Autonomy as a promotor of intrapreneurship

A Person-Environment fit view on autonomy and intrapreneurial behaviour, together with the influence of psychological safety.

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Summary

Organisations need to gain and maintain a competitive advantage over their competition. Innovation is key for organisations to thrive in this world. Managers must ensure sustained innovation (Tushman & Nadler, 1986). A way to achieve sustained innovation is through intrapreneurship. Intrapreneurship is a bottom-up process of recognising and exploiting opportunities by being innovative, proactive, and taking risks (Neessen et al., 2019).

Not all employees in an organisation will behave as intrapreneurs. Intrapreneurial behaviour is influenced by many factors, including autonomy (De Jong et al., 2015). Prior research has investigated the relationship between intrapreneurial behaviour with autonomy being a design variable. The level of autonomy given by the organisation being the variable under study. However, that is only part of the story. Some people will thrive in an environment of autonomy, whereas others will experience it as demanding. The relationship between individual autonomy need, organisational autonomy supply, and intrapreneurial behaviour is viewed through the perspective of Person-Environment fit in this study.

Two prominent views exists in the academic literature. The affective-consistency view argues that a fit should exists between individual needs and organisational supply. Only when both variables are congruent will the individual be motivated. Contradicting this view is the self-regulatory view. The self-regulatory view states that a misfit is required between individual needs and organisational supply if individuals are to be motivated. Given these two contradicting views, this research aims to provide insight into whether fit or misfit is required to promote intrapreneurship by influencing autonomy. Leading to the hypotheses:

- Hypothesis 1: (a) Intrapreneurial behaviour will be lower when individual autonomy need and organisational autonomy 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 2: (a) Intrapreneurial behaviour will be lower when individual autonomy need and organisational autonomy supply are both low or both high; (b) Intrapreneurial behaviour will increase when the difference between individual needs and organisational supply (misfit) increases.

Most of today's work is accomplished by teams (Edmondson & Lei, 2014). The way teams communicate, give feedback, and learn together have all been found to influence their performance. A prominent influence is psychological safety. Psychological safety is the shared belief by team members that one can engage in interpersonal risk-taking within the team (Edmondson, 1999). Teams with high levels of psychological safety do better on feedback seeking, sharing concerns,

and learning in general, all of which positively influence intrapreneurial behaviour. Teams with high levels of psychological safety may perform better than teams with low safety, which leads to the following hypotheses:

- Hypothesis 3: Psychological safety is positively related to intrapreneurial behaviour
- Hypothesis 4a: The positive relation of needs-supplies fit on autonomy will be stronger when psychological safety is high compared to when it is low
- Hypothesis 4b: The positive relation of needs-supplies misfit on autonomy will be stronger when psychological safety is high compared to when it is low

A diary study was performed to collect data from software development teams. Using validated constructs, participants entered a baseline survey, 10 daily surveys, and a closing survey. The last survey was also done by the team supervisor. Polynomial regression analysis and surface response modelling were used to test the above hypotheses. No evidence was found to support or reject any of the hypotheses.

Which view has the right perspective on promoting intrapreneurial behaviour via autonomy is still unclear. The analysis of the collected data showed a peculiar relation between the individual need for autonomy and organisational supply. An explanation of this relation can be found by measuring Person-Environment fit. Each approach may measure different concepts. The two views might not therefore be contradicting but may actually be complementing. Further research should combine these approaches in a single study to shed a light on this peculiarity.

No direct relationship between psychological safety and intrapreneurial behaviour was found. However, in environments with low psychological safety, an excess of autonomy leads to lower levels of intrapreneurial behaviour. In other words, an individual that feels unsafe and has a lot of autonomy, will not take risks, be proactive, or innovate. Organisations should be aware of psychological safety in their teams and take appropriate actions, for example, by reducing autonomy or provide training to improve psychological safety.

1. Introduction

1.1 Background & context

In today's world, organisations need to stay ahead of their competition. To do so, they need to maintain or gain a competitive advantage over their competition. Already in 1986 Tushman and 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 a lack of experience (Braganza et al., 2009). It is up to managers to ensure organisations innovate and cope with a 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 important for innovation and economic growth (Elert & Stenkula, 2020; Gawke et al., 2019). To be intrapreneurs, 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 address or even start changing requirements. Thereby, they can impact the strategic direction of a firm (Peters & Waterman, 1984).

1.2 Problem statement

Not all employees in an organisation will behave as intrapreneurs. Neessen et al. (2019) stated, in their systematic literature review, that employee autonomy influences the intrapreneur. Similarly, De Jong et al. (2015) found that job autonomy relates to innovative and proactive behaviour, which are both sub-dimensions of intrapreneurial behaviour. The underlying premise in the research of de Jong is that job autonomy is provided by the organisation. However, this is only part of the story. Although an environment provides a certain level of characteristics, one may question whether supplying autonomy will induce an employee to behave in a certain manner.

Autonomy, for example, can be given by an organisation, but some employees will thrive with autonomy and others will be unhappy. It is generally assumed that a fit should exist between the

characteristics desired by an employee and the characteristics of an organisation (Lambert et al., 2003; van Vianen, 2018).

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

Although people have an innate need to fit into their environment, a perfect fit seldom exists (van Vianen, 2018). Consequently, 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 contexts of autonomy misfit, on intrapreneurial behaviour can help organisations to influence intrapreneurship in their organisation.

Intrapreneurial behaviour is often measured on an individual level. However, obtaining intrapreneurial outcomes often requires 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 team members 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. Psychological safety has 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 have been shown to influence dimensions of intrapreneurial behaviour. Yu and Davis (2016), for example, showed that autonomy misfit leads to higher levels of proactivity. In the case of autonomy fit, psychological safety has been shows to influence 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 to intrapreneurial behaviour.

In summary, autonomy has been studied as a contributing factor to intrapreneurship in various research. However, previous studies have not considered employees' personal needs for autonomy. Different forms of experienced misfits can have different effects on intrapreneurial

behaviour. Additionally, a psychologically safe team can moderate the effect of misfit on intrapreneurial behaviour. This study examines these various perspectives to produce answers and new questions.

1.3 Academic & practical relevance

The extant academic literature scarcely addresses the relationship between and the effects of autonomy (mis)fit, psychological safety, and intrapreneurial behaviour. Although the elements on their own have been the subjects of many studies, the trilogy of these elements have not been examined together. This research therefore contributes in multiple ways.

1.3.1 Academic relevance

The contribution of this paper to the academia more specifically is twofold. First, a recurring object of study in the field of intrapreneurship is the influence of teams on intrapreneurial behaviour (De Jong et al., 2015; Neessen et al., 2019). The present research contributes to the field by revealing whether and how teams affect the intrapreneurial behaviour of an individual. Specifically, this research examines whether a psychologically safe team environment acts as a catalyst or as a coping mechanism in the case of autonomy (mis)fit for the individual. Secondly, this research also answers a question raised by van Vianen (2018): “Which environmental and individual factors mitigate experienced misfits?”. This research specifically answers whether psychological safety mitigates the experienced autonomy misfit.

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

1.3.2 Practical relevance

Organisations has been 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 an organisation is a prescient problem for organisations. This research aims to show whether autonomy (mis)fit and/or psychological safety are beneficial for increasing the intrapreneurial behaviour of employees, especially for software development organisations, which

represent the context of this research. These insights could lead to the adoption of recruitment strategies where managers select adaptable minds that can cope with misfit between levels of needs and supplies of autonomy (van Vianen, 2018; Yu & Davis, 2016).

Beyond providing advice and insights regarding how to attract and select employees, this research contributes to the field of job design. De Jong et al. (2015) already showed that job autonomy influences entrepreneurial behaviour. However, their research took employees as a homogeneous group. This research attempts to complement that insight by acknowledging the personal needs of autonomy compared to the autonomy supplied by organisations. This additional knowledge can help organisations to develop strategies and mechanisms to design their positions in a way that promotes and enhances intrapreneurship among different individuals.

1.4 Method of research

The study uses a quantitative design to analyse correlating effects between the variables. A diary study was the primary method used 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 daily surveys, a reflective survey (T1) was filled in by participants and their supervisors. The resulting data was analysed using polynomial regression analysis and visualised in the three-dimensional images using surface response modelling.

2. Literature research

The theoretical framework of this study is centred around key concepts discussed in the problem statement. The definitions of these concepts are provided and explained using literature study. Figure 1 shows a visual model of this study.

2.1 What is intrapreneurship & intrapreneurial behaviour?

Intrapreneurship can be defined as "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 the academic literature "intrapreneurship" usually refers to individual workers rather than organisations or boardroom-level decision makers (De Jong et al, 2011). This thesis adopts the point 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 for 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 is 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 intrapreneurial, this behaviour will lead to outcomes such as new products or innovations, new business ventures, or self-renewal (Neessen et al., 2019).

The framework of Neessen et al. (2019) describes 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 an employee's participation in an 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 of employees is conceptualised as the tendency toward innovativeness, risk taking, and personal initiative. This last conceptualisation is commonly used in the literature to measure intrapreneurial behaviour (De Jong et al, 2011; Gawke et al., 2019; Neessen et al., 2019; Stam et al., 2012). This research is primarily concerned with the behaviour of an individual and not the outcomes of that behaviour. Consequently, the conception of entrepreneurial orientation adopted is the viewpoint of De Jong et al (2011) on intrapreneurial behaviour. De Jong et al. define intrapreneurial behaviour "as the identification and exploitation of opportunities by individual workers that (also) advance the organisation."

2.2 The role of autonomy

Labour market conditions are changing. Rapid technological progress, increased employee tenures, a rise in high-skilled jobs, and requests 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). With autonomy becoming a more prominent component of work, the further investigation of its relationship with intrapreneurial behaviour is valuable.

Autonomy is an influencing factor for intrapreneurial behaviour (Neessen et al., 2019). Giving employees the freedom to design their own work and make decisions results in more intrapreneurial activity and higher levels of self-efficacy (Neessen et al., 2019). De Jong et al. (2015) similarly found that job autonomy leads to higher levels of intrapreneurial behaviour, especially with respect to 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 been shown to influence intrapreneurial behaviour through 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 they are given autonomy (Jung et al., 2003; Yukl, 2001). Additionally, both autonomy and innovative behaviour have shown meaningful variability on a 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 research 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 through the lens of job design (see De Jong et al., 2015; Gawke et al., 2019; Rigtering & Weitzel, 2013). Although an organisation may offer autonomy, whether that autonomy will

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

Not all individuals will display the same behaviour, even when they are in the same environment. A popular theory explaining possible reasons for this difference is the 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). In other words, if the characteristics of an individual are aligned with those of the environment, this will lead to a certain outcome in behaviour. The Person-Environment fit theory examines how job attitudes are explained by the fit between individuals and their work situation (Jong & Ford, 2021).

The key assumption of the Person-Environment fit theory is that people have an innate need to fit with 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 of 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 than leaving the organisation (Simmering et al., 2003). Although individuals and organisations might strive for fit during attraction and selection, misfits research might provide organisations with more tangible advice and insight that helps them change their selection strategies or helps new hires adapt to their situation.

To answer the main hypothesis of this research, the fit concept of needs-supplies was chosen. Needs-supplies fit describes the alignment of the employee's 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 predominate. 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 self-regulation view gives an opposing perspective. This view

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

2.2.1 The affective-consistency view

Prevalent idea of the affective-consistency based view is that a needs-supplies fit is required for one to be motivated (Yu & Davis, 2016). This 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. Similarly, negative emotions lead a person to believe that a misfit exists (Yu, 2009). A person perceives the right fit when they have been given the amount of autonomy that accords with their individual needs. The effect of perceiving this fit will positively influence the motivation of the individual. When an individual would like to have more or less autonomy than what their organisation gives them, they perceive a misfit. The misfit would negatively influence the motivation of the individual.

Many studies have 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 influenced intrapreneurial behaviour. Job autonomy also affects job performance. Muecke and Iseke (2019) found that job autonomy leads to better performance as it enhances 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. In short, job autonomy has been found to have positive outcomes on a variety of perspectives. However, underlying all these positive outcomes is a fit between the autonomy needs and supplies. In other words, if an individual's autonomy need fits the organisational supply, the individual will exhibit higher levels of intrapreneurial behaviour. Following the person-environment perspective, fit will show a linear effect on its outcome. When both person and environment are low, the outcome variable will be low. High levels for person and environment will lead to high levels for the outcome variable. For example, Jong and Ford (2021) found that work outcomes were at their highest levels only when the need and supply of autonomy both were high.

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

2.2.2 The self-regulatory view

The 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 that a negative effects from an individual's experience leads to the individual acting to improve their experience. Edwards (1992) argues that an individual's experience of stress has a negative effect on their well-being. This negative experience leads to an individual experiencing negative feelings that kickstart behaviour to improve their well-being, similar to how a thermostat triggers the boiler to reach a desired temperature by recognising when the temperature is not at a desired level.

Following the self-regulatory view, a perceived misfit of autonomy is required for individuals to change. van Vianen (2018) further states that an individual's experience of misfit will lead to them adapting. Depending on the misfit perception, opportunities to repair the misfit, environmental and individual mitigating factors might motivate individuals to leave the job or adapt to the situation (van Vianen, 2018). The literature demonstrated powerful examples of beneficial misfits. For example, in a study that examines autonomy fit and personal development, Simmering et al. (2003) examined autonomy fit and personal development and found that autonomy misfit is essential for creating the impetus for an individual's personal development. The autonomy misfit of newcomers has been shown to lead to higher levels of proactive behaviour (Yu & Davis, 2016). These examples lend evidence to the self-regulatory view of needs-supplies misfit. Consequently, if misfit is required to motivate people, a needs-supplies fit will lead people to refrain from showing intrapreneurial behaviour or simply display less intrapreneurial behaviour.

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 determine the misfit's impact. Additionally, Lambert et al. (2003) showed that not all experienced misfits are important for the individual. In other words, although a misfit may exist, it does not necessarily affect behaviour, attitudes, or outcomes.

Various studies argue that a linear relationship exists between the deficiency of autonomy and its impact on behaviour Stiglbauer and Kovacs (2018) showed that deficient misfit had a linear effect on well-being, meaning that any increase in fit leads to an equal improvement in well-being.

Additionally, their research showed that a slight misfit deficiency actually fosters employee growth and well-being, confirming the self-regulatory view. In a study of employees' online sharing of knowledge, the authors also found a linear effect on job autonomy (Pee & Min, 2017).

It is believed that an excess of misfit will do less harm than a deficient misfit (van Vianen, 2018). The research of Yu and Davis (2016) investigated the level of proactivity of newcomers in an organisation, based on their personal needs for autonomy and what was supplied by the organisation. The authors found that an excess of autonomy misfit led to higher levels of proactivity compared to fit and deficient misfit. This result shows that, in the case of an excess misfit, meaning the organisation provided more autonomy than desired, individuals adapted more easily to 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 autonomy was detrimental for the individual. Substantial levels of excess autonomy have been shown to decrease an individual's well-being (Stiglbauer & Kovacs, 2018). Zhou (2020) argues that an increase in autonomy leads to a depletion of job resources and consequently the subjective well-being of an individual will declines. 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, autonomy negatively impacts intrapreneurial behaviour. The effect of excess autonomy on intrapreneurial behaviour is deemed to be curvilinear instead of linear.

In summary, the affective-consistency based view is centres around autonomy fit. Individual need and organisational supply must be aligned, so that positive emotions will positively influence intrapreneurial behaviour. Which leads to the first hypothesis:

> Hypothesis 1: (a) Intrapreneurial behaviour will be lower when individual autonomy need and organisational autonomy supply are both low and will be higher when both are high; (b) intrapreneurial behaviour will increase as the 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 must be incongruent. Without this misfit, people will not adapt and behave intrapreneurial. This view leads to the second hypothesis:

> Hypothesis 2: (a) Intrapreneurial behaviour will be lower when individual autonomy need and organisational autonomy 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 businesses accomplishes much of their work through teamwork (Edmondson & Lei, 2014; Frazier et al., 2017; Newman et al., 2017). Rather than 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 refers to the shared belief among team members 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 have been linked to higher levels of creative thinking and risk-taking, innovation in R&D teams, process improvements in manufacturing, knowledge creation, and the successful implementation of technology (Newman et al., 2017). Frazier et al. (2017) recognises that psychological safety is a key factor in facilitating the processes 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 important, psychological safety is as well (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 and Lei (2014) argue that the group is the appropriate level for measuring psychological safety. In their systematic review they state: "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.".

2.4 Psychological safety impacting intrapreneurial behaviour

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

De Stobbeleir et al. (2020) discovered that in psychologically safe teams, members engage in feedback seeking. This type of feedback seeking can be labelled as "relational proactivity", and it aligns 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 for experimentations, feedback, and learning by trial and error is one of the two aspects needed to realise intrapreneurial potential (Gawke et al., 2019). The other aspect is proactivity.

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 of psychological safety on components of intrapreneurial behaviour, the authors hypothesise that a relation exists between psychological safety and the complete construct of intrapreneurial behaviour exists. As far as the author knows, there has not been any distinctive research linking psychological safety to the complete construct of intrapreneurial behaviour.

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

2.5 Psychological safety influences the effects of autonomy misfit

Achieving intrapreneurial outcomes, such as new products or self-renewal, does not arise from individual effort, but rather they are achieved through team effort. Today's work is mostly accomplished in collaboration (Edmondson & Lei, 2014; Frazier et al., 2017; Newman et al., 2017). Therefore, the effects of an autonomy misfit on a team member can be influenced by others on the team. As individuals work in teams, the reactions of team members toward one another potentially impacts member attitudes about their work. Consequently, an individual's team can influence their intrapreneurial behaviour. Neessen et al. (2019) called for further research regarding whether the psychological safety of a team influences the intrapreneurial behaviour of team members.

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

2.5.1 Psychological safety in the affective-consistency 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), one can hypothesise that psychological safety will have a positive influence on the intrapreneurial behaviour of team members with autonomy fit. Psychological safety has proven to have a positive effect on the learning behaviour of teams (Edmondson, 1999; Edmondson & Lei, 2014; Frazier et al., 2017). Edmondson (1999) describes learning behaviour 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 team performance (Edmondson, 1999; Edmondson & Lei, 2014; Frazier et al., 2017). Choo et al. (2007) found that psychological safety influenced creativity, divergent thinking, risk-taking, and motivated engagement in learning, all of which increase team performance. 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 leads to perceived fit by the individual (Yu, 2009). Consequently, it is likely that a psychologically safe team would have positive work experiences, resulting in a team that perceives a needs-supplies fit for autonomy. Thus, one can hypothesise that according to the affective-consistency based view, intrapreneurial behaviour is stronger in environments with high psychological safety.

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

2.5.2 Psychological safety in the self-regulatory view

A negative experience is required with the self-regulatory view if individuals are to act. 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.

An excess of misfit has been shown to lead individuals to adapt to a given situation. Yu and Davis (2016) discovered that an excess of misfit leads to higher levels of proactive behaviour by an individual. Ashford and 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. Information seeking and feedback seeking have especially been found to be influenced by psychological safety (De Stobbeleir et al., 2020; van Vianen, 2018). Feedback seeking may help 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, whereas in teams with low levels of psychological safety information will be sought outside the team (De Stobbeleir et al., 2020; Safdar et al., 2017).

According to the self-regulatory view, an excess of autonomy will give individuals the 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 and Davis (2016) showed that a deficiency of misfit also yields to proactive behaviour, although less than what happens with excess misfit. The authors do not provide a clarification for this difference. A possible explanation can be found in the findings of Lambert et al. (2003). They found that deficient misfit leads to greater job dissatisfaction for specific inducements. Work dissatisfaction 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 compared to when it is low

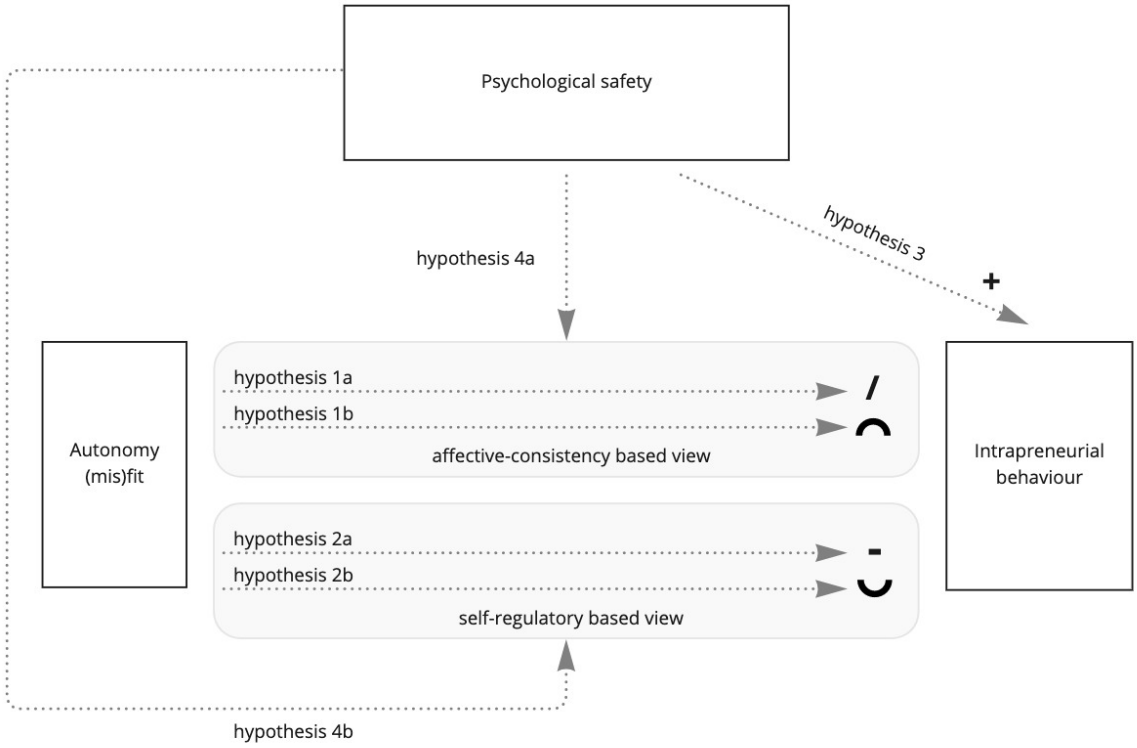

Figure 1: Research framework

3. Methodology

3.1 Research design

Data was collected via diary studies. Diary studies are used for two primary reasons. First, diary studies are helpful for collecting data on working-environment characteristics that are subject to fluctuations (Bakker, 2014). Second, using diary studies helps prevent common rater bias, a pronounced effect in PE-fit studies (Kristof-Brown et al., 2005). Common rater biases are conscious or unconscious tendencies that influence supplied ratings. By using a diary study and thus by collecting responses on multiple days, this bias can be prevented. The developed hypotheses concern the relationships of fluctuating states and are typical research questions answered by a diary study (Ohly et al., 2010).

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

As soon as a sprint started, 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 necessary, as the main concern was not the affective or cognitive observations for a specific event. Rather, this research aimed to obtain an overall perceived assessment of each day. Using daily diaries therefore enabled the participants to fill in the survey at their own convenience, which added to the response rate. To further reduce non-responses and dropouts – which can occur due to diary studies being burdensome (Ohly et al., 2010)– the number of daily questionnaires was capped to 10, as done in previous research (see Vleugels et al., 2018). The daily assessments were capped to a maximum of 5-7 minutes, as suggested by Ohly et al. (2010), to maintain the willingness of participants.

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 for the team was an extended version of the daily surveys. The survey for the team supervisor focused on assessing the perceived intrapreneurial behaviour of the team. The supervisor's 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 to agile methodologies such as Scrum or Kanban. Typically, these teams are self-organising and autonomous. Scrum, for example, has the key philosophy of becoming more proficient, as team, in the leading values of Scrum – namely commitment, focus, openness, respect, and courage – to be successful (Schwaber & Sutherland, 2020). The primary focus of a Scrum team is to make the best possible progress towards the goals they set.

Given the Scrum values and similar values of other agile methods, researching this study's hypotheses in software development teams is expected to yield interesting results. Companies using Scrum are likely to expect their teams to exhibit innovative behaviours, such as adaptation, and self-management is an essential pillar of Scrum (Schwaber & Sutherland, 2020). Additionally, agile teams are typically together for an extensive period. This prevents diluting the 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 this research, teams were required to work in a commercial, for-profit organisation. Survey participants were expected to be from various nationalities, and the survey was therefore in English.

Ohly et al. (2010) emphasised recruiting many persons for participation in diary studies. Empirical data shows that diary studies lose around 20% of their participants (Ohly et al., 2010). Moreover, higher numbers of participants impact statistical power more strongly compared to a higher number of dailies (Scherbaum & Ferreter, 2009). Teams were recruited via the network of the researcher via direct requests, public LinkedIn messages, and via the network of the researcher's employer. Ultimately 72 organisations were contacted, of which 14 (19%) agreed to participate with a single team or more.

3.2.2 Collection procedure

The data for this research was collected in three phases (tbl. 1). The study recognises two types of respondents, team members and supervisors. Team members are those actively participating in the team's development efforts. Members included software developers, engineers, and UX designers. Supervisors are people overseeing or steering the activities of the team, for example, team leads or 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 email. The digital surveys were programmed in the software Qualtrics. The T0 survey was sent a week before the start of the daily collection period and had to be filled in before the first daily. All dailies were sent at 15:30 and only active for the day they were 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 T0 and T1, a reminder was sent on the third day. Participants had the option to opt-out of any email sent to them, effectively stopping their participation in the survey. Ultimately, the supervisors data is only used for supplementary analysis to control main model findings.

3.3 Measures

All measurement items are presented in Appendix A. For all items, a 7-point Likert scale was used.

3.3.1 Intrapreneurial behaviour

Intrapreneurial behaviour was measured using the validated measurement of (De Jong et al., 2015). This measurement has been proven to measure the dimensions of proactiveness, innovativeness and risk-taking. This measurement was used in the daily and the T1 surveys. The T1 survey, both for team members and the supervisor, consisted of nine items. An example item is “I generate creative ideas”. For the daily a shorter three-item construct (De Jong et al., 2015) was used.

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

Another measure of internal consistency is composite reliability. Compared to Cronbach’s α composite reliability does not assume all indicator loadings represent the same population. The

study's data might violate this assumption and as such result into a lower value. The composite reliability for intrapreneurial behaviour was .70. Hair et al. (2021) state that .70 is the minimum threshold for internal consistency reliability. Considering the moderate Cronbach's α and the acceptable value for composite reliability, the construct was deemed consistant enough for use in this study.

For the T1 survey the nine-item construct had a Cronbach's α of .97 for the team members. For the supervisor survey the construct had a Cronbach's α of .98.

3.3.2 Autonomy (mis)fit

To determine the (mis)fit of autonomy for an individual the construct of (Spreitzer, 1995) was used. The construct was used at T0 and for the daily surveys. To determine both the need and the supply, the same three items were 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 a prefix for the supply and "I find…" as prefix for the need.

This validated measurement consisted out of three items. "The opportunity to determine how I do my job" is an example item. Cronbach's alpha's for the various surveys were T0/Need: .93; T0/Supply: .94; T1/Need: .92; and T1/Supply: .89.

3.3.3 Psychological safety

Psychological safety was measured via the well-proven construct of Edmondson (1999). As part of the T0 survey, participants were required to respond to seven items. Example items 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 had a Cronbach α of .67, which is doubtful. Removing an item would not yield a higher reliability score. The composition reliability of this construct was .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 was added to the T0 survey as a control variable. The meta-review study of Neessen et al. (2019) found that intrapreneurs have a higher educational level in comparison with other employees. Similarly, educational level influences job autonomy (Ross & Reskin, 1992). To discern

participants' educational level, the survey asked, "Which is your highest earned education?" Possible answers were high school, bachelor, master, doctorate, and other.

Prior experience has been shown to improve individuals' ability to recognise opportunities (Neessen et al., 2019). To prevent confounding results, a control variable for "first job" was added.

3.4 Data analysis

The data analysis was conducted using 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 hypotheses.

The reliability of the constructs in the survey is was tested by calculating Cronbach's alphas (α). The internal consistency is was deemed valid enough at if a score of .7 or higher was obtained. For constructs that didn't did not meet this threshold — or just barely met this threshold - – additional tests for reliability are were done using composite reliability.

The analysis of relations and effect between the variables was done using polynomial regression equations (Edwards & Parry, 1993). Polynomial regression analysis allows researchers to analyse the effects of two predictor variables in relationship to an outcome (Shanock et al., 2010). As an analytical technique, polynomial regression is often used to study Person-Environment fit (e.g. Edwards & Cable (2009); Kristof-Brown et al. (2005); Yu & Davis (2016)). Polynomial regression equations notably 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 shown below, where N = individual autonomy needs and S = organisational autonomy supplied.

$$Z = b_0 + b_1N + b_2S + b_3N^2 + b_4NS + b_5S^2 \tag{1}$$

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

$$\begin{gathered} Z = b*0 + b_1N + b_2S + b_3N^2 + b_4NS + b_5S^2 + \\ b_6PS + b_7PSxN + b_8PSxS + b_9PSxN^2 + b*10PSxNS + b\_11PSxS^2 \end{gathered} \tag{2}$$

The results of the polynomial regression analysis were 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). This view 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. The interpretation of the surfaces was done using four test variables: $a1$, $a2$, $a3$, and $a4$. The first two test variables were 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 $a4$ were used to evaluate the curvature of each corresponding line. Unstandardised values are used to calculate the as. 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

For the analysis, all data was exported from Qualtrics into Google Sheets. Relevant data was 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 including extra data, such as psychological safety from the T0 survey added as additional columns. This process resulted in a workable dataset for polynomial regression analysis in RStudio. Partial surveys were deleted from the dataset. For the dailies, eight unfinished surveys were deleted, resulting in 336 useful datapoints.

A total of 24 teams participated in the daily studies. The number of unique participants was 79, of which 57% filled in the daily survey at least four times or more. Only two participants (2.5%) filled in all 10 surveys. A total of 135 participants registered to participate. With 79 unique persons responding, the response rate was 59%.

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

3.4.2 Characteristics of the survey participants

The characteristics of the survey participants represent only 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 per week. The ages of the respondents ranged between 21 and 64 ($M = 36.81$, $SD = 9.21$) and ,most were highly educated (87% had at least an bachelor's 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, preventative measures were taken.

Non-response, To prevent non-responses, the recommendations of Ohly et al. (2010) were incorporated into the research design. Limiting the number of surveys and making it easy to complete them helps prevent non-responses. Starting from the fourth distribution group, a personal introduction email was sent to the participants. The email outlined the goals of the survey and allowed participants to more easily communicate with the researcher in case they had questions.

Internal validity, To raise the internal validity of the research, all constructs were taken from well-tested sources. For example, the construct of psychological safety is an often-used construct in similar settings of research.

Reliability, The reliability of the research was enhanced through the use of temporal sampling. The three main constructs are surveyed in either T0 and the daily surveys or the daily surveys and T1. This allowed for the triangulation of the data.

4. Results

4.1 Descriptive analysis

Table 2 presents the means, standard deviations, and zero-order correlations for the variables. The survey origin is added for each variable. These origins have been used for analysing the main model. Supplementary analysis has been held to control the results of the main model. The supplementary analysis 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 variation 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 was particularly helpful in understanding what happened here. Regarding the control variables, only a significant relation between psychological safety and education was found. Since all other correlations were insignificant, the control variables were ignored in the further analysis of the data.

Table 2: Means, Standard Deviations, and Correlations among the Study variables (significance codes: '**' 0.01 '*' 0.05)

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	-

Confirmatory factor analyses showed that the four-factor model in which the studied variables were kept separate fit better 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 than 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

The multiple linear regression analysis (χ2 = 0.0423, F (266) = 5.874, ρ < 0.01) showed that individual autonomy needs and organisational autonomy supply exhibit different behaviour. For every 1% increase in individual autonomy need an 0.24% increase in intrapreneurial behaviour was found (ρ < 0.01). Regarding organisational supplied autonomy each 1% increase led to 0.17% decrease in intrapreneurial behaviour (ρ < 0.05). Polynomial regression analysis provides answers to the two predictive autonomy variables on the outcome variable, intrapreneurial behaviour. Following the protocol established by Edwards (1993) the polynomial regression analysis was 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 a moderator, which follows 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. Both models had low R^2 values. As this study tests a congruence hypothesis the R^2 values are not informative. For testing the hypotheses the pattern in the coefficients is crucial, and this pattern is not given by the 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
F-statistic	2.61 *		2.28 *	
R²	.05 *		.08 *	
ΔR²			-.03	

To better understand polynomial regressions results; Shanock et al. (2010) recommends using three-dimensional visualisations. The analysis for the main model is illustrated in figure 2, figure 3 illustrates the moderated model. Each surface shows the effect of (in)congruence between needs and supply along the outcome variable, intrapreneurial behaviour. As such, it allows for a 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 where individual autonomy needs matches the organisational supplied autonomy supplied by the organisation. In other words, this situation represents autonomy fit. The outcome of misfit on intrapreneurial behaviour is represented by what happens left or right from of the line of perfect fit shows the outcome of misfit on intrapreneurial behaviour. The opposite situation is captured by the line of incongruence, the Y=-X line. This line represents the situations where individual need is opposite of organisational supply. As such, it represents the relationship of perfect misfit (i.e., 7 on need and 1 on supply) on intrapreneurial behaviour. Complete incongruence is found in the top-left-top and bottom-right-bottom corner.

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 slope value for a slope suggests that the outcome increases linearly as both predictors increase. A significant value for curvature tells something about indicates the degree of discrepancy. High curvature 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

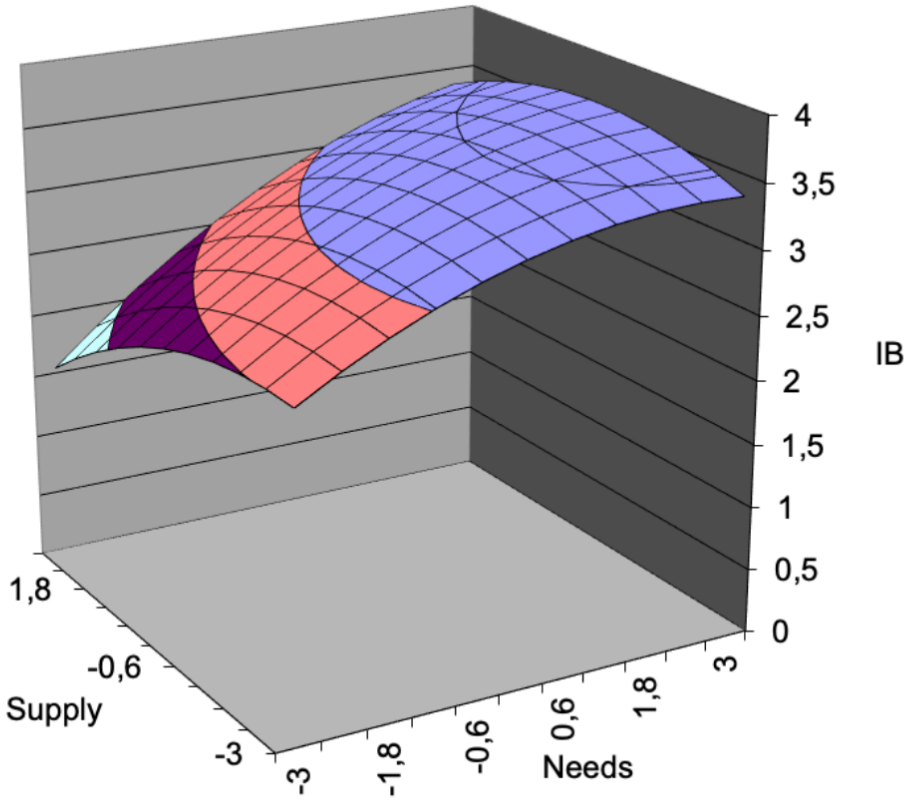

Figure 2: Response surface linking our main model of needs-supplies fit on autonomy and intrapreneurial behaviour

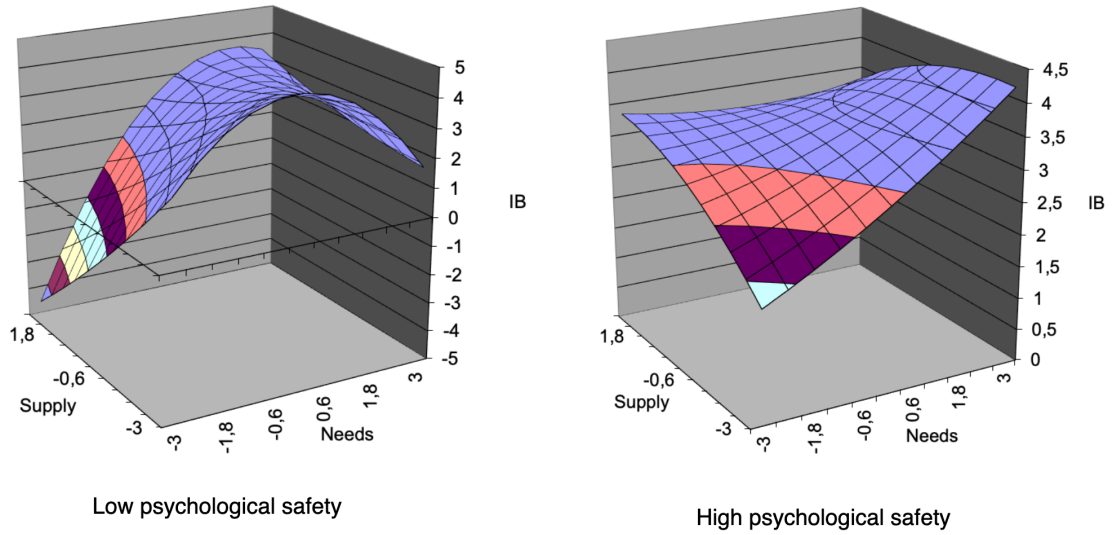

Figure 3: Relationship between autonomy and intrapreneurial behaviour at Low and High levels of psychological safety

4.3 Hypothesis testing

> Hypothesis 1: (a) Intrapreneurial behaviour will be lower when individual autonomy need and organisational autonomy 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 for the interaction of the terms. 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, the values of a1 and a2 are particularly interesting, 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 was found for both values, meaning there is no evidence to support hypothesis 1a. Part b claims that reducing the deficiency of autonomy leads to higher levels of intrapreneurial behaviour. If autonomy is excessive, this will lead to lower levels of intrapreneurial behaviour. This possibility 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 since the test values of a3 and a4 were both insignificant, no claim can be made. Thus, hypothesis 1b lacks supporting evidence.

> Hypothesis 2: (a) Intrapreneurial behaviour will be lower when individual autonomy need and organisational autonomy 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 autonomy fit, either both low individual need and organisational supply, and high individual need and organisational supply, of autonomy would lead to respectively low or high levels of intrapreneurial behaviour. If correct, the surface of the main model in 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 as well. As the value of $a2$ was insignificant, no evidence exists in support of hypothesis 2a.

Part b of hypothesis 2 suggests that a degree of discrepancy between individual need and supply should exist, and the surface should be convex (high edges; low middle) along the line of incongruence. The surface in the main model (fig. 2) instead is concave, and the test value of $a4$ (tbl. 4) is insignificant. Consequently, no evidence supports 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 was 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. Thus, hypothesis 3 lacks supporting evidence.

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

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

Hypothesis 4: Hypotheses 4a and 4b both suggest that high levels of psychological safety are beneficial, regardless of whether a (mis)fit of autonomy needs and supply exists. To test these hypothesis surface models (fig. 3) and surface test values (tbl. 4) were 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 than a deficiency of autonomy.

No significant results were found for environments with high psychological safety. Therefore, comparing the environments with low and high psychological safety would not lead to meaningful insights and hypothesis 4a and 4b are not supported.

4.4 Supplementary analysis

The main analysis was not able to find a revealed no significant relation between psychological safety and intrapreneurial behaviour. This relation was tested by using the three-item construct of intrapreneurial behaviour, a construct with a relatively weak Cronbach's α of .65. The nine-item construct used in both T1 surveys had higher reliability scores. Therefore, control tests were run for psychological safety using on the T1 survey of the team members and on that for the supervisors. Both these tests also yielded insignificant results as well. The self-reported found an effect of .13 (χ2 = 0.0021, F (260) = 0.564, ρ < 0.453) and the supervisor survey had a value of -.19 (χ2 = 0.0029, F (267) = 0.785, ρ < 0.376). This lack of evidence further supports the rejection of 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 promote innovative behaviour. Intrapreneurship is well-researched, but many questions about it remain unanswered. This research attempts to shed light on the relation between autonomy (mis)fit and intrapreneurial behaviour, which is a relationship that can potentially be influenced by levels of team-level psychological safety. The relationship between psychological safety and autonomy (mis)fit and intrapreneurial behaviour was therefore examined. Two dominant views are prevalent in the academic literature. The affective-consistency view argues that fit has to exist between autonomy needs and supply to foster intrapreneurial behaviour. The self-regulatory view presents an opposing view. This view argues that a misfit is required to foster intrapreneurial behaviour.

This research used polynomial regressions and the 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 were 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). The results of the polynomial regression analysis did not yielded any no significant results. Importantly, the interaction between needs and supply notably does not showed no a distinct relationship between with intrapreneurial behaviour. The lack of a distinct relationship does not speak in favour of the affective-consistency view, which argues that fit is required to obtain 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 validity for the affective-consistency view in the context of autonomy fit and intrapreneurial behaviour.

Characteristics of psychological safety are similar to antecedents of intrapreneurial behaviour at first glance. This research examined the potential existence of a direct relationship between psychological safety and intrapreneurial behaviour. This relationship was not found. Although a direct relationship does not exist, psychological safety could still have a moderating effect between autonomy (mis)fit and psychological safety. Conclusive statements could not be found. For environments with high psychological safety, no significant results were found.

For environments with low psychological safety, a large excess of autonomy was found to lead 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.

5.2 Discussion

5.2.1 The role of autonomy on intrapreneurial behaviour

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

This study found no significant relation between autonomy (mis)fit and intrapreneurial behaviour. In other words, no significant relation was found between our two predictor variables and the outcome variable, intrapreneurial behaviour. This is, for example, shown by the lack of significance in the interaction between needs and supplies (tbl. 3). Given the meta reviews of Neessen et al. (2019) and Blanka (2019), one might find this result peculiar. Three elements can explain it.

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 views the relationship between autonomy and intrapreneurial behaviour through a person-environment fit lens. The person-environment fit suggests that behaviours, and other outcomes, result from the relationship between person and environment. Therefore, a different lens was applied to the relationship between autonomy and intrapreneurial behaviour than previous research.

Edwards et al. (2006) state the importance of applying a different lens. Edwards et al. recognise three approaches to the person-environment fit: (a) the atomistic, which separates the person and the environment; (b) the molecular, which looks at the discrepancy between person and environment; and (c) the molar, which focuses on the perceived match or fit between the person and environment. Figure 4 visualises these three approaches.

The meta reviews tested autonomy using 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. Rigtering and Weitzel (2013) similarly examined individuals' autonomy to make their own decisions and control their own job as factors for intrapreneurial behaviour.

This study followed an atomistic approach. It evaluated the needs and supply of autonomy as separate entities, which is similar to the approaches of Yu and Davis (2016) and Vogel et al. (2016).

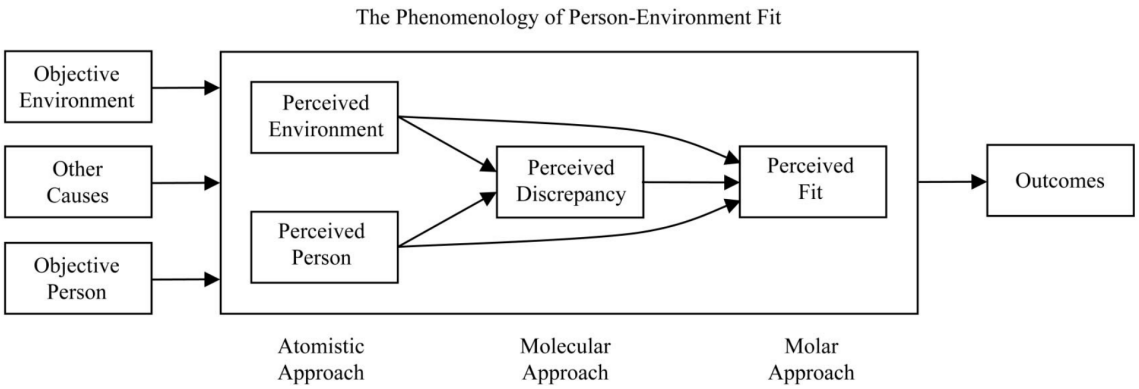

Figure 4: Phenomenology of Person-Environment fit (Edwards et al., 2006)

Given the atomistic approach of this study autonomy in its relation with intrapreneurial behaviour can be reviewed more thoroughly. The findings of this study suggest autonomy should not be viewed as a needs-supplies fit in relationship to 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 whether the affective-consistency view and the self-regulatory view are in fact competing views. The affective-consistency view seems to be centred around the molar approach, whereas the self-regulatory view uses the atomistic approach. Rather than competing, the two views might be looking at the same relationship at different levels. With the risk of interpreting relationships, its origins, and consequences differently.

Finally, this study tested autonomy in a broad sense of the concept. The items of Spreitzer (1995) test for job autonomy, decision making, and freedom. Autonomy, as combination of these three items, did not show a significant relation with intrapreneurial behaviour. Not in the case of individual autonomy need, as organisational autonomy supply.

5.2.2 Psychological safety as moderator

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

This study found no significant relationship between psychological safety and intrapreneurial behaviour. This finding was repeatedly found by comparing psychological safety with the daily

measurements, the self-reported T1 measurements, and the supervisor reported T1 measurements. The lack of a significant relationship contradicts recently published research. Mahmoud et al. (2021) found a significant relationship between psychological safety and intrapreneurial behaviour. Their research investigated this relationship in Nigeria among middle-managers. Differences might be explained due to role or culture. For example, Edmondson and Lei (2014) note that: "employees in certain cultures may be particularly hesitant to ask questions, provide feedback, or openly disagree with their superiors" (p. 8). The low impact of psychological safety on outcomes is not uncommon. The review of Edmondson and 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 that psychological safety can have.

Although no direct relation between psychological safety and intrapreneurial behaviour was found, there was a significant moderating effect. In an environments of low psychological safety, an individual supplied with high levels (excess) of autonomy, while not having a desire for autonomy, will show little intrapreneurial behaviour. This contradicts the dominant belief that an excess of misfit will do less harm than a deficient misfit (van Vianen, 2018). In environments with low psychological safety, an excess clearly leads to lower intrapreneurial behaviour. In fact, a slightly deficient misfit was found to lead to the highest level of intrapreneurial behaviour when experienced in an environment with low psychological safety. Thus, the effect of this deficient misfit supports the self-regulatory view.

Other research has also found that a slight misfit results in positive behaviour (Simmering et al., 2003; Yu & Davis, 2016). A negative effect of excess was not found in these studies. This raises the question, is there a compounding effect of the two negative elements on intrapreneurial behaviour? A chicken or egg question might exist in this case. Does the lack of desire for autonomy originates due to the low psychological safety or does the lack of desire result in one perceiving the environment as psychologically unsafe. In any case, providing an excess of autonomy to an individual negatively affects their intrapreneurial behaviour when they are in an environment with low psychological safety.

5.2.3 Affective-consistent or self-regulation; who is the winner?

Two competing views were being tested in this research. The lack of support for hypothesis 1 goes against Negative findings for the affective-consistency view is the lack of support for hypothesis 1. If the view is correct, the analysis would have shown a significant a1 and a2 value and a linear surface along the line of perfect agreement. The absence of these findings do not speak in favour for go against the affective-consistency view but supports . Which also adds

positively for the self-regulatory view. Although no significant findings have been were found in the main model, the low psychologically safe environment did yielded significant results. The positive effects of deficient misfit on intrapreneurial behaviour are positive signs for support the self-regulation view.

Considering all the found results — and the limitations of this research — no conclusive statement can be made regarding on which view is better explains how to foster for intrapreneurial behaviour. More research is therefore required for better insights and significant findings. The analysis and findings of this research can be used as a beacon for further directions and recommendations, both in practice and in research

5.3 Recommendations for practice

Organisations that are under constant pressure to innovate can benefit from intrapreneurship in their organisation. Intrapreneurship can influence an organisation's ability to develop new products or services or to renew itself. This research has not revealed significant relationships between autonomy (mis)fit and intrapreneurial behaviour and psychological safety and intrapreneurial behaviour.

However, the study's findings suggest that individual autonomy needs and the 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. This would suggest that most people are in a situation of misfit and a form of discomfort. The significant finding regarding environments with low psychological safety shows that a small deficient misfit leads to higher levels of intrapreneurial behaviour. Instead of striving for a needs-supplies fit during candidate selection, organisations should rather emphasise training and support systems to help employees handle misfit.

This study found that an excess of autonomy, when little is desired, in environments with low psychological safety leads to a lack of intrapreneurial behaviour. When an organisations experiences low levels of intrapreneurial behaviour, an 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 should consider reducing autonomy. By expecting less of the team, a decline of safety could be halted. Organisations that regularly conduct employee satisfaction surveys (e.g., eNPS) could easily add this set of questions to their survey and take corresponding actions.

5.4 Recommendations for research

This research has contributed to the academic field but also has some limitations. This study found no supporting evidence for the proposed hypotheses. Consequently, this study primarily raises new questions and does not provide definitive answers. Data for this study was collected using a diary study (12 points) and a single supervisor survey. Although this allowed for the triangulation of the data, the data was predominantly gathered using self-reports. Self-reports can lead to the common-method bias. Meaning, that answers are reported in a consistent manner (Podsakoff et al., 2003). Teams that participated in the survey did not participate as a whole. Only a few individuals from each team filled in one or more surveys, which increases the risk of self-selection issues. Future research could avoid these limitations by reducing the number of timepoints, thereby reducing the effort for all team members to participate.

The relationship between autonomy and intrapreneurial behaviour withholds many related questions. Likewise, many questions for future research exist regarding the influence of psychological safety. Are the self-regulatory view and the affective-consistency view competing views, or are they concerned with different things? The three approaches regarding Person-Environment fit of Edwards et al. (2006) offer a wealth of opportunities to explore this question. Future research that combines the atomistic and molar approach could provide insight into what the effects of both approaches on intrapreneurial behaviour are. The atomistic approach may tend to measure different aspects compared to the molar approach. This might provide answers with regards to the views of self-regulation and affective-consistency.

This study found no direct relationship between psychological safety and intrapreneurial behaviour. Additional research should further investigate the possible existence of this relationship. There might be potential influencing factors, such as culture or organisational role. Contextual elements such as certainty of work or learning behaviour could influence the relation between the two constructs as well. A large set of questions and possibilities must still be researched and analysed in future research.

A high supply of autonomy, when none is desired, leads to low intrapreneurial behaviour in environments with low psychological safety. Further research could determine the directionality. Does the low level of desired autonomy originate from low levels of psychological safety or do other factors play a role here? There might be a circular relationship. Too much autonomy leads to higher levels of feeling unsafe, where the excess is high and intrapreneurial behaviour declines. A better understanding of this directionality is also useful for organisations. If it origins from low psychological safety, organisations have ample opportunities to better the situation. For example, they may use trainings and support systems. If other factors are at play, it might affect hiring and selection strategies and consequently reduce the potential pool of candidates.

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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