Allow me to be an intrapreneur.

How does autonomy misfit, together with psychological safety in a team, contribute to intrapreneurial behaviour?

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1. Introduction

1.1 Background & context

In today's world, organisations need to stay ahead of their competition. To do so, they need to remain and gain a competitive advantage over their competition. Already in 1986 Tushman & Nadler stressed that "organisations can gain competitive advantage only by managing effectively for today while simultaneously creating innovation for tomorrow". Innovativeness is a key differentiator for organisations to thrive in this competitive world. A pressing problem for managers is to ensure sustained innovation (Tushman & Nadler, 1986). Years later managers still tend to be myopic, untrained, or constrained by lack of experience (Braganza et al., 2009). It is up to managers to ensure organisations innovate and cope with the changing environment.

A way for organisations to achieve sustained innovation is to promote intrapreneurship. Intrapreneurship is a bottom-up process of recognising and exploiting opportunities by being innovative, proactive and taking risks (de Jong et al., 2015; Elert & Stenkula, 2020; Gawke et al., 2019; Neessen et al., 2019). It argues that intrapreneurial employees self-start initiatives. As it are these employees who are aware of external trends and events.

Intrapreneurial employees contribute to the competitive advantage of an organisation. Intrapreneurs are becoming an important factor to innovation and economic growth (Elert & Stenkula, 2020; Gawke et al., 2019). To be an intrapreneur, employees should display different behaviours. According to Bowen (2016) employees should not be passive recipients of changing jobs and products. They need to adapt to roles as innovators and differentiators. Adopting a more intrapreneurial way of working is required for employees. It allows them to deal with or even start changing requirements. As such, impacting the strategic direction of a firm (Peters & Waterman, 1984).

1.2 Problem statement

In an organisation not all employees will behave as intrapreneurs. Neessen et al. (2019) stated, in their systematic literature review, that employee autonomy influences the intrapreneur. On that same note, de Jong et al. (2015) found that job autonomy relates to innovative and proactive behaviour. Both sub-dimensions of intrapreneurial behaviour. Underlying premise in the research of de Jong is that job autonomy is provided by the organisation. Yet, this is only part of the story. Although an environment provides a certain level of characteristics, it can be questionable whether this will engage the employee into certain behaviour. Autonomy, for example, can be given by an organisation, but some employees will thrive in it and others will be unhappy. It is

generally assumed that a fit should exist between the characteristics desired by an employee and provided by an organisation (Lambert et al., 2003; van Vianen, 2018).

An increase in autonomy has proved to be beneficial for subjective well-being and work efficiency. Still, it does have a tipping point. Both Zhou (2020) and Stiglbauer & Kovacs (2018) discovered a "too-much-of-a-good-thing" effect occurred when autonomy exceeded the threshold of an individual. Resulting into a sharp decrease in subjective well-being. Following the model of Job Demands-Resources, autonomy can be perceived as a resource for an individual or a demand. Many researches has looked into the various perspectives of job autonomy (Jong & Ford, 2021; Simmering et al., 2003; Sørlie et al., 2022; Yu & Davis, 2016). Yet, no prior research has investigated the topic of autonomy (mis)fit and its influences on intrapreneurial behaviour. A gap in academic literature that this research attempts to fill.

Although people have an innate need to fit to their environment, a perfect fit seldom exists (van Vianen, 2018). Meaning that most individuals and organisations will experience misfit. Misfits are not necessarily bad. Experiencing misfit will lead individuals to adapt to their situation (van Vianen, 2018). Understanding the effect of adaptation, in the case of autonomy misfit, towards intrapreneurial behaviour can help organisations to influence intrapreneurship in their organisation.

Intrapreneurial behaviour is often measured on individual level. Yet, the act of getting intrapreneurial outcomes is often a team effort. Team members have to work and learn collaboratively to achieve desired outcomes (Edmondson & Lei, 2014). In times of uncertainty and collaboration, psychological safety has shown to enhance the performance of the team (Edmondson & Lei, 2014; Frazier et al., 2017; Newman et al., 2017). Psychological safety is a shared belief held by members of a team that the team is safe for interpersonal risk raking (Edmondson, 1999). Teams with high levels of psychological safety take more risks, share more information, seek more feedback, and perform better. Having a positive influence on innovation, process improvements, knowledge creation, and successful technology implementations (Edmondson, 1999; Edmondson & Lei, 2014; Frazier et al., 2017; Newman et al., 2017).

Both autonomy fit and misfit has shown to influence dimensions of intrapreneurial behaviour. Yu & Davis (2016), for example, showed that autonomy misfit leads to higher levels of proactivity. In case of autonomy fit, psychological safety has influenced creativity, risk taking, and motivation to engage in learning (Choo et al., 2007). Given these findings, psychological safety might influence the effects of autonomy (mis)fit in relation with intrapreneurial behaviour.

Summarising, autonomy has been researched as a contributing factor to intrapreneurship in various researches. Yet, none of these consider the personal needs for autonomy. Different forms of experienced misfits can have different effects on intrapreneurial behaviour. Additionally, a psychological safe team can moderate the effect of misfit on intrapreneurial behaviour. This study

researches these various perspectives to raise answers and new questions.

1.3 Academic & practical relevance

In current academic literature not much is known about the relation and effects of autonomy (mis)fit, psychological safety, and intrapreneurial behaviour. Although the elements on their own have been subject of many researches, the trilogy of these elements have not been examined. The contribution of this research as such is multifold.

1.3.1 Academic relevance

The contribution of this paper to the academics is twofold. First, a recurring question in the field of intrapreneurship is the influence of teams on intrapreneurial behaviour (de Jong et al., 2015; Neessen et al., 2019). The answers of this research contribute to the field by displaying if and how the team affects intrapreneurial behaviour of an individual. Specifically, if a psychological safe team environment acts as a catalyst or as a coping mechanism in the case of autonomy (mis)fit for the individual. Secondly, this also answers a question raised by van Vianen (2018): “which environmental and individual factors mitigate experienced misfits?”. In the case of this research the question is if psychological safety mitigates the experienced autonomy misfit.

Two types of misfit exist. By using polynomial regression analysis and the accompanying surface response analysis the type of misfit can be determined. Investigating the both types of misfit is important. Misfit can be either an excess (having too much of it) or a deficiency (having too less of it). Prior research shows that an excess of misfit can have different outcomes then a deficient misfit Vogel et al. (2016).

1.3.2 Practical relevance

Organisations has shown to benefit from innovation and other means of gaining competitive advantage (Elert & Stenkula, 2020; Peters & Waterman, 1984). Ensuring sustained innovation is a pressing problem for managers (Tushman & Nadler, 1986). Attracting, retaining, and growing intrapreneurs in the organisation is a vivid question for organisation. This research aims to show whether or not autonomy (mis)fit and/or psychological safety is beneficial to increase intrapreneurial behaviour of employees. Especially for organisations that are active in the field of software development, the context of this research. These insights could lead to adoption of recruitment strategies by selecting adaptable minds that can cope with misfit between levels of needs and supplies of autonomy (van Vianen, 2018; Yu & Davis, 2016).

Besides providing advice & insights to the attraction and selection of employees, this research tries to contribute to the field of job design. de Jong et al. (2015) already showed that job autonomy is an influencing factor to entrepreneurial behaviour. However, in that research employees are seen as an homogeneous group. This research attempts to complement that insight by acknowledging the personal needs of autonomy compared to what is supplied. This additional knowledge can help organisations to develop strategies and mechanisms to smartly design their jobs to promote and enhance intrapreneurship for different individuals.

1.4 Method of research

The study follows a quantitive design to analyse correlating effects between the variables. A diary study is the primary method to collect the data. Software development teams filled in a daily questionnaire for 10 consecutive working days. Prior to the daily surveys participants filled in a baseline (T0) survey. Following the dailies a reflective survey (T1) is filled in by participants and their supervisors. The resulting data is analysed using polynomial regression analysis and visualised in the tree-dimensional images using surface response modelling.

2. Literature research

The theoretical framework of this study is centred around the key concepts discussed in the problem statement. The concepts are further detailed and explained using literature study. A visual model of this study can be seen in fig. 1.

2.1 What is intrapreneurship & intrapreneurial behaviour?

"Intrapreneurship is a process whereby employee(s) recognise and exploit opportunities by being innovative, proactive and by taking risks, in order for the organisation to create new products, processes and services, initiate self-renewal or venture new businesses to enhance the competitiveness and performance of the organisation (Neessen et al., 2019)". In academic literature "intrapreneurship" usually refers to individual workers rather than organisations or boardroom-level decision makers (de Jong et al, 2011). This thesis adopts this points of view that intrapreneurship is a bottom-up approach (de Jong et al, 2011; Neessen et al., 2019). Some literature uses intrapreneurship as a synonym to corporate entrepreneurship (de Jong et al, 2011). However, both terms are distinct concepts. In line with de Jong et al (2011) this thesis regards corporate entrepreneurship as a top-down process that can be used by business owners and general managers to foster new ventures, innovation, and strategic renewal.

Characteristically, intrapreneurship should be seen as a process. Intrapreneurship "is about a set of activities of an individual or an organisation to get from point A to point B in time, with an increased competitiveness and performance of the organisation as the end goal (Neessen et al., 2019)". This definition shows that intrapreneurship is not simply a behaviour of an individual or an organisation, but rather a complex construct of various activities. The framework makes a clear distinction between organisational and individual constructs. For example, the managerial support or organisational structure influences intrapreneurship. Attitudes and characteristics of individuals likewise influence intrapreneurship by impacting the behaviour of individuals. When individuals behave intrapreneurially it will lead to outcomes as new product / innovation, new business venturing, or self-renewal (Neessen et al., 2019).

The framework of Neessen et al. (2019) displays intrapreneurship as the sum of intrapreneurial behaviour and corporate entrepreneurship. The dimensions of intrapreneurial behaviours are defined as proactivity, innovativeness, risk-taking, opportunity recognition and exploitation, and networking. A review of Gawke et al. (2019) found three prominent conceptualisations of employee intrapreneurship in academic literature. Intrapreneurship can be seen as the employees participation in organisation's intrapreneurial pursuits (the intrapreneurial outcomes approach), the contribution of employee activities to strategic renewal and new ventures of an organisation

(the behaviour-based approach) or as the employees' entrepreneurial orientation. This entrepreneurial orientation is conceptualised as the tendency toward innovativeness, risk taking and personal initiative. This last conceptualisation is commonly accepted in the literature to measure intrapreneurial behaviour (de Jong et al, 2011; Gawke et al., 2019; Neessen et al., 2019; Stam et al., 2012). As we are primarily concerned with the behaviour of an individual and not the outcomes of that behaviour, this research follows the entrepreneurial orientation by adopting the view point of de Jong et al (2011) on intrapreneurial behaviour. These authors describe intrapreneurial behaviour "as the identification and exploitation of opportunities by individual workers that (also) advance the organisation".

2.2 The role of autonomy

Labor market conditions are changing. Rapid technological progress, increased employee tenure, a rise in high-skilled job, and request for more flexibility all indicate an increased need for autonomy (Stiglbauer & Kovacs, 2018). Companies are advised to grant employees a greater span of control in order to leverage digital technologies and employee's expertise (Muecke & Iseke, 2019). As autonomy is becoming a more prominent work characteristic it can be of value to further investigate its relationship with intrapreneurial behaviour.

Autonomy is an influencing factor for intrapreneurial behaviour (Neessen et al., 2019). Giving employees the freedom to design its own work and make decisions results into more intrapreneurial activities and higher levels of self-efficacy (Neessen et al., 2019). On that same note de Jong et al. (2015) found that job autonomy leads to higher levels of intrapreneurial behaviour, especially on its innovation and proactivity dimensions.

However, Gerards et al. (2021) states that the positive relation between autonomy and intrapreneurial behaviour is ambiguous. One stream states that autonomy has shown to influence intrapreneurial behaviour thru the mediating effect of a transformational leadership style (Gerards et al., 2021). Another stream states that employees will be reluctant to show initiative when organisations and leaders emphasise efficiency and flawlessness, even when given autonomy (Jung et al., 2003; Yukl, 2001). Additionally, both autonomy and innovative behaviour have shown meaningful variability on daily basis (Zacher & Wilden, 2014). On days of perceived high autonomy employees are more likely to generate novel ideas, proactively tackle work-related problems and be more inclined to innovate (Ohly & Fritz, 2010; Orth & Volmer, 2017).

Much of the existing literature researches autonomy from the provisioning aspect of an organisation (e.g. de Jong et al., 2015). These studies see the relation between autonomy and intrapreneurial behaviour thru the lens of job design (see de Jong et al., 2015; Gawke et al., 2019; Rigtering & Weitzel, 2013). Although an organisation offers autonomy, whether the autonomy will

be used will depend per individual. How individuals respond on high levels of autonomy strongly depend upon individual and/or contextual characteristics (Stiglbauer & Kovacs, 2018). Jong & Ford (2021) argues that it is critical to not only examine job autonomy on its own, but to examine the congruence between autonomy and preference for autonomy. The person-environment theory offers a perspective to research this congruence. Seen in simple terms, the needs and supplies of autonomy can be either a fit or a misfit.

Not all individuals will display the same behaviour, even when they are in the same environment. To find possible reasons for this difference a popular theory is Person-Environment fit theory. "Person-Environment fit is generally defined as the compatibility between individuals and their environment (van Vianen, 2018)". The theory suggests that the attitudes, behaviours, and other outcomes, do not result from the person or environment separately, but rather from the relationship between the two (Jong & Ford, 2021). Meaning, if the characteristics of an individual are aligned with those of the environment, it will lead to a certain outcome in behaviour. Person-environment fit theory examines how job attitudes are explained by the fit between individuals and their work situation (Jong & Ford, 2021).

Key assumption of person-environment fit theory is that people have an innate need to fit their environments (van Vianen, 2018). Having a fit allows individuals to better understand the behaviours of others and facilitates interpersonal interactions. They compare themselves with other people in their social environment (van Vianen, 2018). Perfect fit, however, is a rare circumstance. People make suboptimal choices, and individuals and their environments change over time (van Vianen, 2018). A dominant model in current person-environment fit theory is the attraction-selection-attrition (ASA) model from Schneider (1987; Simmering et al., 2003). This model posits that employees are attracted to organisations that provide a high level of fit, are selected by organisations that recognise this fit, and leave the organisation when misfit occurs. This deemphasises the possibility that individuals might change themselves rather then just leave the organisation (Simmering et al., 2003). Although individuals and organisations might strive for fit during attraction and selection, researching misfits might provide organisations with more tangible advise and insights to change their selection strategies, or to help new hires to adopt to their situation.

To answer the main hypothesis in this research the fit concept of needs-supplies is chosen. Needs-supplies fit displays the alignment of the employees needs, desires, or preferences and the supply provided by the job they perform (Kristof-Brown et al., 2005) The reason for this is twofold: 1) autonomy is typically researched in the context of person-job fit (van Vianen, 2018), and 2) needs-supplies fit has the greatest impact on job attitudes (Kristof-Brown et al., 2005). Regarding the effects of (mis)fit two opposing views are prevalent. The affective-consistency based view states that a needs-supplies fit gives rise to positive attitudes, which in turn acts as motivators (Yu & Davis, 2016). The view of self-regulation holds an opposite perspective. Within this view

the core principle of cybernetics is followed that a negative feedback loop is required to get in motion (Edwards, 1992). In other words, there has to be a misfit in order to engage in certain behaviour. The research of Yu & Davis (2016) showed that a misfit of autonomy yields proactive behaviour at an individual, supporting the self-regulatory view.

2.2.1 The affective-consistency based view

Prevalent idea in the affective-consistency based view is that a needs-supplies fit is required in order to be motivated (Yu & Davis, 2016). The view posits that individual experiences of positive work-based emotions, will lead to a person-environment fit. The positive experience leads individuals to adjust or perceive that aspect so that a person-environment fit exists. Likewise, negative emotions would lead a person to be inclined that a misfit exists (Yu, 2009). To illustrate with an example, when an individual has had a good period of work. Having the flexibility to schedule its own day and make its own decisions. This person would likely perceive a fit of autonomy. Now take another individual. This person has not been allowed to schedule its own day and most decisions are made for this person. However, this person used to be able to make own decisions. This individual is likely to perceive a misfit of autonomy.

Many researches has implicitly or explicitly researched this affective-consistency based view. A fit between the autonomy needs and supplies can be viewed from the existing literature that treats autonomy from a job design perspective. Although the person-environment fit is not directly used in this existing research, it does display an underlying assumption that providing autonomy will lead to positive work experiences and as such enhance the perceived fit.

de Jong et al. (2015) found that job autonomy was directly related to the intrapreneurial dimensions of innovativeness and proactiveness. Job autonomy in this research made a difference towards intrepreneurial behaviour. Job performance is also affected by job autonomy. Muecke & Iseke (2019) found that job autonomy leads to better performance as it enhance work motivation and reduces mental strain. In conjunction with high-quality leader-member exchange, job autonomy strengthens the effect of this exchange on creative work. Summarising, job autonomy has been found to have positive outcomes on a variety of perspectives. Yet, underlying in all these positive outcomes is a fit between the autonomy needs and supplies. Meaning, as an individual when I get the right level of autonomy I will show higher levels of intrapreneurial behaviour, compared to those who feel they either lack or have too much autonomy.

Nevertheless, the nature of this research discards the desire to have autonomy in contrast to the autonomy supplied by the organisation. de Jong et al. (2015) for example, already mentioned the limitation that highly intrepreneurial employees may be the ones that obtain high-autonomy functions. This potentially skews it findings.

2.2.2 The self-regulatory view

Core principle of the self-regulating view is its focus on a negative feedback loop. This loop is essential to minimise differences between aspects of the environment and relevant reference criteria of the individual (Edwards, 1992). The core premise is the realisation that an individuals experience leads to a negative effect and consequently leads to an action or intervention to improve. An example provided by Edwards (1992) argues that the experience of stress by an individual has a negative effect on well-being. This leads to negative feelings and kickstarts a coping behaviour to improve that well-being. Just like a thermostat recognising that the temperature is not on the desired level, it triggers the boiler to heat up and get the room to the desired temperature.

Following the self-regulatory view a perceived misfit of autonomy is required to get individuals in motion. Likewise van Vianen (2018) states that experiencing misfit as an individual will lead to adaptation. Depending on the misfit perception, opportunities to repair the misfit, and environmental and individual mitigating factors it might motivate individuals to leave the job or adapt to the situation (van Vianen, 2018). Academic literature holds powerful examples of beneficial misfits. For example, in a study that examines autonomy fit and personal development, Simmering et al. (2003) found that autonomy misfit is essential to create the need for personal development by the individual. Autonomy misfit for newcomers has shown to lead to higher levels of proactive behaviour (Yu & Davis, 2016). Arguing the case for the self-regulatory view of needs-supplies misfit. Consequently, if misfit is required to get people into motion, a needs-supplies fit will lead people to not show intrapreneurial behaviour or less.

The exact nature of misfit might yield to different outcomes. Misfit can either be an excess of supply or be a deficiency of what the individual needs. An individual can be affected by a lack of autonomy (deficiency) or be troubled due to an oversupply of autonomy (excess). Which type of misfit is experienced will make a difference on their impact. Additionally Lambert et al. (2003) showed that not all experienced misfits is of importance for the individual. Meaning, that although there is a misfit, it does not have a consequence on behaviour, attitudes or outcome.

Various studies argue a linear relationship between the deficiency of autonomy and its impact on behaviour. Stiglbauer & Kovacs (2018) showed that deficient misfit had a linear effect on well-being, meaning that any increase from a deficient misfit to fit leads to an equal improvement on well-being. Additionally, the research showed that slight deficiency misfit actually foster employees growth and well-being, confirming the self-regulatory view. In a study of employee's online sharing of knowledge, the authors found an equal linear effect on job autonomy (Pee & Min, 2017).

It is believed that an excess of misfit will do less harm then a deficient misfit (van Vianen, 2018). The research of Yu & Davis (2016) investigated the level of proactivity for newcomers in an organisation,

based on their personal needs for autonomy and what was supplied by the organisation. Here, the authors found that an excess of autonomy misfit lead to higher levels of proactivity compared to fit and deficient misfit. This shows that in case of an excess misfit, meaning more autonomy provided then desired, leads to stronger adoption of the individual to belong in the organisation (Yu & Davis, 2016).

A "too-much-of-a-good-thing" effect exist for autonomy. Zhou (2020) discovered that giving too much autonomy to an individual has a tipping point. When exceeding that tipping point too much of autonomy displayed to be detrimental for the individual. Substantial levels of excess autonomy has shown to decrease an individuals well-being (Stiglbauer & Kovacs, 2018). Zhou (2020) argues that an increase of autonomy leads to a depletion of job resources and consequently the subjective well-being of an individual will decline.

An excess of autonomy therefore is unproblematic, but not indefinitely. At some point the individual will perceive the autonomy as a burden and from that moment negatively impact intrapreneurial behaviour. The effect of excess autonomy on intrapreneurial behaviour is deemed to be curvilinear instead of linear.

Summarising, the affective-consistency based view is centred around autonomy fit. Leading to our first hypothesis:

> Hypothesis 1: (a) Intrapreneurial behaviour will be lower when individual needs and organisational supply are both low and will be higher when both are high; (b) intrapreneurial behaviour will increase as organisational supply of autonomy increases towards individual autonomy need (fit), and will decrease as organisational supply exceeds individual need.

The self-regulatory view assumes individual autonomy needs and organisational autonomy supply need to be incongruent. Without this misfit, people will not come into motion and behave intrapreneurially. Leading to our second hypothesis:

> Hypothesis 2: (a) Intrapreneurial behaviour will be lower when individual needs and organisational supply are both low or both high; (b) Intrapreneurial behaviour will increase when the difference between individual needs and organisational supply (misfit) increases.

2.3 Psychological safety

Today's business environment accomplishes much of its work in collaboration (Edmondson & Lei, 2014; Frazier et al., 2017; Newman et al., 2017). Rather then being individuals at work, multi-disciplined teams are working collectively to accomplish their goals. Product design, patient care, strategy development, and rescue operations are a few examples that call for collaborative work (Edmondson & Lei, 2014). The field of organisational research has identified psychological

safety as an important factor in how people collaborate to achieve a shared outcome (Edmondson & Lei, 2014).

Psychological safety is the shared belief by members of the team that the team is safe for interpersonal risk-taking (Edmondson, 1999; Edmondson & Lei, 2014; Frazier et al., 2017; Newman et al., 2017). Individuals that feel psychologically safe in a team will be less concerned with the way others might react when introducing a new idea or when voicing a concern. High levels of psychological safety has been linked to higher levels of creative thinking and risk-taking, innovation in R&D teams, process improvements in manufacturing, knowledge creation, and successful implementation of technology (Newman et al., 2017). Frazier et al. (2017) recognises that psychological safety is a key factor in facilitating the process of learning, collaborating, and employee engagement.

The performance enabling role of psychological safety has consistently been found in numerous studies (Edmondson & Lei, 2014). Especially when organisational learning is of importance, psychological safety is relevant (Edmondson & Lei, 2014). Much of today's organisational learning happens between the interactions of interdependent individuals. Individual's concerns about interpersonal risk or consequences could limit the learning behaviours of these individuals. High levels of psychological safety can reduce these concerns and as such contribute to organisational learning.

Psychological safety is both an individual-level and team level construct (Edmondson & Lei, 2014; Frazier et al., 2017). However, Edmondson & Lei (2014) argues that the group is the appropriate level to measure psychological safety. "Starting with Edmondson (1999), studies have found statistically significant variance in psychological safety between groups within organisations; that is, people working closely together tend to have similar perceptions of psychological safety, which vary across groups within the same organisation. This body of work thereby supports the idea that psychological safety in organisational life can best be considered a phenomenon that lives at the group level. (Edmondson & Lei, 2014)".

2.4 Psychological safety impacting intrapreneurial behaviour

Individual elements of the intrapreneurial behaviour construct has been linked to psychological safety. Risk-taking, for example, is enhanced by psychological safety (Edmondson, 1999; Newman et al., 2017). Likewise, enhancements of creative thinking, innovation, process improvements are outcomes of teams that have a high level of psychological safety (Newman et al., 2017). Members of a team in a psychologically safe climate share more information, speak up with suggestion for organisational improvements, and are found to take initiative to develop new products and services (Edmondson & Lei, 2014).

De Stobbeleir et al. (2020) discovered that in psychological safe teams, members engage in feedback seeking among team members. This type of feedback seeking can be labeled as "relational proactivity", aligning well with the networking dimension of intrapreneurial behaviour. Feedback seeking positively contributes to experimentation and learning. Psychological safety is strongly related to team learning and performance in environments that benefit from learning (Sanner & Bunderson, 2015). An appropriate culture that allows experimentations, feedback, and learning by trial and error is one of the two required aspects to unfold intrapreneurs' potential (Gawke et al., 2019). The other aspect being proactive intrapreneurs.

Psychological safety has been found to effect components of intrapreneurial behaviour and intrapreneurial outcomes as described in the framework of Neessen et al. (2019). Given the impact on these isolated components the author hypothesises that a relation between psychological safety and the complete construct of intrapreneurial behaviour exists. To the author's knowledge there has not been any distinctive research that linked psychological safety to the complete construct of intrapreneurial behaviour.

> Hypothesis 3: Psychological safety is positively related to intrapreneurial behaviour

2.5 Psychological safety to influence the effects of autonomy misfit

Getting to intrapreneurial outcomes like new products or self-renewal isn't an individual effort, but a team effort. As today's work is mostly accomplished in collaboration (Edmondson & Lei, 2014; Frazier et al., 2017; Newman et al., 2017), the effects of an individual autonomy misfit can be influenced by others in the group. As individuals work in teams, it's the reaction of those team members to the individual that potentially impacts its attitude to the job. As such, the team can be influential in supporting an individual towards intrapreneurial behaviour. Whether or not the psychological safety in a team influences an individuals intrapreneurial behaviour answers a call for further research by Neessen et al. (2019).

Moderating effects of psychological safety has been proven extensively in academic literature. In their systematic literature review Newman et al. (2017) already summarised that psychological safety weakens the negative relationship between role conceptualisation and achievement orientation, expertise diversity influence the team performance, and the relationship between process innovativeness and profitability. This moderating effect has been found on individual, team, and organisational level. This prior research gives viability to a potentially moderating effect of psychological safety between autonomy (mis)fit and intrapreneurial behaviour.

2.5.1 Psychological safety in the affective-consistency based view

Following the job design perspective that autonomy fit leads to more intrapreneurial behaviour (de Jong et al., 2015) and better performance (Muecke & Iseke, 2019), it can be hypothesised that psychological safety will have a positive influence on the intrapreneurial behaviour of members in a team with autonomy fit. Psychological safety has proven to have positive effect on the learning behaviour of teams (Edmondson, 1999; Edmondson & Lei, 2014; Frazier et al., 2017). Learning behaviour is described by Edmondson (1999) as "learning at the group level of analysis as an ongoing process of reflection and action, characterised by asking questions, seeking feedback, experimenting,reflecting on results, and discussing errors or unexpected outcomes of actions". These behaviours are positively related with the performance of the team (Edmondson, 1999; Edmondson & Lei, 2014; Frazier et al., 2017). Choo et al. (2007) found that psychological safety influenced creativity, divergent thinking, risk taking, and motivates engagement in learning, increasing the performance of the team as such. Additionally, Frazier et al. (2017), found that work design characteristics (including autonomy) positively influence psychological safety.

The premise of the affective-consistency based view is that positive work experience lead to perceived fit by the individual (Yu, 2009). Consequently, it is likely that a psychological safe team would lead to positive work experiences. Resulting into a team of which it members perceive a needs-supplies fit on autonomy. Following that logic it can be hypothesised that according to the affective-consistency based view, intrapreneurial behaviour would be stronger in environments of high psychological safety.

> Hypothesis 4a: The positive relation of needs-supplies fit on autonomy will be stronger when psychological safety is high then when it is low

2.5.2 Psychological safety in the self-regulatory based view

A negative experience is required in the self-regulatory view in order to get individuals in motion. Proponents of this view argue that needs-supplies misfit is required to ignite the negative feedback loop. Consequently, fit will not trigger any feedback loop and people will not act differently. As such, the author hypothesise that psychological safety will not influence the effect of autonomy fit in the self-regulatory based view.

An excess of misfit has shown to lead individuals to adapt to the situation. Yu & Davis (2016) discovered that an excess of misfit lead to higher levels of proactive behaviour by the individual. Ashford & Black (1996) identified seven key types of change-oriented proactive behaviours: feedback seeking; information seeking; job change negotiation; positive framing; general socialising; building relationships with the boss; and networking. Especially information seeking and feedback

seeking has been found to be influenced by psychological safety (De Stobbeleir et al., 2020; van Vianen, 2018). Feedback seeking may be beneficial for individuals to cope with the misfit of autonomy (van Vianen, 2018). Teams with high levels of psychological safety ensure that information will be sought within the team, where in teams with low levels of psychological safety information will be sought outside the team (De Stobbeleir et al., 2020; Safdar et al., 2017).

Following the self-regulatory view, an excess of autonomy will give individuals an impetus to engage in intrapreneurial behaviour. Given that an excess of autonomy misfit leads to higher levels of proactivity, proactivity being a key behavioural dimension of intrapreneurship, and acknowledging the existing literature on the influencing effect psychological safety has on proactivity.

Additionally, Yu & Davis (2016) showed that also a deficiency of misfit yields to proactive behaviour, although lower then the case of excess misfit. Clarification for this difference has not been provided by the authors. A possible explanation can be found in the findings of Lambert et al. (2003) that deficient misfit leads to greater job dissatisfaction for specific inducements. The dissatisfaction of work has been found to lead to creativity (Zhou & George, 2001), Likewise, van Vianen (2018) noted that “Seeking feedback may help individuals to better cope with misfit by putting effort into learning or adjusting to the job demands.”

> Hypothesis 4b: The positive relation of needs-supplies misfit on autonomy will be stronger when psychological safety is high then when it is low

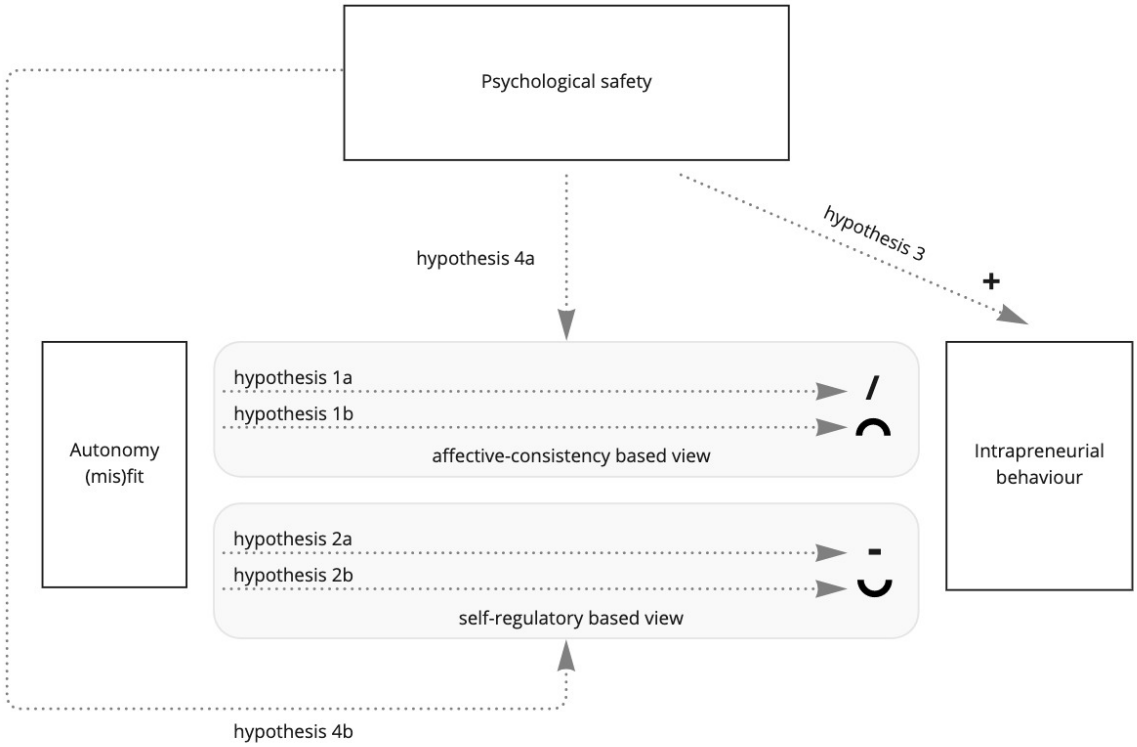

Figure 1: Research framework

3. Methodology

3.1 Research design

A descriptive research design is used for this study. Collecting the data has utilised diary studies. Two primary reasons has lead to the practice of using diary studies. First of all, diary studies are helpful to collect data on working environment characteristics that are subject to fluctuations (Bakker, 2014). Secondly, using diary studies help to prevent common rater bias, a pronounced effect in PE-fit studies (Kristof-Brown et al., 2005). Common rater bias are conscious or unconscious tendencies that affect supplied ratings. By using a diary study, and thus collecting responses on multiple days, this bias can be prevented. The developed hypothesis are concerned about the relationships of fluctuating states and are typical research questions to be answered by a diary study (Ohly et al., 2010).

As psychological safety is primarily a team construct (Edmondson, 1999) and getting to intrapreneurial outcomes is a team effort, the research design is focused on team behaviour as well. Teams were asked to collect data during a sprint. Sprints are a fixed period of time in which a teams tries to fulfil their commitments to work items, promised at the start of the sprint. The concept of sprints are part of Scrum, an agile methodology of work. Typically, sprints last for two weeks. When a sprint started for the team, the data collection period started as well.

From the start of the sprint team members were asked to answer a daily questionnaire. Using daily diaries might increase retrospective bias compared to using experience-sampling methods (Ohly et al., 2010). For this research, using experience-sampling was not required as we were not searching for affective or cognitive observations for specific events during the day. Rather, the research aims to get an overall perceived assessment of the day. Using daily diaries as such suffices and enabled the participants to enter the survey at their own convenience, positively adding to the response rate. To further reduce nonresponse and dropout, as diary studies can be burdensome for the participants (Ohly et al., 2010), the number of daily questionnaires was capped to 10, as done by other research (see Vleugels et al., 2018). The daily assessments was capped to a maximum of 5-7 minutes to not affect the willingness of participants as suggested by Ohly et al. (2010).

At the end of the sprint a closing survey was sent to the members of the team and the team's supervisor. The closing survey of the team was an extended version compared to the daily surveys. The survey for the team supervisor was focused on assessing the perceived intrapreneurial behaviour of team. The supervisors answers ensured triangulation of the perceived data of the time, as such increasing the validity of the findings and preventing common rater bias (Kristof-Brown et al., 2005).

3.2 Data collection

3.2.1 Sample recruitment & size

The collected data for this research was gathered with teams active in software development. Software development teams commonly work according agile methodologies like Scrum or Kanban. Typically these teams are self-organising and autonomous. Scrum, for example has the key philosophy to become more proficient, as team, in the leading values of Scrum, namely: commitment; focus; openness; respect; and courage, in order to be successful (Schwaber & Sutherland, 2020). The primary focus of the team is to make the best possible progress towards the goals that are set by the team.

Given the Scrum values and its goal for the Scrum team, researching these hypothesis in software development teams is expected to yield interesting results. Companies using Scrum are likely to expect innovative behaviour of their teams as adaptation and self-management is an essential pillar of Scrum (Schwaber & Sutherland, 2020). Additionally, Scrum teams are typically together for a longer period of time. This prevents diluting effects of socialisation behaviour typically seen at newcomers in an organisation (Vleugels et al., 2022; Yu & Davis, 2016).

To narrow the diversity of organisations participating in the research, participating teams were required to work in a commercial, for-profit organisation. Participants of the survey held various nationalities, as such the survey was held in English.

Following the suggestions of Ohly et al. (2010) on diary studies, the emphasis has been on recruiting a large number of persons for participation. Empirical data shows that diary studies loose around 20% of participants during the study (Ohly et al., 2010). Likewise, higher numbers of participants impact statistical power more strongly compared to higher number of dailies (Scherbaum & Ferreter, 2009). Teams were recruited via the network of the researcher via direct requests, public LinkedIn messages, and internal messages at communication channels of the employer of the researcher. Ultimately 72 organisations are contacted, of which 14 (19%) agreed to participate with a single team or more.

3.2.2 Collection procedure

The collection for this research was separated in three phases (tbl. 1). The study recognises two types of respondents, team members and supervisors. Team members are those actively participating in the teams development efforts. This could be software developers, engineers, or UX designers. Supervisors are people overseeing or steering the activities of the team, for example Team Leads of Product Owners. The collection period was chosen by the team itself in correspondence with the researcher.

Table 1: Phased approach of data collection

Phase	Survey	Who	When
T0	Introduction survey	Team members	Week before start of the sprint
Dailies	Daily survey	Team members	Each day at 15:30
T1	Final survey	Team members & supervisors	Next working day after the last daily

All surveys were sent digitally via e-mail. The digital surveys were programmed in the software Qualtrics. The T0 survey was sent a week for the start of the sprint and had to be filled in before the first daily. All dailies were sent at 15:30 and only active for the day they have been sent out. Participants were free to ignore a survey due to a day off or work for another team. Lastly a T1 survey was sent directly after the dailies phase. For both the T0 and T1 a reminder has been send on the third day. Participants had the option to opt-out on any e-mail send to them, effectively stopping their participation in the survey.

3.3 Measures

All items used for measurement are added in Appendix A. For all questions a 7-point likert scale has been used.

3.3.1 Intrapreneurial behaviour

Intrapreneurial behaviour is measured using the validated measurement of (de Jong et al., 2015). This measurement is proven to measure the dimensions of proactive, innovativeness and risk-taking. This measurement is used in both the daily as the T1 survey. The construct in the T1 survey, both team member and supervisor, exists out of nine questions. An example question of the construct is: “I generate creative ideas”. For the daily a shorter three item construct (de Jong et al., 2015) is used.

The daily construct has a Cronbach’s α of .65. Which denotes it as a construct with a doubtful internal consistency. Typically a score higher then .7 is deemed acceptable and higher then .9 is excellent. Removing any items would not increase the consistency. Removal of any of items would consequently lead to removing a measurement for one of the variables: proactive, innovativeness, and risk-taking.

Another measure of internal consistency is composite reliability. Compared to Cronbach's α composite reliability does not assume all indicator loadings to be the same in the population. The study's data might violate this assumption and as such result into a lower value. The composite reliability for intrapreneurial behaviour is .70. Hair et al. (2021) states .70 as a minimum threshold for internal consistency reliability. Taking into account the moderate Cronbach's α and the acceptable value for composite reliability yields confidence that the construct is consistent enough for use in this study.

In the T1 survey the nine-item construct has a Cronbach's α of .97 for the team members. In the supervisor survey the construct scored an α of .98.

3.3.2 Autonomy (mis)fit

To determine the (mis)fit of autonomy for an individual the construct of (Spreitzer, 1995) is used. The construct is used in T0 and the daily surveys. In order to determine both the need and the supply, the same three items are asked with a different prefix. For the need, each item in the daily survey started with: "Today, I found…". "Today, I had…" was the prefix for the supply construct in the daily survey. The T0 survey had "I have/can…" as prefix for the supply, and "I find…" as prefix for the need.

This validated measurement consists out of three questions. "The opportunity to determine how I do my job" is an example question. The alpha's for the various surveys are T0/Need: .93; T0/Supply: .94; T1/Need: .92; T1/Supply: .89.

3.3.3 Psychological safety

Psychological safety is measured via the well-proven construct of Edmondson (1999). As part of the T0 survey participants were required to answer 7 questions. Example questions are "Members of this team are able to bring up problems and tough issues" and "Working with members of this team, my unique skills and talents are value and utilised".

The internal consistency of the construct psychological safety has an α of .67, which is doubtful. Removing an item would not yield an higher reliability score. The composition reliability of this construct is .78. A value close to the minimum threshold of .8 for a five to nine-item construct (Netemeyer et al., 2003).

3.3.4 Control variables

Education is added as a control variable to the T0 survey. The meta-review study of Neessen et al. (2019) found that intrapreneurs have a higher educational level in comparison to other employees. Educational level is asked as "Which is your highest earned education?". Possible answers were: high school; bachelor; master; doctorate; other.

Prior experiences has proven to improve the recognition of opportunities (Neessen et al., 2019). To prevent confounding results a control variable of first job is added.

3.4 Data analysis

The analysis of data is done via the program 'RStudio' and the R packages 'lavaan' and 'multcomp'. Lavaan enables latent variable modelling and provides a large variety of multivariate statistical models. Multcomp offers tests and confidence intervals for general linear hypothesis.

The reliability of the constructs in the survey is tested by calculating Cronbach's alpha (α). The internal consistency is deemed valid enough at a score of .7 or higher.

The analysis of relations and effect between the variables is done by polynomial regression equations (Edwards & Parry, 1993). Polynomial regression analysis allows researchers to analyse the effects of two predictor variables in relationship with an outcome (Shanock et al., 2010). As an analytical technique it is often used to study person-environment fit (e.g. Edwards & Cable (2009), Kristof-Brown et al. (2005), Yu & Davis (2016)). Predominantly interesting is that polynomial regression equations allow for three-dimensional investigations of the effect of autonomy needs and supply on intrapreneurial behaviour. Polynomial regression analyses are generally performed using equation 1, where N = individual autonomy needs and S = organisational autonomy supplied.

$$Z = b_0 + b_1N + b_2S + b_3N^2 + b_4NS + b_5S^2 \quad (1)$$

For this research the emphasis is not only on the interaction between needs and supplies on intrapreneurial behaviour, but also to assess a potential moderating effect of psychological safety. To test this effect, psychological safety needs to be added to the main model and interaction. This is done by multiplying each factor in our model, as done priorly by Vogel et al. (2016). The equation including moderating is shown in equation 2, where PS being psychological safety. Before multiplication the values of psychological safety were standardised to a mean of 0 and a standard deviation of 1.

$$Z = b_0 + b_1N + b_2S + b_3N^2 + b_4NS + b_5S^2 + \\ b_6PS + b_7PSxN + b_8PSxS + b_9PSxN^2 + b_{10}PSxNS + b_{11}PSxS^2 \quad (2)$$

The results of the polynomial regression analysis are plotted in a three-dimensional space following Edwards & Parry (1993). The three dimensional view allows for more explanatory potential than traditional moderated regression analyses (Shanock et al., 2010). It visualises the relationship of two predictor variables on the outcome variable along the line of congruence and incongruence. The resulting surfaces are helpful in the explanation and understanding of the discovered findings. Interpretation of the surfaces is done by four test variables: $a1$, $a2$, $a3$, and $a4$. The first two test variables are centred around the line of perfect agreement between the two predictor variables. The latter two are centred around the line of incongruence. Where $a1$ and $a3$ are both concerned with the slope of each line, $a2$ and $a4$ evaluate the curvature of each corresponding line. Unstandardised values are used to calculate the a's. Computation for the slope and curvature of the surface, across low and high levels of psychological safety, were computed by substituting values one standard deviation above and below the mean of intrapreneurial behaviour (Cohen et al., 2014).

3.4.1 Dataset preparation

In preparation of the analysis all data is exported from Qualtrics into Google Sheets. Relevant data is merged into a single worksheet in a short row format. The daily surveys acted as the base for the worksheet. Each daily was a single row with extra data like psychological safety from the T0 survey added as additional columns. Resulting into a workable dataset for polynomial regression analysis in RStudio. Partial surveys are deleted from the dataset. For the dailies 8 unfinished surveys were deleted, resulting into 336 useful datapoints.

A total of 24 teams participated in the daily studies. The number of unique participants is 79 of which 57% filled in the daily survey at least 4 times or more. Only 2 participants (2.53%) filled in all 10 surveys. A total of 135 participants registered to participate. With 79 unique persons responding, the response rate is 59%.

Not all respondents of the daily survey has filled in the T0 survey. 20 participants did not fill in the T0 survey, resulting into missing information on psychological safety. As RStudio can cope with partial information, and the data is still useful for hypothesis 1 and hypothesis 2 the daily surveys of these 20 people have not been removed for analysis. The T0 is opened by 73 respondents of which only 59 completed the survey (81%).

3.4.2 Characteristics survey participants

The characteristics of the survey participants only represent those respondents that entered at least one daily survey and the T0 survey. The respondents were pre-dominantly male (87%). Most respondents worked full-time (88%), meaning 36 hours or more. The age of the respondents ranged between 21 and 64 ($M = 36.81$, $SD = 9.21$) and were mostly highly educated (87% has at least an bachelor degree).

3.5 Methodological issues

Conducting research can lead to various methodological issues that potentially harm the reliability of the research. To prevent these from occurring prevented measures were taken.

Non-response In order to prevent non-response the recommendations of Ohly et al. (2010) have been incorporated in its research design. Setting a maximum of surveys and reducing the effort to complete them attributes to not burden the participants during the process. Starting from the fourth distribution group a personal introduction e-mail is sent to the participants. The e-mail outlined the goals of the survey and allowed for easier communication with the researcher in case of questions.

Internal validity In order to raise the internal validity of the research all constructs originate from well-tested sources. For example, the construct of psychological safety is often used construct in similar settings of research.

Reliability The reliability of the research is enhanced by temporal sampling. The three main constructs are surveyed in either T0 and the daily surveys, or the daily surveys and T1. This allows for triangulation of the data for results and reliability. $$

4. Results

4.1 Descriptive analysis

The means, standard deviations, and zero-order correlations for our variables are presented in table 2. For each variable the survey origin is added. These origins has been used for analysing the main model. Supplementary analysis has been held to control the results of the main model. This is reported in the last section of this chapter.

Table 2 shows significant relations between individual autonomy needs and organisational autonomy supplied, and between both autonomy variables intrapreneurial behaviour. Means and standard deviations for all variables suggest considerable variations and little evidence of floor or ceiling effects. It is noteworthy that both variables are significantly related to intrapreneurial behaviour, but differ in direction. Polynomial regression analysis is particularly helpful in understanding what's happening here. For our control variables only a significant relation between psychological safety and education has found. As all other correlations are insignificant the control variables are ignored for further analysis of the data.

Table 2: Means, Standard Deviations, and Correlations among the Study variables

Variables	Survey origin	Mean	SD	1	2	3	4	5	6
Study variables									
1. Individual autonomy needs	Daily	5.12	1.44	-					
2. Organisational autonomy supplied	Daily	5.74	1.15	.43	-				
3. Intrapreneurial behaviour	Daily	3.27	1.35	.15 **	-.11 *	-			
4. Psychological safety	T0	5.49	.49	.08	.14 *	.02	-		
Control variables									
5. Education	T0	4.4	.91	.09	.08	0	-.19 **	-	
6. First job	T0	1.88	.33	.07	.04	-.12	.13	-.07	-

Signif. codes: 0 '*' **0.001** '' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Confirmatory factor analyses showed that the four-factor model in which the study variables were kept separate was a better fit to the data. The four-factor model (χ2 (98, N=269) = 401.566, ρ < 0.001; comparative fit index (CFI) = .873; root mean square error of approximation (RMSEA) = .107; standardised root mean square residual (SRMR) = .037) compared better then the one-factor model (χ2 (104, N=269) = 1443.527, ρ < 0.001; CFI = .44; RMSEA = .219; SRMR = .17). An

ANOVA test between the models showed a $\Delta\chi 2$ of 1042 with a ρ < 0.001. The results of the four-factor model support the distinctiveness of the measures used in the study.

4.2 Polynomial regression analysis & response surface modelling

Multiple linear regression analysis ($\chi 2$ = 0.0423, F (266) = 5.874, ρ < 0.01) shows different behaviour for individual needs and organisational supply. For every 1% increase in individual autonomy need an 0.24% increase of intrapreneurial behaviour is found (ρ < 0.01). On organisational supplied autonomy each 1% increase leads to 0.17% decrease of intrapreneurial behaviour (ρ < 0.05). Polynomial regression analysis provides answers on the two predicting autonomy variables on the outcome of intrapreneurial behaviour.

Following the protocol established by Edwards ((1993)) the polynomial regression analysis is executed in a multi-step approach. The first step represents our main model of the relationship between person (individual autonomy needs), environment (organisational autonomy supply), and outcome (intrapreneurial behaviour). The second step adds the interaction with psychological safety as moderator following procedures set by Vogel et al. (2016). Results from both polynomial regressions are displayed in table 3. R^2 results suggest that both models account for significant variance. For both models low R^2 values are reported. As this study tests congruence hypothesis the values of R^2 are not informative. To test our hypotheses the pattern in the coefficients is crucial, which is not displayed by R^2 (Edwards, personal communication).

Table 3: Polynomial regression results of intrapreneurial behaviour on individual autonomy (N) and organisational supplied autonomy (S)

	Step 1		*Step 2*	
Variables	**b**	**SE**	**b**	**SE**
Individual autonomy needs (N)	.23	.15	.41 *	.19
Organisational autonomy supplied (S)	-.09	.12	-.20	.15
N²	-.03	.04	-.15 **	.05
N x S	.02	.07	.08	.08
S²	-.03	.04	0	.06
Psychological Safety (PS)			0	.23
PSxN			-.21	.23
PSxS			.24	.15
PSxN²			.16 *	.07
PSxNxS			-.15 .	.09
PSxS²			.05	.05

	Step 1	*Step 2*
F-statistic	2.61 *	2.28 *
R^2	.05 *	.08 *
$\triangle R^2$		-.03

For better understanding of the polynomial regressions the use of three-dimensional visualisations are recommended Shanock et al. (2010). Analysis for our main model is illustrated in figure 2, figure 3 shows the illustration for our moderated model. Each surface shows the effect of (in)congruence between needs and supply along the outcome of intrapreneurial behaviour. As such it allows for richer interpretation of the results. Central elements in the visualised surface are the line of perfect agreement and the line of incongruence. Perfect agreement, the $Y = X$ line, represents the situation that autonomy needs matches the supplied autonomy. In other words, this represents autonomy fit. What happens left or right from the line of perfect fit shows the outcomes of misfit on intrapreneurial behaviour. The opposite situation is captured by the line of incongruence, the $Y = -X$ line. This represents the situations where need is opposite of supply. As such it represents the relationship of perfect misfit (e.g. 7 on need and 1 on supply) on intrapreneurial behaviour. Complete incongruence is found in the left-top and right-bottom corner.

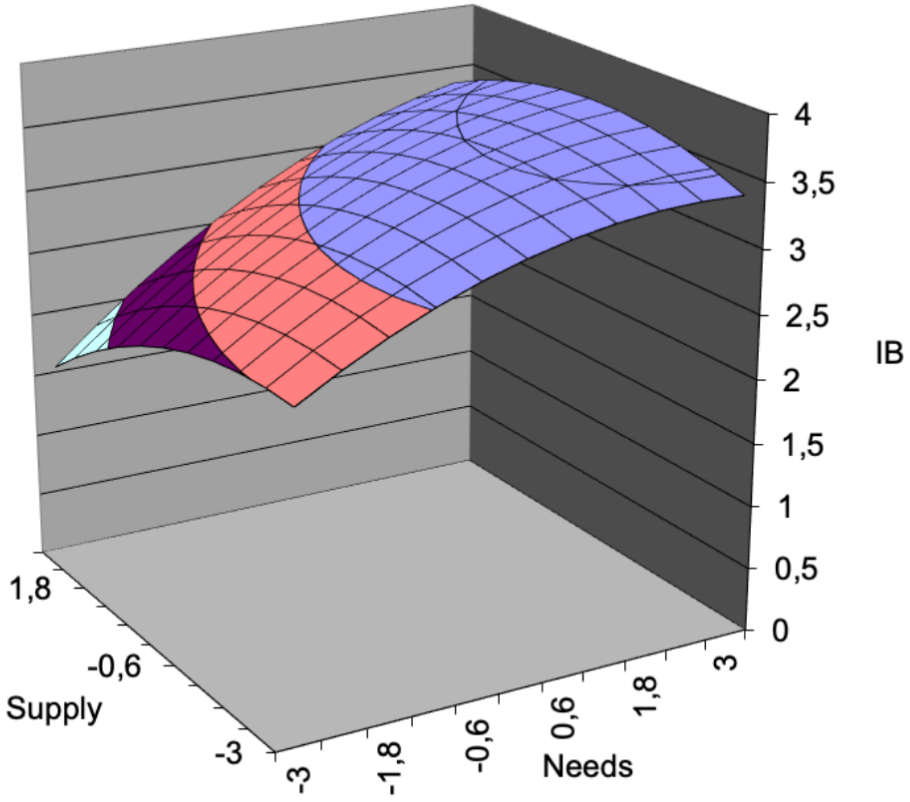

Figure 2: Response surface linking our main model of needs-supplies fit on autonomy and intrapreneurial behaviour

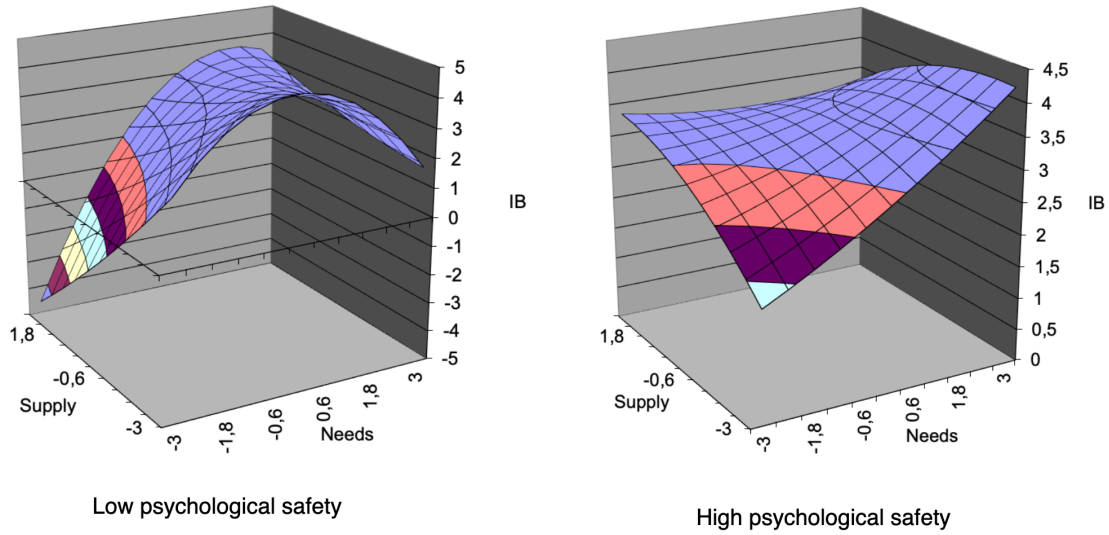

Figure 3: Relationship between autonomy and intrapreneurial behaviour at Low and High levels of psychological safety

Important features of the surface are mathematically identified by four test values: $a1$, $a2$, $a3$, and $a4$ (Edwards & Parry, 1993). The first two test variables are centred around the line of perfect agreement between the two predictor variables. The latter two are centred around the line of incongruence. Where $a1$ and $a3$ are both concerned with the slope of each line, $a2$ and $a4$ evaluate the curvature of each corresponding line. A significant positive value for a slope suggests that the outcome increases linearly as both predictors increase. A significant value for curvature tells something about the degree of discrepancy. High values for curvature indicates that divergence between the two predictors is of relevance in relationship to its outcome. For both our main model and moderating model the surface tests values are reported in table 4.

Table 4: Surface response analysis

	Main model	Low psychological safety	High psychological safety
a1	.14	.19	.25
a2	-.04	-.05	-.09
a3	.31	1.06 * (ρ = .03)	.16
a4	-.08	-.52 * (ρ = 0.35)	.05

4.3 Hypothesis testing

> Hypothesis 1: (a) Intrapreneurial behaviour will be lower when individual needs and organisational supply are both low and will be higher when both are high; (b) intrapreneurial behaviour will increase as organisational supply of autonomy increases towards individual autonomy need (fit), and will decrease as organisational supply exceeds individual need.

Hypothesis 1: The premise of this hypothesis is that a fit of autonomy needs and supply is not only essential for intrapreneurial behaviour, but also will increase linearly as both need and supply increase (part a). Table 3 shows the regression results for the main model. These results do not show any significant results for the individual terms or when in interaction. The three-dimensional response surface is illustrated in figure 2 and the corresponding test values are reported in table 4.
For part a of this hypothesis particular interest lies in the value of $a1$ and $a2$ as they are focused on the line of perfect fit. A significant $a1$ would suggest a linear slope, whereas a significant $a2$ would suggest a non-linear slope. No significant result has been found for both values leading to a lack of evidence to support hypothesis 1a.
Part b claims that reducing the deficiency of autonomy leads to higher levels of intrapreneurial behaviour. As autonomy becomes an excess it will leads to lower levels of intrapreneurial behaviour. This behaviour would be visualised as a concave (low edges; high middle) surface in the surface model. A significant negative test value of $a4$ would mathematically support this concave surface. The visualised surface response (fig. 2) suggests differently, but as the test values $a3$ and $a4$ both yielded insignificant results no claim can be made. Thus, evidence lacks to support hypothesis 1b.

> Hypothesis 2: (a) Intrapreneurial behaviour will be lower when individual needs and organisational supply are both low or both high; (b) Intrapreneurial behaviour will increase when the difference between individual needs and organisational supply (misfit) increases.

Hypothesis 2: Part a of this hypothesis suggests that perfect fit, both low and high, of autonomy would lead to low levels of intrapreneurial behaviour. If correct, the surface of the main model fig. 2 should illustrate a concave surface along the line of perfect fit. The test value of $a2$ (tbl. 4) should be significant and negative to support the concave surface. As $a2$ has not yielded a significant result, evidence lacks to support hypothesis 2a.
The b part of the hypothesis suggests that a degree of discrepancy between individual need and supply should exists. In the surface this should result into a convex (high edges; low middle) surface along the line of incongruence. The surface of our main model (fig. 2) instead shows a concave surface and the test value of $a4$ (tbl. 4) failed to reach significance. Consequently evidence lacks to support hypothesis 2b.

> Hypothesis 3: Psychological safety is positively related to intrapreneurial behaviour

Hypothesis 3: This hypothesis argues that psychological safety positively relates to intrapreneurial behaviour. An individual regression analysis for the relation between psychological safety and intrapreneurial behaviour has been run to test this hypothesis. It showed an insignificant effect of .05 (χ2 = 0.0006, F (267) = 0.154, ρ < 0.695) for they daily measurements. As such hypothesis 3 lacks evidence to be supported.

> Hypothesis 4a: The positive relation of needs-supplies fit on autonomy will be stronger when psychological safety is high then when it is low Hypothesis 4b: The positive relation of needs-supplies misfit on autonomy will be stronger when psychological safety is high then when it is low

Hypothesis 4: Hypothesis 4a and 4b both suggest that high levels of psychological safety are beneficial, irrelevant if a (mis)fit of autonomy needs and supply exists. To test these hypothesis surface models (fig. 3) and surface test values (tbl. 4) are calculated for both low and high levels of psychological safety. Only for low levels of psychological environment significant values were found. The significant negative value of $a4$ - the curvature test along line of incongruence - mathematically represents a concave surface as shown in the figure. The significant negative value of $a3$ represents the directionality of the discrepancy. Along the line of incongruence an excess (supply > need) of autonomy is impacting intrapreneurial behaviour more then a deficiency of autonomy.
No significant results have been found for high psychological safe environments. As such comparing the low and high environments would not lead to meaningful insights. Resulting into a lack of evidence to support hypothesis 4a and 4b.

4.4 Supplementary analysis

The main analysis yielded results that lacked evidence to support any of the developed hypotheses. For controlling purposes, and extra insights, additional analysis has been held.

Primary results showed that individual needs together with organisational autonomy supply would not show a significant relationship with intrapreneurial behaviour. Which is shown by both the executed multiple linear regression and the polynomial regression analysis. To measure autonomy the construct of Spreitzer (1995) is used. These questions test for job autonomy, decision making, and freedom. Three concepts which can be seen as distinct elements of autonomy. Potentially a needs-supplies effect of autonomy could be found on each distinct element of autonomy. Table 5 displays the results for each individual analysis. Each analysis was a polynomial regression analysis that took the perceived and desired observation and regressed it on the daily intrapreneurial

behaviour. Job autonomy showed a significant relationship between the individual needs and organisational supply on intrapreneurial behaviour.

Table 5: Polynomial regression analysis on distinct elements of autonomy

	Job autonomy		*Decision making*		*Freedom*	
Variables	**b**	**SE**	**b**	**SE**	**b**	**SE**
Individual autonomy needs (N)	.04	.10	.35 **	.12	.11	.11
Organisational autonomy supplied (S)	-.07	.11	-.06	.11	-.16	.09
N^2	-.01	.03	0.02	.03	-.02	.03
N x S	.09 *	.05	-.06	.05	.04	.05
S^2	-.09 *	.04	-.05	.03	-.02	.04
F-statistic	4.88 *		4.83 *		2.87 *	
R^2	.07 *		.07 *		.04 *	

The main analysis was not able to find a significant relation between psychological safety and intrapreneurial behaviour. This is tested by using the three-item construct of intrapreneurial behaviour. A construct with a relatively weak Cronbach's α of .65. The nine-item constructs used in both T1 surveys had higher reliability scores. Therefore control tests were run for psychological safety on the T1 survey of the team members and on that for the supervisors. Both yielded insignificant results as well. The self-reported an effect of .13 ((χ2 = 0.0021, F (260) = 0.564, ρ < 0.453) and the supervisor survey reported value of -.19 (χ2 = 0.0029, F (267) = 0.785, ρ < 0.376). Contributing to the lack of evidence to support hypothesis 3.

5 Conclusion, discussion, and recommendations

5.1 Conclusion

As organisations are continuously striving for innovation, managers are searching for ways to boost their innovative capabilities throughout their organisation. Intrapreneurship, a bottom-up process of recognising and exploiting opportunities, is a way to boost innovative behaviour. The phenomenon of intrapreneurship is well-researched, but many questions still are unanswered. This research attempts to shed a light on the relation between autonomy (mis)fit on intrapreneurial behaviour. A relationship that potentially can be influenced by levels of psychological safety in a team. Because of that the research looks into the relationship of psychological safety on autonomy (mis)fit and intrapreneurial behaviour. Two dominant views are prevalent in academic literature. The affective-consistency view argues that fit has to exist for autonomy needs and supplies in order to get intrapreneurial behaviour. An opposite view is held by the self-regulatory view. This view argues a misfit is required to get people moving.

This research used polynomial regression and response surface methodology to examine the PE-fit of autonomy on intrapreneurial behaviour. It offers a thorough understanding of the effects between the two predictor variables and the outcome. Two models are created to test and understand these effects.

The main model tested the effect of autonomy need (person) and autonomy supply (environment) on intrapreneurial behaviour (outcome). Results of the polynomial regression analysis did not yield any significant results. Importantly, the interaction between needs and supply does not show a distinct relationship between intrapreneurial behaviour. The lack of distinct relationship does not speak in favour of the affective-consistency view which argues that fit is required to get the desired outcome of intrapreneurial behaviour. The lack of mathematical proof along the line of perfect fit ($a1$ - slope, tbl. 4) aids in questioning the validness for the affective-consistency view in the context of autonomy fit and intrapreneurial behaviour.

Characteristics of psychological safety display similarity with antecedents of intrapreneurial behaviour at first sight. This research examined the prevalence of a direct relationship between psychological safety and intrapreneurial behaviour. A relationship which not has been found. Although a direct relationship lacked, psychological safety could still have a moderating effect between autonomy (mis)fit and psychological safety. Conclusive statements could not be found. For high psychological safe environments no significant results could be found.

For low psychological safe environments this research finds that a large excess of autonomy leads to low intrapreneurial behaviour (fig. 3). Especially when the individual need for autonomy is at its lowest, any excess of autonomy has negative consequences on intrapreneurial behaviour. This

concave surface, or in simpler terms the lower intrapreneurial behaviour when needs and supplies diverge, fits the affective-consistency view.

5.2 Discussion

5.2.1 The role of autonomy on intrapreneurial behaviour

Autonomy is becoming a more prominent work characteristic in order to leverage digital technologies and innovation (Muecke & Iseke, 2019; Stiglbauer & Kovacs, 2018). As an influential factor on intrapreneurial behaviour (de Jong et al., 2015; Neessen et al., 2019) this research has studied the effects of autonomy on intrapreneurial behaviour. The Person-Environment fit theory, more specifically needs-supplies fit, has been used as a lens to investigate the relationships between our main study variables. Person-Environment fit is generally defined as the compatibility between individuals and their environment (van Vianen, 2018).

This study was not able to find a significant relation between autonomy (mis)fit and intrapreneurial behaviour. Specifically, a relation between our two predictor variables and the outcome of intrapreneurial behaviour. This is, for example, displayed by the lack of significance on the interaction between needs and supplies (tbl. 3). Given the meta reviews of Neessen et al. (2019) and Blanka (2019) this finding might seem peculiar. Explanations for this peculiar behaviour can be found in three elements.

First and foremost, the meta reviews describe autonomy from a supply perspective. For example, Neessen et al. (2019) states: "… giving employees autonomy in their work is one of the other dimensions that influence the intrapreneur. Giving the employee the freedom to design his/her work and to decentralise the decision-making process results in more intrapreneurial activities" (p. 15). In contrast this research provides a Person-Environment fit lens on the relationship between autonomy and intrapreneurial behaviour. As such, the findings of this research show that the PE-fit lens leads to new and interesting questions.

The importance of applying a different lens is offered by Edwards et al. (2006). In this paper Edwards recognises three approaches to person-environment fit: (a) atomistic, which separates the person and the environment; (b) molecular, which looks at the discrepancy between person and environment; and (c) molar, which focus on the perceived match or fit between the person and environment. Figure 4 visualises these three approaches.

Studies used in the meta reviews test autonomy via a molar approach. For example, de Jong et al (2011) sees job autonomy as a design variable and implicitly sees it as a (mis)fit between person and environment. On that same note Rigtering & Weitzel (2013) looks at the given autonomy to make own decisions and control their own job as factor for intrapreneurial behaviour.

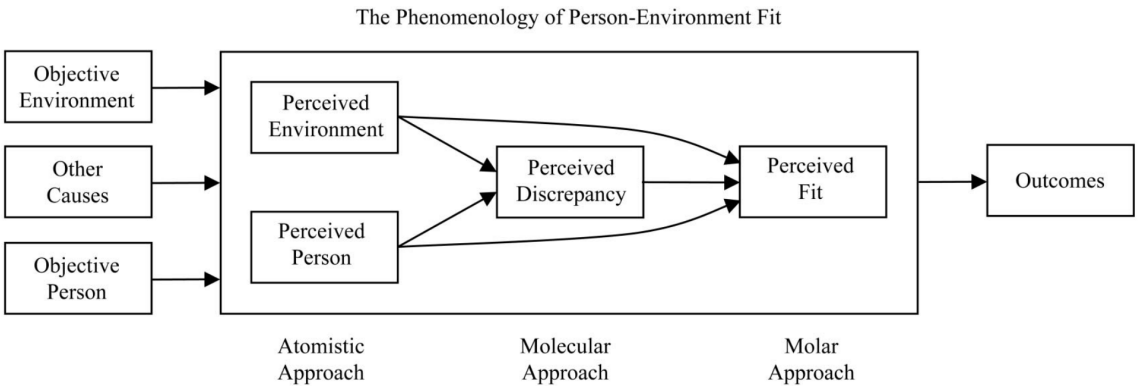

Figure 4: Phenomonology of person-environment fit (Edwards et al., 2006)

This study followed a atomistic approach. We have evaluated the needs and supply of autonomy as separate entities. A similar approach as Yu & Davis (2016) and Vogel et al. (2016). Given the atomistic approach of this study autonomy in its relation with intrapreneurial behaviour can be reviewed more thoroughly. The study findings suggest autonomy should not be viewed as a needs-supplies fit in relationship with intrapreneurial behaviour. Rather, both variables should be seen as distinct variables. A conclusion supported by an insignificant result on the interaction term of individual need and organisation supply (table 3).

It raises the question if the affective-consistency view and self-regulatory view are competing views. The affective-consistency view seems to be centred around the molar approach, whereas the self-regulatory view uses the atomistic approach. Rather then being competing, the two views might look at the same relationship with different approaches. With the risk of interpreting relationships, its origins, and consequences differently.

Finally, this study tested autonomy in a broad sense of the concept. The questions of Spreitzer (1995) test for job autonomy, decision making, and freedom. As a group of three elements, both for individual need and organisational supply, a significant relation with intrapreneurial behaviour could not be found. Additional analysis (tbl. 5) repeated this finding for each distinct element.

5.2.2 Psychological safety as influencer

Today's work is accomplished in collaboration (Edmondson & Lei, 2014; Frazier et al., 2017; Newman et al., 2017). Psychological safety is an important factor in how people collaborate to achieve a shared outcome (Edmondson & Lei, 2014). This shared belief makes member feel safe for interpersonal risk-taking, a key characteristic of intrapreneurial behaviour (Neessen et al., 2019).

This study has not found any significant relationship between psychological safety and intrapreneurial behaviour. This finding has repeatedly been found in the study by comparing psychological safety with the daily measurements, the self-reported T1 measurement, and the supervisor reported T1 measurement. The lack of a significant relationship is contradicting with recently published research. Mahmoud et al. (2021) found a significant relationship between psychological safety and intrapreneurial behaviour. That research investigated this relationship in Nigeria and with middle-managers. Differences might be explained due to role or culture. For example, Edmondson & Lei (2014) notes: "employees in certain cultures may be particularly hesitant to ask questions, provide feedback, or openly disagree with their superiors" (p. 8). Low impact of psychological safety on outcomes is not uncommon. The review of Edmondson & Lei (2014) summarises that the impact of psychological safety was low when individuals had more confidence in the knowledge shared. When work was certain and less dependent on learning, the impact of psychological safety was lower. Boundary conditions potentially play a role in the impact psychological can have.

Although no direct relation between psychological safety and intrapreneurial behaviour has been found, a significant moderating effect has been found. In low psychological safe environment supply high levels of autonomy has a negative effect on individuals that does not desire autonomy. A chicken or egg question arises in this case. Does the lack of desire for autonomy originates due to the low psychological safety or does low desire result into perceiving the environment as psychologically unsafe. In any case, providing an excess of autonomy to an individual harms the intrapreneurial behaviour low psychological safe environments.

In that same low environment the highest levels of intrapreneurial behaviour are seen when the desire for autonomy is slightly larger than supplied by the organisation. This finding is in line with Yu & Davis (2016) finding that a slight misfit results into positive behaviour. @@ add explanation to the claim

5.3 Recommendations for practice

Organisations who are under constant pressure to innovate can benefit from supporting intrapreneurship in their organisation. Facilitating and supporting this intrapreneurial behaviour can be of influence in the ability to develop new products or services, or self-renewal. This research has not been able to provide significant relationships between autonomy (mis)fit and intrapreneurial behaviour, and psychological safety and intrapreneurial behaviour.

Nevertheless, the study's findings suggest that individual autonomy needs and organisational supply of autonomy should be seen as individual components. Allowing organisations to change their hiring and selection strategy. Searching for candidates with close to perfect fit leads to a narrow group of possible candidates.

Although individuals strive for perfect fit, achieving this fit is a rare situation (van Vianen, 2018). This would suggest that most people are in a situation of misfit and a form of discomfort. The significant finding in low psychological safe environments show that a small deficient misfit leads to higher levels of intrapreneurial behaviour. Instead of striving for a needs-supplies fit, organisations should rather emphasise on training and support systems to help employees with handling this misfit.

This study finds that an excess of autonomy, when little is desired, in low psychological safe environments lead to a lack of intrapreneurial behaviour. When an organisations finds intrapreneurial behaviour low, additional analysis of psychological safety should be executed. For example, via anonymous surveys using the seven-items of Edmondson (1999). If this yields low scores, the organisation might consider reducing the provided autonomy. Organisations that regularly conduct employee satisfaction surveys (e.g. eNPS) could consider adding this set of questions to their survey.

5.4 Recommendations for research

This research has contributed to the academic field, but also bears some limitations. For all hypotheses this study has not been able to find supportive evidence. As such, this study primarily raises new questions and does not provide definitive answers.

Data for this study was collected following a diary study (12 points) and a single supervisor survey. Although this allowed for triangulation of the data, the dataset is predominantly gathered by self-reports. Potentially this could lead to common-method bias. Meaning, that answers are reported in a consistent manner (Podsakoff et al., 2003). Teams that participated in the survey have not participated as a whole. From each team only a few individuals filled in one or more surveys. This could have raised self-selection issues. Future research could design for this limitations by reducing the number of timepoints. Effectively reducing the effort to participate for all team members.

The relationship between autonomy and intrapreneurial behaviour has found to hold many questions for answering. Likewise, the influence of psychological safety yields enough questions to be answered in future research. Are the self-regulatory view and the affective-consistency view competing views, or are they concerned about different things. The three approaches towards PE-fit of Edwards et al. (2006) offers a wealth of opportunities to explore this question. Future research that combines the atomistic and molar approach could provide insight what the effects is of both approaches on intrapreneurial behaviour. It could be that the atomistic approach tends to measure different things then the molar approach. Potentially this might provide answers with regards to the views of self-regulation and affective-consistency.

This study was not able to find a direct relationship between psychological safety and intrapreneurial behaviour. Additional research should further investigate the presence of this relationship. There might be potential influencing factors as culture or organisational role. Contextual elements as certainty of work or learning behaviour could influence the relation between the two constructs as well. A large set of questions and possibilities is yet to be researched and analysed in future research.

A high supply of autonomy, when none is desired, leads to low intrapreneurial behaviour in low psychological safe environments. Further research could answer the question of directionality. Does the low level of desired autonomy originate from low levels of psychological safety or do other factors play a role here. A better understanding for this directionality is primarily useful for organisations. If it origins from low psychological safety organisations have ample opportunities to better the situations, for example by trainings and support systems. If other factors are at play it might affect hiring and selection strategies and as such reduce the potential pool of candidates to hire.

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Appendix A: Measures

Intrapreneurial behaviour (de Jong et al, 2011)

Code	Question (1-7 Likert scale)
IBI1	…generate creative ideas
IBI2	…search out new techniques, technologies and or product ideas
IBI3	…promotes and champions ideas to others
IBP1	…identifies long term opportunities and threats for the company
IBP2	…is known as a successful issue seller
IBP3	…puts effort in pursuing new business opportunities
IBR1	…takes risks in his/her job
IBR2	…when large interests are at stake, goes for the 'big win' even when things could go seriously wrong
IBR3	…first acts and then asks for approval, even if he/she knows that would annoy other people

Daily intrapreneurial behaviour

Code	Question (1-7 Likert scale)
IBI3	…promotes and champions ideas to others
IBP3	…puts effort in pursuing new business opportunities
IBR3	…first acts and then asks for approval, even if he/she knows that would annoy other people

Autonomy (misfit) (Spreitzer, 1995)

Questions for the need

Code	Question (1-7 Likert scale)
AUT1	Today, I found it important to have significant autonomy in determining how I do my job.
AUT2	Today, I found it important to decide on my own how to go about doing my work.
AUT3	Today, I found it important to have considerable opportunity for independence and freedom in how I do my job.

Questions for the supply

Code	Question (1-7 Likert scale)
AUT1	Today, I had significant autonomy in determining how I do my job.
AUT2	Today, I could decide on my own how to go about doing my work.
AUT3	Today, I had considerable opportunity for independence and freedom in how I do my job.

Psychological safety (Edmondson, 1999)

Code	Question (1-7 Likert scale)
CPS_1_R	If you make a mistake on this team, it is often held against you
CPS_2	Members of this team are able to bring up problems and tough issues
CPS_3_R	People on this team sometimes rejects others for being different
CPS_4	It is safe to take a risk on this team
CPS_5_R	It is difficult to ask other members of this team for help
CPS_6	No one on this team would deliberately act in a way that undermines my efforts
CPS_7	Working with members of this team, my unique skills and talents are value and utilised