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Impairment in personality functioning throughout adolescence and co-development with personality traits, emotion regulation strategies, and psychopathology

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ABSTRACT

The Alternative Model for Personality Disorders (AMPD) introduced in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), provides a dimensional operationalization of personality disorders and brings into account developmental tasks typical to adolescence, which makes it more suitable to apply to personality disorder symptomatology in adolescence. This study investigated the developmental course of impairment in personality functioning (IPF) in adolescence as well as trajectory classes and co-development with Big-Five personality traits, emotion regulation strategies, and psychopathological behaviors/symptoms. Data from a three-wave longitudinal study in 1480 high school students were used. Results revealed no significant linear change of IPF in the total sample. Four developmental trajectory classes emerged and classes significantly differed regarding psycho(patho)logical variables.

1. Introduction

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5; American Psychiatric Association [APA], 2013) has introduced the Alternative Model for Personality Disorders (AMPD) in its third section. The two primary criteria of the AMPD are 1) a severity criterion (Criterion A), reflecting impairment in personality functioning, and 2) pathological personality traits (Criterion B) (Krueger & Hobbs, 2020). Criterion A (or Impairment in Personality Functioning, IPF), which is the focus of this study, describes impairment in two domains: impairment in self-functioning (with identity and self-direction as subdomains), and impairment in interpersonal functioning (with empathy and intimacy as subdomains). According to the AMPD, these impairments in self- and interpersonal functioning are present in all personality disorders (PDs), regardless of their trait-like manifestation. The AMPD situates these problems related to self- and interpersonal functioning on a continuum of severity ranging from no/little to extreme impairment. Hence, this alternative model also accounts for normative self- and social development, being key developmental processes of adolescence. Moreover, the AMPD does not apply a strict age limit on the diagnosis of PDs like the DSM-5 Section II classification does.

In this study, we aim to provide more insight into the longitudinal development of personality pathology in adolescence. First, we are interested in two aspects of development: the general development of IPF throughout adolescence, and possible subgroups of adolescents developing differently over time regarding IPF (i.e., trajectory classes). A second aim of this study is to examine differences in Big-Five personality traits, emotion regulation strategies, and psychopathological

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behaviors/symptoms among the identified developmental trajectory classes of IPF. By examining developmental subgroups in addition to examining development in the total sample, we gain more insight into how prevalent these subgroups are and how they are associated with psycho(patho)logical functioning over time, providing an indication of which adolescents are more (or less) vulnerable for personality pathology or psychopathology. In order to formulate hypotheses for our research questions, we discuss the following topics in our introduction. For Research Question 1, we discuss the suitability of the AMPD's Criterion A as a marker of personality pathology in adolescence (1.1), the development of personality functioning in adolescence (1.2), and developmental trajectories of personality functioning in adolescence (1.3). For Research Question 2, we discuss associations between IPF and psycho(patho)logical functioning (1.4). We end our introduction by formulating research questions and hypotheses (1.5). Given that the Criterion A measurement used in this study is primarily focused on self-functioning, we will concentrate on discussing the literature in this domain (and less on the literature of interpersonal functioning).

1.1. AMPD's Criterion A as a marker of personality pathology in adolescence

Diagnosing and studying personality pathology in adolescence has long been a controversial topic (Laurenssen et al., 2013; Sharp, 2017). Nonetheless, research has clearly shown that PDs are present in adolescence (Morey & Hopwood, 2013; Sharp & Tackett, 2014; Sharp & Wall, 2018; Shiner, 2009). Recently, researchers have argued that the AMPD is a suitable model to examine personality pathology in adolescence because of the dimensional character of Criterion A *and* because Criterion A incorporates developmental aspects of personality pathology, that is self- and social development (Fossati & Somma, 2021; Sharp & Wall, 2018, 2021; Sharp et al., 2018; Sharp, 2020). A core aspect of self-development in adolescence is identity formation (Erikson, 1950, 1968). According to Erikson (1950, 1968), identity formation is a process of balancing feelings of identity synthesis with feelings of identity confusion, most optimally working towards a predominant feeling of identity synthesis. Identity synthesis is the sense of a stable and coherent self, characterized by an integrated set of life goals, values and beliefs. Individuals experiencing identity confusion are unable to make goals or commitments that are incorporated in their identity due to a more fragmented sense of self. Feeling confused about one's identity is considered to be a normative experience and part of the so-called 'storm and distress' of adolescence. In addition, neurological changes (e.g., in perspective-taking) enable adolescents to regulate their selves in their social relationships and to increasingly develop empathy and intimacy (Sharp, 2020). So it is mainly from adolescence onwards that individuals possess the capacity to develop and integrate self- and interpersonal concepts (which are all included in Criterion A). Consequently, when individuals fail to adhere to these developmental tasks, personality pathology may start to arise. Criterion A thus seems to be a suitable marker for detecting the development of personality pathology in adolescence (Sharp, 2020).

1.2. Development of personality functioning in adolescence

Research investigating the development of impairment in personality functioning (or Criterion A) in adolescence is limited. Sharp et al. (2021) have found that maladaptive self- and identity functioning (one of the two domains of Criterion A) increases from age 12 to 16 and then decreases from age 17 onwards (to levels observed at age 12). Similarly, research of Bogaerts, Claes, Buelens, Verschueren, et al. (2021) has shown that identity confusion, on a group level, increases from ages 12 to 15 and then decreases from ages 15 to 23. Finally, research on the development of personality pathology in adolescence has demonstrated that PDs onset in early adolescence, peak in mid-adolescence, and decline into early adulthood (Cohen et al., 2005; Kaess et al., 2014; Kongerslev et al., 2015; Sharp et al., 2018; Venta et al., 2014). In the present study, we want to add to the existing literature by examining the development of IPF from early to late adolescence (age 12–19).

1.3. Developmental trajectories of personality functioning in adolescence

In addition to investigating the longitudinal development of IPF in a total sample of adolescents, examining differences between subgroups of adolescents in how they develop with regard to IPF is highly relevant. In doing so, we gain insight into which adolescents are more vulnerable to development of personality pathology and thus, which individuals could be targeted earlier for prevention and treatment of personality pathology (Petersen et al., 2019). Yet, research on developmental trajectories of IPF throughout adolescence is to the best of our knowledge lacking. Hence, to formulate hypotheses, we discuss here the broader literature on personality pathology in adolescence, which suggests that there may be two trajectories of personality pathology in adolescence (Sharp et al., 2018). For the majority of adolescents, PD symptoms decrease from early adolescence to adulthood. Yet, a smaller subgroup of adolescents increase in PD symptoms when transitioning to adulthood and may even qualify for categorical PDs. Cohen et al. (2005), for example, found that this smaller subgroup of adolescents at risk for PDs comprised around 20 % of their sample. Also, Sharp et al. (2018) refer to a smaller subgroup of adolescents, characterized by incoherence, confusion and a disintegrated sense of self, which may eventually end in a personality structure corresponding to AMPD's Criterion A (IPF). Erikson (1968) as well mentioned a smaller portion of adolescents experiencing what he called 'identity diffusion'. According to Erikson, these adolescents are unable to acquire a balance between identity synthesis and confusion at the end of adolescence and thus cannot accomplish the developmental task of identity formation, as opposed to most adolescents undergoing normative identity confusion. We aim to examine the existence of these two (or more) subgroups of adolescents, with one group going through the normative developmental process in adolescence, and another group experiencing severe identity issues, making them more at risk for developing personality pathology.

We will address this question by means of Latent Class Growth Analysis (LCGA). LCGA is a technique to classify individuals based on similar patterns of data (Berlin et al., 2013). Individuals are assigned to classes that differ from each other with regard to initial levels (intercept) and rates of change (slope) of one (or more) variable(s). This technique is used in the field of child mental health to investigate which developmental patterns are often found in a population, how prevalent these patterns are, and whether/how they change over time (Petersen et al., 2019). LCGA is often perceived as a technique to identify categorically distinct subgroups of individuals that are mutually exclusive. However, Johnson et al. (2007) cautioned against such a strong assumption and stated that in the field of personality development, developmental trajectories are much more continuous and their boundaries rather fuzzy. In the context of personality disorder features, Conway, Hammen, and Brennan (2012) state that latent classes may represent different severity levels of an underlying continuum. Hence, it is not our goal in the present study to 'carve nature at its joints' (Johnson et al., 2007). Instead, we aim to use LCGA as a data-driven approach to capture diversity in developmental patterns and identify those individuals deviating from the average trajectory. This is particularly relevant for the clinical application of personality pathology research. For clinicians working with adolescents, an understanding of which individuals are more vulnerable to personality pathology and how to identify them may be useful for both assessment and treatment.

1.4. Associations between personality functioning and psycho(patho)logical functioning

For our second research question, we aim to examine associations between IPF trajectory classes and variables of psycho(patho)logical

functioning. Several studies have examined where precisely Criterion A is situated in a dimensional and hierarchical personality-psychopathology spectrum framework (McCabe et al., 2022; Sharp & Cervantes, 2023; Sharp, 2020; Widiger et al., 2019), such as the Hierarchical Taxonomy of Psychopathology (HiTOP; Kotov et al., 2017). There is no consensus yet regarding this topic, but what *is* clear is that Criterion A has a transdiagnostic value and is suggested to represent an indicator of heightened severity of psychopathology (Sharp, 2020). It is equally well established that personality pathology has an impact on psychopathology and psychosocial functioning (Conway, Hammen, & Brennan, 2016; Skodol, 2018) and that identity functioning serves as a transdiagnostic factor in several psychopathological phenomena (Kaufman et al., 2014; Verschueren, Claes, Gandhi, & Luyckx, 2019). Hence, the present study addresses how IPF trajectories are linked to trajectories of Big-Five traits, emotion regulation strategies (rumination and positive appraisal), and psychopathological behaviors and symptoms (depressive symptoms, eating disorder symptoms, and substance use). We focus on these specific variables for the following reasons.

First, the Big-Five personality traits (neuroticism, openness, agreeableness, conscientiousness, and extraversion) closely align to the five maladaptive traits of Criterion B of the AMPD (negative affectivity, psychoticism, antagonism, disinhibition, and detachment; respectively) as well as the five domains of the HiTOP model, namely internalizing, thought disorder, antagonistic externalizing, disinhibited externalizing, and detachment, respectively (Kotov et al., 2017; Widiger et al., 2019). Since IPF can be considered a transdiagnostic factor in the personality-psychopathology framework, investigating associations with the Big-Five traits (the hierarchically lower domains), may further delineate the role of IPF in this framework. By doing so, we may obtain a better understanding of how specific traits – and corresponding spectra – are linked to IPF over time, which in turn can shed light on how IPF is related to the lowest domains of this framework, psychopathological disorders and symptoms. Cross-sectional associations have been found between IPF and Big-Five traits in adolescents and adults (Eggermont et al., 2022; Hopwood et al., 2018). Moreover, given the possible role of Criterion A in the personality-psychopathology framework, there may be an interplay between these two constructs in relation to psychopathology. Consequently, Benzi et al. (2019) found that personality functioning moderated associations between internalizing maladaptive personality traits (corresponding to the neuroticism trait) and psychological distress in adolescents. Furthermore, De Clercq et al. (2009) found that children/adolescents with elevated maladaptive traits (such as high neuroticism and low agreeableness) at the beginning of adolescence appear to be less flexible throughout adolescence: their maladaptive trait patterns declined less during adolescence compared to adolescents with lower levels of maladaptive trait patterns at the beginning of adolescence.

Second, emotion regulation is an important underlying element of PDs (Gratz et al., 2016; Pollock et al., 2016; Scott et al., 2013). Moreover, emotion regulation strategies could be key mechanisms of change in the treatment of PDs (Gratz et al., 2015; 2016; Sloan et al., 2017). Gaining insight into the associations between IPF and emotion regulation strategies could help optimize prevention and treatment guidelines for personality pathology in adolescence. In the present study, we focus on one maladaptive strategy, rumination (i.e., negative repetitive thinking about one's problems or emotional experiences; Daros & Williams, 2019), and one adaptive strategy, positive reappraisal (i.e., formulating positive reinterpretations of one's problems or certain stressful situations in order to reduce stress; Daros & Williams, 2019), because of their relevance in PDs and PD severity (Carter et al., 2009; Kelley et al., 2021; Spada et al., 2021; van Wijk-Herbrink et al., 2011). Research on associations between IPF and emotion regulation strategies in adolescents or adults are to the best of our knowledge lacking at the moment. Studies on personality pathology and emotion regulation strategies in both adults and adolescents have established positive associations between PD symptoms and rumination, and negative associations between PD symptoms and positive reappraisal (Daros & Williams, 2019; Kelley et al., 2021; McLachlan et al., 2021; Spada et al., 2021; van Wijk-Herbrink et al., 2011).

Third, as mentioned above, Criterion A is suggested to be a transdiagnostic factor in psychopathology. In the present study, we focus on the association between both internalizing (depressive symptoms, eating disorder symptoms, non-suicidal self-injury) and externalizing (substance use) psychopathological symptoms and behaviors as they are known to be associated with impairment in personality functioning (Benzi et al., 2018; Creswell et al., 2016; Hutsebaut et al., 2016; Sleep et al., 2019; Weekers et al., 2019) and identity functioning (Bogaerts et al., 2023; Claes et al., 2014, Gandhi et al., 2017; Ferrer-Wreder et al., 2008; Raemen et al., 2022; Verschueren et al., 2018, 2019) in adolescence.

Most of the above-mentioned studies suggest linkages between IPF and psycho(patho)logical functioning. However, these studies do not specify how adolescents who develop differently with regard to IPF, may also show differences in their developmental course of these psycho(patho)logical variables. In the present study, we want to address this gap in the literature.

1.5. The present study

The present study addressed two research questions. First, we examined the longitudinal course as well as developmental trajectory classes of IPF in adolescents. In the total sample, we hypothesized a (slight) increasing linear trend in IPF throughout adolescence (Bogaerts, Claes, Buelens, Verschueren, et al., 2021; Cohen et al., 2005; Kaess et al., 2014; Kongerslev et al., 2015; Sharp et al., 2018; Sharp et al., 2021; Venta et al., 2014). In addition, we investigated whether distinct developmental trajectory classes of IPF could be identified and how gender is distributed across these trajectory classes. Based on previous research (Cohen et al., 2005; Sharp & Wall, 2021; Sharp et al., 2018), we hypothesized to find (at least) two classes: an adaptive class, comprising the majority of participants, and a maladaptive class, comprising only a smaller subgroup of the sample. We hypothesized that adolescents in the adaptive class would show relatively (i.e., as compared to the rest of the sample) low initial levels of IPF and a slight increase in impairment over time. We expected adolescents in the maladaptive class to have higher initial levels of IPF and a greater increase in IPF towards late adolescence. We explored whether additional trajectory classes could be identified (e.g., a group with higher initial levels of impairment in personality functioning and a stable course over time). As for gender differences among the trajectory classes at baseline, we hypothesized girls being significantly more present in the maladaptive class than boys, as previous research has found that adolescents girls showed more disrupted personality functioning, identity confusion and BPD symptoms compared to adolescent boys (Barkauskiene et al., 2022; Bogaerts, Claes, Buelens, Gandhi et al., 2021; Crick et al., 2005; Sharp & Tackett, 2014).

The second aim of our study was to investigate whether individuals among different trajectory classes of IPF developed differently with regard to Big-Five personality traits, cognitive emotion regulation strategies,[3] and psychopathological behaviors and symptoms (eating disorder symptoms, depressive symptoms, substance use, and non-suicidal self-injury). With regard to Big-Five traits, we expected lower and/or decreasing levels of neuroticism and higher and/or increasing levels of openness, agreeableness, conscientiousness, and extraversion in the adaptive class, and the reverse pattern in the maladaptive class (De Clercq, 2018; Shiner, 2009). With regard to cognitive emotion regulation strategies, we expected lower and/or decreasing levels of rumination and higher and/or increasing levels of positive reappraisal in the adaptive class, and the reverse pattern in the maladaptive class (Daros &

[3] Cognitive emotion regulation strategies were not mentioned in our preregistration and were added afterwards during the analysis phase.

Williams, 2019; McLachlan et al., 2021). Regarding psychopathological behaviors and symptoms, we expected lower and/or decreasing levels of depressive symptoms, eating disorder symptoms, and substance use in the adaptive class and higher and/or increasing levels of these symptoms in the maladaptive class (Benzi et al., 2021; Creswell et al., 2016; De Clercq, 2018; Hutsebaut et al., 2016; Kongerslev et al., 2015; Sharp et al., 2018; Skabeikyte & Barkauskiene, 2021; Sleep et al., 2019; Weekers et al., 2019). With regard to non-suicidal self-injury (NSSI), we hypothesized an overrepresentation of NSSI engagement in the maladaptive class and an underrepresentation of NSSI engagement in the adaptive class (Benzi et al., 2018; Kongerslev et al., 2015; Stead et al., 2019).

2. Method

2.1. Participants and procedure

Data for the present study have been collected in the context of a broader longitudinal questionnaire study – the Longitudinal Study on Identity in Adolescents (LIA) study (Buelens et al., 2020), which was approved by the Social and Societal Ethics Committee of KU Leuven. The LIA study was conducted at three annual measurement points between January 2018 and February 2020. High school students in eight secondary schools in Flanders (the Dutch-speaking part of Belgium) partook in the LIA study. In the current study, we only used data from four schools that completed a questionnaire booklet with questionnaires examining personality and personality pathology. Informed consent letters were sent out to parents of 2598 students of the four participating schools, as minor participants required active parental consent to participate. A total of 1674 students received parental consent and 1562 students agreed to participate after reading the informed assent document. Questionnaires were completed during school hours with researchers present at all time, or online when the participants were absent on the day of data collection. After participating, respondents received a movie ticket. At Time 2 (T2) and Time 3 (T3), students who had left high school or changed to another school were also contacted via e-mail to participate online, to minimize drop-out. To limit the age range to 12–17 years at Time 1 (T1), 83 participants were excluded in the present study. This resulted in a final sample of 1480 students at T1. At T2, 1344 students participated (90.81 % retention rate), and at T3, a total of 1234 students participated (91.81 % retention rate). The relatively large sample size of the study exceeds those recommended by Hoyle and Gottfredson (2015) and Kim (2005) to attain high statistical power for the fit indices typically used in structural equation modeling. Moreover, the sample size of the study seemed more than sufficient for a growth mixture model with 6 classes and 8 time-points (Kim, 2012), corresponding to the models using cohort-sequential design in Research Question 1 (see below).

2.2. Measures

Impairment in personality functioning was measured by means of the Dutch version of the Five-Item Screening Scale for Personality Disorder (FISSPD; Skodol et al., 2011), which has been validated in adult and adolescent community samples (Eggermont et al., 2022). The FISSPD contains five items (see Table 1) rated on a 5-point Likert rating scale ranging from 0 (completely disagree) to 4 (completely agree). Item scores were aggregated to obtain a single personality impairment score. The original English items of the FISSPD (Skodol et al., 2011) were translated into Dutch using back-translation. Cronbach's alpha coefficients were 0.78, 0.82, and 0.86 at T1, T2, and T3, respectively.

The **Big-Five personality traits** were assessed by means of the Big-Five Inventory (BFI; Denissen et al., 2008; Gerlitz & Schupp, 2005). This scale contains 25 items that are rated on a 5-point scale, ranging from 1 (completely untrue) to 5 (completely true). The BFI yields scores on five personality traits: neuroticism, openness to new experiences, agreeableness, conscientiousness, and extraversion. Cronbach's alpha coefficients at T1, T2, and T3, respectively, were 0.80, 0.81, and 0.84 for neuroticism; 0.79, 0.78, and 0.80 for openness to new experiences; 0.61, 0.63, and 0.63 for agreeableness; 0.72, 0.73, and 0.70 for conscientiousness; and 0.76, 0.80, and 0.83 for extraversion. As for the alpha coefficients for agreeableness, previous research has found similar alpha coefficients for this trait (Klimstra et al., 2013).

Cognitive emotion regulation strategies were measured by the short 18-item version of the Cognitive Emotion Regulation Questionnaire (CERQ-short; Garnefski & Kraaij, 2006). The CERQ contains 18 items that are rated on a 5-point scale ranging from 1 ((almost) never) to 5 ((almost) always). The CERQ comprises nine subscales, measuring nine cognitive emotion regulation strategies. Because we could not include all nine subscales in the analyses, we chose to include one adaptive subscale (positive reappraisal) and one maladaptive subscale (rumination) based on theoretical relevance. Cronbach's alpha coefficients of positive reappraisal were 0.66, 0.73, and 0.74 and those of rumination were 0.74, 0.75, and 0.76 at T1, T2, and T3, respectively.

To measure **eating disorder symptoms**, participants completed three subscales of the Eating Disorder Inventory-3 (EDI-3; Garner, 2004). The EDI-3 has been proven to be a valid and reliable questionnaire for assessing eating disorder pathology in (adolescent) community samples (Cumella, 2006). Three subscales were included in the present study, being Drive for Thinness (7 items), Bulimia (7 items), and Body Dissatisfaction (9 items). Items were scored on a 6-point scale ranging from 1 (never) to 6 (always). Cronbach's alpha coefficients for Drive for Thinness were 0.89, 0.91, and 0.93 at T1, T2, and T3, respectively. For Bulimia, alpha coefficients were 0.74, 0.80, and 0.80 at T1, T2, and T3, respectively. For Body Dissatisfaction, Cronbach's alpha coefficients were 0.91, 0.91, and 0.92, at T1, T2, and T3, respectively.

Non-suicidal self-injury (NSSI) was measured in two ways: lifetime NSSI and past year NSSI.[4] Lifetime NSSI was measured by a single-item screening measure "Have you ever engaged in self-injury without an intent to die?". Response options were either "yes" or "no", resulting in a categorical variable. Participants who marked "yes" to the lifetime NSSI item, received follow-up questions. One of those questions was "How long ago did you last injure yourself?". Response options to this question were: "yesterday or today", "several days ago", "a week ago", "a month ago", "several months ago", and "more than a year ago". Our second NSSI variable (past year NSSI) was constructed by creating a dummy variable based on the latter question. All respondents who had engaged in NSSI in between measurement waves (or one year prior to the first measurement wave), received a score "1" on the past year NSSI variable; respondents who had not engaged in NSSI in the past year, received a score "0" on the past year NSSI variable, also resulting in a categorical variable.

Depressive symptoms were measured by means of the Depression

Table 1
Five-Item Screening Scale for Personality Disorder (FISSPD; Skodol et al. (2011).

Items
1. I can hardly remember what kind of person I was only a few months ago.
2. My feelings about people change a great deal from day to day.
3. Most of the time I don't have the feeling of being in touch with my real self.
4. I drift through life without a clear sense of direction.
5. I have very contradictory feelings about myself.

[4] In our preregistration, we planned to examine current NSSI (a single-item screening measure "Are you currently engaging in non-suicidal self-injury?"). When running our analyses, we observed many missing values in current NSSI because this item was only answered by participants who responded "yes" on the lifetime NSSI variable. Therefore, we decided to run our analyses using lifetime NSSI at T1, and then examining past-year NSSI at T1, T2, and T3 only for those participants who responded "yes" to lifetime NSSI at T1.

subscale (16 items) of the Symptom Checklist-90-Revised (SCL-90-R; Derogatis & Unger, 2010). Participants were asked to what extent they experienced 16 depressive symptoms in the past week and had to rate these items on a 5-point scale ranging from 1 (not at all) to 5 (extremely). Cronbach's alpha coefficients were 0.93, 0.94, and 0.94 at T1, T2, and T3, respectively.

To assess **substance use**, participants were asked five questions regarding the presence and frequency of the use of soft drugs, hard drugs, drinking alcohol, smoking cigarettes, and unauthorized use of medication during the past month. Items were scored on a 5-point Likert scale ranging from 1 (never) to 5 (almost every day). A principal component analysis using Promax rotation at Time 1 was performed to examine whether the substance use items could be combined into one underlying construct. Based on the criterion of eigenvalue > 1, two factors could be extracted, whereas based on visual examination of the scree plot, one factor could be extracted. We extracted one factor based on the scree plot, which explained 41.03 % of the total variance. The factor loadings for smoking cigarettes, drinking alcohol, soft drugs, hard drugs, and unauthorized use of medication were 0.82, 0.56, 0.83, 0.59, and 0.19 respectively. Cronbach's alpha was 0.54 for the substance use construct with five items, and increased to 0.59 after deletion of the unauthorized use of medication item. Hence, we used the calculated mean of the remaining four items (excluding unauthorized use of medication) to obtain a total score for substance use.

2.3. Statistical analyses

Hypotheses and plan of data analysis were registered prior to conducting analyses at the Open Science Framework platform (https://tinyurl.com/2p8tp2uh). We aimed to use a cohort-sequential design in order to estimate a single trajectory across ages 12 to 19 years for our three research questions. Unfortunately, for Research Question 2, many of the multigroup models across age did not converge. Therefore, we proceeded estimating the multigroup models across timepoints (T1, T2, T3) instead of age. Regarding the interpretation of the LGCMs across time instead of age, it must be noted that data were collected before the start of the COVID 19 pandemic in Belgium and no other major societal events that could have impacted the results occurred during the three years of data analysis. For Research Question 1, the cohort-sequential design could be adopted and thus, models were estimated across age. Further information on the cohort-sequential design can be found in the preregistration. Table 6 of the supplementary materials displays an overview of the age cohorts and the distribution of boys and girls in these cohorts at T1.

Preliminary analyses. Preliminary analyses were conducted using IBM SPSS Statistics Version 27. Descriptive statistics (means and standard deviations) of all study variables at T1–T3[5] as well as Pearson correlations at T1–T3 were calculated among the study variables.

Analyses for Research Questions 1 and 2 were conducted in Mplus Version 8.6 and models were estimated with maximum likelihood estimation (ML).[6]

Research question 1. We used Latent Growth Curve Modeling (LGCM) to examine the development of IPF across age. In this model, initial level (intercept) and rate of change (linear slope) of IPF were estimated. Model fit was evaluated by means of the following fit indices: the χ^2-value, which should be as small as possible, the Root Mean Square Error of Approximation (RMSEA), which should be below 0.08, the Standardized Root Mean Square Residual (SRMR) which should be below 0.10, and the Comparative Fit Index (CFI), which should be above 0.90 (Kline, 2015). Next, Latent Class Growth Analysis (LCGA) was used in order to investigate the developmental subgroups of IPF. LCGA solutions with two to six classes were estimated. To decide on the number of classes, we adopted several criteria. The Bayesian Information Criterion (BIC) for a solution with k classes should be lower than for a solution with $k - 1$ classes. Further, Entropy (E) indicates accurate classification of subjects in a class and should be equal to or higher than 0.75 (Reinecke, 2006). Moreover, a significant *p*-value for the bootstrap likelihood ratio test (b-LRT) is an indication of added value of k classes over $k - 1$ class. Finally, we considered the usefulness of the classes and theoretical interpretability in order to obtain a final class solution. Furthermore, each class should include at least 5 % of the sample. After choosing the most optimal class solution, participants were assigned to the trajectory class for which their posterior probability of membership was highest. Next, gender differences at T1 were examined among classes using χ^2 tests of independence.

Research question 2. To examine whether the trajectory classes of IPF develop differently over time with regard to Big-Five traits, emotion regulation strategies as well as psychopathology variables (depressive symptoms, eating disorder symptoms, substance use), we estimated 12 multigroup Latent Growth Curve Models (LGCM). The IPF trajectory classes found in Research question 1 were used as the groups across which multigroup LGCMs were estimated. First, fully unconstrained baseline models were estimated for each Big-Five trait, emotion regulation strategy, and psychopathology variable separately in which intercept and slope could vary across the trajectory classes. Model fit was determined by the χ^2-value, RMSEA, SRMR, and CFI, which should meet the same requirements as described above (see Research question 1). Next, the models were re-estimated with intercepts constrained to be equal across all classes and, finally, models were estimated in which slopes were constrained to be equal across classes as well. Next, model fit of all models per variable were compared by means of the $\Delta\chi^2$. If the constrained models provided significantly poorer fit, this would be an indication of meaningful differences in intercept and/or slope among classes on the psychopathology variable. In case of significant differences, intercepts and slopes were fixed in a pairwise manner across classes and χ^2 difference tests were used to uncover which intercepts or slopes significantly differed from one another. Given the categorial nature of the NSSI variables, we examined differences in NSSI across trajectory classes using χ^2 tests of independence. First, differences between trajectory classes in lifetime NSSI at T1 were examined. Further, differences between trajectory classes in past year NSSI at T1, T2, and T3 were examined only for those participants who responded "yes" to lifetime NSSI at T1.

3. Results

3.1. Preliminary analyses

Table 2 displays means and standard deviations of IPF per cohort and per age. As this table shows, there were no significant differences between cohorts at the same age. Table 3 shows means and standard deviations of all other study variables at T1, T2, and T3. Means and standard deviations of the study variables are in line with those of previous studies (Denissen et al., 2008; Palmeroni et al., 2020; Santos et al., 2023; Verschueren et al., 2018). We refer to Table 7 of supplementary materials for within-time correlations among study variables at T1, T2, and T3.

[5] In our preregistration, we planned to report descriptive statistics for each variable at each time point per cohort. However, as we were not able to examine Research Question 2 cohort-sequentially, we will not report the descriptive statistics of the variables of Research Question 2 per cohort and will only report for each time point (T1, T2, and T3).

[6] In our preregistration, we planned to use maximum likelihood estimation with robust standard errors (MLR) as estimator. However, MLR could not be calculated due to low coverage (because of missing by design). Hence, we chose ML as estimator.

Table 2
Means and Standard Deviations (in brackets) of Impairment in Personality Functioning per Cohort per Age, and T-values for the Comparisons between Cohorts per Age.

				t	df	*p*
Age 12	Cohort 11.23 (0.82)					
Age 13	Cohort 11.33 (0.88)	vs.	Cohort 21.43 (0.83)	−1.35	514	0.18
Age 14	Cohort 11.44 (0.97)	vs.	Cohort 21.50 (0.82)	−0.72	442.27	0.47
	Cohort 1	vs.	Cohort 31.52 (0.89)	−0.96	460	0.34
	Cohort 2	vs.	Cohort 3	−0.30	473	0.77
Age 15	Cohort 21.46 (0.88)	vs.	Cohort 31.59 (0.91)	−1.58	438	0.11
	Cohort 2	vs.	Cohort 41.50 (0.79)	−0.59	448.14	0.55
	Cohort 3	vs.	Cohort 4	1.08	415.94	0.28
Age 16	Cohort 31.60 (0.95)	vs.	Cohort 4 1.53 (0.86)	0.85	414	0.39
	Cohort 3	vs.	Cohort 51.62 (0.85)	−0.17	409.72	0.86
	Cohort 4	vs.	Cohort 5	−1.15	478	0.25
Age 17	Cohort 41.43 (0.92)	vs.	Cohort 51.52 (0.89)	−1.04	461	0.30
	Cohort 4	vs.	Cohort 61.59 (0.87)	−1.79	413	0.07
	Cohort 5	vs.	Cohort 6	−0.85	460	0.39
Age 18	Cohort 51.39 (0.92)	vs.	Cohort 61.60 (0.92)	−2.14	375	0.03
Age 19	Cohort 61.47 (0.86)					

Note. Bonferroni adjusted alpha levels of 0.004 (0.05/14) were adopted to test significance.

Table 3
Means and Standard Deviations of All Study Variables (except for IPF) for Each Time Point.

	T1		T2		T3		Range
	M	*SD*	*M*	*SD*	*M*	*SD*	
Neuroticism	3.17	0.95	3.22	0.95	3.27	0.98	1–5
Openness	3.15	0.89	3.13	0.89	3.13	0.89	1–5
Agreeableness	3.73	0.67	3.71	0.68	3.75	0.68	1–5
Conscientiousness	3.16	0.79	3.14	0.79	3.20	0.77	1–5
Extraversion	3.48	0.81	3.47	0.86	3.41	0.90	1–5
Rumination	2.83	1.07	2.85	1.05	2.82	1.07	1–5
Positive reappraisal	3.18	1.05	3.18	1.10	3.27	1.07	1–5
Depressive symptoms	1.88	0.83	1.93	0.87	1.96	0.86	1–5
Drive for thinness	2.31	1.16	2.27	1.17	2.27	1.19	1–6
Bulimia	1.87	0.68	1.90	0.74	1.90	0.75	1–6
Body dissatisfaction	2.88	1.22	2.99	1.22	2.98	1.22	1–6
Substance use	1.22	0.40	1.35	0.50	1.45	0.60	1–5

3.2. The development of IPF throughout adolescence

3.2.1. Trajectory of IPF in the total sample

Variance around the intercept was estimated freely, and variance around the slope (which was not significant) was fixed to 0 due to initial non-convergence. RMSEA and CFI suggested the trajectory fitted the data adequately; χ^2 and SRMR, however, indicated poor model fit [$\chi^2(18) = 102.176$; RMSEA = 0.056, RMSEA 95 % CI [0.046, 0.067]; CFI = 0.940; SRMR = 0.198]. Mean intercept was 1.450, $p < .001$, and mean slope was 0.010, $p = .232$, suggesting no significant linear change across adolescence. Variance around the intercept equaled 0.475, $p < .001$. One should be cautious, however, when interpreting the estimates of this linear trajectory, as both χ^2 and SRMR exceeded their cut-off values. To look for potential causes of this misfit, we investigated observed means of IPF from age 12 to age 19 (Fig. 1). These means suggest that IPF increases in early adolescence and then decreases towards late adolescence/adulthood, indicating that a quadratic trajectory instead of a linear one would have better captured IPF development across adolescence. Unfortunately, our three-wave study design limits us to analyzing linear trajectories across adolescence.

3.2.2. Trajectory classes of IPF

LCGA with a cohort-sequential design was used to examine developmental trajectory classes of IPF. Models with two to six classes were estimated (see Table 4). Fit indices favored the four-class solution. In the four-class solution, one class contained only 2.60 % of the sample. However, this percentage corresponds with the prevalence of BPD in adolescence (Guilé et al., 2018), hence the four-class solution was chosen. *P*-values of intercepts were below 0.001 in all classes. The first class was named "at risk" [$n = 432$, *M* intercept = 2.147, *M* slope = 0.026, $p = .069$], and represents adolescents with relatively high mean levels of IPF over time. The second trajectory class, labeled "adaptive" [$n = 368$, *M* intercept = 0.648, *M* slope = 0.020, $p = .094$], represents adolescents with initial low levels of IPF that remain low over time. The third class was labeled as "disorder" [$n = 39$, *M* intercept = 2.809, *M* slope = 0.085, $p = .073$], and represents adolescents with chronically high levels of IPF and with the highest (yet non-significant) increase over time. The fourth trajectory class, labeled as "normative", [$n = 641$, *M* intercept = 1.349, *M* slope = 0.007, $p = .585$], consists of adolescents situated between the adaptive and at risk class group. They report moderate IPF scores that remain moderate over time.

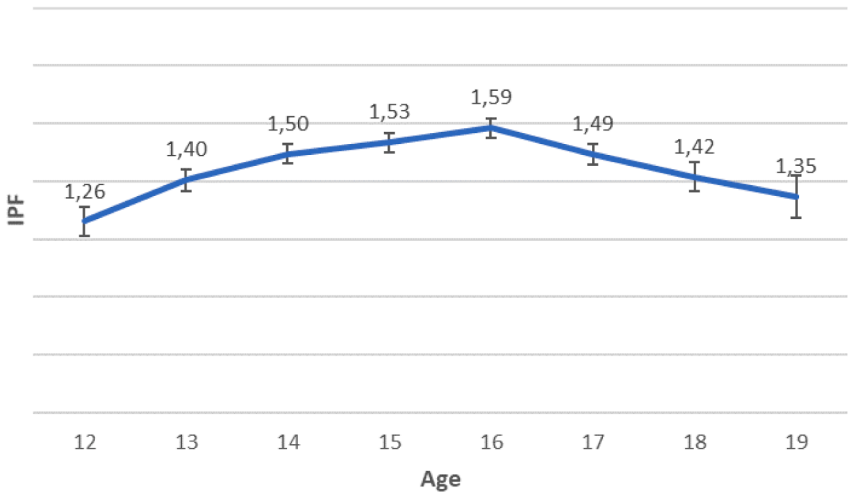
There were no significant age differences among classes [$F(3,1476) = 2.488$, $p = .059$]. Gender was unequally distributed across classes [$\chi^2(3) = 100.32$, $p < .001$]. Post-hoc analyses (with Bonferroni correction of $\alpha = 0.05/6 = 0.008$) indicated that girls were overrepresented in the disorder class (79 % girls) in comparison to the normative (57 % girls) and adaptive classes (43 % girls). Girls were also overrepresented in the at risk class (76 % girls) in comparison to the normative and adaptive classes. Finally, girls were significantly overrepresented in the normative class in comparison to the adaptive class.

3.3. Associations between trajectory classes and psycho(patho)logical functioning

Multigroup LGCMs were estimated to investigate whether the developmental trajectories of the psycho(patho)logical variables were different in the four IPF classes (see Table 5 for model fit). Below, the most relevant findings are reported and summarized. We refer to the supplementary materials for an extensive overview of the results, including Table 8, which displays the intercept and slope estimates for each IPF group, and Table 9, which displays comparisons between the model fits of unconstrained and constrained models. Differences between classes with regard to initial levels and slopes were not significant, unless otherwise specified.

Big Five traits. Regarding initial levels of Big-Five traits, all classes significantly differed from each other. Initial levels of neuroticism were lowest in the adaptive class, higher in the normative class, again higher in the at risk class, and highest in the disorder class. The reverse pattern was found for agreeableness, conscientiousness, and extraversion (except for non-significant differences between the at risk and disorder classes for conscientiousness and extraversion). As for openness, initial levels in the adaptive class were significantly higher as compared to the other classes. Mean slopes of neuroticism significantly differed between the adaptive and normative class (with the slope of the adaptive class being close to zero and of the normative class being positive), between the normative and disorder class (with a significantly stronger positive slope in the normative class), and between the at risk and disorder class (with a positive slope in the at risk class and a negative slope in the disorder class).

Emotion regulation strategies. All classes significantly differed from each other with regard to initial levels of rumination and positive reappraisal (except for the difference in initial levels of positive



Note. IPF = Impairment in Personality Functioning, measured by the FISSPD

Fig. 1. Observed means of IPF for each age. Note. IPF = Impairment in Personality Functioning, measured by the FISSPD.

Table 4
Fit Indices for Different Latent Class Growth Analyses.

Solution	BIC	Entropy	b-LRT	Trajectory Group Prevalence (%)					
				1	2	3	4	5	6
2-class	9424.69	0.729	p < .001	41.3	58.7				
3-class	9198.38	0.676	p < .001	30	24.6	45.4			
4-class	**9137.468**	**0.707**	**p < .001**	**29.2**	**24.8**	**2.6**	**43.3**		
5-class	9148.339	0.604	p = 0.05	38.4	22.6	12.2	25	1.8	
6-class	9162.872	0.636	p = .0882	2	23.9	14.3	37.2	0.3	22.4

Note. BIC = Bayesian Information Criterion; b-LRT = bootstrap Likelihood Ratio Test; The solution in bold was selected; Descriptors for the selected four-class solution: 1 = at risk class, 2 = adaptive class, 3 = disorder class, 4 = normative class.

Table 5
Fit Indices of the Multigroup LGCMs for the Variables of Psycho(patho)logical Functioning.

	χ^2 (df)	*p*	RMSEA	CFI	SRMR
Neuroticism	4.89 (5)	0.43	0	1	0.005
Openness	7.13 (4)	0.13	0.04	0.998	0.01
Agreeableness	13.17 (4)	0.01	0.08	0.77	0.02
Conscientiousness	1315 (5)	0.02	0.07	0.99	0.02
Extraversion	6.55 (5)	0.26	0.03	0.999	0.01
Rumination	3.69 (5)	0.59	0	1	0.01
Positive reappraisal	3.22 (4)	0.52	0	1	0.01
Depressive symptoms	8.97 (4)	0.06	0.06	0.98	0.01
Drive for thinness	6.64 (4)	0.16	0.04	0.999	0.01
Bulimia symptoms	4.55 (4)	0.34	0.02	0.999	0.01
Body dissatisfaction	13.88 (4)	0.01	0.08	0.996	0.02
Substance use	2.85 (5)	0.72	0	1	0.01

Note. LGCM = Latent Growth Curve Model; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residual.

reappraisal between the at risk and disorder classes). Initial levels of rumination were lowest in the adaptive class and highest in the disorder class, whereas initial levels of positive reappraisal were highest in the adaptive class and lowest in the at risk and disorder classes.

Psychopathological behaviors/symptoms. Initial levels of depressive symptoms, eating disorder symptoms (drive for thinness, bulimia symptoms, body dissatisfaction), and substance use were significantly different in all four classes. Initial levels of all psychopathological behaviors/symptoms were lowest in the adaptive class and highest in the disorder class. Mean slopes of drive for thinness were significantly different between the adaptive, normative, and at risk classes. For adolescents in the adaptive class, drive for thinness decreased over time. For adolescents in the normative class, drive for thinness decreased, but less strongly compared to the adaptive class, whereas drive for thinness increased in the at risk class. As for bulimia symptoms, the mean slope in the adaptive class significantly differed from all other classes. Adolescents in the adaptive class decreased over time regarding bulimia symptoms, whereas adolescents in the other classes increased over time. Moreover, the slope of bulimia symptoms in the at risk class increased significantly more compared to the normative class. Finally, differences across trajectory classes in NSSI were examined using χ^2 tests of independence. Only 8 % of adolescents in the adaptive class reported lifetime NSSI at T1, which significantly differed from the normative (18 %), at risk (36 %), and disorder class (64 %). Group differences in NSSI behavior were present in the year before T1 [$\chi^2(3) = 12.45$, $p = .006$]. Bonferroni corrected post-hoc analyses indicated that individuals in the at risk class (79 % engaged in NSSI) were significantly more likely to have engaged in NSSI behavior during the past year compared to individuals in the adaptive class (52 %). Group differences were not significant in the year between T1 and T2 [$\chi^2(3) = 7.51$, $p = .057$]. Group differences were significant in the year between T2 and T3 [$\chi^2(3) = 10.70$, $p = .013$], with 73 % of the adolescents in the disorder class reporting past-year NSSI, compared to 59 % in the at risk class, 48 % in the normative class, and 29 % in the adaptive class. However, after applying the Bonferroni correction, none of the pairwise group comparisons were significant.

4. Discussion

Developing a coherent identity and sense of self as well as establishing fulfilling relationships with others are essential developmental tasks in adolescence (Sharp, 2020). These tasks are also the core domains of Criterion A of the AMPD and combined they provide an indication of impairment in personality functioning (IPF). The fact that the core domains of Criterion A are developmental tasks central to adolescence as well as that they are dimensional in nature (instead of categorical) makes the AMPD a convenient model to study personality pathology in adolescence. In the present study, we were interested in examining the longitudinal development of IPF throughout adolescence as well as developmental trajectories of IPF and co-development with other psychological variables. More specifically, we were interested whether we could find (at least) two groups of IPF: one group developing normatively throughout adolescence (i.e. experiencing normative difficulties in self-functioning, but eventually establishing a more or less balanced feeling of self towards the end of adolescence); and another group, experiencing more extreme difficulties regarding self-functioning in adolescence, resulting in a disintegrated, unstable sense of self. Furthermore, we were interested to examine whether these groups, aside from differences in IPF development, would also show differences with regard to development of psycho(patho)logical variables. Such information could increase our knowledge about (the development of) personality pathology in adolescence, which is crucial for prevention and treatment programs.

First, we did not find any significant linear change regarding IPF across adolescence. As we were only able to estimate linear models with our three-wave longitudinal design, we hypothesized a slight increase in IPF from ages 12 to 19, which we did not find. However, observed means indicated a quadratic trajectory with an increase of IPF in early adolescence until the age of 16 and a decrease of IPF in late adolescence. This quadratic change corresponds more closely to research on age trends in maladaptive self-functioning and identity confusion (Bogaerts, Claes, Buelens, Verschueren, et al., 2021; Sharp et al., 2021).

Second, we were able to distinguish four developmental trajectory classes with regard to IPF: an adaptive class (comprising 24.80 % of the sample), a normative class (43.30 %), an at risk class (29.20 %), and a disorder class (2.60 %). In the disorder class, we found the highest initial levels of IPF at age 12. These results are in line with previous research indicating significant individual variability in initial levels of personality pathology throughout adolescence (De Clercq et al., 2009; Haltigan & Vaillancourt, 2016; Sharp et al., 2018; Skabeikyte & Barkauskiene, 2021; Stepp et al., 2014; Wright et al., 2016). Contrary to our expectations, IPF levels in all classes were stable across adolescence. These results imply that classes mainly differ in their initial levels and not in their rate of change. Consequently, they basically seem to capture the severity continuum of IPF: the adaptive class is situated at one end of the severity continuum (as in experiencing very little impairment in personality functioning) and the disorder class is situated at the other end of the continuum (as in experiencing severe impairment in personality functioning). Yet, the positive slope of the disorder class was marginally significant, which, given the small amount of adolescents belonging to this group ($n = 39$), is important to mention. Moreover, weighted means of IPF in the disorder class started at 2.26 at age 12 and increased to 3.26 at age 17. Given the range of the FISSPD (0–4), the disorder class seemed to increase substantially throughout adolescence (despite their already high initial levels). To conclude, results regarding developmental trajectories seem to indicate that differences between classes mainly lie within the initial levels of IPF at age 12, representing different positions on a severity continuum. Yet, the disorder class also seemed to differ from the other classes with regard to rate of change (as in increasing instead of stagnating). Future research in larger samples estimating quadratic models could provide more clarity regarding this matter.

The second research question of the present study was to examine whether individuals belonging to different trajectory classes of IPF also developed differently over time with regard to Big-Five traits, cognitive emotion regulation strategies (positive reappraisal and rumination), and psychopathological behaviors and symptoms (depressive symptoms, eating disorder symptoms, substance use, and NSSI). Unfortunately, cohort-sequential models did not converge for several multigroup LGCMs and hence, we estimated models across time points (T1–T3) and not age (age 12–19). Results of Research question 2 revealed a clear pattern in line with our hypotheses. In terms of initial levels (intercepts), adolescents belonging to the adaptive and normative classes had lower levels of neuroticism and higher levels of adaptive Big-Five traits, more adaptive and less maladaptive emotion regulation strategies, and less psychopathological behaviors/symptoms compared to adolescents belonging to the at risk and disorder classes. In these more pathological classes, all psychological constructs displayed a more maladaptive pattern, with very high initial levels of psychopathological behaviors/symptoms at T1 in the disorder class. With regard to rate of change (slope), most psycho(patho)logical variables did not show significant differences among the classes. Interestingly, for the slopes of the eating disorder symptoms, meaningful differences were found among the classes with regard to drive for thinness and bulimia symptoms. Taken together, it seems that adolescents with lower initial levels of IPF at T1 are less likely to experience eating disorder symptoms over time, whereas adolescents with higher initial levels of IPF are more likely to experience eating disorder symptoms over time. Moreover, adolescents in the adaptive class that had reported lifetime NSSI at T1, showed less occurrence of past-year NSSI compared to the other classes (although not all group differences were significant). Individuals in the adaptive class may be less affected by the typical 'storm and stress' of adolescence compared to individuals in the other classes. For instance, adolescents in the normative class showed a more typical profile with, for example, a lifetime prevalence of NSSI (18 %) that corresponds to the lifetime prevalence of NSSI in community adolescents (Swannell et al., 2014).

One of the most relevant contributions of the present study is the identification of a small group of adolescents (the disorder class) who – already at the age of 12 – reported high levels of IPF that increased (however only marginally significant) throughout adolescence. These adolescents have the feeling of drifting through life without a clear sense of direction, of not being in touch with their 'real' self and experiencing contradictory feelings about themselves; and these feelings only seemed to increase towards adulthood. Moreover, these adolescents reported high levels of maladaptive personality traits, maladaptive emotion regulation strategies, and psychopathological behaviors/symptoms. For instance, lifetime prevalence of NSSI in these adolescents was as high has 64 % at T1, corresponding to the prevalence of lifetime NSSI in psychiatric adolescent samples (Brown & Plener, 2017). Individuals in this class seem especially vulnerable for psychopathology and may benefit from early detection and prevention/treatment. In recent years, it has become clear that early intervention of PDs in adolescence is feasible and necessary. By targeting individuals at risk in this developmental phase, PD trajectories may still be altered, eventually resulting in a more favorable prognosis (Bozzatello et al., 2019; Chanen & Thompson, 2018; Chanen, 2015; Rivnyak et al., 2021). Thomson et al. (2022) underscore the importance of using developmentally sensitive screeners in the context of early detection of PD symptoms in adolescence. Consequently, the developmentally sensitive, 5-item FISSPD may be a promising tool for the early detection of personality pathology. However, more research is necessary on the FISSPD as a screening tool in adolescents.

A final matter to discuss is that of Criterion A in the context of hierarchical, dimensional personality-psychopathology frameworks. In line with these models (such as the HiTOP model) and hypotheses of Widiger et al. (2019), our results seem to indicate that Criterion A may indeed function as a transdiagnostic factor and is able to distinguish more adaptive and more vulnerable individuals with regard to personality traits, emotion regulation strategies, and specific psychopathological behaviors/symptoms. However, more research is needed to

investigate (longitudinal) associations between Criterion A and other psychological constructs. In doing so, such research would provide more insight into how Criterion A of the AMPD functions in a broader network of psychopathology and, translated to the clinical practice, these insights could optimize treatment guidelines for PD symptoms in adolescence.

Aside from several strengths of this study, we must also address some important limitations and suggestions for future research. First, we believe it is a major strength of our study that with only five items, we were able to find meaningful differences between adolescents who are more or less vulnerable for the development of personality pathology and psychopathology. However, it must be noted that this is a brief screener with a primary focus on self-functioning, and that there are more thorough measures of personality impairment, such as longer self-report questionnaires or interviews (who may or may not have been developed based on the official LPFS of the DSM-5). Second, only self-report questionnaires were used, which may have caused reporting bias and inflated correlations due to shared method variance (Podsakoff, 2003). Future research could make use of alternative measurement methods such as structured interviews (as mentioned above) and/or multi-informant measures. Third, with regard to assessment instruments, substance use was measured using a non-validated questionnaire. Moreover, Cronbach's alpha coefficients of the agreeableness subscale of the Big-Five Inventory were rather low at all three time points, which may indicate inadequate internal consistency. Fourth, we were not able to adopt the cohort-sequential design for all research questions. Therefore, the results of co-development with psycho(patho) logical variables need to be interpreted differently in comparison to the results of our first research question. Growth curve models in our first research question span the entire adolescence period (age 12–19), whereas growth curve models in our second research question span the study period of two years (T1–T3). A fifth limitation is the three-wave longitudinal design spanning two years. This design was limited to estimating linear trajectories. As observed means of the total sample indicated a quadratic trajectory of IPF throughout adolescence, future research should adopt longitudinal designs including more than three repeated measures to enable estimating non-linear trajectories as well. Non-convergence of the linear model may also explain the non-significant slope variance found in the univariate growth model of IPF. We hypothesize that in future studies that would estimate quadratic models, slope variance may be significant because these models would capture the trajectory of IPF more accurately. Future research could also focus on IPF and its association with other psychological constructs on a daily basis. Indeed, identity processes are prone to fluctuations on a daily basis (Becht et al., 2016, 2021; Klimstra et al., 2010), and identity difficulties/Criterion A predict negative affect or depressive symptoms on a daily basis (Hatano et al., 2022; Heiland & Veilleux, 2021). Sixth, the research design used in this study prohibits us from making conclusions regarding directionality of effects. Examining directionality of effects before, during, and after adolescence could be an interesting direction for future research. A seventh limitation is that we cannot generalize our findings to clinical samples as we used a community sample in our study. Future studies could investigate developmental trajectories of IPF in adolescence in clinical samples, possibly in specific clinical subgroups such as patients with a personality disorder. Finally, future research could research antecedents of IPF in adolescence. Results from our study show that already at the age of 12, there is significant individual variability in the initial levels of IPF. Examining which factors underlie these differences (e.g. parenting practices, traumatic experiences (Back et al., 2021), temperament, …) would help to build the bigger picture regarding developmental processes leading to personality pathology.

Author contributions

The first, third, and sixth author designed the study. The fourth and fifth author were involved in the data collection. The second author analyzed the data and data were further interpreted by the first, second, third, and sixth author. The first author wrote the manuscript, which was revised by all co-authors. All authors read and approved the final manuscript.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jrp.2023.104380.

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