Even though environmental contexts have been associated with personality development, little attention has been paid to individuals’ psychological perceptions thereof. Basic psychological needs theory assesses environments based on their levels of autonomy, competence, and relatedness support. In order to better understand the factors that drive personality development we related the support of basic psychological needs (BPN) and the individual importance ascribed to BPN support to Big Five personality development 1.5 years later. We focused on the context of the first job in a longitudinal study of young Germans ($N_{T1} = 1,886; M_{ageT1} = 18.41$). Based on theory and previous research we derived multiple hypotheses and tested them simultaneously against each other with an information theoretic approach including response surface analyses. Results differed across the Big Five: Controlling for personality at T1, people who ascribed greater importance to BPN support, had higher perceptions of BPN support, and who had an incongruence between the two at T1 were higher in emotional stability and extraversion at T2. The pattern was more complex for openness, whereas individuals ascribing more importance to BPN support at T1 were more agreeable and conscientious at T2. Findings are discussed for theory and future research of personality development.

Keywords: Personality Development; Basic Psychological Needs; Emerging Adulthood; Longitudinal Response Surface Analyses

Introduction

Personality is understood as the relatively enduring, automatically occurring individual differences in people’s feelings, thoughts, and behaviors across situations and time (e.g., Roberts, 2009). Especially during the time of emerging adulthood (ages 18 to 25; Arnett, 2000) personality has been shown to change substantially (Lucas & Donnellan, 2011; Roberts & DelVecchio, 2000) with large interindividual differences in intraindividual change (e.g., Lüdtke, Roberts, Trautwein, & Nagy, 2011; Roberts, Walton, & Viechtbauer, 2006; Scollon & Diener, 2006; Schwaba & Bleidorn, 2017; Soto, John, Gosling, & Potter, 2011). In aiming to identify the determining factors, various environmental contexts, such as life events (e.g., marriage, first job, first partnership) or phases of transitions (e.g., from high school to university) were found to be associated with personality change (e.g., Bleidorn, Hopwood, & Lucas, 2016; Lüdtke et al., 2011; Wagner, Becker, Lüdtke, & Trautwein, 2015). However, the large interindividual differences remained unresolved calling for a deeper investigation of the underlying mechanisms and processes (e.g., Bleidorn, 2015; Roberts, Caspi, & Moffitt, 2001, 2003; Roberts & Nickel, 2017). In this regard, the individuals' psychological experience of the environment should be considered (e.g., Bleidorn, 2015; Lodi-Smith & Roberts, 2007). Investigating the interplay between individual perceptions and the individual importance ascribed to features of the respective contexts would allow for a further understanding of why and how individuals differ in their personality development in comparable environments.

A framework that describes environmental contexts from a psychological perspective and has been shown to be important for behavioral and emotional outcomes is basic psychological needs theory (BPNT; Deci & Ryan, 2000).
BPNT suggests that human beings strive to fulfill three basic psychological needs (BPN): the need for autonomy, the need for competence, and the need for relatedness. As every environmental context can be classified according to how autonomous, competent, and related to others a person feels (e.g., Deci & Ryan, 2000), BPNT provides a useful framework from which to assess environmental contexts psychologically.

Thus, the aim of this study was to investigate how environmental characteristics in the major context of a person’s first job, assessed via perceived BPN support and the individual’s importance attached to BPN support, are associated with personality development across 1.5 years. On the basis of theory and previous research, we simultaneously tested competing hypotheses against each other using an information-theoretic approach (IT; Burnham & Anderson, 2002) with response surface analyses (RSA; Edwards, 2002).

**Personality Development in Emerging Adulthood**

Emerging adulthood (Arnett, 2000) has been shown to be a time of major personality development (e.g., Lucas & Donnellan, 2011; Roberts et al., 2006) with most people displaying mean-level increases in emotional stability, agreeableness, and conscientiousness (maturity principle; Roberts, Wood, & Caspi, 2008). Equally consistent is the finding that emerging adults differ substantially in how their personalities develop. That is, several studies have shown that reliable interindividual differences in personality change exist for all five personality traits in this time period (e.g., Mõttus, Allik, Hõbeäki, Kööts-Ausmees, & Realo, 2016; Lüdtke et al., 2011; Roberts et al., 2006). However, determining factors and predictors of these individual differences in personality development are still largely unknown (e.g., Roberts & Nickell, 2017).

Initial findings in the debate on driving factors of personality development have demonstrated the experience of various environmental contexts to be powerful (e.g., Bleidorn, Kandler, & Caspi, 2014; Briley & Tucker-Drob, 2014; Hopwood, Donnellan, Blonigen, Krueger, McGue, Iacono, & Burt, 2011). In this regard, emerging adulthood offers a variety of challenging new contexts within a relatively dense period of time (for an overview, see Schwab & Bleidorn, 2017; Roberts & Davis, 2016). For example, emerging adults are expected to take their first steps not only toward establishing a solid working career but also toward establishing a supportive social network, finding a romantic partner, and starting a family of their own (Arnett, 2000). The environmental context of work is one of the most important and potentially most challenging contexts of emerging adulthood as it involves significant changes in, for example, a person’s daily life schedule, task requirements, and identity formation (Sutin & Costa, 2010). In this manner, work experiences have been found to be primarily related to mean-level increases in conscientiousness (e.g., Hudson, Roberts, & Lodi-Smith, 2012; Leikas & Salmela-Aro, 2015; Lodi-Smith & Roberts, 2007; Specht, Egloff, & Schmukle, 2011). However, diverse work experiences were shown to predict personality traits differentially, and people’s reactions to these experiences were found to fluctuate significantly (Roberts et al., 2003). Thus, emerging adults were shown to differ from each other with respect to their personality development in all of the investigated contexts with the determining factors remaining largely unknown (for an overview, see Bleidorn et al., 2016).

**Toward a More Psychologically Oriented Assessment of Environmental Contexts**

Aiming to understand interindividual differences in personality development in significant environmental contexts, we followed current directions and went beyond categorizing whether someone was immersed in a certain context or not. Rather, we chose to describe the individual’s psychological perception of the environmental experience. To state this another way, it is indispensable not only to know which environmental contexts individuals engage in (e.g., the workforce) but also to understand how each individual perceives his or her environmental context psychologically (for similar arguments, see Rauthmann et al., 2014). For example, say Alex and Jesse are both starting their careers at the same age and in the same industry, that is, both emerging adults can be considered to have entered the workforce. Let’s even consider that both emerging adults have similar experiences from an objective point of view, for example, they are both confronted with challenging new tasks, they must deal with hierarchical organizational structures, they must take on responsibilities, and so forth. Nevertheless, Alex and Jesse might differ with respect to their subjective psychological perceptions of these work experiences. Alex might perceive her working context as supportive in taking on responsibilities, whereas Jesse perceives his environment as overstraining. Based on trait activation theory (Tett & Burnett, 2003) the different experiences of the environmental contexts should activate different personality traits to develop in Alex and Jesse.

The perception of the environmental context might become additionally meaningful when the level of importance the individual ascribes to the respective context is included (Rauthmann et al., 2014; Wrzus & Roberts, 2017). For example, perceiving a similar amount of support on the job can result in different emotional reactions depending on the level of importance individuals ascribe to perceiving support on the job. Say, Jesse ascribes high importance to support on the job. His emotional and behavioral response to receiving low levels of support on the job might be more anxious or stressed than receiving high support. Thus, the interplay between the perception of and the importance ascribed to an environmental context might determine a person’s emotions and subsequent behavior, thus potentially impacting their personality development in the long run (e.g., Le, Donnellan, & Conger, 2014). Therefore, examining an individual’s perception of and importance ascribed to the respective environmental context should provide meaningful information on the predictive power of the respective environmental context for future personality change.

**Basic psychological needs as a framework for psychological assessments of environments**

A framework that can be applied to describe environmental contexts from a psychological perspective is basic psychological needs theory (BPNT), which is embedded in the larger framework of self-determination theory (SDT; e.g., Deci &
Ryan, 2008). BPNT postulates three fundamental needs that human beings strive to satisfy in their environment and whose support is considered to be beneficial for effective functioning and psychological health regarding, for example, well-being, motivation, and behavior (e.g., Deci & Ryan, 2000). The basic needs are the need for autonomy, the need for competence, and the need for relatedness. Thereby, the need for autonomy refers to the need to self-organize and feel volitional towards as well as the origin of one’s behavior (De Charms, 1968; Ryan & Deci, 2008). The need for competence refers to experiencing effectiveness in exercising and expressing oneself in one’s actions (Ryan & Deci, 2008). Finally, the need for relatedness concerns feelings of belongingness and connectedness with others (Baumeister & Leary, 1995; Deci & Ryan, 1991). Experiencing support of BPN in one’s environmental contexts is understood as a fundamental requirement for pursuing a growth-orientation, an activity, or connectedness to other beings in the contexts of, for example, work (for empirical overviews, see Deci, Olafsen, & Ryan, 2017; Van den Broeck, Ferris, Chang, & Rosen, 2016), social relationships (e.g., Deci & Ryan, 2014), or education (e.g., Klassen, Perry, & Frenzel, 2012; Niemiec & Ryan, 2009). BPN support is also assumed to be associated with higher or lower expressions of personality traits (La Guardia & Ryan, 2007). That is, the perceived degree of BPN support in an environmental context is thought to result in individual differences regarding tendencies of a person’s cognition, affect, or behavior (Deci & Ryan, 1985), and thus, in personality.

The basic psychological needs in personality research
Even though BPNT offers an opportunity to assess environmental contexts from the individual’s psychological perception, and despite the postulated association between support for BPN and individual differences in emotions and behavior, only a few studies have empirically investigated the relations between BPN and personality (Sheldon & Prentice, 2017). Results from cross-sectional studies showed that individuals who experienced more support of autonomy, competence, or relatedness in their environmental contexts were also less anxious (e.g., Gillet, Fouquereau, Lafrenière, & Huyghebaert, 2016) and displayed less negative affect (Van den Broeck, Vansteenkiste, & De Witte, 2008). La Guardia and Ryan (2007) demonstrated that individuals who reported that they felt more autonomy support in their relationships were simultaneously more extraverted, agreeable, open, and conscientious and more emotionally stable. Further, feeling that all of the three basic needs were supported was positively associated with prosocial engagement (Gagné, 2003; Van den Broeck et al., 2016) and commitment (Van den Broeck et al., 2016), which can be conceptually linked to agreeableness and conscientiousness respectively. A meta-analysis of cross-sectional studies of BPN in the work context identified small to medium effects between autonomy support and the Big Five traits except for openness (Van den Broeck et al., 2016). Competence support showed associations with agreeableness, openness, and emotional stability, and relatedness support was associated with only conscientiousness and emotional stability (Van den Broeck et al., 2016). However, to our knowledge, no longitudinal studies have been conducted on the effects of the support of BPN in environmental contexts on Big Five personality trait development.

To address this gap, we utilized BPN support as a psychological description of environmental contexts. Additionally, we considered the level of importance individuals ascribe to BPN support, thus, following previous suggestions that individuals’ goals or needs are relevant to subsequent behavior (e.g., Denissen, van Aken, Penke, & Wood, 2013; Hennecke, Bleidorn, Denissen, & Wood, 2014). Therefore, we longitudinally investigated perceived BPN support and importance ascribed to BPN support on subsequent personality while controlling for initial personality at the beginning of VET.

Effects of BPN Support and Importance of BPN Support on Personality Change
How should BPN support, importance ascribed to BPN support and the interplay of these two variables relate to personality development in the first job? The literature provides multiple, partly contradictory expectations on this question which can be seen as a very promising research situation as it allows for a high and rapid gain of scientific knowledge (Anderson, Burnham, & Thompson, 2000). That is, if the different expectations are formalized in clear, alternative hypotheses that are systematically compared to each other strong inferences regarding the plausibility of the different hypotheses can be deduced, and accordingly, contradictory information is reduced (Burnham & Anderson, 2016; Chamberlin, 1965; Platt, 1964). In the following, we transferred and combined information from the research field of psychology into plausible, alternative hypotheses (for a similar approach see Humberg et al., 2019).

In our understanding, hypotheses on the effects of BPN support and the importance ascribed to BPN support on personality change can be grouped into three patterns. First, personality change might be directly linked to previous BPN support and/or the importance ascribed to BPN support by main effects. We call this pattern the hypotheses of main effects. Second, it is likely that BPN support or importance ascribed to BPN support are not meaningful for personality development per se, but rather their directed discrepancy. According to the linear discrepancy hypotheses, the effects of BPN support and importance attached to BPN support on subsequent personality change are particularly pronounced if either of the two predictors takes on a higher value than the other. Third, personality change might be particularly pronounced if BPN support and the importance of BPN support are related in a specific way (e.g., when they take on the same values, or when they differ by a specific amount; optimal discrepancy hypotheses). In the following, we present an overview of eight potential hypotheses describing the interplay between BPN support, the importance a person attaches to BPN support, and personality change1 (for overviews, see Table 1 and Figure 1).

Hypotheses of main effects
In line with BPNT, the Basic Needs Support Hypothesis posits that only perceived BPN support is positively associated with personality change (Figure 1a). BPNT
### Table 1: Initial Set of Hypotheses and Respective Statistical Models.

<table>
<thead>
<tr>
<th>Hypotheses on the interplay between BPN support, importance of BPN support, and Big Five personality change</th>
<th>Regression models</th>
<th>Figure 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic Needs Support Hypothesis:</strong> “The more a person perceives BPN support, the larger the increase (or the smaller the decrease) in personality.”</td>
<td>$P_2 = b_4 + b_1S + b_2I + b_3P_1$ with $b_4 &gt; 0$, $b_2 = 0$</td>
<td>a</td>
</tr>
<tr>
<td><strong>Importance of Basic Needs Hypothesis:</strong> “The higher a person rates the importance of BPN support, the stronger is the association with personality change.”</td>
<td>$P_2 = b_4 + b_1S + b_2J + b_3P_1$ with $b_3 = 0$</td>
<td>b</td>
</tr>
<tr>
<td><strong>Importance and Support Hypothesis:</strong> “The higher a person rates the importance of BPN support and the more a person perceives BPN support, the stronger is the association with personality change.”</td>
<td>$P_2 = b_4 + b_1S + b_2J + b_3P_1$ with $b_3 &gt; 0$</td>
<td>c</td>
</tr>
<tr>
<td><strong>Positive Effect of Discrepancy Hypothesis:</strong> “The larger the directed discrepancy of perceived BPN support and importance of BPN support, the larger the increase (or the smaller the decrease) in personality.”</td>
<td>$P_2 = b_4 + b_1S + b_2J + b_3P_1$ with $b_3 &gt; 0$, $b_2 &lt; 0$</td>
<td>d</td>
</tr>
<tr>
<td><strong>Negative Effect of Discrepancy Hypothesis:</strong> “The larger the directed discrepancy of perceived BPN support and importance of BPN support, the smaller the increase (or the larger the decrease) in personality.”</td>
<td>$P_2 = b_4 + b_1S + b_2J + b_3P_1$ with $b_3 &lt; 0$, $b_2 &gt; 0$</td>
<td>e</td>
</tr>
<tr>
<td><strong>Strict Congruence Hypothesis:</strong> “The more congruent BPN support and BPN importance, the more increases (or decreases) personality.”</td>
<td>$P_2 = b_4 + b_1S + b_2J + b_3P_1$ with $b_1 = b_2 = 0; b_3 = b_4 = -2b_1$</td>
<td>f, f’</td>
</tr>
<tr>
<td><strong>Congruence and Main Effects Hypothesis:</strong> “The more congruent and the higher BPN support and BPN importance, the more increases (or decreases) personality.”</td>
<td>$P_2 = b_4 + b_1S + b_2J + b_3P_1$ with $b_1 = b_2 = b_3 = b_4 = -2b_1$</td>
<td>g, g’</td>
</tr>
<tr>
<td><strong>Optimal Margin Hypothesis:</strong> “The more BPN support exceeds the reported level of BPN importance by a specific fixed amount, the more increases (or decreases) personality, and people with higher levels of BPN support and importance increase more (or decrease more) than people at lower levels.”</td>
<td>$P_2 = b_4 + b_1S + b_2J + b_3P_1$ with $b_3 = b_4 = -2b_1$</td>
<td>h, h’</td>
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</tbody>
</table>

**Supplementary hypotheses**

<table>
<thead>
<tr>
<th>Regression models</th>
<th>Figure 1</th>
</tr>
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<tbody>
<tr>
<td><strong>Curvilinear Basic Needs Hypothesis:</strong> “There is a positive association between BPN support and personality change which diminishes at higher levels of BPN support or turns negative at an inflection point.”</td>
<td>$P_2 = b_4 + b_1S + b_2S^2 + b_3P_1$ with $b_3 &lt; 0$</td>
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</table>

**Null model**

<table>
<thead>
<tr>
<th>Regression models</th>
<th>Figure 1</th>
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<tr>
<td><strong>Curvilinear Basic Needs Model</strong></td>
<td>$P_2 = b_4 + b_1S + b_2S^2 + b_3P_1$ with $b_3 &lt; 0$</td>
</tr>
<tr>
<td><strong>Null Model</strong></td>
<td>$P_2 = b_4 + b_1P_1$</td>
</tr>
<tr>
<td><strong>Full Model</strong></td>
<td>$P_2 = b_4 + b_1S + b_2J + b_3S^2 + b_4SI + b_5J^2 + b_6P_1$</td>
</tr>
</tbody>
</table>

**Global model**

**Note:** $P_2$ denotes the outcome variable personality at T2, $S$ denotes perceived basic needs support, $I$ denotes importance attached to basic needs support, and $P_1$ denotes personality at T1.
Figure 1: Prototypical model representations of the tested models. The colors indicate the levels of the x-axis from red (=low) to green (=high).
strongly emphasizes the impact that BPN support in a person’s environment has on individual development (e.g., Deci & Ryan, 1985, 2000). Additional support for this hypothesis comes from the ASTMA model referring to developmental processes of attraction, selection, transformation, manipulation, and attrition between the person and the working organization (Roberts, 2006). Especially the process of transformation postulating effects of experiences made within the organization on personality development captures the BPN support hypothesis. BPN support has been shown to be cross-sectionally related to, for example, high performance, adjustment, active commitment, and self-esteem (e.g., Baard, Deci, & Ryan, 2004; Greguras & DieFendorff, 2009). Longitudinally, BPN support has predicted aspects of well-being such as lower turnover intentions, work engagement, and organizational citizenship behavior in the context of work (e.g., Olafsen, Deci, & Halvari, 2018; Roche & Haar, 2013; Trépanier, Fernet, & Austin, 2015) as well as lower anxiety and lower depression in school children (e.g., Yu, Li, Wang, & Zhang, 2016). On the basis of such findings, BPN support should be positively related to personality development.

In contrast to the previous hypothesis, the Importance of Basic Needs Hypothesis postulates that only the importance of BPN support is positively related to subsequent personality change (Figure 1b). Considering the processes of self-regulation that are needed to attain psychological or physical goals, people regulate and adapt their behavior in reaction to their innate needs or goals (e.g., Denissen et al., 2013; Fishbach, Zhang, & Koo, 2009; Hennecke et al., 2014; Koo & Fishbach, 2008). In the ASTMA model this hypothesis would refer to the process of manipulation in which the person actively works upon the environment to fulfill personal needs and work goals (Roberts, 2006). In this regard, the motivation to attain and the importance of the desired outcome have been found to be associated with behavior changes in clinical studies (e.g., Kelly & Greene, 2014) and in the work context (for a review, see Kanfer, Frese, & Johnson, 2017). In the case of BPN, people who perceive autonomy support to be important might subsequently display behavior that increases the likelihood that they will fulfill their need for autonomy support (e.g., more emotionally stable or more agreeable behavior; Fleeson & Jayawicre, 2015; Prentice, Jayawicre, & Fleeson, 2018).

The Importance and Support Hypothesis combines the first two hypotheses by positing that both perceived BPN support and the importance of BPN support matter for personality change (Figure 1c).

Discrepancy hypotheses

Another possibility is that personality change depends on the perception of BPN support compared to importance ascribed to BPN support. In this regard, a central measure is a person’s directed discrepancy between BPN support and BPN importance. It takes on a positive value for individuals who obtain higher BPN support than they ascribe importance to, and a negative value if BPN support trails behind BPN importance. The hypotheses of discrepancy posit that this directed discrepancy linearly relates to personality change. The Positive Effect of Discrepancy Hypothesis assumes that a person’s value in some personality trait should increase more (or decrease less), the higher this person’s value in the directed discrepancy of BPN support and BPN importance. That is, this hypothesis posits that personality change should be higher the more BPN support exceeds importance ascribed to BPN support, and that personality change should be lower the more importance ascribed to BPN support exceeds perceived BPN support (Figure 1d). Reasoning for the first of these assumptions, individuals experiencing more BPN support than they ascribe importance to might feel challenged by the requirement to deal with the “too high” support and might adapt their personality respectively. For example, Jesse, who would prefer a rather mediocre level of autonomy support in his job, might feel challenged when his job environment in fact offers a rather high level of autonomy support (e.g., when he is often asked to work on his own), and this might in the long run lead to increases in his extraversion, openness, or emotional stability. To make the second part more explicit, let’s consider the example of Alex, for whom the importance attached to autonomy support exceeds her perceptions of autonomy support at her job. Thus, Alex perceives much less autonomy support than is important to her, and this comes down to a lack of autonomy support. Previous research has supported detrimental effects of lack of need satisfaction on affect, physical stress reactions, or depression in cross-sectional and longitudinal studies (e.g., Bartholomew, Ntoumanis, Ryan, Bosch, & Thogersen-Ntoumani, 2011; Olafsen, Niemiec, Halvari, Deci, & Williams, 2017). These findings support the hypothesis that the larger the gap between need importance and its actual satisfaction (i.e., when the need is not satisfied), the greater the increases that will be observed in, for example, anxiety and emotional overstress and potentially the greater the decreases that will be observed in emotional stability over time.

It can also be argued for the opposite hypothesis. The Negative Effect of Discrepancy Hypothesis postulates a negative effect of the directed discrepancy of BPN support and BPN importance on personality change. This hypothesis posits that personality change should be lower the more BPN support exceeds BPN importance, and higher the more BPN importance exceeds perceived BPN support (Figure 1e). Arguments for the first part of this hypothesis can be traced back by considering the example of Jesse, who perceives that the amount of autonomy support he gets on the job exceeds his level of autonomy importance (e.g., he might experience more responsibilities, self-management requirements, and so forth, than he ascribes importance to). Reasonably, Jesse might feel overwhelmed, stressed, and potentially overstrained. In this case, Jesse might need all his inner resources to cope with his stressful environment, and thus, decreases in energy-consuming behavior (e.g., engaging with others or being open to new tasks or requirements; Soto, 2015). Concerning the second expectation of the hypothesis, it can be argued that the more BPN importance...
exceeds BPN support, the more need should a person feel to advocate his or her needs, which could positively affect personality development. For example, Alex, who would prefer a high autonomy support at her job but is provided with rather mediocre support, might be motivated to stand up and even go into conflict with her boss, aiming to change her working conditions (e.g., demanding the right to take more decisions on her own). Such interpersonal challenges might increase her extraversion level and, at the long run, increase her emotional stability (especially if she successfully convinces her boss to provide higher autonomy support).

Hypotheses of optimal discrepancy
The concept of congruence between a person’s attributes and features of the environmental context is called person-environment fit (e.g., Caplan, 1987; Holland, 1997). The Strict Congruence Hypothesis states that people’s level of BPN support should be predictive of personality change (Figure 1f, and 1f). Within this assumption it was, first, argued that personality change should be maximized the more similar a person’s BPN support is to their respective BPN importance (Figure 1f). Congruence has been widely discussed as important for optimal functioning, well-being, or organizational citizenship behavior (e.g., Greguras & Diefendorff, 2009; Hoffman & Woehr, 2006; Kristof-Brown, Li, & Schneider, 2016). In this regard, it was reasoned that congruence between a person and the environment, and thus, between the importance an individual attaches to BPN support and the BPN support the person perceives, predicts more emotional stability, agreeableness, and conscientiousness (i.e., greater maturity). Contrasting this positive effect of congruence on personality development, it was, second, also found that higher PE-fit was associated with higher levels of personality consistency, and personality development more likely reinforced the fit to the given environmental context (Roberts & Robins, 2004). This finding constitutes the assumption that personality change might be minimized when BPN support and BPN importance are congruent. To sum, the Strict Congruence Hypothesis states that individual differences in the level of congruence between the person and the environment should predict differences in personality change, while theory and research remain indefinite about whether this association should be positive or negative. Additional main effects of support and importance are also conceivable, and these are represented in the Congruence and Main Effects Hypothesis. It states that congruence is associated with more personality change, and that in addition, personality change should be higher at higher levels of the predictors (Figure 1g, and 1g).

A final hypothesis suggests that some specific Optimal Margin of BPN support and BPN importance lead to the highest, or to the lowest, personality change (Figure 1h, and 1h). First, personality change might be maximized when perceived BPN support exceeds the importance of BPN support by a specific optimal amount (Figure 1h). Let’s take Alex whose perceived autonomy support exceeds the extent to which she views autonomy as important by a specific amount, thereby slightly expanding her comfort zone. Similar processes of exposition or adaptation as observed in treatment, therapy, or intervention studies (e.g., to address social anxiety) that have been found to be longitudinally related to personality changes (e.g., Nelis, Kotsou, Quoidbach, Hansenne, Weytens, Dupuis, & Mikolajczak, 2011; Smits, Julian, Rosenfield, & Powers, 2012) could take place. In particular, the personality traits of emotional stability and extraversion appear to increase as reactions to different types of interventions (for a systematic review, see Roberts, Luo, Briley, Chow, Su, & Hill, 2017). Thus, it seems reasonable to hypothesize that not only are people able to cope with a little overstretching but that they might even adjust and change their personalities in the long run. However, change in reaction to adaptation or exposition processes can be understood as both increases and decreases in the respective personality traits.

Speaking for the second part, there should be a specific margin of BPN support and BPN importance at which personality change is minimized (Figure 1h).

The Present Study
In this study, our goal was to test effects of the important environmental context of a person’s first job on subsequent personality change during emerging adulthood. In this endeavor, we assessed the environmental context of work from the participants’ psychological perspective by utilizing the framework of BPN support and included the importance that the individual attached to BPN support. On the basis of theory and previous research, we tested eight hypotheses on the interplay between BPN support and the importance of BPN support on personality change across the first 1.5 years that participants spent at their first job. Thereby, we included theoretical assumptions and empirical evidence from varying research fields such as personality development, self-determination theory, and work and organizational psychology. To capture the various approaches and conceptualizations of the constructs, the hypotheses depict the current inconsistencies that exist in the literature regarding the effects of BPN support and BPN importance on personality change. Therefore, we aimed to test the hypotheses with an information-theoretic approach (e.g., Burnham & Anderson, 2002) combined with methods of RSA (Edwards, 2002; for a similar approach see Humberg et al., 2019). In this regard, the competitive testing approach was clearly based on theory and previous research and our research objective is therefore considered confirmatory in nature (Burnham & Anderson, 2002). The hypotheses were not preregistered. In order to organize the hypotheses of interest, we grouped them into three sets of hypotheses.

Method
Participants
Participants were drawn from the first two waves of the study “Mathematics and Science Competencies in Vocational Education and Training” (ManKobE; e.g., Retelsdorf, Lindner, Nickolaus, Winther, & Köller, 2013) which was conducted in line with the ethical guidelines of the American Psychological Association (APA) for research
with human participants. In ManKobE emerging adults undergoing vocational education and training (VET) as industrial clerks ($N_{T1} = 551$), laboratory assistants ($N_{T1} = 283$), or technicians ($N_{T1} = 1052$) were assessed in three German states ($N = 1,886$; $M_{T0} = 18.41$, $SD_{T0} = 1.82$, 29% women). VET is a special educational career pathway that is characterized by the combination of higher education at vocational schools and the acquisition of job-specific skills via hands-on practical training in the respective industrial field. The double-tracked system is realized by a reiterated cycle including periods of time spent at vocational schools as well as periods of time spent on the job.

The trainees were first assessed at the beginning of VET (August to November 2012, $N_{T1} = 1,886$), and the second assessment took place 16.50 ($SD = 1.01$) months later $N_{T2} = 1,460$). Attrition analyses between trainees who participated at both time points (continuers) and participants who dropped out after the first assessment (dropouts) revealed no substantial differences between continuers and dropouts for all Big Five personality variables as well as for additional background variables such as age, sex, type of secondary schooling, graduation degree, or immigration background (all $d < |0.05|$).

As the ManKobE study is an ongoing joint research project it is not yet possible to publicly provide the data.

**Measures**

**Personality**

Personality was measured with 42 items from the German version of the Big Five Inventory (BFI; Lang, Lüdtke, & Asendorpf, 2001) for assessing the personality dimensions emotional stability, extraversion, openness to experience, agreeableness, and conscientiousness. Items were answered on a 5-point scale ranging from 1 (applies not at all) to 5 (applies totally). Cronbach’s alpha reliabilities for the Big Five traits at the two measurement occasions were .71, and .67 for emotional stability, .82, and .82 for extraversion, .73, and .71 for openness, .68, and .69 for agreeableness, and .75, and .76 for conscientiousness, respectively.

**BPN support**

We used an adapted scale for the perceived support of BPN on the job (Prenzel, Kramer, & Drechsel, 2002). Participants rated statements regarding how often BPN support was provided in the context of work on a 6-point scale ranging from 1 (never) to 6 (very often). For commensurability reasons, we transformed the scale to range from 0 to 1 with the two-step proportion of maximum scaling procedure (POMS; Little, 2013; Moeller, 2015). Autonomy support was assessed with seven items (e.g., I am encouraged to work independently; I am allowed to manage my time on my own; I am allowed to fulfill tasks my way), whereas competence support (e.g., I have the opportunity to practice what I have learned; My performance is getting attention; My achievements are acknowledged) and relatedness (e.g., I am treated as a colleague; I have the feeling I belong; I have the feeling that my colleagues understand me) were assessed with six items each. Cronbach’s alpha reliabilities for BPN support at the two measurement occasions were .79 and .84 for autonomy, .87 and .91 for competence, and .93 and .93 for relatedness.

**Importance ascribed to BPN support**

To assess the level of importance the young trainees attached to autonomy support, competence support, and relatedness support, the participants were asked to rate the same characteristics that were presented for perceived BPN support with respect to the statement, “In my job it is important to me that…” on a 5-point scale ranging from 1 (not at all) to 5 (very much). We conducted POMS scaling for this scale as well to achieve commensurability with BPN support. Cronbach’s alpha reliabilities for importance attached to BPN support at the two measurement occasions were .82 and .89 for autonomy, .88 and .90 for competence, and .92 and .94 for relatedness.

**Analyses**

In order to empirically compare the competing hypotheses on how the interplay between BPN support ($T_j$) and importance of BPN support ($T_j$) relates to personality change, we followed the analytical strategy of Humberg et al. (2019) and adapted it to our initial model set. That is, we first transformed each of the theoretically derived hypotheses into a corresponding statistical model by drawing from the literature on RSA, where polynomial regression models were presented to reflect different hypotheses on how the interplay of two variables (in our case, BPN support and importance ascribed to BPN support) affects an outcome variable (personality change; e.g., Edwards, 2002; see Humberg et al., 2019; Humberg, Nestler, & Back, 2018; Schönbrodt, 2016). The specification of the polynomial regression models and the corresponding constraints on the regression parameters are shown in Table 1. A detailed description of the different regression models is provided in supplement A1. In addition to the eight hypotheses derived from theory and previous research, we extended the model set by adding three statistical models (null model, full model, and curvilinear model) that must be included for technical reasons when evaluating multiple hypotheses with an IT approach (for more information, see Supplemental Material A1).

Second, for each combination of basic needs domain (autonomy, competence, relatedness) and Big Five trait (emotional stability, extraversion, openness, agreeableness, conscientiousness), we tested the postulated hypotheses against each other with an information-theoretic approach (Burnham & Anderson, 2016). Thereby, each of the resulting 15 model comparison procedure was threefold: First, we checked for a meaningful association between the predictors and personality change by investigating whether the full model (all other models were nested in the full model) explained significantly more variance than the null model, and we continued with the model comparison analyses only if the full model explained significantly more variance than the null model. Second, we estimated all models with the sem function in the R package lavaan (version 0.5.23.1097; Rosseel, 2012). In a third step, we computed the models’ Akaike weights (Akaike, 1973), applying the R package AICcmodavg.
(version 2.1.1; Mazerolle, 2017) while excluding models that were estimated to be redundant based on the Akaike weights4 (Arnold, 2010; Burnham & Anderson, 2002). The Akaike weights w are the central element of the model comparison analyses and drive the interpretation of the results. The Akaike weight of a model reflects the likelihood that this specific model provides the most parsimonious explanation of the data, out of all alternative models that are considered. In other words, the weights provide a direct estimate of a model's empirical evidence in the data. This strategy takes account to the fact that several hypotheses might provide similarly good explanations of the data. For this reason, we based the interpretation of the results not on a single best model, but instead considered the confidence set of models. The confidence set not only consists of the best model but also includes all models whose cumulated Akaike weights exceed 95% of being the best model in the tested set. When the full model was included in the confidence set, we interpreted it by applying RSA tools (Box & Draper, 1987; Edwards, 2002, 2007; Humbers et al., 2018).

All analyses were conducted in RStudio (RStudio Team, 2016). We used the RSA package (version 0.9.11, Schönbrodt, 2017) to plot the models. Missing data were treated with full information maximum likelihood (FIML) estimation. The respective scripts of analysis are provided in the supplement.

Results

Descriptive Statistics

Table 2 presents information on the means, standard deviations, stabilities, and correlations of all variables. Regarding mean-level personality trait change between the two assessment intervals, all personality traits decreased from T1 to T2. That is, the emerging adults reported that they had become less emotionally stable (d = −0.34), less extraverted (d = −0.30), less open (d = −0.09), less agreeable (d = −0.41), and less conscientious (d = −0.49) on average. Personality consistency was moderate with values of r = .50 for emotional stability, r = .65 for extraversion, r = .58 for openness and agreeableness, and r = .57 for conscientiousness, indicating that extraversion was most and emotional stability least stable which has been shown in a previous study on mean-level personality change and individual differences in change with this sample (Deventer, Lüdtke, Nagy, Retelsdorf, & Wagner, 2019). With respect to initial correlations, the importance of BPN support was more strongly related to perceived BPN support (autonomy: r = .38; competence: r = .41; relatedness: r = .48) than the personality traits were to either BPN support (15 < r < .30) or importance of BPN support (.13 < r < .30).

Results of Model Comparison Analyses

The results of the model comparison analyses are presented separately for the personality traits: emotional stability (Table 3), extraversion (Table 4), openness (Table 5), agreeableness (Table 6), and conscientiousness (Table 7). All tables include the 95% confidence set of models. The respective RSA graphs of the models contained in the confidence sets can be found in the Supplemental Material (Figure A1 to Figure A5). The amount of variance accounted for by the predictor variables above and beyond initial personality ranged from approximately $R^2 = 0.1\%$ and can be found in the Tables 3 to 7. Whereas inference was not based on the models' $R^2$ values directly, tracing them in the table nicely demonstrates how the Akaike weights balance variance explanation versus model parsimony. That is, when the $R^2$ of two models are similar (e.g., as for the importance & support versus the full model in Table 3), the Akaike weights suggest more evidence for the model with fewer free parameters. This idea is similar to the idea of the traditional frequentist approach for model selection (where one would base inference on a more complex model only if it brings a significant increase in $R^2$). The main difference is that the aim of IT model comparison is not the selection of one single “best” model but the transparent comparison of the models’ evidence in the data, so unless an increment in $R^2$ is clearly neglectable, both models will appear in the confidence set.

Overall, the patterns of evidence for the respective hypotheses were more coherent within the Big Five personality traits than within the BPN (i.e., the results were similar across the three BPN for each personality trait). Therefore, the results will be presented along the Big Five traits. Further, the large majority of the confidence sets provided strong evidence for either (or some of) the following hypotheses: Importance of Basic Needs Only, Support of Basic Needs Only, Importance and Support, Congruence and Main Effects, and Negative Effect of Discrepancy (only openness). Few analyses included the null or the full model in the confidence set. In order to provide a guiding example of how to interpret the results, the confidence set for emotional stability is explained in more detail.

Emotional stability

Considering the effect of autonomy support and importance ascribed to autonomy support on change in emotional stability, the Importance and Support Model had a likelihood of 38% (Akaike weight of w = 0.38) of being the best model out of the alternatives. This model thereby had just as much evidence in the data as the next-best Congruence and Main Effects Model (w = 0.37). The set was completed by the Importance of Basic Needs model (w = 0.16) and the Full Model (w = 0.06). Accordingly, both the Importance and Support Model and the Congruence and Main Effects Model were 2.4 times more likely than the Importance of Basic Needs Model (evidence ratio = .38/.16 = 2.4) and 6 times more likely than the Full Model (.38/.06 = 6.3). All models in the confidence set indicated a positive linear effect of importance ascribed to autonomy support on emotional stability such that trainees scoring higher on autonomy importance at T1 subsequently displayed more increases in emotional stability. (Importance of Basic Needs Only Model). Both the Importance and Support model and the Congruence and Main Effects model provided strong evidence for an additional positive effect of autonomy support, which indicates that the emerging adults increased more in emotional stability the higher
Table 2: Descriptive Statistics of the Big Five Personality Traits and Basic Psychological Needs.

| Personality traits | \( M_{T1} \) | \( SD_{T1} \) | \( M_{T2} \) | \( SD_{T2} \) | \( d \) | \( r_{T1-T2} \) | \( \alpha_{T1} \) | \( \alpha_{T2} \) | \( ES \) | \( E \) | \( O \) | \( A \) | \( C \) | \( A_s \) | \( C_s \) | \( R_s \) | \( A_I \) | \( C_I \) | \( R_I \) |
|-------------------|------------|------------|------------|------------|------|-------------|-----------|-----------|------|---|---|---|---|---|---|---|---|---|
| Emotional stability | 3.45       | 0.62       | 3.26       | 0.58       | -0.34 | .50         | .71       | .67       | 1    |   |   |   |   |   |   |   |   |   |
| Extraversion      | 3.56       | 0.68       | 3.38       | 0.68       | -0.30 | .65         | .82       | .82       | .35  | 1 |   |   |   |   |   |   |   |   |
| Openness          | 3.29       | 0.58       | 3.24       | 0.54       | -0.09 | .58         | .73       | .71       | .08  | .28| 1 |   |   |   |   |   |   |   |
| Agreeableness     | 3.61       | 0.57       | 3.43       | 0.57       | -0.41 | .58         | .68       | .69       | .23  | .12| .12| 1 |   |   |   |   |   |   |
| Conscientiousness | 3.72       | 0.56       | 3.48       | 0.57       | -0.49 | .57         | .75       | .76       | .32  | .32| .22| .43| 1 |   |   |   |   |   |
| Basic needs support |            |            |            |            |      |             |           |           |      |   |   |   |   |   |   |   |   |   |
| Autonomy          | 4.31       | 0.90       | 4.31       | 1.00       | 0.00  | 0.36        | .76       | .82       | .22  | .22| .15| .19| .28| 1 |   |   |   |   |
| Competence        | 4.54       | 1.01       | 4.31       | 1.15       | -0.21 | 0.33        | .87       | .91       | .22  | .22| .17| .18| .26| .67| 1 |   |   |   |
| Relatedness       | 4.95       | 1.05       | 4.64       | 1.24       | -0.27 | 0.37        | .93       | .94       | .27  | .23| .15| .23| .30| .65| .75| 1 |   |   |
| Importance of needs support |          |            |            |            |      |             |           |           |      |   |   |   |   |   |   |   |   |   |
| Autonomy          | 3.75       | 0.66       | 3.80       | 0.73       | 0.07  | 0.37        | .83       | .89       | .14  | .23| .22| .14| .20| .38| .31| .31| 1 |   |
| Competence        | 4.09       | 0.70       | 3.95       | 0.77       | -0.19 | 0.40        | .88       | .90       | .16  | .25| .22| .21| .30| .34| .41| .40| .68| 1 |
| Relatedness       | 4.33       | 0.71       | 4.19       | 0.79       | -0.19 | 0.46        | .92       | .94       | .13  | .21| .17| .27| .30| .35| .38| .48| .60| .76| 1 |

Note: \( M \) = Mean, \( SD \) = standard deviation, \( d \) = Cohen's \( d \), \( r_{T1-T2} \) = correlation T1 and T2; \( \alpha_{T1} / \alpha_{T2} \) = Cronbach's \( \alpha \) at T1/T2; \( ES \) to \( R_I \) = variable correlations at T1; \( ES \) = Emotional Stability, \( E \) = Extraversion, \( O \) = Openness, \( A \) = Agreeableness, \( C \) = Conscientiousness, \( A_s \) = Autonomy Support, \( C_s \) = Competence Support, \( R_s \) = Relatedness Support, \( A_I \) = Importance of Autonomy, \( C_I \) = Importance of Competence, \( R_I \) = Importance of Relatedness. Bold numbers are significant at \( p < .01 \).
<table>
<thead>
<tr>
<th>95% Confidence set of models</th>
<th>w</th>
<th>$b_1$ (SE)</th>
<th>$b_2$ (SE)</th>
<th>$b_3$ (SE)</th>
<th>$b_4$ (SE)</th>
<th>$b_5$ (SE)</th>
<th>$R^2$ model</th>
<th>$R^2$ predictors</th>
<th>Final conclusion across all BPN domains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance &amp; support</td>
<td>0.38</td>
<td>0.16 (.09)</td>
<td>0.23 (.09)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.264</td>
<td>0.010</td>
<td>Essential evidence for positive main effects of support and importance (Importance and Support Hypothesis), and for an additional negative effect of congruence (Congruence and Main Effects Hypothesis).</td>
</tr>
<tr>
<td>Congr. &amp; main effects</td>
<td>0.37</td>
<td>0.20 (.05)</td>
<td>0.20 (.05)</td>
<td>0.10 (.24)</td>
<td>-0.19 (.47)</td>
<td>0.10 (.24)</td>
<td>0.264</td>
<td>0.010</td>
<td></td>
</tr>
<tr>
<td>Importance of BPN</td>
<td>0.16</td>
<td>0</td>
<td>0.30 (.08)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.261</td>
<td>0.008</td>
<td></td>
</tr>
<tr>
<td>Full model</td>
<td>0.06</td>
<td>0.20 (.09)</td>
<td>0.21 (.09)</td>
<td>0.26 (.41)</td>
<td>-0.21 (.52)</td>
<td>-0.38 (.39)</td>
<td>0.265</td>
<td>0.011</td>
<td>Some tentative evidence for simple main effect of BPN importance (Importance of Basic Needs Hypothesis).</td>
</tr>
<tr>
<td>Competence</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>BPN support model</td>
<td>0.29</td>
<td>0.14 (.07)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.256</td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td>Congr. &amp; main effects</td>
<td>0.29</td>
<td>0.11 (.05)</td>
<td>0.11 (.05)</td>
<td>0.13 (.16)</td>
<td>-0.27 (.32)</td>
<td>0.13 (.16)</td>
<td>0.257</td>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td>Importance of BPN</td>
<td>0.21</td>
<td>0</td>
<td>0.14 (.08)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.256</td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td>Null model</td>
<td>0.12</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.254</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Full model</td>
<td>0.10</td>
<td>0.23 (.10)</td>
<td>0.03 (.10)</td>
<td>0.57 (.30)</td>
<td>-0.23 (.44)</td>
<td>-0.31 (.39)</td>
<td>0.259</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>Relatedness</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Importance &amp; support</td>
<td>0.29</td>
<td>0.12 (.08)</td>
<td>0.20 (.08)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.262</td>
<td>0.009</td>
<td></td>
</tr>
<tr>
<td>Congr. &amp; main effects</td>
<td>0.28</td>
<td>0.16 (.04)</td>
<td>0.16 (.04)</td>
<td>0.07 (.18)</td>
<td>-0.15 (.36)</td>
<td>0.07 (.18)</td>
<td>0.262</td>
<td>0.008</td>
<td></td>
</tr>
<tr>
<td>Importance of BPN</td>
<td>0.24</td>
<td>0</td>
<td>0.27 (.07)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.261</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Full model</td>
<td>0.12</td>
<td>0.23 (.11)</td>
<td>0.12 (.11)</td>
<td>0.43 (.30)</td>
<td>0.21 (.41)</td>
<td>-0.61 (.35)</td>
<td>0.265</td>
<td>0.011</td>
<td></td>
</tr>
<tr>
<td>BPN support model</td>
<td>0.07</td>
<td>0.20 (.07)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.259</td>
<td>0.005</td>
<td></td>
</tr>
</tbody>
</table>

Note: For each analysis, the 95% confidence set of models is provided. $w$ = Akaike weight of the respective model = the model’s likelihood of being the best model in the set. Regression coefficients $b_1$ to $b_5$ refer to the full polynomial model $P_2 = b_0 + b_1S + b_2I + b_3S_2 + b_4SI + b_5I_2 + b_6P_1$; $SE$ = standard errors; $R^2$ model equals $R^2$ of the respective model; $R^2$ predictors equals $R^2$ accounted for by the predictor variables (without personality at T1). Importance & Support = linear effects of basic needs support and importance of basic needs support. BPN support model = basic needs support only model; Importance of BPN = importance of basic needs only model; Congr. & main effects = congruence and main effects model. The final conclusions were drawn after considering the area of data, interpreting the full model if included in the confidence set, and identifying common effects of the models in the confidence set.
both importance of autonomy support and perceived autonomy support at the first job. However, evidence was inconclusive about a potential additional effect of congruence: Adding to the two linear main effects, the Congruence and Main Effects Model provided evidence that more congruence between importance of autonomy support and experienced autonomy support might have been associated with lower increases in emotional stability. Thus, this means that it is actually incongruence that was associated with larger increases in emotional stability. The Importance of Basic Needs model provided rather small evidence that autonomy importance alone, but not autonomy support or congruence, might have played a role for change in emotional stability. The Full Model had only little evidence in the data and should not be overinterpreted. Overall, the models in the confidence set provided strong evidence for positive main effects of both predictor variables, a finding that is in line with the Importance and Support Hypothesis, and some evidence spoke for an additional negative effect of congruence on personality development.

For competence, however, the null model was included in the confidence set with a likelihood of 12% of being the best model in the set, which indicated that the alternative models explained only a small amount of variance, and the results of the competitive test should not be overinterpreted. This little exploratory power of the predictor variables was also reflected in the rather inconclusive evidence for the competing models, which supported contradictory effects: The Congruence and Main Effects model provided evidence for positive main effects of both competence support and importance of competence, and for an additional negative effect of congruence between the two variables (analogous to the congruence effect for autonomy). The Basic Needs Support model and the Importance of Basic Needs model, however, had (almost) as much evidence in the data as the first model, but spoke for a single main effect of competence support or of importance attached to competence support, respectively. The full model should not be interpreted, because it was similarly supported by the data as the null model. To sum up, competence support, importance ascribed to competence support, and their interplay did not seem to explain much of the variation in emotional stability at T2 (controlled for T1). Very tentative evidence indicated that, if there were effects at all, there were positive linear main effects of support and/or importance and possibly an additional negative effect of congruence.

With respect to effects of relatedness on personality change, the confidence set was almost identical to autonomy except for additional evidence for the Basic Needs Support Hypothesis. Thus, the model set indicated a positive linear effect of relatedness support and a positive linear effect of the importance the person attached to relatedness support. These effects indicate that the higher trainees were on relatedness support and the higher the importance of relatedness support was to them at T1, the more they increased in emotional stability at T2. In addition, some evidence spoke for the notion that congruence between the two predictors yielded smaller increases in the emerging adults’ emotional stability than incongruence between the importance of relatedness support and experienced relatedness support. Some evidence also pointed towards the notion that importance of relatedness support alone might suffice to explain interindividual variation in emotional stability development (Importance of Basic Needs Model). With very low evidence, the Full Model indicated that the positive effect of importance might diminish at higher importance levels and might eventually even turn negative at very high levels. All in all, the models in the confidence set provided strong evidence for positive main effects of both predictor variables and also essential evidence for a congruence effect.

**Extraversion**

For autonomy, the Full Model did not explain significant variance in extraversion at T2 beyond the amount explained by extraversion at T1. That is, the importance of autonomy support, perceived autonomy support, and change in extraversion were not significantly related.

With respect to competence, the confidence set provided strong evidence for both positive main effects of importance of competence support and perceived competence support and again a negative effect of congruence (Congruence and Main Effects Hypothesis).

Rather little evidence supported the assumption that only the importance that people attach to competence support, but not perceived support or the interplay of these variables, plays a role for extraversion development.

For relatedness, the Congruence and Main Effects Model and the Importance of Basic Needs Model gained equal evidence. In addition, the Full Model had substantial evidence. The coefficients of the full model reflected a strong positive effect of the importance of relatedness, a positive effect of relatedness support, and a negative effect of congruence on change in extraversion. Once more, higher levels (vs. lower levels) in the predictors were associated with larger increases in extraversion. Very little evidence spoke for a simple congruence effect without main effects. All in all, we found evidence for the notion that incongruence (vs. congruence) between the predictor variables was associated with larger increases in extraversion.

**Openness**

For autonomy, both models in the confidence set indicated a positive effect of importance of autonomy on increases in openness. The Negative Effect of Discrepancy model, which had substantial evidence in the data, spoke for an additional negative effect of the directed discrepancy of autonomy support and importance. That is, the evidence for this model indicated that the more an individual’s importance of autonomy exceeds the experienced level of autonomy support the more increased openness. Contrary, the more autonomy support exceeded importance of autonomy the more decreased openness. Thus, both models indicated a positive effect of importance, and any uncertainty that existed in model selection referred only to the question of whether there was an additional negative effect of autonomy support.
Table 4: Results of the Model Evaluation Analyses for the Personality Trait Extraversion.

<table>
<thead>
<tr>
<th>95% Confidence set of models</th>
<th>$w$</th>
<th>$b_1$ ($SE$)</th>
<th>$b_2$ ($SE$)</th>
<th>$b_3$ ($SE$)</th>
<th>$b_4$ ($SE$)</th>
<th>$b_5$ ($SE$)</th>
<th>$R^2$ model</th>
<th>$R^2$ predictors</th>
<th>Final conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Competence</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congr. &amp; main effects</td>
<td>0.82</td>
<td>0.16 (.05)</td>
<td>0.16 (.05)</td>
<td>0.46 (.19)</td>
<td>−0.91 (.38)</td>
<td>0.46 (.19)</td>
<td>0.431</td>
<td>0.007</td>
<td>Strong evidence for Congruence and Main Effects Hypothesis.</td>
</tr>
<tr>
<td>Importance of BPN</td>
<td>0.17</td>
<td>0</td>
<td>0.26 (.09)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.428</td>
<td>0.005</td>
<td>Some evidence for mere BPN importance main effects (Importance of Basic Needs Hypothesis)</td>
</tr>
<tr>
<td>Relatedness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congr. &amp; main effects</td>
<td>0.36</td>
<td>0.12 (.05)</td>
<td>0.12 (.05)</td>
<td>0.39 (.16)</td>
<td>−0.78 (.33)</td>
<td>0.39 (.16)</td>
<td>0.428</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>Importance of BPN</td>
<td>0.35</td>
<td>0</td>
<td>0.22 (.09)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.427</td>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td>Full model</td>
<td>0.21</td>
<td>0.14 (.11)</td>
<td>0.25 (.12)</td>
<td>0.61 (.28)</td>
<td>−0.24 (.44)</td>
<td>0.44 (.38)</td>
<td>0.431</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Strict congruence</td>
<td>0.04</td>
<td>0</td>
<td>0</td>
<td>0.25 (.15)</td>
<td>−0.50 (.31)</td>
<td>0.25 (.15)</td>
<td>0.425</td>
<td>0.001</td>
<td></td>
</tr>
</tbody>
</table>

Note: For each analysis, the 95% confidence set of models is provided. $w$ = Akaike weight of the respective model = the model’s likelihood of being the best model in the set. Regression coefficients $b_1$ to $b_5$ refer to the full polynomial model $P = b_0 + b_1S + b_2I + b_3S^2 + b_4SI + b_5I^2$; $SE$ = standard errors; $R^2$ model = $R^2$ of the respective model; $R^2$ predictors = $R^2$ accounted for by the predictor variables (without personality at T1). Strict congruence = strict congruence model; Importance of BPN = importance of basic needs only model; Congr. & main effects = congruence and main effects model. The final conclusions were drawn after considering the area of data, interpreting the full model if included in the confidence set, and identifying common effects of the models in the confidence set.
Table 5: Results of the Model Evaluation Analyses for the Personality Trait Openness to Experience.

<table>
<thead>
<tr>
<th>95% Confidence set of models</th>
<th>w</th>
<th>$b_1$ (SE)</th>
<th>$b_2$ (SE)</th>
<th>$b_3$ (SE)</th>
<th>$b_4$ (SE)</th>
<th>$b_5$ (SE)</th>
<th>$R^2$ model</th>
<th>$R^2$ predictors</th>
<th>Final conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative discrepancy</td>
<td>0.87</td>
<td>-0.18 (.07)</td>
<td>0.25 (.08)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.348</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Importance of BPN</td>
<td>0.12</td>
<td>0</td>
<td>0.18 (.08)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.344</td>
<td>0.003</td>
<td></td>
</tr>
<tr>
<td>Competence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relatedness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative discrepancy</td>
<td>0.50</td>
<td>-0.17 (.07)</td>
<td>0.21 (.08)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.345</td>
<td>0.005</td>
<td>Negative Effect of Discrepancy Hypothesis</td>
</tr>
<tr>
<td>Full model</td>
<td>0.35</td>
<td>-0.10 (.10)</td>
<td>0.29 (.10)</td>
<td>0.25 (.29)</td>
<td>0.31 (.42)</td>
<td>0.21 (.41)</td>
<td>0.348</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Strict congruence</td>
<td>0.06</td>
<td>0</td>
<td>0</td>
<td>0.22 (.14)</td>
<td>-0.44 (.28)</td>
<td>0.22 (.14)</td>
<td>0.342</td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td>Importance of BPN</td>
<td>0.05</td>
<td>0</td>
<td>0.11 (.08)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.342</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Null model</td>
<td>0.04</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.340</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

Note: For each analysis, the 95% confidence set of models is provided. $w = \text{Akaike weight of the respective model} = \text{the model's likelihood of being the best model in the set}$. Regression coefficients $b_1$ to $b_5$ refer to the full polynomial model $P = b_0 + b_1S + b_2I + b_3S^2 + b_4SI + b_5I^2; SE = \text{standard errors}; R^2\text{ model} = R^2\text{ of the respective model}; R^2\text{ predictors} = R^2\text{ accounted for by the predictor variables (without personality at T1)}$. **Negative Discrepancy** = negative effect of discrepancy model. **Importance of BPN** = importance of basic needs only model; **Strict congruence** = strict congruence model. The final conclusions were drawn after considering the area of data, interpreting the full model if included in the confidence set, and identifying common effects of the models in the confidence set.
For competence, the Full Model did not explain a significant amount of variance in openness at T2 beyond the amount explained by openness at T1; importance of competence support, perceived competence support, and their quadratic and interaction terms did not significantly predict change in openness.

The confidence set for relatedness includes the Null Model, indicating a careful interpretation of the results as the power of the models to explain variation in the development of openness might be rather small. Again, the Negative Effect of Discrepancy Model was favored, but substantial evidence for the full model was also provided. In line with the findings of autonomy, strong evidence for the Negative Effect of Discrepancy model suggests a negative effect of the directed discrepancy of relatedness support and importance of relatedness. The Full Model provided even more evidence for this negative effect of discrepancy but indicated that, in addition, openness increased most for people whose importance and support levels were both either very low or very high. There was also very little, thus, rather negligible evidence for a congruence effect, and for a mere main effect of relatedness importance. In summary, the Negative Effect of Discrepancy Hypothesis was received most evidence in the data.

Agreeableness
All models in the confidence set for autonomy indicate a positive linear main effect of the importance of autonomy support on change in agreeableness. Both the Importance and Support Model and the Congruence and Main Effects Model provided evidence for an additional positive effect of autonomy support, and the latter also indicated a negative effect of congruence with little evidence.

Regarding competence, it was again the Importance of Basic Needs Model that gained high evidence in the confidence set. The Full Model had only little evidence in the data. Both the Importance of Basic Needs Model and the Full Model indicated that when the importance of competence support was higher at T1, agreeableness subsequently increased more.

With respect to relatedness, the Importance of Basic Needs Model was clearly the best model out of the alternatives, indicating that higher importance of relatedness at T1 was positively associated with change in agreeableness subsequently.

Conscientiousness
For autonomy, all models in the confidence set provided the most evidence for a positive effect of importance of autonomy on subsequent change in conscientiousness (Importance of Basic Needs Hypothesis). Again, the Congruence and Main Effects Model provides tentative evidence for an additional positive effect of the experienced autonomy support as well as a negative effect of congruence.

Regarding competence, all models in the confidence set again provided evidence for a positive effect of importance of competence. The most evidence was again added by the Congruence and Main Effects Model, suggesting an additional positive effect of perceived competence support and a negative effect of congruence. The Full Model additionally indicated that the positive effect of importance might be stronger for higher importance levels than for lower levels and that the effect might be much stronger for people with low levels of competence support than for people with medium to high levels of competence support.

With respect to relatedness, the confidence set was identical to the confidence set for autonomy, that is, the most evidence was provided for a positive effect of importance of relatedness on change in conscientiousness. Some evidence for the Congruence and Main Effects Model again pointed to an additional positive effect of relatedness support and a negative effect of congruence.

We reran the analyses with controlling for the different vocational groups. However, the overall conclusion drawn from the confidence sets never changed.

Discussion
In this longitudinal study, our goal was to test contextual environmental factors on personality development in the important context of a person’s first job in emerging adulthood. To do so, we assessed 1,886 emerging adults in the major environmental context of their first job with respect to their individual psychological perceptions of BPN support and the level of importance they attached to BPN support in their work context. On the basis of theory and research, we evaluated three sets of hypotheses represented by models describing possible effects of BPN support and importance attached to BPN support on personality change 1.5 years later.

In assessing environmental contexts from a psychological perspective, we followed recent arguments to take steps toward a more psychologically oriented understanding of individuals’ perceptions of the environmental contexts associated with personality change (e.g., Bleidorn, 2015). By utilizing the framework of BPN to psychologically describe environmental contexts, we joined two important lines of research to further understand interindividual differences in feelings, thoughts, and behavior: personality development research and self-determination theory (Deci & Ryan, 2008). In the following, we briefly summarize the results and describe the overall picture that is painted by the findings of the model comparisons, discuss the results, and refer to important implications and limitations for theory and future research.

Personality Development and BPN Support—Different Trait, Different Model
Contrary to previous studies, the emerging adults working at their first job decreased in all of the Big Five personality traits and, thus, they did not develop according to the maturity principle in the first 1.5 years of their first job experience (Deventer et al., 2019). This is a surprising finding because the context of a person’s first job has been associated with development toward more emotional stability, agreeableness, and conscientiousness (e.g., Lodi-Smith & Roberts, 2007; Specht et al., 2011). However, previous studies confirming the maturity principle have mostly covered longer time periods (e.g., Lucas &
Table 6: Results of the Model Evaluation Analyses for the Personality Trait Agreeableness.

<table>
<thead>
<tr>
<th>95% Confidence set of models</th>
<th>$w$</th>
<th>$b_1$ (SE)</th>
<th>$b_2$ (SE)</th>
<th>$b_3$ (SE)</th>
<th>$b_4$ (SE)</th>
<th>$b_5$ (SE)</th>
<th>$R^2$ model</th>
<th>$R^2$ predictors</th>
<th>Final conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance &amp; Support</td>
<td>0.37</td>
<td>0.11 (.08)</td>
<td>0.22 (.08)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.353</td>
<td>0.008</td>
<td>Importance of Basic Needs Hypothesis.</td>
</tr>
<tr>
<td>Importance of BPN</td>
<td>0.35</td>
<td>0</td>
<td>0.27 (.08)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.352</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Congr. &amp; main effects</td>
<td>0.26</td>
<td>0.16 (.05)</td>
<td>0.16 (.05)</td>
<td>0.03 (.18)</td>
<td>-0.05 (.35)</td>
<td>0.03 (.18)</td>
<td>0.353</td>
<td>0.008</td>
<td>Some evidence for positive effect of autonomy support and of congruence between autonomy importance and support</td>
</tr>
<tr>
<td>Competence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance of BPN</td>
<td>0.85</td>
<td>0</td>
<td>0.33 (.08)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.356</td>
<td>0.010</td>
<td></td>
</tr>
<tr>
<td>Full model</td>
<td>0.15</td>
<td>-0.18 (.09)</td>
<td>0.39 (.09)</td>
<td>-0.43 (.28)</td>
<td>0.11 (.41)</td>
<td>-0.12 (.36)</td>
<td>0.358</td>
<td>0.013</td>
<td></td>
</tr>
<tr>
<td>Relatedness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance of BPN</td>
<td>0.99</td>
<td>0</td>
<td>0.39 (.08)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.360</td>
<td>0.015</td>
<td></td>
</tr>
</tbody>
</table>

Note: For each analysis, the 95% confidence set of models is provided. $w$ = Akaike weight of the respective model = the model’s likelihood of being the best model in the set. Regression coefficients $b_1$ to $b_5$ refer to the full polynomial model $P_2 = b_0 + b_1 S + b_2 I + b_3 S^2 + b_4 SI + b_5 I^2$; $SE$ = standard errors; $R^2$ model = $R^2$ of the respective model; $R^2$ predictors = $R^2$ accounted for by the predictor variables (without personality at T1). Importance & Support = linear effects of basic needs support and importance of basic needs support. Importance of BPN = importance of basic needs only model; Congr. & main effects = congruence and main effects model. The final conclusions were drawn after considering the area of data, interpreting the full model if included in the confidence set, and identifying common effects of the models in the confidence set.
Table 7: Results of the Model Evaluation Analyses for the Personality Trait Conscientiousness.

<table>
<thead>
<tr>
<th>95% Confidence set of models</th>
<th>w</th>
<th>$b_1$ (SE)</th>
<th>$b_2$ (SE)</th>
<th>$b_3$ (SE)</th>
<th>$b_4$ (SE)</th>
<th>$b_5$ (SE)</th>
<th>$R^2$ model</th>
<th>$R^2$ predictors</th>
<th>Final conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance of BPN</td>
<td>0.84</td>
<td>0</td>
<td>0.34 (.08)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.338</td>
<td>0.010</td>
<td></td>
</tr>
<tr>
<td>Congr. &amp; main effects</td>
<td>0.16</td>
<td>0.19 (.05)</td>
<td>0.19 (.05)</td>
<td>0.21 (.20)</td>
<td>−0.42 (.40)</td>
<td>0.21 (.20)</td>
<td>0.338</td>
<td>0.010</td>
<td>Conclusive evidence for Importance of Basic Needs Hypothesis.</td>
</tr>
<tr>
<td>Competence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congr. &amp; main effects</td>
<td>0.61</td>
<td>0.16 (.05)</td>
<td>0.16 (.05)</td>
<td>0.43 (.16)</td>
<td>−0.86 (.32)</td>
<td>0.43 (.16)</td>
<td>0.339</td>
<td>0.010</td>
<td></td>
</tr>
<tr>
<td>Importance of BPN</td>
<td>0.24</td>
<td>0</td>
<td>0.28 (.08)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.337</td>
<td>0.008</td>
<td>Essential evidence for the Congruence and Main Effects Hypothesis.</td>
</tr>
<tr>
<td>Full model</td>
<td>0.16</td>
<td>0.06 (.11)</td>
<td>0.20 (.11)</td>
<td>0.03 (.28)</td>
<td>−1.02 (.49)</td>
<td>0.68 (.36)</td>
<td>0.341</td>
<td>0.012</td>
<td></td>
</tr>
<tr>
<td>Relatedness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance of BPN</td>
<td>0.86</td>
<td>0</td>
<td>0.39 (.08)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.343</td>
<td>0.014</td>
<td></td>
</tr>
<tr>
<td>Congr. &amp; main effects</td>
<td>0.14</td>
<td>0.21 (.05)</td>
<td>0.21 (.05)</td>
<td>0.22 (.17)</td>
<td>−0.45 (.34)</td>
<td>0.22 (.17)</td>
<td>0.342</td>
<td>0.014</td>
<td></td>
</tr>
</tbody>
</table>

Note: For each analysis, the 95% confidence set of models is provided. $w = $ Akaike weight of the respective model = the model's likelihood of being the best model in the set. Regression coefficients $b_1$ to $b_5$ refer to the full polynomial model $P_j = b_0 + b_1S + b_2I + b_3S^2 + b_4SI + b_5I^2 + b_6P_1$; SE = standard errors; $R^2$ model = $R^2$ of the respective model; $R^2$ predictors = $R^2$ accounted for by the predictor variables (without personality at T1). Importance of BPN = importance of basic needs only model; Congr. & main effects = congruence and main effects model. The final conclusions were drawn after considering the area of data, interpreting the full model if included in the confidence set, and identifying common effects of the models in the confidence set.
Donnellan, 2011; Neyer & Asendorpf, 2001) whereas studies with shorter time spans elaborated on comparable results (e.g., Deventer et al., 2019; Leikas & Salmela-Aro, 2015; Milojčev & Sibley, 2017). Regarding the effect of BPN support and the importance of BPN support on subsequent personality change, almost identical results for autonomy, competence, and relatedness were revealed for a given personality trait. However, the patterns differed across the Big Five traits.

For change in emotional stability and change in extraversion, we found nearly conclusive evidence for positive main effects of BPN support and BPN importance, and also evidence for an additional effect of congruence. That is, both higher BPN support in the job environment and higher importance attached to this support as well as incongruence between the two were indicated to be essential for increases in emotional stability and extraversion. A similar pattern held for conscientiousness with essential evidence for a mere main effect of BPN importance. Specifically, emerging adults reporting a high importance of BPN support at the beginning of their job subsequently increased more in conscientiousness. Agreeableness differed such that only main effects—especially the importance of BPN support—seemed to be meaningful. Openness constituted a special case in which only the Negative Effect of Discrepancy Model gained evidence. The emerging adults were shown to increase more in openness the more they perceived their BPN support, whereas individuals decreased in openness when their BPN support exceeded their BPN importance.

Overall, when considering results for all five personality traits, we found essential evidence for (mostly positive) main effects of BPN support and of BPN importance (category of main effects hypotheses). They were often combined with a negative effect of congruence (category of congruence effect hypotheses). Also, we found some specific negative discrepancy effects on openness development (category of discrepancy hypotheses). In the following, we will discuss the findings in more detail.

Support, importance, and congruence—their theoretical value for understanding personality development

In line with theoretical assumptions and previous research, BPN support was positively or negatively associated with increases in personality. However, in most analyses, we found strong evidence that the importance the emerging adults ascribed to BPN support was also relevant for increases in personality. We even found some evidence that importance alone could explain variation in personality change. Thus, our study showed that both perceived BPN support at a person's first job and individuals' needs, goals, or requirements are important for personality change. Conceptually, one might propose that the meaningfulness of the importance of BPN support for personality change only originated in an initially close relationship between personality traits and the importance individuals attach to needs. That is, the level of importance attached to BPN support might be a result of personality. However, because initial correlations between importance attached to BPN support and the personality traits ranged between $0.13 \leq r \leq 0.30$, it can be reasoned that the importance of BPN support can be considered informative to personality development above and beyond personality.

Thus, the present study reinforces theoretical assumptions regarding personal or social goals and norms as driving factors to achieve a desired outcome by means of self-regulated behavior (e.g., Denissen et al., 2013; Hennecke et al., 2014). As an implication, future theory and research on personality development should further investigate environmental contexts from a psychological perspective, including personal goals, values, or the level of importance attached to the respective context (e.g., Rauthmann et al., 2014).

Further, incongruence between BPN support and the importance of BPN support was associated with more increases in the respective personality traits than congruence. Roberts and Robins (2004) found that initial congruence between the person and the aggregated collective perception of the environment were associated with changes toward reinforcing this fit. Transfering the findings of their study, emerging adults in our study whose goals or needs were initially congruent with the aggregated perception of the shared environment (e.g., the job context) might have subsequently reinforced their personalities toward PE fit. If this thesis held, it would allow for conclusions on the VET environment. That is, fitting the environment of the first job in VET might mean to be less emotionally stable, less extraverted, less open, less agreeable, and less conscientious. However, this daring thesis lacks any basis or rationale and would therefore need further investigation in future research. Also, both selection and socialization effects might have played a role such that experiencing incongruence between the importance of BPN support and perceived BPN support drove subsequent adjustment to the context which would support the selection and transformation aspects of the ASTMA model (e.g., Denissen, Ulferts, Lüdtke, Muck, & Gerstorf, 2014; Roberts, 2006). To conclude, even though higher PE fit was reported to be associated with specific behavioral and emotional aspects (e.g., Greguras & Diefendorff, 2009; Hoffman & Woehr, 2006; Kristof-Brown et al., 2016), it does not seem to be associated with personality maturation in the context of the first 1.5 years in the working environment.

The special case of openness

Openness to experience constitutes a special case in the interplay of BPN support, importance of BPN support, and personality change. There was strong evidence for the Negative Effect of Discrepancy Hypothesis for openness, indicating that when the importance of BPN support exceeded perceived BPN support, the decreases in openness were smaller, and the more BPN support exceeded BPN importance, the more decreases in openness were observed. However, only a very small amount of variance could be explained. This finding goes counter to assumptions of BPNT, postulating that the satisfaction of needs should be associated with aspects of well-being (e.g., Deci & Ryan, 2000), which in turn have been associated with higher openness (e.g., Hill, Turiano, Mroczek, & Roberts, 2012; Soto, 2015; Steel, Schmidt,
Shultz, 2008). Nevertheless, the associations between aspects of well-being and subsequent change in openness in these studies were not as strong as for other personality traits. Both previous and the current findings indicate that changes in openness to experience unfold differently than they do for the other traits. Future research will need to address the processes and mechanisms that are specifically related to the development of openness to experience.

Personality development and the explanatory power of BPN

Despite the clear findings on the interplay of BPN support, the importance of BPN support, and personality change, it is important to note that the models explained only 26% (emotional stability), ≈34% (openness, agreeableness, conscientiousness), and 43% (extraversion) of the variance in personality traits at T2. Thereby, only 1% of the explained variance could be consistently attributed to the predictor variables, leaving the remainder to personality stability. Thus, the importance of BPN support and perceived BPN support in the context of an emerging adult’s first job do play a role but a rather small one in explaining personality change. However, small effects of predictors that account for personality change are common in personality development research (Ahadi & Diener, 1989; Neyer & Asendorpf, 2001). Nevertheless, we believe this study adds important information to the current debate on the environmental factors that drive personality development in emerging adulthood.

Limitations and Outlook

Our study is one of the first to test environmental factors from a psychological perspective on subsequent personality change and thereby contributes to knowledge in personality development research. However, some features of our study can be improved in future research.

First, even though the study was conducted with a large sample of emerging adults in their first job, future studies will need to replicate the findings with samples that are balanced with respect to gender and industry branch, and that include young adults with different life paths. As Roberts and Robins (2004) indicated, it is likely that emerging adults experiencing PE fit will reinforce the attributes that constitute the fit between their personal desires, needs, and goals and the features of the environmental context. Special attention should be drawn to the sample. The present sample was derived from science based VET programs suggesting specific vocational interest profiles that have been shown to correlate with personality and cognitive abilities (Ackerman & Heggestad, 1997; De Fruyt & Mervielde, 1997; Wille & De Fruyt, 2014). It is therefore of special interest to replicate the findings with emerging adults from diverse vocational tracks to rule out potential self-selection effects.

Second, by utilizing the BPNT framework, we approached the psychological assessment of the environmental context from a new perspective, thus highlighting the interplay between BPN support and the importance of BPN support in the job context. Thus, future research could address or include potential alternatives for assessing environmental contexts (e.g., DIAMONDS; Rauthmann et al., 2014), but it should also investigate the processes and mechanisms that drive personality development. In this regard, experience sampling studies such as daily diary approaches (Allemand & Mehl, 2017; Mehl & Conner, 2012; Wrzus & Mehl, 2015) for assessing sequential changes in the environment might be useful (e.g., Wrzus & Roberts, 2017). In order to learn more about the longitudinal processes, it might be useful to first investigate the longitudinal development of BPN, and to second, investigate the longitudinal reciprocal interplay between psychological descriptions of the environment (e.g., BPN) and personality change to also obtain an understanding of how personality longitudinally predicts BPN support as well as the importance of BPN support.

Third, even though the BPN are considered distinct factors that should each contribute substantially to behavioral and emotional outcomes from a theoretical and empirical point of view (e.g., Deci & Ryan, 2000, 2008; Neubauer & Voss, 2016) it is striking that the correlations between the BPN are rather high. This might suggest an underlying common factor of need support. Thus, future research might want to further investigate whether a common BPN factor is useful to consider from an analytical point of view. As this study was driven by theoretical considerations, implying the distinct usefulness of autonomy, competence, and relatedness as stated in self-determination theory (Deci & Ryan, 2000), we decided to present the results for all three BPN dimensions instead of a common support factor (see also Volodina, Lindner, & Retelsdorf, 2019).

Fourth, when studying determining factors of personality development both the time lag and the number of measurement bursts are important as they determine the type of change that can be observed (Luhmann, Orth, Specht, Kandler, & Lucas, 2014). In this regard, our study adds on previous research demonstrating significant personality change in shorter research intervals of about one to two years (e.g., Bleidorn, 2012; Zimmermann & Neyer, 2013). However, additional measurement points would be interesting to study long-term processes and to replicate the patterns across longer periods of time with multiple measurement points and possibly a dynamic RSA approach.

Fifth, from a methodological perspective, we followed the established procedure to achieve commensurability between the scales on which the two predictors were measured. Nevertheless, it remains challenging to adapt two different scales to a psychologically commensurable range. Ideally, future research should assess the constructs of interest on the same scale.

Conclusion

In the present study, we applied the BPNT framework to personality development research in describing the important environmental context of an emerging adult’s first job from a psychological perspective. We found that both importance of basic needs and perceived needs support, and also their degree of (in)congruence were relevant to explain interindividual differences in personality change. Future research might build on our research by assessing environmental contexts from individuals’ psychological perspectives. Replications using the basic psychological needs framework and the
DIAMONDS framework should be conducted (Rauthmann et al., 2014) and can be extended from situational descriptions to broader contexts. Daily assessments might be especially useful for gaining more knowledge of the mechanisms that underlie environmental contexts associated with personality change.

**Data Accessibility Statement**
Data material can be found on this paper’s project page [https://osf.io/h54a2/].

**Notes**
1. To support readability, we will speak of emotional stability instead of neuroticism. Thus, when we refer to previous findings, we present the results in the direction of emotional stability.
2. To support readability, we will speak of personality change in the following presentation of hypotheses. However, it is important to keep in mind that the outcome variable of interest is personality at T2 controlled for initial personality.
3. Thereby, two preconditions have to be fulfilled. First, the predictor scales have to be commensurable in order to ensure that comparing individuals’ scores on these variables is theoretically meaningful. In order to achieve commensurability between BPN support and the importance of BPN support, we followed the two-step proportion of maximum scaling (POMS) procedure (Little, 2013; Moeller, 2015) resulting in both scales ranging from 0 to 1. The advantage of the POMS scaling procedure is that the absolute distances between the scale responses are maintained. Second, data must be distributed such that there are sufficient discrepant predictor pairs (e.g., Shanock, Baran, Gentry, Pattison, & Haggstedt, 2010). We z-standardized the “POMS” scaled predictors and determined the number of participants whose score on one predictor variable was one standard deviation above or below their score on the other predictor (see Supplemental Material A2 for results; Shanock et al., 2010). The results indicated sufficient discrepant predictor pairs.
4. Following the argumentation and rationale presented by Humberg et al. (in press) we considered the log likelihood (LL) of two nested models to be essentially the same when the algebraic difference between the two LLs was smaller than 1. When holding the number of parameters constant, a LL difference of 1 corresponds to an AICc difference of 2 which is often interpreted in the way that the two models offer comparably good representations of the data (e.g., Symonds & Moussali, 2011).

**Additional File**
The additional file for this article can be found as follows:

- **Supplemental Material.** Testing Competing Hypotheses on the Interplay of Importance and Support of the Basic Psychological Needs at Work and Personality Development with Response Surface Analyses. DOI: https://doi.org/10.1525/collabra.214.s1

**Competing Interests**
The authors have no competing interests to declare.

**Author Contributions**
- Contributed to conception and design: Deventer, Humberg, Lüdtke, & Wagner
- Contributed to acquisition of data: Nagy & Retelsdorf
- Contributed to analysis and interpretation of data: Deventer, Humberg, Lüdtke, & Wagner
- Drafted and/or revised the article: Deventer, Humberg, Lüdtke, Nagy, Retelsdorf, & Wagner
- Approved the submitted version for publication: Deventer, Humberg, Lüdtke, Nagy, Retelsdorf, & Wagner

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