imaginative subjects in school such as art and music”*; and *“the themes of my play were mostly based in reality – e.g., hospitals and playing mummies and daddies.”*) The remaining 11 items had item-total correlations ranging from .54 to .78 (see Table 1).

*Insert Table 1 Here*

Inter-item correlations ranged between 0.30 and .67, Bartlett’s (1954) test of sphericity was highly significant (chi squared = 474.13, df = 55,  $p < .0001$ ) confirming homogeneity of variances, and a Kaiser-Meyer-Olkin (KMO) value of .87 was higher than the recommended .60 (Kaiser, 1970; Field, 2017), indicating that the correlation matrix was adequate for a PCA. The participant-to-item ratio was greater than 10-1 (Gaskin & Happell, 2014). Although there were two eigenvalues greater than 1.00, a parallel analysis suggested that the scale was unidimensional (Baglin, 2014; see page 18 below for discussion of parallel analysis). The 11 item unidimensional scale had an eigenvalue of 5.73 and accounted for 52% of the variance in RCFPS scores. Coefficient alpha was .91 adding further support for the high level of internal

consistency-reliability suggested by the item–total correlations (Hulbert-Williams et al., 2014). The unrotated component loadings and communalities are shown in Table 2. Only one item loaded below .6. The same item also had the lowest communality at .35 (*'I preferred constructive play such as board games and Lego rather than fantasy play'*).

*Insert Table 2 Here*

## **Discussion**

Overall, study 1 showed that the RCFPS had very good internal consistency reliability. Three items were removed from the initial pool of 14 items, resulting in a final 11-item scale. Analyses indicated that the RCFPS is unidimensional. Study 2 set out to examine its factorial validity using EFA.

---

## **Study 2: Exploring the Factor Structure**

### **Method**

#### ***Participants***

Overall, 730 participants took part in Study 2 and 3. The mean age of this combined sample was 25.94 years (SD = 11.43; range = 18 to 82). Of these participants 506 (71%) were female, 205 (27%) were male and 19 (2%) did not report their gender. Two hundred participants were randomly allocated to Study 2 using SPSS 23. This subgroup had a mean age of 28.75 (SD = 12.90; range = 18 to 70) years. Of these participants 144 (72%) were female, 50 (25%) were male and 6 (3%) did not report their gender.

**Materials**

Participants completed the 11-item RCFPS. They rated each of the 11 items using a 5-point scale with 1 = *strongly disagree*, 2 = *disagree*, 3 = *neither agree nor disagree*, 4 = *agree* and 5 = *strongly agree*. Higher scores indicated a stronger preference for fantasy play.

**Procedure**

The sample for Study 2 and 3 was recruited online from a Psychology Department recruitment pool, social media sites Facebook and Twitter, and also offline, face-to-face using paper questionnaires. The sample included undergraduate and postgraduate students across a range of disciplines, as well as non-students recruited via social media. Participants recruited via the Psychology research pool received research credits for taking part.

**Results**

Table 3 shows the item level statistics for the RCFPS, and Table 4 shows the scale statistics. Table 3 shows that the sample generally had high levels of engagement with fantasy play. Table 3 also shows that the item-total correlations for the RCFPS ranged from .44 to .89. Table 4 shows coefficient alpha was .95, with both results suggesting very high levels of internal consistency-reliability.

*Insert Table 3 Here*

*Insert Table 4 Here*



To determine the factor structure of the RCFPS, FACTOR 10.5.3 (Lorenzo-Seva & Ferrando, 2006) was used to conduct an exploratory factor analysis (EFA). Table 3 shows the univariate skewness and kurtosis for each item. According to the Shapiro-Wilks' test of normality, none of the items were univariate normal. Table 4 suggests that this asymmetry was also reflected at scale level, and this was supported by the results of Mardia's (1970) test, a commonly used test of multivariate normality that is included in FACTOR to permit recommendations about the type of EFA to carry out. Due to the asymmetrical univariate and multivariate distribution of the data, a polychoric correlation matrix was selected for the EFA (Muthen & Kaplan, 1985, 1992). Robust unweighted least squares (RULS) factor extraction was chosen for factor extraction, because RULS is a distribution-free method that has been shown to work well with polychoric correlations and moderate sample sizes. Furthermore, it is an efficient method of extraction that will often converge when other methods fail (Jöreskog, 2003; Baglin, 2014; Morata-Ramírez et al, 2013). RULS factor analysis utilises bootstrapping techniques to improve the overall accuracy of the EFA. Bootstrapping is a resampling method that generates many random samples from the original data (e.g., 500 in this case) and conducts the same analysis on each random sample. The results are then aggregated and compared against the original results, with agreement providing added support when the original results came from a small sample or a non-normal distribution (Field, 2017; Olsson, 1979; Pison, Rousseeuw, Filzmoser, & Croux, 2003; Treiblmaier & Filzmoser, 2010).

After computing the correlation matrix, the adequacy of the correlation matrix for factor analysis was examined. The item- to-participant ratio was above 15 to 1 after listwise deletion of missing variables, exceeding often-cited recommendations in the literature (Nunally, 1978). All inter-item correlations were above .3 (see Table 4).

Bartlett's Test of Sphericity to confirm homogeneity of variance was highly significant ( $p < .001$ ), the determinant of the matrix was above zero, and the KMO index was very good (KMO = 0.94). These results provide converging evidence that shows that the sample was adequate for factor analysis. The BC Bootstrap 95% confidence interval of the KMO was .94 to .95, further supporting the adequacy of the data for factor analysis (Field, 2017).

To determine the number of factors to retain from the EFA, two procedures were used for guidance. First, the number of factors with eigenvalues greater than 1 was established (i.e., Kaiser's rule; Kaiser, 1974; Field, 2017). The first factor had an eigenvalue of 7.93 that accounted for 72% of the variance in RCFPS scores. Second, a parallel analysis was conducted. PA is a Monte Carlo method in a similar vein to bootstrapping, and it is now considered by many researchers to be the gold standard of methods to identify the number of factors to retain in EFA (Gaskin & Happell, 2014), with evidence from simulation studies demonstrating its superiority over Kaiser's rule and the scree test (Baglin, 2014). PA compares the proportion of variance explained by each factor in the real data with the proportion that is explained by the mean variance in the random samples, and only the cases where the real data exceeds the random samples are considered to be independent factors (Hayton, Allen, & Scarpello, 2004; Ledesma & Valero-mora, 2007; Baglin, 2014). Nevertheless, on this occasion PA and Kaiser's rule both suggested that the CFPPS is unidimensional.

After listwise deletion of missing variables, the sample size reduced to 173. As well as using listwise deletion to handle missing variables, an alternative analysis using "hot-deck multiple imputation for EFA", (Lorenzo-Deva & Van Ginkel, 2016) was also conducted. Hot deck imputation is an alternative and widely used method for dealing with missing data that replaces the missing value with an observed response

from a characteristically similar respondent within the dataset (Andridge & Little, 2010). This analysis showed the same factor solution as the original analysis therefore supporting its validity. (Analyses are not reported here but are available on request.)

Two exploratory factor analyses were carried out in Factor 10.5.3 using RULS factor extraction, a one-factor solution and a two-factor solution for comparison. For the two-factor solution, Promin, an oblique rotation method, was chosen to obtain simple structure. An oblique method is preferred over orthogonal methods because oblique methods allow factors to correlate and therefore provide a more realistic model of human psychology compared to orthogonal rotation. Also, Promin was designed by one of the authors of FACTOR, and reports suggest it works well with FACTOR (Baglin, 2014; Lorenza-Sava, 1999).

Table 5 shows the factor loadings and the communalities for the one and two-factor solutions. The loadings for the items in the one-factor solution were generally high, as were the communalities. Only item 3 had a communality low enough to warrant monitoring in future studies. In the two factor solution, the items of the first factor had high loadings, but the second factor did not have any items loading of .4 or above, which was our threshold for identifying significant loading.

*Insert Table 5 Here*

Table 6 shows the fit indices that were used to compare the one- and two factor solutions from the EFA. The robust mean and variance-scaled chi-square statistic (Asparouhov & Muthen, 2010) was much larger for the one- compared to the two-factor model, and the result for the one-factor model was statistically significant ( $p < .05$ ), whereas this statistic was not significant for the two- factor model. Therefore,

based on the chi-square statistics, the two factor model seemed to fit the data better than the one-factor model. Nevertheless, there has been growing concern about the reliability of the chi-square statistic as an index of goodness of fit, and many factor analysts now consider it unfit for that purpose, with sensitivity to sample size an often-cited reason (Schermelleh-Engel, Moosbrugger & Muller, 2003; Vandenburg, 2006). Factor analysts have attempted to develop more reliable indices of goodness of fit, such as the comparative fit index (CFI), the adjusted goodness of fit index (AGFI) and the root mean square residual (RMSR). The CFI compares the specified model with a simplified baseline (e.g., with no correlation between factors), and the AGFI is the difference between observed and predicted co-variances for the proposed model adjusted for the degrees of freedom. Values of .95 or above indicate good fit, the nearer to 1 the better. The RMSR is related to the average variance during the fitting of the residuals, which generally should be .05 or lower. As Table 6 shows, these three indices indicate that both models had a very good fit, with the two-factor model slightly superior, and these findings were supported by analyses of the bootstrap samples. Nevertheless, in the two-factor model the second factor had no loadings above .4, and the correlation between the factors was .90. Thus, the second factor appeared to add nothing to the utility of the scale, and may be considered an artefact of positive and negative wording.

*Insert Table 6 Here*

## **Discussion**

The factor structure of the 11-item RCFPS was examined using EFA. Converging evidence supported a one-factor solution, but one- and two- factor models were

examined. Both models showed good fit, but as the two-factor solution included factors that were highly correlated, the one-factor solution was considered the better solution.

The one-factor model was inferior to the two-factor model based on the chi-square statistics (“fair” compared to “excellent” according to the outputs from FACTOR). However, within papers on scale development in Psychology, the chi-square statistic is typically highly significant, and disregarded by the researchers, who suggest their findings may have been influenced by factors such as sample size, kurtosis and a distribution that is not multivariate normal. These were all issues in the present study, although various measures were taken to try to minimise their influence (such as the use of robust unweighted least squares factor extraction, a polychoric correlation matrix, and the bootstrapping of all the main results, etc). The results of the bootstrap analyses supported all of the main results for the one- and two-factor solutions. The differences between the one- and two- factor solutions are likely to reflect differences between the positively and negatively worded items. In addition, one item had a communality that was less than ideal, and this should be monitored in future research. Overall, these results suggested that the RCFPS is a unidimensional scale with very good internal-consistency reliability. This was tested through confirmatory factor analysis in study 3.

### **Study 3: Testing the Model Fit**

#### **Method**

##### ***Participants***

530 participants took part in Study 3, with a mean age of 24.89 (SD = 10.65; range = 18-82). There were 361 females (70%) and 155 males (30%). 14 cases with missing data were deleted from the dataset.

### ***Materials***

All participants completed the 11-item RCFPS.

### ***Procedure***

The procedure was the same as that for Study 2: participants were recruited online from a Psychology Department recruitment pool, social media sites Facebook and Twitter, and also offline, face-to-face using paper questionnaires.

### ***Analysis Plan***

Study 3 used CFA to test the factor structure of the RCFPS using LISREL 8.8. The CFA model assumes each item only loads on one factor, and error measurement does not correlate across the scale. Two models were examined in the CFA, a one factor solution and a two-factor solution based on positively- and negatively-worded items.

### ***Results***

Table 7 shows descriptive statistics at item level, and Table 4 shows descriptive statistics for the RCFPS. According to the results of the Shapiro-Wilks' and Mardia's (1970) tests these data were not univariate or multivariate normal, so polychoric correlations, and RULS extraction were the chosen methods for the CFA. Scale scores were high again, suggesting strong preferences for fantasy play within the sample. Item-total correlations (see Table 7) and coefficient alpha (see Table 4) were high, suggesting very good internal consistency reliability

*Insert Table 7 Here*

Table 8 shows the standardised loadings for both the one- and two-factor models. The loadings for both models were all statistically significant. Interestingly, negatively worded items loaded strongly (F1 in two factor model) when forced to load on one factor, in comparison to the unrestricted EFA in Study 2.

*Insert Table 8 Here*

The chi-squared results indicated that neither model fit the data well (see Table 9) with the one-factor model performing slightly better. As for Study 2, the CFA, AGFI and RMSR all suggested both models fit the data well. Nevertheless, as Table 9 shows, the inter-factor correlation was even higher than in Study 2, with a correlation of .98. With such a high correlation between factors, the CFA also suggested that the RCFPS was unidimensional.

*Insert Table 9 Here*

## **Discussion**

CFA was used to compare one- and two- factor solutions of the RCFPS, with the two factor solution including positive and negative items as separate factors. The fit indices suggested that both models fit the data well, but as the inter-factor correlation was .98, the two factors appear to be measuring the same thing, and therefore the two factor solution adds little to the one factor solution. In future studies, researchers should regard the RCFPS as unidimensional.

Study 3 also provides further evidence that the RCFPS has good internal consistency reliability, with an alpha coefficient of .94, and corrected item-total correlations ranging from .59 to .83. These coefficients suggest that all items are making a useful contribution to the scale, although there may be some redundancy (Field, 2017).

Although we tried to take a consistent approach to EFA and CFA, and based both sets of analyses on a polychoric correlation matrix and robust unweighted least squares factor extraction, we used the program FACTOR (Lorenzo-Seva & Ferrando, 2006) for EFA, and LISREL (Jöreskog & Sörbom, 2006) for CFA. There is a possibility that using different algorithms influenced the results. We could have used LISREL for both analyses, but FACTOR provides useful information that can be used to justify the solution, such as bootstrap estimates. Although not reported due to space, a LISREL EFA also suggested a one-factor solution, which suggests the use of different programs is not a major concern.

Overall, the results suggested that the RCFPS has factorial validity and internal consistency-reliability, but with some room for improvement. Item 3, for example, was the least reliable item. Dropping or rewording this item could be considered. For example, the wording “I preferred constructive play, such as board games and Lego, rather than fantasy play” might be reworded to “I preferred constructive play, such as Lego, rather than fantasy play” as board games are not necessarily constructive play. Based on an inter-factor of .98, another possibility for future research is to explore a version of the scale based on just the positive items.

#### **Study 4: Examining Construct Validity**

Research suggests the creation of an IC is an elaborate and internally motivated form of pretend play (e.g., Harris, 2000) that facilitates and positively correlates with overall pretence skills (see Taylor & Carlson; 1997; Boudlin & Pratt, 1999). According to parental reports, children with ICs are more likely to incorporate myth into their play, explain events as magical, and play imaginatively (Bouldin & Pratt, 1999). Similarly, children with ICs show a preference for fantasy- over reality-based toys (Acredolo,



Goodwyn & Fulmer, 1995) and have been shown to have a higher disposition toward fantasy-based play (Taylor, 1999). Adults endorsing having an IC during childhood also demonstrate higher levels of imagery and imagination than those that do not (Gleason, Jarudi & Cheek, 2003). As such, we anticipated that there would be a link between having an IC and engaging in more fantasy play during childhood. To test this, and with respect to construct validity, it was predicted that participants who created a childhood IC would score significantly higher on the RCFPS than participants who did not have a childhood IC. As a further test of convergent validity, we were interested to examine the relationships between responses to the RCFPS and the Creative Experiences Questionnaire (CEQ; Merckel et al., 2001). The CEQ is a reliable and previously validated measure of fantasy proneness that would be expected to be positively associated with fantasy play during childhood given the conceptual similarity between the two constructs. The CEQ is composed of 25 items, with the first 8 referring to recalled experiences as a child, and the final 17 items to experiences as an adult. The first 6 items of the scale focus specifically upon recalled childhood experiences of fantasy (e.g., *as a child, I thought that the dolls, teddy bears, and stuffed animals that I played with were living creatures.*) As such, it was additionally hypothesised that this subset of items would correlate more strongly with the RCFPS than the 25 CEQ scale as a whole. CEQ items 7 (*“As a child I often felt lonely”*) and 8 (*“As a child, I devoted my time to playing a musical instrument, dancing, acting and / or drawing”*) were excluded from this analysis due to their lack of specific focus upon fantasy play.

## **Method**

### ***Participants & Procedure***

Data from participants in study 2 and 3 were combined for this study to produce a sample of 730 participants including non-students, and undergraduate and postgraduate students across a range of disciplines. The mean age of this sample was 25.94 years (SD = 11.43; range = 18 to 82). Of these participants, 506 (69%) were female, 205 (28%) were male and 19 (3%) did not report their gender.

An additional, independent subsample of 200 participants were recruited via a psychology recruitment pool and Facebook to examine associations between the RCFPS and the CEQ. This subsample consisted of 58 males (29%), 140 females (70%) and 2 participants (1%) who identified their gender as 'other.' The sample ranged in age from 18 years to 64, with an average age of 25 years (exact date of birth was not requested in this study). Participants received research credits if they took part via the psychology recruitment pool as part of their Undergraduate or Postgraduate Psychology course.

### ***Materials***

Participants completed the 11-item RCFPS. They were also asked to indicate whether or not they had an IC as a child (either completely imaginary or a personified object). The 200 subsample participants completed the 11-item RCFPS and the 25-item Creative Experiences Questionnaire (CEQ; Merckel, Horselenberg & Muris, 2001). Responses on the CEQ are either yes or no with 'yes' items summed to obtain a total score (range 0-25). There are no reverse scored items on the CEQ scale.

### **Results**

Of the 730 participants in the combined sample, 264 participants indicated that they had an IC as a child (36.2%) and 389 that they did not (53.3%); 77 (10.5%) participants did not respond to this item. A Mann Whitney U test (two tailed) indicated that RCFPS

scores were significantly higher for participants who reported having an IC (Mdn = 45.00) than for those who did not (Mdn =40.00) ( $U =55,192.50, p <.001$ ).

Descriptive statistics for the RCFPS, 25 item CEQ and 6 item CEQ subset are shown in Table 10. For the RCFPS and complete CEQ, the distribution of scores was similar, with the mean for each in the upper quartile. A Pearson's correlation (two tailed) conducted between the RCFPS and 25 item CEQ found a significant positive relationship ( $r(171) =.54, p <.001$ ) classified as large according to Cohen (1988). A two tailed Pearson's correlation also found a large significant positive relationship between the RCFPS and 6 item CEQ child –focused subset ( $r(189) = .60, p <.001$ ). Although the 6 item CEQ correlation was slightly higher, a Fishers  $r$ -to- $z$  transformation indicated that the difference between the two correlation coefficients did not reach statistical significance ( $z = -.97, p = .17$ ).

*Insert Table 10 Here*

### **Study 5: Examining Convergent validity with adult imagination**

To further investigate the construct validity of the RCFPS, a final study was undertaken to determine whether scores on the measure converged with scores of imagination during adulthood. Several theorists (e.g., Harris, 2000; Smith & Lillard, 2012) have proposed that fantasy proneness is a trait that continues through the life course, although it may be displayed in forms other than direct play (e.g., fiction reading) as an adult (Walton, 1990; Sutton-Smith, 1997). Studies by Gleason et al., (2003) and Kidd et al., (2010) using retrospective designs have previously found that adults who report having an IC as a child (and therefore engaged in prolonged fantasy play), scored significantly higher than those who did not on several measures relating

to imagination including imagery use, the tendency to become absorbed in an active fantasy life, and creative personality traits. Therefore it was hypothesised that if the RCFPS is a valid measure of childhood fantasy predisposition, its scores should significantly positively correlate with a measure of adult imagination (in this case, an IPIP representation ("IPIP", 2018;) of the fantasy facet of the openness to experience subscale of Costa & McCrae's (1992) NEO-PI-R.)

## **Method**

### ***Participants & Procedure***

263 participants took part in Study 5, with a mean age of 25.58 (SD = 11.27; range = 18-75). There were 211 females (80%) and 46 males (18%). 6 (2%) participants declined to provide their gender. Individuals were recruited using the procedures described in Study 4 above via Facebook and a psychology recruitment system, and consisted of both Undergraduate and Postgraduate Psychology students and non-students.

### ***Materials***

All participants completed the 11-item RCFPS and the IPIP imagination subscale. The Imagination subscale includes 10 items (compared to 8 in the original NEO) which are both positively and negatively worded and scored on a 1-5 response scale with 1 = *strongly disagree*, 2 = *disagree*, 3 = *neither agree nor disagree*, 4 = *agree* and 5 = *strongly agree*. The items focus on current imagination (for this study this was during adulthood because all participants were over the age of 18). Example items include: "*I have a vivid imagination*" and "*I have difficulty imagining things.*" The IPIP

Imagination scale correlates well with the original NEO fantasy subscale and has acceptable internal reliability with a coefficient alpha value of .87 (“IPIP”, 2018).

## **Results**

Descriptive statistics for the RCFPS and Imagination scale are shown in Table 10 with the range and mean scores being similar for each measure. A Pearson’s correlation (two tailed) conducted between the RCFPS and Imagination scale found a significant positive relationship ( $r(236) = .62, p < .001$ ) classified as large according to Cohen (1988).

## **Discussion of Construct Validity: Studies 4 and 5**

The significant difference in RCFPS scores according to engagement in an advanced form of pretend play (ICs) provides support for the case that the scale is measuring predisposition towards fantasy. This finding also aligns with those of prior research studies which have demonstrated higher imagination (Gleason et al., 2003) and fantasy proneness (Taylor, 1999) in those who report having an IC during childhood. Similarly, the significant positive association between scores on the RCFPS and the overall CEQ support the assertion that the current measure coincides with a general measure of fantasy proneness as assessed by a previously validated measure. The stronger positive association (albeit not statistically significantly so) between the RCFPS and the subset of childhood fantasy oriented items of the CEQ also supports the initial construct validity of our measure as an appropriate assessment of fantasy play in a specific retrospective childhood context. This is strengthened by the findings of study 5, where the strong positive association between the RCFPS and a measure of adult imagination (an IPIP representation (“IPIP”, 2018))

of the fantasy facet of the openness to experience subscale of Costa & McCrae's (1992) NEO-PI-R) support the prospective utility of the scale.

### **General Discussion**

This paper describes the development and preliminary validation of a new measure of engagement in and predisposition towards fantasy play during childhood. Retrospective measures of fantasy orientation during childhood are lacking in the research literature but have previously been called for (e.g., see Smith & Lillard, 2012) and are crucial to further investigate the developmental correlates of fantasy play over time. Although there is room for improvement in the fit of the model, taken together, the results of the exploratory and confirmatory factor analyses suggest that the RCFPS functions well as a unidimensional scale, with a one factor solution being both acceptable and parsimonious. The 11 item RCFPS is brief and quick to complete compared to other lengthy measures of fantasy predisposition (e.g., the Inventory of Childhood Memories and Imaginings, Wilson & Barber, 1983; Lynn & Rhue, 1988) thus increasing its utility in survey research. The preliminary validation data also suggest that the scale differentiates between individuals who report engaging in advanced childhood fantasy play in the form of ICs (Harris, 2000; Taylor, 1999), as well as being positively related to self-reported fantasy proneness and imagination during adulthood. Thus, the measure shows acceptable preliminary construct validity which could be investigated further in comparison to other measures of general childhood fantasy orientation including the Children's Fantasy Inventory (Rosenfeldt et al., 1982). Further examination of the discriminant validity of the RCFPS would also be beneficial, including measures of theoretically related but distinct constructs such

as internal state awareness, creativity and absorption or potentially opposing traits such as reality based, convergent thinking.

Fantasy play has been conceptualised as related to key aspects of neurotypical human social cognition (e.g., imagination) throughout the lifespan (e.g., see Crespi et al., 2016). However, longitudinal studies in this area are limited and there are a lack of standardised retrospective instruments designed to measure engagement and predisposition towards typical fantasy play. The RCFPS is a general measure designed to address this deficit in the literature, informing about potential associations between childhood fantasy play and adult functioning and thus what fantasy play may be antecedent of. Such a prospective approach may help to inform the value and importance of childhood fantasy play at a time when this is increasingly being challenged (Russ, 2016). Specific applications of the RCFPS may involve studies considering the relationships between childhood fantasy predisposition and later socio-emotional skills (e.g., theory of mind), personality traits (e.g., openness to experience, motivation (see Hoff, Ekman and Pho, 2017 for a recent study), creativity and divergent thinking, and lifestyle / occupational functioning (e.g., artistic interest, career choice and progression). Whilst the RCFPS is not designed to have a clinically differentiating function, investigating the relationships between this measure and psychopathological traits that involve a reduced or increased interest in fantasy (e.g., autism and schizotypy; Crespi et al., 2016) would be of theoretical interest and provide further information about the psychometric properties of the scale.

Regarding limitations of the current research, further work is required to measure the test-retest reliability of the scale to ensure the stability of responses over time. The general nature of the scale (focusing upon preferences and engagement in fantasy play before 18 years of age) may affect the availability and accuracy of recall

within the sample which is also subject to bias due to the retrospective nature of the study. By design, the scale is also a relatively quick and coarse instrument that does not consider other aspects of childhood fantasy play that might affect its developmental influence over time (e.g., quality and vividness of experiences, and the distance between the fantasy content and reality; Dierker, Davis & Sanders, 1995; Dore & Lilliard, 2015). The cross-sectional and correlational nature and use of the RCFPS also limits the drawing of causal inferences and neglects other variables that may have an important mediating influence (for example, the experience of trauma has been identified as central to the phenomena of childhood IC's and subsequent pathological levels of dissociation; e.g., Lynn, Rhue & Green, 1988; Young, 1988). Due to these limitations, the RCFPS is not designed to replace longitudinal, naturalistic studies of fantasy play during childhood. However, the financial costs, methodological issues and practical limitations of such research necessitate a role for the RCFPS in investigating individual differences related to normative childhood fantasy play, helping to suggest further research ideas and much-needed experimental research (see Lillard et al., 2013).

#### References

- Acredolo, L., Goodwyn, S., & Fulmer, A. (1995, April). *Why some children create imaginary companions: Clues from infant and toddler play preferences*. Poster session presented at the biennial meetings of the Society for Research in Child Development, Indianapolis, IN.
- Ames, L. B., & Learned, J. (1946). Imaginary companions and related phenomena. *The Journal of Genetic Psychology*, 69, 147–167.



- Andridge, R. R., & Little, R. J. A. (2010). A review of hot deck imputation for survey non-response. *International Statistics Review*, 78 (1), 40-64.
- Ariel, S. (2002). *Children's imaginative play: A visit to Wonderland*. Westport, CT: Praeger Publishers.
- Ashiabi, G, S. (2007). Play in the preschool classroom: Its socio-emotional significance and the teacher's role in play. *Early Childhood Education Journal*, 35, (2), 199-207. doi: 10.1007/s10643-007-0165-8
- Baglin, J. (2014). Improving your exploratory factor analysis for ordinal data: a demonstration using FACTOR. *Practical Assessment, Research and Evaluation*, 19(5), 1–14. <http://pareonline.net/getvn.asp?v=19&n=5>
- Basto, M., & Pereira, J. M. (2012). An SPSS R -Menu for Ordinal Factor Analysis. *Journal of Statistical Software*, 46(4), 1–29. <https://doi.org/10.18637/jss.v046.i04>
- Bernstein, E. M., & Putnam, F. W. (1986). Development, reliability and validity of a dissociation scale. *Journal of Nervous and Mental Disease*, 174, 727-735.
- Bouldin, P. (2006). An investigation of the fantasy predisposition and fantasy style of children with imaginary companions. *The Journal of Genetic Psychology*, 167, (1), 17-29. doi:10.3200/GNTP.167.1.
- Bouldin, P., & Pratt, C. (1999). Characteristics of preschool and school-age children with imaginary companions. *Journal of Genetic Psychology*, 160, 397-410.
- British Psychological Society (2014). *Code of human research ethics (2<sup>nd</sup> edition)*. Leicester: BPS. Available from:  
<https://beta.bps.org.uk/sites/beta.bps.org.uk/files/Policy%20%20Files/Code%20of%20Human%20Research%20Ethics%20%282014%29.pdf>

- Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (Neo PI-R) and NEO Five-Factor Inventory (NEO-FFI): Professional manual*. Odessa, FL: Psychological Assessment Resources.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences, 2nd Edition*. Hillsdale: Lawrence Erlbaum.
- Crespi, B., Leach, E., Dinsdale, D., Mokkonen, M., & Hurd, P. (2016). Imagination in human social cognition, autism, and psychotic-affective conditions. *Cognition*, *150*, 181-99. doi: 10.1016/j.cognition.2016.02.001.
- Dierker, L. C., Davis, K., F., & Sanders, B. (1995). The imaginary companion phenomenon: An analysis of personality correlates and developmental antecedents. *Dissociation*, *8*, 220-228.
- Dore, R., A., & Lillard, A. (2015). Theory of mind and children's engagement in fantasy worlds. *Imagination, Cognition and Personality*, *34* (3), 230-242.  
<https://doi.org/10.1177%2F0276236614568631>
- Field, A. (2017). *Discovering Statistics Using IBM SPSS Statistics* (5<sup>th</sup> edition). London: Sage.
- Garvey, C. (1990). *Play* (2<sup>nd</sup> ed.) Cambridge, MA: Harvard University Press.
- Gaskin, C. J., & Happell, B. (2014). On exploratory factor analysis: A review of recent evidence, an assessment of current practice, and recommendations for future use. *International Journal of Nursing Studies*, *51*(3), 511–521.  
<http://doi.org/10.1016/j.ijnurstu.2013.10.005>
- Gleason, T. R. (2005). Mothers' and fathers' attitudes regarding pretend play in the context of imaginary companions and of child gender. *Merrill-Palmer Quarterly*, *5* (4), 412-436. DOI: 10.1353/mpq.2005.0022.

- Gleason, T. R., Jarudi, R. N., & Cheek, J. M. (2003). Imagination, personality and imaginary companions. *Social Behaviour and Personality*, 31, 721-738. DOI: <https://doi.org/10.2224/sbp.2003.31.7.721>
- Goldberg, L. R., Johnson, J. A., Eber, H. W., Hogan, R., Ashton, M. C., Cloninger, C. R., & Gough, H. C. (2006). The International Personality Item Pool and the future of public-domain personality measures. *Journal of Research in Personality*, 40, 84-96.
- Golomb, C. (2011). *The creation of imaginary worlds: The role of art, magic and dreams in child development*. London: Jessica Kingsley Publishers.
- Harman, H. H. (1962). *Modern factor analysis* (2nd edition). Chicago: University of Chicago Press.
- Harris, P. L. (2000). *The work of the imagination*. Oxford: Blackwell Publishers Ltd.
- Hayton, J. C., Allen, D. G., & Scarpello, V. (2004). Factor retention decisions in exploratory factor analysis: a tutorial on parallel analysis. *Organizational Research Methods*, 7(2), 191–205. <https://doi.org/10.1177/1094428104263675>
- Hirsch, C.R. and Holmes, E.A. (2007). Mental imagery in anxiety disorders. *Psychiatry*, 6(4), 1-5.
- Hoff, E. V., Ekman, A., & Kemdal Pho, A. (2017). Fantasy as a driving force: Relations between fantasy and motivation in children. *Imagination, Cognition and Personality: Consciousness in Theory, Research and Clinical Practice*. 0 (0) 1-18. doi: 10.1177/0276236617734787
- Hulbert-Williams, L., Nicholls, W., Joy, J., & Hulbert-Williams, N. (2014). Initial Validation of the Mindful Eating Scale. *Mindfulness*, 5(6), 719-729. <http://doi.org/10.1007/s12671-013-0227-5>
- Hyman, I. E., & Billings, F. J. (1998). Individual differences and the creation of false memories. *Memory*, 6, 1-20.

- International Personality Item Pool: *A Scientific Collaboratory for the Development of Advanced Measures of Personality Traits and Other Individual Differences* (2018, March 27) Retrieved from <http://ipip.ori.org/>
- Izquierdo, I., Olea, J., & Abad, F. (2014). Exploratory factor analysis in validation studies: Uses and recommendations. *Psicothema*, *26*(3), 395–400.  
<https://doi.org/10.7334/psicothema2013.349>
- Jarrold, C. (2003). A review of research into pretend play in autism. *Autism*, *7*, 379-390.
- Jöreskog, K. G. (2003). *Factor analysis by MINRES*. Chicago: Scientific Software.
- Jöreskog, K.G. & Sörbom, D. (2006). *LISREL 8.80 for Windows [Computer Software]*  
Lincolnwood, IL: Scientific Software International, Inc.
- Joseph, A. (2004). The impact of imagery on cognition and belief systems. *European Journal of Clinical Hypnosis*, *5*(4), 12-15.
- Kaiser, H. F. (1970). A second generation little jiffy. *Psychometrika*, *35*, 401–416.  
<https://doi.org/https://doi.org/10.1007/BF02291817>
- Kelley, T. L. (1935). Essential traits of mental life. In *Harvard studies in education* (Vol. 26).  
Cambridge: Harvard University Press.
- Kihlstrom, J. F., Glisky, M. L., & Angiulo, M. J. (1994). Dissociative tendencies and dissociative disorders. *Journal of Abnormal Psychology*, *103*, 117-124.
- Kidd, E., Rogers, P., & Rogers, C. (2010). The personality correlates of adults who had imaginary companions in childhood. *Psychological Reports*, *107*, 163-172.  
doi:[10.2466/02.04.10.PR0.107.4.163-172](https://doi.org/10.2466/02.04.10.PR0.107.4.163-172)
- Kirkham, J. A., Stewart, A., & Kidd, E. (2013). Concurrent and longitudinal relationships between development in graphic, language and symbolic play domains from the fourth to the fifth year. *Infant and Child Development*, *22*, 297-319.  
<https://doi.org/10.1002/icd.1786>

- Kline, P. (1994). *An easy guide to factor analysis*. London: Routledge.
- Klinger, E., Henning, V. R., & Janssen, J. M. (2009). Fantasy-proneness dimensionalized: dissociative component is related to psychopathology, daydreaming as such is not. *Journal of Research in Personality*, 43, 506-510.  
<http://dx.doi.org/10.1016/j.jrp.2008.12.017>
- Kwon, Y. (2002). Changing curriculum for Early Childhood Education in England. *Early Childhood Research and Practice*, 4 (2). <http://ecrp.uiuc.edu/v4n2/kwon.html>
- Ledesma, R. D., & Valero-Mora, P. (2007). Determining the number of factors to retain in EFA: an easy-to-use computer program for carrying out Parallel Analysis. *Practical, Assessment, Research & Evaluation*, 12(2), 1–11.
- Lillard, A. S. (2001). Pretend play as twin earth: A socio-cognitive analysis. *Developmental Review*, 21, 495-531. doi:10.1006/drev.2001.0532
- Lillard, A. S. (2002). Pretend play and cognitive development. In U. Goswami (Ed.), *Handbook of cognitive development* (pp.188-205). London: Blackwell.
- Lillard, A. S., Lerner, M. D., Hopkins, E. J., Dore, R. A., Smith, E. D., & Palmquist, C. M. (2013). The impact of pretend play on children's development: A review of the evidence. *Psychological Bulletin*, 139, 1–34. doi: 10.1037/a0029321
- Lillard, A. S., Pinkham, A. M., & Smith, E. (2010). Pretend play and cognitive development. In U. Goswami (2<sup>nd</sup> ed.), *Handbook of cognitive development* (pp. 285-312). London: UK: Wiley- Blackwell.
- Lorenzo-Seva, U., & Ferrando, P. J. (2006). FACTOR: a computer program to fit the exploratory factor analysis model. *Behavior Research Methods*, 38(1), 88–91.  
<https://doi.org/10.3758/BF03192753>
- Lynn, S. J., & Rhue, J. W. (1988). Fantasy proneness: *Hypnosis, developmental antecedents, and psychopathology*. *American Psychologist*, 43, 35-44.

- Lynn, S. J., Rhue, J. W., & Green, J. P. (1988). Multiple personality and fantasy proneness: Is there an association or dissociation? *British Journal of Experimental and Clinical Hypothesis*, 5, 138-142.
- Majors, K. A. (2013). Children's perceptions of their imaginary companions and the purposes they serve: An exploratory study in the United Kingdom. *Childhood*, 0(0), 1-16. <https://doi.org/10.1177/0907568213476899>
- Manosevitz, M., Prentice, N. M., & Wilson, F. (1973). Individual and family correlates of imaginary companions in preschool children. *Developmental Psychology*, 8, 72-79.
- Mardia, K. V. (1970). Measures of multivariate skewness and kurtosis with applications. *Biometrika*, 57(3), 519–530. <https://doi.org/10.1093/biomet/57.3.519>
- Merckelbach, H., Horselenberg, R & Muris, P. (2001). The Creative Experiences Questionnaire: a brief self-report measure of fantasy proneness. *Personality and Individual Differences*, 31, 987-995.
- Morata-Ramírez, M. de los Á. & Holgado-Tello, F. P. (2013). Construct Validity of Likert Scale Methods of Estimation Based on Pearson and Polychoric Correlations. *International Journal of Social Science Studies*, 1(1), 54–61.  
<https://doi.org/10.11114/ijsss.v1i1.27>
- Miller, L. (1998). *Play as a route to literacy*. Oxford, England: Blackwell.
- Mullineaux, P., & Dilalla, L. (2009). Preschool pretend play behaviours and early adolescent creativity. *Journal of Creative Behaviour*, 43, 41-57.  
<https://doi.org/10.1002/j.2162-6057.2009.tb01305.x>
- Muthen, B., & D, K. (1985). A comparison of some methodologies for the factor analysis of non-normal Likert variables. *British Journal of Mathematical and Statistical Psychology*, 38, 171–189.

- Muthen, B., & D, K. (1992). A comparison of some methodologies for the factor analysis of non-normal Likert variables: A note on the size of the model. *British Journal of Mathematical and Statistical Psychology*, *45*, 19–30.
- Myers, S. A. (1983). The Wilson-Barber Inventory of Childhood Memories and Imaginings: Children's form and norms for 1337 children and adolescents. *Journal of Mental Imagery*, *7*, 83-94.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed). New York, NY, US: McGraw-Hill.
- Olsson, Ulf (1979): Maximum likelihood estimation of the polychoric correlation coefficient. In *Psychometrika*, *44* (4), pp. 443–460. DOI: 10.1007/BF02296207.
- Pison, G., Rousseeuw, P. J., Filzmoser, P., & Croux, C. (2003). Robust factor analysis. *Journal of Multivariate Analysis*, *84*(1), 145–172.  
[https://doi.org/10.1016/S0047-259X\(02\)00007-6](https://doi.org/10.1016/S0047-259X(02)00007-6)
- Roby, A. C., & Kidd, E. (2008). The referential communication skills of children with imaginary companions. *Developmental Science*, *11* (4), 531-540.  
<https://doi.org/10.1111/j.1467-7687.2008.00699.x>
- Rosenfeldt, E., Huesmann, L/ R., Erron, L. D., & Torney-Purta, J. V. (1982). Measuring patterns of fantasy behaviour in children. *Journal of Personality and Social Psychology*, *42*, 347-366.
- Russ, S. W. (2016). Pretend play: Antecedent of adult creativity. In B.Barbot (Ed.), *Perspectives on creativity development. New directions for child and adolescent development*, 21-32. <https://doi.org/10.1002/cad.20154>
- Russ, S. W., Robins, A., & Christiano, B. (1999). Pretend play: longitudinal prediction of creativity and affect in fantasy in children. *Creativity Research Journal*, *12*, 129-139.

- Schermelleh-Engel, K., Moosbrugger, H., and Müller, H. (2003). Evaluating the Fit of Structural Equation Models: Tests of Significance and Descriptive Goodness-of-Fit Measures. *Methods of Psychological Research Online*, 8, (2), 23-74.
- Schmitt, T. A. (2011). Current methodological considerations in exploratory and confirmatory factor analysis. *Journal of Psychoeducational Assessment*, 29(4), 304–321. <https://doi.org/10.1177/0734282911406653>
- Seiffge-Krenke, I. (1993). Close friendship and imaginary companions in adolescence. *New Directions for Child Development* 60(1): 73–87.
- Seiffge-Krenke, I. (1997). Imaginary companions in adolescence: A sign of a deficient or positive development? *Journal of Adolescence*, 20(2): 137–154.
- Singer, D. G., Gollinkoff, R. M., & Hirsh-Pasek, K (2006). *Play = Learning: How play motivates and enhances children's cognitive and social-emotional growth*. New York: Oxford University Press.
- Singer, D. G., & Singer, J. L. (1990). *The house of make-believe: Children's play and developing imagination*. Cambridge: MA: Harvard University Press.
- Smilansky, S. (1968). *The effects of sociodramatic play on disadvantaged preschool children*. New York, NY: Wiley.
- Smith, E. D., & Lillard, A. S. (2012). Play on: Retrospective reports of the persistence of pretend play into middle childhood. *Journal of Cognitive Development*, 13, 4, 524-549. doi: 10.1080/15248372.2011.608199
- Stanton, J. M., Sinar, E. F., Balzer, W. K., & Smith, P. C. (2002). Issues and strategies for reducing the length of self-report scales. *Personnel Psychology*, 55, 167–194. <https://doi.org/10.1111/j.1744-6570.2002.tb00108.x>
- Sutton-Smith, B. (1997). *The ambiguity of play*. Cambridge, MA: Harvard University Press.



- Svendsen, M. (1934). Children's imaginary companions. *Archives of Neurology and Psychiatry*, 2, 985-999.
- Taylor, M. (1999). *Imaginary companions and the children who create them*. Oxford: Oxford University Press.
- Taylor, M., & Carlson, S. M. (1997). The relation between individual differences in fantasy and theory of mind. *Child Development*, 68, 436–455.
- Taylor, M., Hulette, A. C., & Dishion, T. J. (2010). Longitudinal outcomes of young high-risk adolescents with imaginary companions. *Developmental Psychology*, 45, 1632-1636. doi: 10.1037/a0019815.
- Treiblmaier, H., & Filzmoser, P. (2010). Exploratory factor analysis revisited: How robust methods support the detection of hidden multivariate data structures in IS research. *Information and Management*, 47(4), 197–207.  
<https://doi.org/10.1016/j.im.2010.02.002>
- Trionfi, G., & Reese, E. (2009). A good story: children with imaginary companions create richer narratives. *Child Development*, 80 (4), 1301-1313.  
<https://doi.org/10.1111/j.1467-8624.2009.01333.x>
- Usher, J. A., & Neisser, U. (1993). Childhood amnesia and the beginnings of memory for four early life events. *Journal of Experimental Psychology: General*, 122, 155-165. Doi:10.1037/0096-3445.122.2.155.
- Vandenberg, R. J. (2006). Statistical and Methodological Myths and Urban Legends. *Organizational Research Methods*, 9, (2), 194-201.  
DOI:10.1177/1094428105285506
- Van Prooijen, J.W., & van der Kloot, W. A. (2001). Confirmatory analysis of exploratively obtained factor structures. *Educational and Psychological Measurement*, 61(5), 777–792. <https://doi.org/10.1177/00131640121971518>

- Vygotsky, L. S. (2004). Imagination and creativity in childhood. *Journal of Russian and East European Psychology*, 42, 7-97.
- Wagenaar, W. A. (1986). My memory: A study of autobiographical memory over 6 years. *Cognitive Psychology*, 18, 225-252. doi: 10.1016/0010-0285(86)90013-7.
- Walton, K. L. (1990). *Mimesis as make-believe*. Cambridge, MA: Harvard University Press.
- Wellman, H. M., & Estes, D. (1986). Early understanding of mental entities: A re-examination of childhood realism. *Child Development*, 57, 910–923.
- Wilson, S. C., & Barber, T. X. (1981). Vivid fantasy and hallucinatory abilities in the life histories of excellent hypnotic subjects ("somnambules"): Preliminary report with female subjects. In E. Klinger (Ed.), *Imagery, Volume 2, concepts, results, and applications* (pp. 133-149). New York: Plenum Press.
- Wilson, S. C., & Barber, T. X. (1983). Fantasy-prone personality: implications for understanding imagery, hypnosis, and parapsychological phenomena. In A. A. Sheikh, *Imagery, current theory, research and application* (pp.340-387). New York: Wiley.
- Young, W. C. (1988). Observations on fantasy in the formation of multiple personality disorder. *Dissociation*, 1, 13-20.

Table 1: *Corrected item-total correlation coefficients for the 14 items of the initial version of the RCFPS scale (Study 1)*

**Items**

**Number of Items in Scale**

	14	13	12	11
1. I often engaged in fantasy play	.63	.63	.62	.65
2. I liked to believe in fantasy entities as a child (e.g., father Christmas, the tooth fairy)	.44	.44	.42	
3. I often treated my toys as if they were real	.75	.74	.73	.72
4. <i>I preferred constructive play such as board games Lego rather than fantasy play</i>	.65	.67	.66	.66
5. I enjoyed creative and imaginative subjects in school such as art and music	.34			
6. I had a lot of toys as a child which involved some element of pretence	.69	.67	.68	.67
7. I often gave my toys their own names and personalities	.68	.68	.66	.65
8. <i>The themes of my play were mostly based in reality E.g., hospitals playing mummies and daddies</i>	.37	.38		
9. <i>I did not enjoy fantasy play as a child</i>	.76	.77	.77	.78
10. My favourite kind of play involved using my imagination	.54	.55	.54	.54
11. <i>I found fantasy play boring as a child</i>	.66	.68	.71	.72
12. I enjoyed taking on the role of other people or creatures in my childhood play	.56	.57	.58	.57
13. <i>I did not enjoy pretending that my toys were alive</i>	.73	.72	.72	.72
14. Fantasy play was an important part of my childhood	.60	.62	.64	.65

Note: *Italicised items are reverse coded.*

Table 2: *Unrotated factor loadings and communalities for the 11 item RCFPS (Study 1)*

---

Item	Unrotated loading	Communality
1. I often engaged in fantasy play	.75	.56
2. I often treated my toys as if they were real	.77	.59
3. <i>I preferred constructive play such as board games and Lego rather than fantasy play</i>	.59	.35
4. I had a lot of toys as a child which involved some element of pretence	.72	.52
5. I often gave my toys their own names and personalities	.74	.54
6. <i>I did not enjoy fantasy play as a child</i>	.82	.67
7. My favourite kind of play involved using my imagination	.62	.39
8. <i>I found fantasy play boring as a child</i>	.79	.62
9. I enjoyed taking on the role of other people or creatures in my childhood play	.63	.40
10. <i>I did not enjoy pretending that my toys were alive</i>	.77	.59

11. Fantasy play was an important part of my childhood	.71	.51
---	-----	-----

---

Note: Italicised items are reverse coded.

Table 3: *Item-level statistics for the RCFPS (Study 2)*

<b>Item</b>	<b>Item-total</b>	<b>Mean</b>	<b>Standard</b>	<b>Variance</b>	<b>Skewness</b>	<b>Kurtosis</b>
-------------	-------------------	-------------	-----------------	-----------------	-----------------	-----------------

	<b>correlatio n</b>	<b>deviation</b>				
1	.88	3.53	1.38	1.90	-.56**	-1.08**
2	.79	3.45	1.29	1.67	-.46**	-.98**
3	.44	2.98	1.12	1.26	-.06**	-.89**
4	.72	3.43	1.09	1.18	-.38**	-.67**
5	.76	3.43	1.27	1.62	-.25**	-1.27**
6	.86	3.52	1.34	1.80	-.59**	-.91**
7	.75	3.36	1.17	1.38	-.26**	-.92**
8	.85	3.52	1.36	1.86	-.57**	-.95**
9	.78	3.42	1.31	1.72	-.39**	-1.12**
10	.84	3.44	1.38	1.89	-.44**	-1.09**
11	.84	3.45	1.30	1.70	-.43**	-.96**

Table 4: *RCFPS Scale statistics for Study 2 & 3**Study 2**Study 3*

N	200	520
N (after listwise deletion)	177	
Mean	37.49	41.45
SD	11.47	9.49
Variance	131.58	90.14
Median	39.00	43.00
Mode	50.00	44.00
Skewness (standard error)	-.40 (.17) **	-.87 (.11)**
Skewness / standard error	-2.35	-7.91
Kurtosis (standard error)	-.95 (.34) **	.43 (.21)**
Kurtosis /standard error	-2.79	2.05
Range	11-55	11-55
Alpha	.95	.94
Mean inter-item correlations <sup>+</sup>	.68	.65
(SD; min to max)	(.15 .32 to .90)	(.10; .42 to .86)

---

\*\* Shapiro-Wilks test for normality,  $p < .001$

+ computed from a polychoric correlation matrix

Table 5: *Robust unweighted least squares factor loadings and communalities from a one- and two-factor factor solution following exploratory factor analysis (Study 2)*



	<u>One-factor model</u>		<u>Two-factor model</u>		
	F1	Communality	F1	F2	Communality
1	.92	.85	.92	-.13	.86
2	.85	.72	.86	.31	.83
3	.46	.21	.46	-.13	.23
4	.79	.62	.79	.06	.62
5	.83	.69	.84	.33	.83
6	.91	.84	.91	.05	.82
7	.80	.65	.82	-.38	.82
8	.90	.80	.91	-.17	.83
9	.82	.68	.82	-.07	.68
10	.90	.82	.91	.22	.87
11	.90	.80	.90	-.16	.83

Table 6: *Goodness of Fit Statistics for the one- and two-factor exploratory factor models (Study 2)*

---

	One Factor	BCa Bootstrap 95% CI	Two Factor	BCa Bootstrap 95% CI
Parameters	55		55	
Robust chi-square	64.76*		7.18	
d.f.	44		34	
AGFI	1.00	.98 to 1.00	1.00	1.00 to 1.00
CFI	1.00	.99 to 1.00	1.00	1.00 to 1.00
RMSR	.05 <sup>+</sup>	.04 to .06	.03 <sup>+</sup>	.02 to .03
Inter-factor correlation	-		.90	

---

**Notes:**

CI = confidence interval

\*  $p < .05$

Non-significant chi-square result indicates good model fit

AGFI, CFI, closer to 1.0 the better

Root Mean Square Residual, critical value for an acceptable model = .07

(Kelley's criterion; Kelley, 1935; Harman, 1962)

Table 7: *Item-level descriptive statistics for the RCFPS (Study 3)*

---

Item	CITCC	Mean	SD	Variance	Skewness	Kurtosis
------	-------	------	----	----------	----------	----------

---

1	.69	3.90	1.17	1.36	-1.06**	0.18**
2	.73	3.85	1.11	1.24	-0.90**	-0.04**
3	.59	3.16	1.11	1.24	-0.28**	-0.63**
4	.63	3.76	0.98	0.97	-0.84**	0.33**
5	.74	3.81	1.16	1.34	-0.86**	-0.28**
6	.80	3.99	1.05	1.11	-1.16**	0.94**
7	.76	3.69	1.19	1.41	-0.70**	-0.45**
8	.83	4.02	1.07	1.14	-1.29**	1.36**
9	.71	3.81	1.09	1.18	-0.87**	-0.07**
10	.80	3.91	1.11	1.24	-1.13**	0.75**
11	.83	3.81	1.18	1.39	-0.91**	0.06**

\*\* Shapiro-Wilks test of normality,  $p < .001$ ; CITCC = Corrected item total correlation coefficient

Table 8: *Standardised loadings from the CFA (Study 3)*

---

	One-factor	Two-factors	
	1F	F1	F2
<b>Item 10</b>	0.87	0.91	
<b>Item 3</b>	0.63	0.91	
<b>Item 8</b>	0.90	0.88	
<b>Item 6</b>	0.87	0.79	
<b>Item 9</b>	0.78		0.87
<b>Item 11</b>	0.90		0.84
<b>Item 7</b>	0.83		0.83
<b>Item 2</b>	0.80		0.80
<b>Item 1</b>	0.77		0.77
<b>Item 5</b>	0.83		0.71
<b>Item 4</b>	0.70		0.64

---

Table 9: *Goodness of Fit Statistics from the CFA (Study 3)*

---

	One Factor	Two Factor
Parameters	23	24
Satorra-Bentler	171.77**	195.91**
Scaled Chi-Square		
d.f.	43	42
AGFI	.99	.99
CFI	.99	.99
RMSR	.04	.04
Inter-factor correlation	-	.98

---

\*\*  $p < .001$

Table 10: *Descriptive statistics for the CEQ, RCFPS and Imagination Scale (Study 4 & 5)*

	<b>N</b>	<b>Mean (SD)</b>	<b>Range</b>
<b>RCFPS</b>	195	41.36 (9.45)	11 – 55
<b>(Study 4)</b>			
<b>25 Item</b>	175	35.39 (4.65)	25-46
<b>CEQ</b>			
<b>6 Item CEQ</b>	194	9.39 (1.70)	6-12
<b>RCFPS</b>	248	37.70 (5.76)	22-55
<b>(study 5)</b>			
<b>Imagination</b>	248	32.94 (4.98)	21-51

---