

# A time-lagged study on the effect of the need for belongingness on employees' organizational commitment

Analyzing the moderation effects of autonomy and competence on the effect of the need for belongingness on organizational commitment

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# Contents

<b>Abstract .....</b>	<b>4</b>
<b>1 Introduction.....</b>	<b>5</b>
<b>2 Theoretical framework.....</b>	<b>11</b>
2.1 Need for belongingness .....	11
2.2 Self-determination theory.....	11
2.3 Organizational commitment.....	13
2.4 Need for belongingness and organizational commitment.....	14
2.5 SDT and the effect of the need for belongingness on organizational commitment .....	15
2.6 Conceptual model.....	16
<b>3 Methodology .....</b>	<b>18</b>
3.1 Approach & methodology.....	18
3.2 Research design.....	19
3.3 Sample.....	19
3.4 Measures.....	22
3.4.1 Dependent variable.....	22
3.4.2 Independent variable.....	22
3.4.3 Moderating variables .....	23
3.4.4 Control variables .....	24
3.5 Research ethics .....	25
<b>4 Results .....</b>	<b>26</b>
4.1 Descriptives and correlations.....	26
4.2 Testing of hypotheses .....	27
<b>5 Discussion.....</b>	<b>31</b>
5.1 Discussion of results.....	31
5.2 Conclusion.....	32
5.3 Limitations and recommendations for future research .....	33
5.4 Practical recommendations.....	35
<b>6 Literature.....</b>	<b>37</b>

<b>7 Appendix.....</b>	<b>42</b>
<i>Appendix A – Survey .....</i>	<i>42</i>
General information.....	42
Need to belong scale.....	42
Workplace commitment.....	43
Autonomy .....	43
Competence-based scale of employability .....	43
<i>Appendix B – Statistical outputs.....</i>	<i>45</i>
Demographics of the sample.....	45
Factor analysis.....	46
Reliability analyses.....	52
Descriptive analysis .....	55
Correlation analysis .....	56
Assumptions of regression .....	57
Multiple regression analysis.....	58
Moderation analyses.....	61

# Abstract

On the basis of the self-determination theory, this study examines the time-lagged effect of the need for belongingness on employees' organizational commitment and it explores the moderating role of autonomy and competence. The need for belongingness, which every individual has, can be fulfilled within the workplace. Persons can volitionally choose to form meaningful connections or bonds with commitment foci in order to fulfill the need for belongingness. One of these commitment foci is the organization they work for. When persons choose to form connections or bonds with the organization they work for in order to fulfill their need for belongingness within the workplace, their organizational commitment increases. This research aims to examine the underlying dynamics of the effects of the need for belongingness of employees on their organizational commitment. Data was obtained from the "Healthy Brain Study". This study uses a quantitative approach to analyze the comprehensive dataset. This study tested whether there is a time-lagged effect of the need for belongingness on organizational commitment. Furthermore, this study tested the proposed moderating effects of autonomy and competence on this relationship. Contrary to the initial hypothesis, the results of this study indicate no significant time-lagged effect of the need for belongingness on organizational commitment. Furthermore, the anticipated moderating effects of autonomy and competence on this relationship were not supported by the data. Further research is needed to study the underlying mechanisms of the effect of the need for belongingness on organizational commitment.

*Key words: Need for Belongingness, Organizational Commitment, Autonomy, Competence, Self-Determination Theory*

# 1 Introduction

Human beings are inherently social creatures. Every individual has a certain need for belongingness (Baumeister & Leary, 1995). The need for belongingness is the intrinsic desire of individuals to form and maintain meaningful connections with others (Baumeister & Leary, 1995). This desire shapes our interactions, affects our well-being, and impacts the dynamics in our workplaces.

The need for belongingness is a concept that is studied in the past. One of these studies is a study by Deci & Ryan (2012), in which they created a theory named the self-determination theory (SDT). According to the SDT, there are three psychological needs, namely autonomy, competence, and relatedness (Deci & Ryan, 2012). Autonomy means that employees experience their work as volitional and self-endorsed (Niemic & Ryan, 2009). Competence refers to employees to have the feeling that their work is effectively enacted (Niemic & Ryan, 2009). Relatedness is explained as a sense of belonging, reciprocity, and caring (Deci & Ryan, 2012). Relatedness can be explained by the need for belongingness (Tóth-Király et al., 2023). This is the desire to form and maintain meaningful connections with others (Baumeister & Leary, 1995). These three aspects are the three motivations of employees within their workplace (Deci et al., 2017). Every person has a certain need for belongingness and every person will seek for commitment in order to fulfill this need. This commitment in order to fulfill the need for belongingness can occur in one or multiple places.

One of the places where persons could commit themselves to, in order to fulfill their need for belongingness, is within the workplace (Reichers, 1986). The need for belongingness leads to the creation of connections (Baumeister & Leary, 1995). When persons have a need for belongingness, they will form connections. One of these places where people can make connections is within the workplace. When people have a certain need for belongingness, they can choose to form connections with the organization they work. However, the SDT argues that when autonomy and competence are present, it promotes the choice of persons to commit themselves to the workplace (Deci et al., 2017). When autonomy and competence are present within the work sphere, persons are thus more likely to choose to form connections or bonds with the organization they work for to give them a sense of belonging. When a person chooses to form these connections or bonds at work, this can lead to organizational commitment (Klein et al., 2012). However, Klein et al. (2012) state that individuals can form multiple types of bonds. The types of bonds that individuals can form are instrumental, acquiescence, identification, and commitment bonds. An

instrumental bond occurs when a person chooses to stay with the organization after weighing the costs and benefits (Klein et al., 2012). An acquiescence bond is when the individual perceives that they have no choice but to stay (Klein et al., 2012). An identification bond is when an individual merges oneself with the organization (Klein et al., 2012). And a commitment bond occurs when individuals volitionally choose to dedicate themselves to, and have responsibility for the organization (Klein et al., 2012). This study will look at the commitment bonds employees form with the organization they work for. In this study it is assumed that the process of forming certain commitment bonds is volitional and the decision to make a commitment bond is made consciously by individuals. Because of the volition aspect of this type of bond, this study looks into commitment bonds specifically and does not take the other types of bonds into consideration.

Besides the organization a person works for, persons can also choose to fulfill their need for belongingness at other places. The need for belongingness every person has is the intrinsic desire to form meaningful connections (Baumeister & Leary, 1995). This desire could be accomplished by committing themselves to the organization they work for but these connections can also be made elsewhere. The places where persons can form connections to fulfill their desire can be a partner, friends and family, a supervisor, colleagues, career, profession, or the organization (Becker et al., 1996; Vandenberghe et al., 2004). These various places to which a person can choose to commit to are called commitment foci. Commitment foci are persons, groups, or organizations to which a person can choose to commit themselves to (Vandenberghe et al., 2004). Which of these foci a person chooses to commit to and form connections with can be one or multiple of said places (Becker et al., 1996). There are a total of six foci to which an individual can be committed.

Firstly, a person can be committed to their partner, friends, and family (White, 1999; Branje et al., 2007). Persons can choose to be committed to their relationship, friendships, and family members and fulfill their need for belongingness within this commitment focus.

Secondly, persons can be committed to their supervisor (Becker et al., 1996). Early research only examined the commitment of employees to the organization and did not study commitment to the supervisor and commitment to colleagues separately (Paillé et al., 2011). However, Vandenberghe et al. (2004) state that commitment to the supervisor, colleagues, and commitment to the organization should be distinguished from each other.

So, thirdly, there is commitment to a person's colleagues (Pearce & Herbik, 2004). This commitment occurs when persons are psychologically attached to their team members at work (Pearce & Herbik, 2004).

Fourthly, a person can be committed to their career (Blau, 1985). In this study, a person's career is distinguished from a person's profession. A person's commitment to their career is the psychological bond that reflects the volitional dedication and responsibility to their career (Klein et al., 2012).

Fifthly, persons can be committed to the profession in which they operate, so, the field of their work. Commitment to the profession is when a person is psychologically attached to their profession and when they identify with their profession (Morrow & Wirth, 1989). When people are highly committed to their profession, they will have a strong willingness to stay in that profession and to put effort into their profession (Singh & Gupta, 2015).

And finally, persons can choose to commit themselves to the organization at which they are employed. Commitment to the organization is a type of bond that reflects the volitional dedication and responsibility to the organization at which the person is employed (Klein et al., 2012). Persons make a conscious choice to dedicate themselves to and care about a certain target. In this case, the organization they work for (Klein et al., 2012).

So, as every person has a certain need for belongingness, they will seek for commitment to a target in order to fulfill this need. Individuals can choose between these multiple targets to commit themselves to, in order to fulfill their need for belongingness. This choice of committing themselves to one or multiple of the targets, happens over time. It is a complex process which is influenced by individual and situational factors (Becker et al., 2012). The choice individuals make to commit themselves to one target instead of the other target is a volitional and conscious choice (Klein et al., 2012). Persons can also choose to form commitment bonds with multiple targets (Becker et al., 1996). This research will focus on the need for belongingness of persons and whether this certain need for belongingness manifests within the workplace and has an effect on persons' organizational commitment.

The need for belongingness is one of the three motivations of persons at work (Deci & Ryan, 2012). Besides the need for belongingness, autonomy and competence also influence the decision to make connections at work, instead of at other foci (Becker et al., 2012). This study uses the SDT by Deci & Ryan (2012). The SDT provides more insight in the driving mechanisms to

form meaningful connections at work and organizational commitment. This theory includes all three motivations of employees at work; autonomy, competence, and the need for belongingness. This study will look at the need for belongingness and its effect on organizational commitment and this study takes autonomy and competence into account as possible moderators on this effect. This is done because theory suggests that when autonomy and competence are present, persons are more likely to choose to commit themselves to the organization they work for (Deci et al., 2017). Previous research has not included all three motivations yet. Therefore, there is a need to expand existing knowledge on the influence of the need for belongingness on organizational commitment by including autonomy and competence. The use of the SDT enables the researcher to include autonomy and competence and therefore create a more comprehensive understanding of the mechanisms concerning the need for belongingness and organizational commitment.

Previous studies have researched how the need for belongingness manifests in the workplace and how it leads to organizational commitment (e.g. Joseph, 2023; Imboden, 2024; Du et al., 2022). However, these previous studies have used the social exchange perspective as a theoretical lens. While this perspective offers valuable insights into the nature of social interactions within the organizational milieu, it offers an incomplete understanding of the interplay between individual motivations and organizational outcomes. The social exchange perspective does not take autonomy and competence into account when looking at the effect of the need for belongingness on organizational commitment. Therefore, there is a need for a more expansive theoretical framework which includes autonomy and competence. So, this study uses the SDT as a theoretical framework.

Furthermore, this study will look at the need for belongingness instead of the fulfillment of it. This study looks at the need for belongingness that people have, and this study unpacks the process of the development of a commitment bond in order to fulfill the need for belongingness, instead of focusing on the fulfillment of the need. By doing this, this research adds to existing theory by providing more insight into the process that ultimately leads to the fulfillment of the need for belongingness. So, this study does not look at the fulfillment of the need for belongingness, as opposed to existing research (e.g. Mohamed et al., 2014; Raza et al., 2020). Existing research has looked at the fulfillment of the need for belongingness within the workplace. There is a lack of knowledge in existing research on the underlying process of the need for

belongingness towards commitment bonds. Here, this research will add to existing literature by unpacking this process.

Besides the academic relevance, the results of this study are valuable for organizations. The results of this research will provide organizations with insights into the factors that influence employees' need for belongingness and their organizational commitment. Understanding that certain factors might influence the need for belongingness and the commitment of employees can help organizations with developing strategies aimed at increasing organizational commitment. Organizational commitment of employees is useful for organizations because employees' organizational commitment can lead to increased employee performance and productivity, and decreased absenteeism (Nath & Agrawal, 2015). Therefore, it is valuable for organizations to understand if and when people seek to fulfill their need for belongingness at the workplace in order to enhance the organizational commitment of their employees.

Against this backdrop, this study aims to understand the effect of the need for belongingness on employees' organizational commitment. Furthermore, this study takes the possibly moderating effects of autonomy and competence into account. The research question that results from this is:

*“To what extent is there an effect of the need for belongingness on employees' organizational commitment and how do autonomy and competence moderate this effect?”*

This research studies the need for belongingness, autonomy, competence, and the organizational commitment of a large group of employees at three moments in time. By doing this, the researcher aims to unpack the process of how the need for belongingness leads to organizational commitment. Furthermore, the researcher wants to gain more insight into whether autonomy and competence influence the effect of the need for belongingness on organizational commitment. The SDT states that a need for belongingness has an effect on the organizational commitment of employees (Deci et al., 2017). However, this theory does not take into account that this effect of the need for belongingness on organizational commitment is a process which occurs over time. By questioning a group of employees in three moments in time, this study aims to unravel the process of the effect of their need for belongingness on their organizational commitment. The need for belongingness of the respondents at the first timestamp was tested and

the autonomy and competence of the employees was then tested at the second timestamp. Then, the researcher tested whether this affected the organizational commitment of the respondents at the third and final timestamp of the survey. Based on the results of these analyses, an answer to the research question will be formulated.

In the following chapter, the theoretical framework will be presented. All relevant existing theories will be discussed and ultimately, a conceptual model will be created. In the third chapter, the methodology of this study will be discussed. This chapter presents the gathering, processing, and analyses of the data used in this study. In chapter four, the results of the analyses of the data will be shared. And lastly, the fifth chapter contains the conclusion and discussion of the study. This final chapter will include the limitations of this study and recommendations for future research.

## 2 Theoretical framework

This chapter provides an overview of the existing literature that is relevant to this study. Firstly, the concept of the need for belongingness will be presented and explained. Then, the self-determination theory (SDT) will be introduced and its connection with the need for belongingness will be delineated. Thereafter, the concept of organizational commitment will be discussed. Then, the effect of the need for belongingness on organizational commitment will be discussed. Subsequently, the theoretical lens of the SDT will be introduced regarding the effect of the need for belongingness on organizational commitment. This results in three hypotheses on this effect and its possible moderators. Finally, the conceptual model of this study will be shared and explained at the end of the theoretical framework.

### 2.1 Need for belongingness

The need for belongingness is a widely researched concept. Many psychologists studied this concept in various forms. For instance, Freud (1930) studied the need for interpersonal contact and Maslow (2013) studied the need for love and belongingness. Previous research on the need for belongingness states that all individuals do have a certain need for belongingness. This study uses the definition for the need for belongingness by Baumeister & Leary (1995), which says that an individual's need for belongingness is "a pervasive drive to form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships" (p. 497). This definition takes into account that for satisfying the need for belongingness, the interactions need to occur frequently, and they need to be pleasant (Baumeister & Leary, 1995). In addition, the interactions need to occur in a stable and lasting context (Baumeister & Leary, 1995).

### 2.2 Self-determination theory

This study will use the self-determination theory (SDT) as a theoretical lens to look at the effects of the need for belongingness of individuals on their organizational commitment. The SDT is a psychological macro theory that studies the relationship between social-contextual factors and human motivation, behavior, and personality. SDT suggests that there are various environmental factors that influence employees' motivations but that these relationships are moderated by psychological needs (Deci et al., 2017). These psychological needs are the need for autonomy, the

need for competence, and the need for relatedness. Relatedness is explained as a sense of belonging, reciprocity, and caring (Deci & Ryan, 2012). When these three psychological needs are fulfilled, it results in enhanced motivation, performance, and well-being of employees (Deci et al., 2017). This study will focus on the psychological need for belongingness specifically, and how and when this need for belongingness leads to commitment to the organization in order to fulfill the need. Moreover, this study unpacks the process of the development of a commitment bond individuals make in order to fulfill their need for belongingness. So, this study will not focus on the fulfillment of the need for belongingness but rather on the process that occurs when individuals have a certain need for belongingness that they want to fulfill by forming commitment bonds.

As every person has a need for belongingness, they will commit themselves to persons, groups, or organizations in order to fulfill this need. SDT states that persons can choose to commit themselves to the organization they work for, to fill their need for belongingness (Deci et al., 2012). If persons choose to commit themselves to the organization to fill their need for belongingness, the need for belongingness leads to organizational commitment (Deci et al., 2012). However, persons can also choose to commit themselves to other commitment foci than the organization they work for (Becker et al., 1996), such as their family or their partner. The SDT gives a deeper understanding into under which conditions persons choose to commit themselves to the organization they work for in order to fulfill their need for belongingness, instead of committing themselves to other commitment foci. Following the SDT, when autonomy and competence are present at work, persons are more likely to choose to fulfill their need for belongingness within the workplace (Deci & Ryan, 2012). Therefore, when autonomy and competence are present within a person's work sphere, it is possible for that person to fulfill their need for belongingness at the organization they work for, and thus commit themselves to this organization. It is expected that when autonomy and competence are not present at work, persons will more likely choose to commit themselves to other commitment foci than the organization they work for in order to fulfill their need for belongingness (Deci & Ryan, 2012).

The SDT contains more than just the three psychological needs for autonomy, competence, and belongingness. SDT was initially focused on the intrinsic and extrinsic motivation of individuals. Ultimately, this theory expanded and included research on various domains of life. One of these domains is work organizations (Deci et al., 2017). The SDT suggests that the type of motivation employees have at their job, affects employee performance and employee well-being

(Deci et al., 2017). The types of motivation are divided by autonomous motivation and controlled motivation. Autonomous motivation can be explained by a sense of willingness and choice. This is an example of intrinsic motivation (Deci et al., 2017). However, extrinsic motivation can also be autonomous. According to SDT this can be the case when employees understand the purpose of their job, they feel autonomy, and when they receive feedback (Deci et al., 2017). When employees are autonomously motivated, they show better performance.

On the contrary, there is controlled motivation. This motivation occurs when organizations control the motivation of their employees through rewards or power dynamics. This type of motivation, with an extrinsic focus, results in lower efforts by employees and will have a negative effect on organizational performance and the engagement of employees (Deci et al., 2017).

As Deci et al. (2017) states, "... when employees hold intrinsic work values and goals more strongly they will be more effective employees and when the workgroup supports the intrinsic values and goals, there will be further advantages" (p. 25).

SDT states that autonomy, competence, and the need for belongingness are important aspects for employees to choose to commit themselves to the organization they work for, instead of to other commitment foci (Deci et al., 2017). This study will focus on how and under which conditions the need for belongingness can manifest within the workplace as organizational commitment and this study will also take the autonomy and competence of employees into account.

## 2.3 Organizational commitment

Organizational commitment is a term that is well studied in existing literature. The most commonly used model on organizational commitment is the three-component model by Allen and Meyer (1990). This model states that there are three components to organizational commitment: affective commitment, normative commitment, and continuance commitment. Affective commitment represents the emotional attachment of the employee to the organization. Normative commitment is the employee's sense of obligation to stay at the organization. And continuance commitment is the knowledge of the employee that leaving the organization comes with certain costs (Allen & Meyer, 1990).

However, the three-component model by Allen & Meyer (1990) has also been criticized. There is no consistency in the meaning, structure, and the measurement of the concept of

commitment (Klein et al., 2012). It does not become clear from the three-component model whether commitment is a psychological state, a behavior, or an attitude (Klein et al., 2012). Furthermore, the three components of commitment cannot be used to assess the same type of organizational commitment (Solinger et al., 2008). Individuals can be committed to multiple targets, even within an organization (Klein et al., 2012). A person can be committed to their colleagues, but not to their supervisor, for instance. The three-component model by Allen & Meyer (1990) does not make a distinction between what the employee can be committed to within the organization, so the three-component model is not accurate for measuring the organizational commitment of employees when looking at specific commitment targets (Klein et al., 2012).

Klein et al. (2012) developed a new meaning of commitment. They define commitment as a specific type of psychological bond between an individual and a target. This perceived bond is a socially constructed psychological state, differentiated from other bonds in that the individual does not psychologically merge with the target but does make a conscious choice to care about and dedicate him/herself to the target. More concisely, commitment is defined here as a volitional psychological bond reflecting dedication to and responsibility for a particular target. (p. 137)

This definition of commitment is the definition that will be used in this study. The definition by Klein et al. (2012) includes that individuals make a conscious choice to form a commitment bond with a specific target. This means that individuals volitionally choose to commit themselves to a particular target.

## 2.4 Need for belongingness and organizational commitment

Following the SDT, it is known that individuals have intrinsic psychological needs, which are the need for belongingness, autonomy, and competence (Deci et al., 2017). These psychological needs influence the motivation and behavior of employees, and these needs are crucial for employees to choose to commit themselves to the organization they work for (Deci et al., 2017). The need for belongingness can be fulfilled in various places, of which one is the

organization one works for (Vandenberghe et al., 2004). The SDT states that when a person's need for belongingness is higher, they could choose to fulfill this need at the workplace. This is the case because sharing certain attributes with colleagues can enhance a sense of belonging (Bailey et al., 2023). When employees choose to fulfill their need for belongingness within the organization they work for, this need for belongingness can, over time, result in a higher organizational commitment (Deci et al., 2017). Furthermore, research suggests that if employees are satisfied with their work and if their well-being is adequate, the organizational commitment of the employee will be higher (Kolakowski et al., 2020). Following the SDT, when employees have autonomy and competence within the workplace, their well-being at work will increase (Deci et al., 2017) and ultimately, their organizational commitment will be higher. Resulting from this, it can be expected that when a person's need for belongingness increases, and when autonomy and competence are present within the workplace, their organizational commitment also increases. This study will test whether there is a positive effect of the need for belongingness on organizational commitment. This results in the following hypothesis:

*H1: There is a positive effect of the need for belongingness on organizational commitment.*

## 2.5 SDT and the effect of the need for belongingness on organizational commitment

Resulting from existing literature, it is expected that when a person's need for belongingness is higher, their organizational commitment will ultimately also be higher because when persons have a need for belongingness, they will choose to commit themselves to commitment foci (Baumeister & Leary, 2017), of which one is the organization they work for. However, the SDT argues that if the employees' autonomy and competence at work is not satisfied, their well-being at work will decrease and they will less likely choose to commit themselves to the organization they work for (Deci et al., 2017). They will likely choose to commit themselves to other commitment foci (Becker, 1992). So, if autonomy and competence are not present at work, the effect of the need for belongingness on organizational commitment of employees is expected to be less strong (Deci et al., 2017). Thus, not just the need for belongingness needs to be present in order to increase organizational commitment. Autonomy and competence have to be present for the need for belongingness to have a stronger positive effect on organizational commitment.

Building on the SDT, it is expected that when individuals experience a need for belongingness that they want to fulfill, they could seek for this fulfillment within the work sphere. Individuals can make the choice, over time, to commit themselves to the organization they work for, in order to fulfill their need for belongingness. Deci et al. (2017) states that when autonomy and competence are present within the workplace, persons will likely choose to commit to the organization they work for in order to fulfill their need for belongingness. This study will look at how autonomy and competence moderate the effect of the need for belongingness on the organizational commitment of employees. Following the SDT, it is expected that the effect of the need for belongingness on organizational commitment is stronger when there is a higher autonomy and when there is higher competence. This is the case because SDT states that when autonomy and competence are present, persons are more likely to choose to commit to the organization they work for and thus build their organizational commitment (Deci et al., 2017). This study will test the possibly moderating effects of autonomy and competence on the effect of the need for belongingness on organizational commitment. This leads to the following hypotheses:

*H2: The effect of the need for belongingness on organizational commitment is stronger when the employee has autonomy at work.*

*H3: The effect of the need for belongingness on organizational commitment is stronger when the employee has competence at work.*

## 2.6 Conceptual model

The three hypotheses mentioned above are visualized in the conceptual model below in figure 1. This model shows the effect of employees' need for belongingness on organizational commitment. Furthermore, the model shows the moderating effect of autonomy on the effect of the need for belongingness on organizational commitment and the moderating effect of competence on the effect of the need for belongingness on organizational commitment.

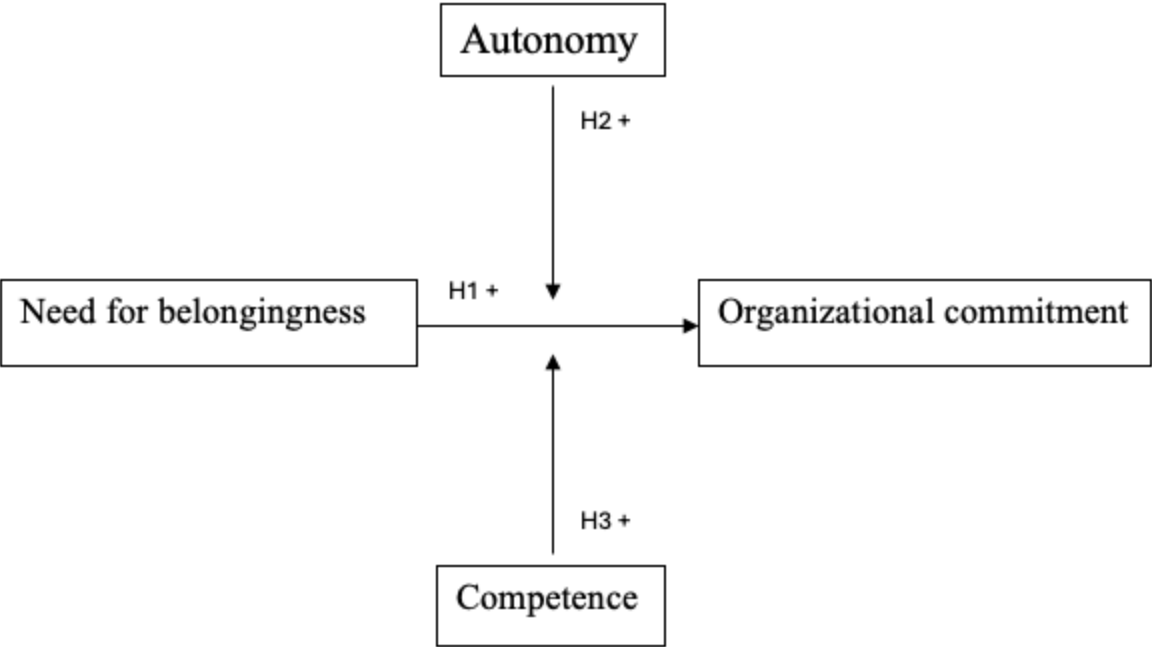


Figure 1. Conceptual model

## 3 Methodology

In the following chapter, the methodology of this study will be discussed. Firstly, the research paradigm will be explained. Then, the research design will be discussed. Following the research design, the used sample and measures will be clarified. At the end of this chapter, the research ethics will be discussed.

### 3.1 Approach & methodology

This study has a positivistic approach with a deductive nature. This research is explanatory. Positivism uses a hypothetical deductive method to test hypotheses. The goal is to examine causal relationships that predict phenomena. This study aims to test existing literature by the hypotheses discussed above, and subsequently the aim is to find an answer to the research question.

In order to find an answer to the research question, this study uses multiple steps. The first step is to examine whether there is an effect of the need for belongingness of employees on their organizational commitment. The second step is to test whether autonomy and competence influence this effect of the need for belongingness on organizational commitment. Both these steps involve the analysis of cause-and-effect relationships by testing hypotheses. Therefore, this study uses a quantitative approach. A quantitative approach is suitable for analyzing cause-and-effect relationships (Hair et al., 2019). Furthermore, a quantitative approach is useful for analyzing large amounts of data (Gürbüz, 2017). As this study aims to measure the data of more than 500 respondents, the use of a quantitative approach is suitable. Furthermore, this study uses a time lagged design because it aims to examine the cause-and-effect over a period of time (Singer & Willett, 2003). A time-lagged study is executed in order to examine the process of the effect of the need for belongingness on organizational commitment. This study expects the effect of the need for belongingness on organizational commitment to occur over time. Therefore, a time-lagged design is used. The need for belongingness of the respondents is tested at timestamp 1, then the possibly moderating effects of autonomy and competence of the respondents is tested at timestamp 2, and finally, the organizational commitment of the respondents is tested at timestamp 3. A time-lagged design is suitable for this study because a time-lagged design allows the researcher to study how the variables change over time (Singer & Willett, 2003). By using a time-lagged design, the researcher can examine whether the need for belongingness of persons indeed has an effect on

their organizational commitment over time. The use of a cross-sectional design to test the effect of the need for belongingness on organizational commitment was considered by the researcher but the use of a cross-sectional design would be less suitable for this research. This is the case because a cross-sectional design studies a phenomenon at one moment in time (Hair et al., 2019). As the effect of the need for belongingness on organizational commitment is expected to occur over time, a time-lagged study is more suitable for this research.

## 3.2 Research design

To find an answer to the research question, this study uses a quantitative approach to analyze the data that is previously collected. The data used in this study is collected in a large study called the Healthy Brain Study (HBS). The HBS is a longitudinal cohort study. The aim of the study is to find out how the human brain works and what the effect of the brain is on the daily life of individuals. The HBS is an interdisciplinary cooperation between multiple disciplines, such as social and biological organizations. The HBS started the collection of respondents in 2017, and the last testing days ended in December 2023.

The participants of the HBS were asked to participate in the study three times. Each assessment included an online survey about demographics, lifestyle, and well-being prior to the visit. Then, it included real-life assessments and a visit to a laboratory. Thereafter, respondents again filled out an online survey about work, life events, and personality. The data collected in this survey are of relevance for this study. The topics assessed that are susceptible to change were measured at three points in time at six-month intervals. The items “need for belongingness” and “organizational commitment”, which are used in this study, are both measured at the three points in time. Moreover, the items that concern autonomy and competence were also tested at three points in time at six-month intervals.

The fact that the data is collected at three points in time, makes the HBS suitable for answering the research question. The longitudinal approach of the study gives the researcher the opportunity to examine whether there is a time-lagged effect of the items used in this study.

## 3.3 Sample

The sample of the HBS includes individuals between 30 and 39 years old, living in the region of Nijmegen in the Netherlands. The respondents were recruited by multiple organizations

and employers, namely general practitioners, the municipality of Nijmegen, and various employers located in the region of Nijmegen. These organizations sent out invitations for the HBS to individuals who might qualify for the HBS. Furthermore, the employers of these individuals were asked to support the HBS by giving their employees days off for participating in the study. On top of that, the HBS tried to increase the awareness of their study by organizing campaigns (Aarts et al., 2021).

The aim of the HBS was to collect a total of 1000 participants of which 500 were to be male and the other 500 female (Aarts et al., 2021). This aim was not reached. The HBS questioned a total of 177 males and 278 females relevant to this study. Furthermore, the HBS wanted to include multiple educational levels. Therefore, their aim was to include 220 respondents with a low educational level, 340 with a middle educational level, and 430 with a high educational level (Aarts et al., 2021). This aim also was not reached by the HBS. The HBS included 8 respondents with a low educational level, 108 respondents with a middle educational level, and 423 respondents with a high educational level relevant to this study. Ultimately, the HBS had a total of 905 participants of which 725 individuals completed the entire study. The data used in this study entails a total of 554 respondents. A more detailed description of the demographics of the respondents can be found in table 1.

As this study entails such a large number of respondents, the external validity of the study is ensured. The rule of thumb for achieving external validity is that a study requires 15 to 20 respondents per variable used (Hair et al., 2019). However, the respondents of the HBS do not perfectly represent the population, because there is not an adequate distribution of gender and educational level. Furthermore, the HBS included individuals between the ages of 30 and 39. This excludes a large group of employees who are younger or older than the used age group. This means that the results of this research are not fully generalizable to the population.

*Table 1. Demographics of the sample*

	Frequency	Percent
<b>Sex</b>		
Male	177	38,9
Female	278	61,1

<i>Total</i>	455	100,0
<b>Age</b>		
30	71	15,6
31	65	14,3
32	35	7,7
33	48	10,5
34	50	11,0
35	48	10,5
36	45	9,9
37	39	8,6
38	42	9,2
39	12	2,6
<i>Total</i>	455	100,0
<b>Education</b>		
Did not receive any education	1	0,2
Primary education	0	0
VMBO	7	1,3
HAVO/VWO	20	3,7
MBO	88	16,3
HBO	250	46,4
WO	173	32,1
<i>Total</i>	539	100,0

## 3.4 Measures

The variables used in this study are organizational commitment, need for belongingness, autonomy and competence. In this paragraph, these variables and how they are measured will be discussed.

### 3.4.1 Dependent variable

The first variable used in this study is organizational commitment. This variable is tested by using the item “workplace commitment”. This measure will be used to test the organizational commitment of the respondents. The measure reference belonging to this measure is “WRKB01”. This variable is measured using the KUT by Klein et al. (2014). The KUT is a scale with four items. The first item of this scale is focused on the commitment to the organization. The other three items in this scale are dedication, volition, and responsibility for the target (Klein et al., 2012). The items used are rated with a seven-point Likert scale. The variable organizational commitment was tested in a total of three assessments. This study will solely include the first question used in the survey, which measures the commitment to the organization of the respondent. This question that is asked is as follows: “*At this moment, I am committed to the organization I work for*” Respondents could choose from 7 answers, which range from “not at all” to “completely”.

In this study the third assessment for this item is used. This is done, because it is expected that the effect in commitment to the organization happens over time and is therefore most visible in the third assessment.

### 3.4.2 Independent variable

The second variable used in this study is need for belongingness. The measure reference belonging to this measure is “NBS01-10”. This variable was tested using the “need to belong scale” (NBS) by Leary et al. (2013). This scale includes 10 items, which are “need to belong”, “need for affiliation”, “affiliation motivation”, “sociability”, “extraversion”, “sociotropy”, “rejection sensitivity”, “frequency of solitary behavior”, “enjoyment of solitary activities”, and “desire for acceptance”. An example of an item within this measure is “*I have a strong need to belong*”. The items used are rated with a five-point Likert scale. This scale ranges from 1, which is “strongly

disagree”, to 5, which is “strongly agree”. The KMO of this variable is sufficient, with a value of .803. Bartlett’s Test of Sphericity is significant at  $<.001$ .

This variable is also tested in a total of three assessments. This study uses the first assessment for the variable need for belongingness. This is done because a certain need for belongingness at timestamp 1 is expected to have an effect on the other variables at timestamp 2 and 3. This way, the effect of the need for belongingness can be measured over time in a time-lagged effect.

### 3.4.3 Moderating variables

The third variable used in this study is the moderating variable autonomy. This variable is tested by using the measure “job autonomy”. The measure reference belonging to this measure is “WRKC25-28”. This variable was tested using the “Questionnaire on the Experience and Evolution of Work” (QEEW2.0) by Van Veldhoven et al. (2015). This questionnaire includes four items. An example question within this questionnaire is: “*Can you choose the way you carry out work?*”. The respondents could choose from four answers, ranging from 1, “always”, to 4, “never”. The KMO of this variable is sufficient, with a value of .786. Bartlett’s Test of Sphericity is significant at  $<.001$ .

This variable was also tested in a total of three assessments. This study uses the variable autonomy in the second assessment. It is expected that a certain need for belongingness leads to the search for autonomy at work in order to fulfill the need for belongingness and thus it leads to more autonomy at work over time. Therefore, it is useful to test the variable autonomy at the second assessment of the study.

The fourth variable used in this study is competence. Competence is tested by using the measure “employability”. The measure reference belonging to this measure is “WRKB14-35”. This variable is used to test the competence of the respondents. “Employability” is used to test the competence of respondents because it represents the competence-based scale of employability. Employability is seen as a competence that the employee built over the years. If this employability is already present, it could serve as a condition for organizational commitment. Therefore, the measure “employability” best suits the variable competence that is used in this study. The variable competence was tested using the competence-based scale of employability by Van der Heijden et al. (2018). This scale includes five subscales, which are “balance”, “anticipation”, “corporate

sense”, “expertise” and “flexibility”. The entire competence-based scale of employability, including all subscales of employability, are used in this study because excluding certain subscales does not improve the reliability of the scale. The KMO of this variable is significant, with a value of .868. Bartlett’s Test of Sphericity is significant at  $<.001$ .

The variable competence was also tested in a total of three assessments. This study will use the variable competence in the second assessment. It is expected that a certain need for belongingness leads to the search for competence at work in order to fulfill the need for belongingness and thus it leads to more competence at work over time. Therefore, it is useful to test competence at the second assessment of the study.

#### 3.4.4 Control variables

This study uses multiple control variables to account for potential influences of other variables. The control variables used in this study are “contract hours” and “type of contract”.

The first control variable used in this study is “contract hours”. The measure reference belonging to this variable is “WRKA03”. Respondents were asked the following question: “*What is the scope of your employment? (Number of work hours per week)*” This question was an open question, so respondents could type in their exact number of work hours per week. Research shows that employees who have a fulltime contract are more committed to their organization than employees with a parttime contract (Millward & Hopkins, 2006). Therefore, the variable “contract hours” is used as a control variable. This study grouped the contract hours of respondents into two groups, namely parttime and fulltime. Parttime represents all the respondents that reported contract hours between  $>0$  hours and  $<36$  hours, and fulltime represents all respondents that reported contract hours of  $\geq 36$  hours.

And secondly, this study uses “type of contract” as a control variable. This study takes two types of contracts into account, namely permanent contracts and temporary contracts. Research suggests that employees who have a permanent contract at the organization they work for, are more committed to the organization than employees who have a temporary contract (Giunchi et al., 2015). Therefore, it is necessary to use the variable “type of contract” as a control variable in this study. The measure reference belonging to this variable is “WRKA02” The HBS asked respondents what the nature of their employment is with the question: “*What is the nature of your employment?*”. The respondents could answer “*Permanent contract*”, “*Temporary contract with*

*prospects of a permanent contract*”, “*Temporary contract without prospects of a permanent contract*”, and “*Other*”. This study grouped the nature of employment into two groups, namely permanent and temporary contracts. The respondents who answered “other” were reported as missing values in this data.

### 3.5 Research ethics

During this study, ethics are taken into consideration to ensure that the data collection methods and the handling of the data is executed respectfully and responsibly. The researcher of this study respects and uses the principles of informed consent, anonymity, and confidentiality. Consent to participate in this study is obtained by the researchers by giving the respondents the freedom to decide whether they participated in the study or not. Furthermore, the researchers asked the respondents explicit permission for using their data for research. The respondents that participated in the study are kept anonymous throughout the entire study. To ensure the confidentiality of the study, the research findings are presented without disclosing any personal information. Moreover, the data used in this study is only altered to clean up invalid responses given by respondents and the data is handled with the greatest possible care.

## 4 Results

In this chapter, the results of the data analysis of this study will be discussed. The data analysis was executed in multiple steps. Firstly, the data was summarized by conducting a descriptive analysis. Secondly, a reliability analysis per scale used in this study was conducted to test whether the reliability of the scales is sufficient for using them. Thirdly, the researcher conducted a factor analysis to explore the underlying dimensions and relationships between the variables in the dataset. Fourthly, correlations were tested with a correlation analysis to examine how the different variables associate with each other. Then, hypothesis 1 was tested using a hierarchical multiple regression analysis. And ultimately, hypotheses 2 and 3 were tested using moderation analyses.

### 4.1 Descriptives and correlations

In table 2 the frequencies of the nominal variables are shown. The table shows that 47,5% of the respondents work parttime and 52,5% of the respondents work fulltime. So, there are almost as many respondents working fulltime as there are respondents working parttime. However, this is different for the type of employment of the respondents. 80% of the respondents state that they have a permanent contract and only 20% of the respondents reported to have a temporary contract. This results in a permanent contract to be the reference variable.

*Table 2. Frequencies of the nominal variables*

	Frequency	Percent
<b>Contract hours</b>		
Fulltime	239	52,5
Parttime	216	47,5
<i>Total</i>	<i>455</i>	<i>100,0</i>
<b>Type of contract</b>		
Permanent	360	80,0
Temporary	90	20,0

<i>Total</i>	<i>450</i>	<i>100,0</i>
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In table 3 the means, standard deviations, and correlations of the metric variables are shown. In this table, it can be seen that organizational commitment is positively correlated to employability ( $r = .337, p = <.001$ ) and positively correlated to autonomy ( $r = .409, p = .018$ ). Furthermore, employability and autonomy are positively correlated to each other ( $r = .669, p = <.001$ ). Besides these correlations, no other variables were found to be correlated to each other. The full correlation analysis can be found in Appendix B.

*Table 3: Descriptives: means, standard deviations, and Pearsons' correlations of the metric variables.*

<b>Variable</b>	<b>M</b>	<b>SD</b>	<b>1</b>	<b>2</b>	<b>3</b>
1. Need for belongingness	32,31	6,42			
2. Organizational commitment	4,17	1,21	-,02		
3. Autonomy	8,14	2,55	-,28	0,41*	
4. Competence	90,60	11,21	-,07	0,34**	0,67**

*\*\*.* Correlation is significant at the 0.01 level (2-tailed)

*.\*.* Correlation is significant at the 0.05 level (2-tailed).

## 4.2 Testing of hypotheses

The hypotheses 1, 2, and 3 were tested using a hierarchical multiple regression analysis. In model 1, only the control variables were included. In model 2, the moderation variables were included. And in model 3, the independent variable was included as well. Hypotheses 2 and 3 were tested by conducting a moderation analysis with PROCESS in SPSS (Hayes, 2017).

Before conducting the analyses for testing the hypotheses, the assumptions for the multiple regression analysis were considered. These assumptions are normality, linearity, homoscedasticity, and multicollinearity (Hair et al., 2019). The results of these tests can be found in Appendix B. The results show that the data is not normally distributed. However, because the

sample of this study is large, it is assumed that the multiple regression analysis can be executed with this sample. The results of the tests show that the assumptions for linearity, homoscedasticity, and multicollinearity are met (Appendix B). As a result, the multiple regression analysis was conducted. The results of this analysis can be found in table 4.

*Table 4: MRA of control variables, moderator variables, and independent variable predicting organizational commitment*

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>
<b>Variable</b>	$\beta$ (SE)	$\beta$ (SE)	$\beta$ (SE)
Constant	4,600 (.368)	1.723(1.894)	1.373(2.205)
Type of employment	.126(.592)	.227(.575)	.213(.600)
Contract hours	-.078(.464)	-.030(.466)	-.009(.499)
Autonomy		.363(.107)	.384(.112)
Competence		.143(.025)	.138(.026)
Need for belongingness			.062(.030)
R <sup>2</sup> (Adjusted R <sup>2</sup> )	.016(-.052)	.221 (.105)	.224(.075)
F	.240	1.911	1.500
F Change	.240	3.541	.106

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).

In table 4, it can be seen that model 2 has the highest adjusted R<sup>2</sup> (.105), therefore, the results of this model will be used. Resulting from the analysis, it shows that need for belongingness does not have a significant effect on organizational commitment ( $\beta = .062$  p = .748). Therefore, hypothesis 1 was rejected. Furthermore, table 4 shows that both the control variable “contract hours” and the control variable “type of contract” do not significantly influence organizational commitment ( $\beta = -.030$ , p = .877) ( $\beta = .227$ , p = .235). What is noticeable is that when the variables “autonomy” and “competence” are included in the model, organizational commitment is better explained. However, as the beta values belonging to these variables are not significant, autonomy and competence do not significantly influence organizational commitment. The complete results of the multiple regression analysis can be found in Appendix B.

After the hierarchical multiple regression analysis, two moderation analyses were conducted. Table 5 and 6 show the results of the moderation analyses conducted to test whether “autonomy” and “employability” influence the effect of the need for belongingness on organizational commitment. This moderation analysis was executed with the help of the tool PROCESS (Hayes, 2017). Only one moderator variable could be tested per analysis, so two moderation analyses were conducted. First, a moderation analysis was conducted testing the moderator variable “autonomy”. Then, a moderation analysis was used to test the moderator variable “competence”.

As can be seen in table 5, the variable autonomy explains 8% of the relationship between the need for belongingness and organizational commitment. However, this interaction effect is not significant in this study (Int = .008, p = .690). Therefore, hypothesis 2 was rejected.

*Table 5: Moderation effect of Autonomy by Process Tool*

	<b>Coefficient</b>	<b>SE</b>	<b>t</b>	<b>P</b>	<b>LLCI</b>	<b>ULCI</b>
Need for belongingness	-.057	.099	-.572	.572	-.259	.146
Autonomy	-.074	.389	-.190	.850	-.869	.721
Interaction Term (Need for belongingness * Autonomy)	.008	.011	.690	.496	-.015	.031

Table 6 shows the results of the moderation analysis for the variable competence. As can be seen, the variable competence explains 1% of the relationship between the need for belongingness and organizational commitment. However, this interaction effect is proven not to be significant (Int = .001, p = .522). Therefore, hypothesis 3 was rejected.

*Table 6: Moderation effect of Competence by Process Tool*

	<b>Coefficient</b>	<b>SE</b>	<b>t</b>	<b>P</b>	<b>LLCI</b>	<b>ULCI</b>
Need for belongingness	-.049	.087	-.565	.572	-.220	.122
Competence	-.074	.389	-.190	.850	-.869	.721

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Interaction Term (Need for belongingness * Competence)	.001	.001	.641	.522	-.001	.002
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## 5 Discussion

This chapter will present a discussion of the results of the study. Thereafter, a conclusion will be presented based on the results of the analyses. Here, an answer on the research question will be formulated. Then, the limitations of this research will be discussed and recommendations for future research will be presented. And finally, the researcher will present practical recommendations based on the findings of this study.

### 5.1 Discussion of results

The results of this study show that the need for belongingness does not have a significant effect on the organizational commitment of employees within the context of this research. This result is surprising, because the existing literature does state that when individuals have a higher need for belongingness, they will seek for fulfillment of this need. One of the places in which persons can fulfill their need for belongingness is at the organization they work for. When persons choose to fulfill their need for belongingness at the workplace, they choose to commit to the organization they work for and that means that their organizational commitment increases. So, based on existing theory, it was expected that the need for belongingness would have an effect on organizational commitment. This unexpected result could be because of the sample of the study. The sample of this study is not as normally distributed as desired. The study did not include all age groups of society and therefore this sample is not completely generalizable. Moreover, the sample of the study only included individuals living in the region of Nijmegen in the Netherlands. It is possible that this narrow sample caused discrepancies between existing theory and the results of this study. Another explanation for this effect to be insignificant is the occurrence of the Covid-19 pandemic during the study. The pandemic started when the HBS was in action. Therefore, a large group of respondents participated in the HBS while the Covid-19 pandemic was also happening. This pandemic changed the working situations of many individuals (Kniffin et al., 2021). There were lockdowns, which resulted in some people having to work remotely. And some professions dealt with an increase in workload due to sickness, for instance hospital workers. This change in the work situations of people, could have influenced the results of this study.

Furthermore, existing theory suggested that autonomy moderates the effect of the need for belongingness on organizational commitment. However, the results from this study show no

significant moderation effect of autonomy on the effect of the need for belongingness on organizational commitment. The results of the moderation analysis do show that autonomy explains 8% of the effect of the need for belongingness on organizational commitment but this was not significant. Therefore, no moderation effect of autonomy was found. A possible explanation for this result is the use of a previously created survey. The researcher of this study did not have the opportunity to create the survey used. Therefore, they did not have a say in what the exact items in the survey would be and whether these items perfectly correlated with the variables used in this study. It is possible that the items used in the survey do not perfectly represent the variables tested in the research. This could have caused an inconsistency between existing literature and the results of this study.

The variable competence explained 1% of the effect of the need for belongingness on organizational commitment, though this moderation effect was also not found to be significant. This is surprising because existing literature suggests that competence would be a moderator of the effect of the need for belongingness on organizational commitment. Within this study it is found that this is not the case. An explanation of this inconsistency with the literature could be the use of the variable “employability” for testing competence. The data used in this study was previously created by other researchers and the variable “competence” was not included in the survey. This study used the “competence-based scale of employability” to test the competence of respondents. This could have resulted in findings that do not match the used variables precisely.

## 5.2 Conclusion

The aim of this study was to look into the effect of the need for belongingness on employees’ organizational commitment and if autonomy and competence possibly moderate this effect. The need for belongingness was measured using the “need to belong scale” (Leary et al., 2013). Based on existing literature on the need for belongingness and organizational commitment, three hypotheses were formulated. These hypotheses were formulated in order to find an answer to the research question. This research question was as follows:

*“To what extent is there an effect of the need for belongingness on employees’ organizational commitment and how do autonomy and competence moderate this effect?”*

As found by this study, there is no significant effect of the need for belongingness of employees on their organizational commitment. Furthermore, the effect of the need for belongingness on organizational commitment is not significantly stronger for the respondents who stated that they have autonomy in their work. Moreover, the effect of the need for belongingness on organizational commitment is not significantly stronger for the respondents who stated that they have competence at work. So, answering the research question, within the contexts of this study, there is no significant effect of the need for belongingness of employees on their organizational commitment, and autonomy and competence do not significantly moderate this effect.

### 5.3 Limitations and recommendations for future research

This study was part of a larger study, namely the “Healthy Brain Study” (HBS). The HBS is an interdisciplinary cooperation focused on finding out how the human brain works and what the effect of the brain is on the daily lives of individuals. This study used the data that was collected by the HBS. Therefore, the researcher of this study did not create the survey themselves. The use of an already created and executed survey led to some limitations of the study.

Firstly, a limitation of this study is that the researcher did not have the possibility to create the variables to fit the definitions used in the study perfectly. For some variables it is unclear which questions were asked to the respondents exactly. The “need to belong scale” was used in the survey, however, the researcher did not have the opportunity to influence which exact questions were asked regarding this variable. Due to this, it could be the case that the questions used in the survey do not adequately represent the variable competence. Furthermore, the exact questions used in the “employability scale” were not shared with the researcher. So, the researcher could not confirm whether the questions asked in the survey perfectly fit the variable competence. For future research, it is recommended that researchers create survey questions that adequately represent the definitions of the variables used. Then, it can be said with certainty that the results of the analyses represent effects that were intended to be tested.

Secondly, a limitation of this study is the fact that the Covid-19 pandemic started during the execution of the HBS. The pandemic had an impact on the personal and professional lives of the respondents. The pandemic could have had an effect on all variables used in this study. However, the researcher did not have access to information on when respondents took part in the study. Therefore, it is not possible to find out whether respondents took part in one or more of the

three assessments of the study while the Covid-19 pandemic was also happening. It is possible that respondents started the HBS study before the pandemic existed and completed the study when the pandemic was still happening. It could also be the case that respondents started the HBS when the pandemic had already started. As the Covid-19 pandemic had a large impact on the personal and professional lives of a lot of individuals, it could also have had an effect on the results of this study. It would have been useful if the researcher could obtain information on when each respondent filled out the assessments of the survey. Then, the researcher could determine whether the Covid-19 pandemic could have had an effect on the results of the study. For future research, it is recommended to execute an experiment instead of a quantitative study. By using an experiment, future researchers can control the conditions of the study. Then, all aspects that could have an effect on the variables used can be controlled, and no unexpected events, such as the Covid-19 pandemic, could have an effect on the results of the study.

Thirdly, a limitation of this study is that the researcher did not use the profession of the respondents as a control variable. This study used data from a survey that was made by a third party, the HBS. Due to this, the researcher was unable to determine the profession of individual respondents. The researcher could not gain access to this information. This is a limitation to this study because the profession of the respondent could influence the variables tested in this study. During the HBS, the Covid-19 pandemic struck, and this pandemic had different effects for different professions. Recent studies have shown that the organizational commitment of employees working in certain sectors increased, while the organizational commitment of employees working in other sectors decreased. The organizational commitment of hospital workers increased during the start of the pandemic, for instance (Su et al., 2023). While in sectors where employees had to work remotely, the organizational commitment of the employees decreased (e.g. Wang et al., 2020; Akartuna & Serin, 2022). For future research, it is recommended to use the profession of the respondents as a control factor. It would be insightful to be able to see whether the profession of the respondents influences the effect of the need for belongingness of the respondents on their organizational commitment.

Another limitation of this study is the sample that is used. The HBS included individuals between 30 and 39 years old, living in the region of Nijmegen. The HBS did not include respondents younger than 30 years old or older than 39 years old. However, individuals who are younger than 30 and older than 39 can be part of the working society. Therefore, the HBS does

not represent the society adequately. Furthermore, the inclusion of only individuals living in the region of Nijmegen can influence the results of the data. In Nijmegen, the average educational level is higher than the average educational level of the Netherlands. As can be seen in the descriptives of the sample, the educational level of the respondents is mostly high. This is not an adequate representation of society. It is recommended that future research uses a sample that represents society better. This could be done by not being bound to one region of the Netherlands and thus including individuals from the entire country in the study. Future research should also not be bound to specific ages of individuals. They should include working individuals of all ages in order to represent society adequately.

Lastly, a recommendation for future research is to look at the relationship between the need for belongingness and commitment over time and consider multiple targets of commitment. It would be useful if future research also assesses other targets of commitment, instead of only assessing organizational commitment because it is possible that individuals choose to commit themselves to targets other than the organization over time. It would be insightful if future research takes this possibility into account.

## 5.4 Practical recommendations

As the effect of the need for belongingness on organizational commitment is insignificant within the contexts of this study, no recommendations can be given regarding the need for belongingness of employees of organizations. The results of this study show no significant moderation effect of autonomy and competence on the effect of the need for belongingness of employees on their organizational commitment. Therefore, also no practical recommendations can be given regarding the effect of autonomy and competence on the effect of the need for belongingness on organizational commitment.

Within this study, there were no significant effects found. Therefore, no recommendations for developing strategies aimed at increasing organizational commitment, using the need for belongingness, autonomy, and competence of employees, can be given. This is the case because in this study no relationship is found between these variables. As no relationships between the variables were found, the development of strategies aimed at increasing organizational commitment, using the need for belongingness, autonomy, and competence, should be reassessed critically by organizations. Because, despite existing theories, no empiric relationship is found

between the variables need for belongingness, autonomy, competence, and organizational commitment.

## 6 Literature

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# 7 Appendix

## Appendix A – Survey

### General information

Sex

1 = male

2 = female

Age

Value: Age in years, specified as the age of the participant at the time of the first visit to the lab.

What is the highest level of education that you have completed with diploma or certificate?

0 = did not receive any education

1 = primary education

2 = VMBO, pre-vocational secondary education

3 = HAVO/VWO, senior general secondary education/pre-university secondary education

4 = MBO, secondary vocational education

5 = HBO, higher professional education

6 = WO, academic education

### Need to belong scale

For each of the statements below, indicate the degree to which you agree or disagree with the statement by writing a number in the space beside the question using the scale below:

1 = Strongly disagree

2 = Moderately disagree

3 = Neither agree nor disagree

4 = Moderately agree

5 = Strongly agree

1. If other people don't seem to accept me, I don't let it bother me.
2. I try hard not to do things that will make other people avoid or reject me.
3. I seldom worry about whether other people care about me.
4. I need to feel that there are people I can turn to in times of need.
5. I want other people to accept me.
6. I do not like being alone.
7. Being apart from my friends for long periods of time does not bother me.

8. I have a strong need to belong.
9. It bothers me a great deal when I am not included in other people's plans.
10. My feelings are easily hurt when I feel that others do not accept me.

## Workplace commitment

At this moment, I am committed to the organization I work for.

All Workplace commitment questionnaire items (except the last one) were rated on the following scale:

- 0 = Not at all
- 1 = Very little
- 2 = Little
- 3 = Moderate
- 4 = A lot
- 5 = Very much
- 6 = Completely

## Autonomy

Questions 03-49 were all assessed on the same scale:

Response categories 03-48:

- 0 = never
- 1 = sometimes
- 2 = often
- 3 = always

WRKC25\_freedom\_to\_perform\_work

WRKC26\_determine\_how\_to\_work

WRKC27\_determine\_how\_much\_time

WRKC28\_organize\_work\_yourself

## Competence-based scale of employability

Participants responded by selecting responses on a 6-point scale. The exact response categories vary between questions.

- 1 = not at all/never/very little/...
- 6 = extremely/always/very much/...

sub\_balance

Balance subscale score

Range: 4 - 24

Calculation: WRKB14\_work\_private\_life\_balance + WRKB15\_work\_conditions\_balance + WRKB16\_development\_balance + WRKB17\_personal\_colleagues\_balance

sub\_anticipation

Anticipation and optimization subscale score Range: 4 - 24

Calculation:

WRKB18\_explore\_other\_work + WRKB19\_apply\_new\_skills + WRKB20\_new\_developments + WRKB21\_skills\_knowledge

sub\_corporate\_sense

Corporate sense subscale score

Range: 4 - 24

Calculation: WRKB22\_support\_business\_processes + WRKB23\_share\_responsibilities + WRKB24\_participate\_common\_vision + WRKB25\_share\_knowledge

sub\_expertise

Occupational expertise subscale score Range: 4 - 24

Calculation: WRKB26\_safe\_with\_few\_errors + WRKB27\_decisions\_work\_approach + WRKB28\_set\_priorities + WRKB29\_choices\_working\_methods + WRKB30\_level\_of\_skills

sub\_flexibility

Personal flexibility subscale score Range: 4 - 24

Calculation: WRKB31\_adapt\_to\_changes + WRKB32\_adapt\_to\_developments + WRKB33\_respond\_to\_changes + WRKB34\_duties + WRKB35\_changes\_in\_function

## Appendix B – Statistical outputs

### Demographics of the sample

#### Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	177	38,9	38,9	38,9
	Female	278	61,1	61,1	100,0
	Total	455	100,0	100,0	

#### Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30	71	15,6	15,6	15,6
	31	65	14,3	14,3	29,9
	32	35	7,7	7,7	37,6
	33	48	10,5	10,5	48,1
	34	50	11,0	11,0	59,1
	35	48	10,5	10,5	69,7
	36	45	9,9	9,9	79,6
	37	39	8,6	8,6	88,1
	38	42	9,2	9,2	97,4
	39	12	2,6	2,6	100,0
	Total	455	100,0	100,0	

#### Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Did not receive any education	1	0,2	0,2	0,2
	Primary education	0	0	0	0,2
	VMBO	7	1,3	1,3	1,5
	HAVO/VWO	20	3,6	3,7	5,2
	MBO	88	15,9	16,3	21,5
	HBO	250	45,1	46,4	67,9
	WO	173	31,2	32,1	100,0
	Missing	15	2,7		
	Total	554	100,0		

## Type of employment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Permanent	360	65,0	80,0	80,0
	Temporary	90	16,2	20,0	100,0
	Missing	104	18,8		
	Total	554	100,0		

## Contract hours

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fulltime	239	43,1	52,2	52,2
	Parttime	216	39,0	47,5	100,0
	Missing	99	17,9		
	Total	554	100,0		

## Factor analysis

### Need for belongingness

#### KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.803
Bartlett's Test of Sphericity	Approx. Chi-Square	912.805
	df	45
	Sig.	<.001

#### Communalities

	Initial	Extraction
If other people don't seem to accept me, I don't let it bother me. (reversed)	1,000	0,539
I try hard not to do things that will make other people avoid or reject me.	1,000	0,613
I seldom worry about whether other people care about me. (reversed)	1,000	0,534
I need to feel that there are people I can turn to in times of need.	1,000	0,743
I want other people to accept me.	1,000	0,571

I do not like being alone.	1,000	0,653
Being apart from my friends for long periods of time does not bother me. (reversed)	1,000	0,556
I have a strong need to belong.	1,000	0,529
It bothers me a great deal when I am not included in other people's plans.	1,000	0,397
My feelings are easily hurt when I feel that others do not accept me.	1,000	0,547

Extraction Method: Principal Component Analysis.

### Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings			Rotation of Sums of Squared Loadings Total
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
1	3,236	32,360	32,360	3,236	32,360	32,360	2,693
2	1,490	14,902	47,262	1,490	14,902	47,262	2,185
3	1,010	10,099	57,360	1,010	10,099	57,360	1,689
4	0,864	8,642	66,002				
5	0,673	6,734	72,737				
6	0,632	6,318	79,055				
7	0,589	5,890	84,945				
8	0,552	5,521	90,466				
9	0,516	5,157	95,623				
10	0,438	4,377	100,000				

Extraction Method: Principal Component Analysis.

### Pattern Matrix

	1	2	3
If other people don't seem to accept me, I don't let it bother me. (reversed)	0,755	-0,032	-0,107
I try hard not to do things that will make other people avoid or reject me.	0,749	0,071	0,333
I seldom worry about whether other people care about me. (reversed)	0,745	-0,064	0,001

I need to feel that there are people I can turn to in times of need.	-0,083	0,047	-0,859
I want other people to accept me.	0,392	0,095	-0,543
I do not like being alone.	-0,022	0,837	0,268
Being apart from my friends for long periods of time does not bother me. (reversed)	-0,175	0,707	-0,185
I have a strong need to belong.	0,213	0,524	-0,257
It bothers me a great deal when I am not included in other people's plans.	0,228	0,494	-0,101
My feelings are easily hurt when I feel that others do not accept me.	0,652	0,090	-0,189

Extraction Method: Principal Component Analysis.  
 Rotation Method: Oblimin with Kaiser Normalization.  
 a. Rotation converged in 12 iterations.

## Autonomy

### KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.786	
Bartlett's Test of Sphericity	Approx. Chi-Square	102,897
	df	6
	Sig.	<.001

### Communalities

	Initial	Extraction
Freedom to perform work	1,000	0,700
Determine how to work	1,000	0,894
Determine how much time	1,000	0,816
Organize work yourself	1,000	0,807

Extraction Method: Principal Component Analysis.

### Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %

1	3,216	80,412	80,412	3,216	80,412	80,412
2	0,423	10,575	90,987			
3	0,239	5,984	96,970			
4	0,121	3,030	100,000			

Extraction Method: Principal Component Analysis.

### Component Matrix

	1
Freedom to perform work	0,836
Determine how to work	0,945
Determine how much time	0,904
Organize work yourself	0,898

Extraction method: Principal Component Analysis.

- a. 1 components extracted.

### Competence

#### KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.868
Bartlett's Test of Sphericity	Approx. Chi-Square	3244,477
	df	231
	Sig.	<.001

#### Communalities

	Initial	Extraction
Work private life balance	1,000	0,644
Work conditions balance	1,000	0,625
Development balance	1,000	0,718
Personal colleagues balance	1,000	0,575
Explore other work	1,000	0,425
Apply new skills	1,000	0,724

New developments	1,000	0,666
Skills knowledge	1,000	0,663
Support business processes	1,000	0,562
Share responsibilities	1,000	0,670
Safe with few errors	1,000	0,597
Decisions work approach	1,000	0,688
Set priorities	1,000	0,584
Choices working methods	1,000	0,575
Level of skills	1,000	0,513
Adapt to changes	1,000	0,769
Adapt to developments	1,000	0,758
Respond to changes	1,000	0,749
Duties	1,000	0,262
Changes in function	1,000	0,627

Extraction Method: Principal Component Analysis.

### Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings			Rotation of Sums of Squared Loadings Total
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
1	6,718	30,535	30,535	6,718	30,535	30,535	4,119
2	2,041	9,279	39,813	2,041	9,279	39,813	3,760
3	1,926	8,757	48,570	1,926	8,757	48,570	3,380
4	1,643	7,467	56,037	1,643	7,467	56,037	4,275
5	1,276	5,799	61,836	1,276	5,799	61,836	3,939

6	0,87 7	3,986	65,823			
7	0,80 6	3,663	69,486			
8	0,71 9	3,267	72,752			
9	0,70 7	3,215	75,967			
10	0,63 8	2,900	78,867			
11	0,58 0	2,638	81,504			
12	0,52 2	2,372	83,877			
13	0,51 1	2,323	86,199			
14	0,46 4	2,109	88,308			
15	0,44 1	2,004	90,312			
16	0,38 4	1,746	92,058			
17	0,35 3	1,606	93,665			
18	0,32 8	1,491	95,156			
19	0,31 4	1,427	96,583			
20	0,28 3	1,285	97,868			
21	0,25 6	1,164	99,033			
22	0,21 3	0,967	100,000			

Extraction Method: Principal Component Analysis.

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	1	2	3	4	5
Work private life balance	0,091	-0,044	0,778	-0,088	0,112
Work conditions balance	0,034	-0,025	0,768	-0,049	-0,014
Development balance	- 0,070	0,070	0,840	-0,011	0,000
Personal colleagues balance	0,033	0,075	0,667	0,104	-0,229
Explore other work	- 0,098	0,594	-0,060	-0,089	-0,121
Apply new skills	0,143	0,845	0,039	0,023	0,102

New developments	0,048	0,795	0,001	-0,034	0,004
Skills knowledge	0,012	0,801	0,079	0,059	-0,009
Support business processes	- 0,089	0,130	0,052	-0,031	-0,686
Share responsibilities	0,211	-0,034	-0,071	-0,032	-0,744
Participate common vision	- 0,079	-0,080	0,044	-0,053	-0,861
Share knowledge	0,151	0,064	0,048	0,032	-0,619
Safe with few errors	0,733	-0,142	0,162	-0,029	-0,005
Decisions work approach	0,829	0,044	-0,016	-0,021	0,047
Set priorities	0,684	0,047	0,112	-0,083	0,005
Choices working methods	0,656	0,088	-0,001	-0,057	-0,120
Level of skills	0,673	0,113	-0,113	0,010	-0,080
Adapt to changes	0,085	-0,062	-0,021	-0,878	0,043
Adapt to developments	0,072	-0,032	0,050	-0,818	-0,048
Respond to changes	0,122	-0,016	-0,109	-0,821	-0,070
Duties	0,038	0,200	0,057	-0,276	-0,154
Changes in function	- 0,160	0,103	0,120	-0,768	0,028

Extraction method: Principal Component Analysis

Rotation Method: Oblimin with Kaiser Normalization

- a. Rotation converged in 6 iterations

## Reliability analyses

### Need for belongingness

#### Reliability Statistics

Cronbach's Alpha	N of Items
0,755	10

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
If other people don't seem to accept me, I don't let it bother me. (reversed)	29,19	33,487	0,529	0,730
I try hard not to do things that will make other people avoid or reject me.	29,09	36,935	0,323	0,758
I seldom worry about whether other people care about me. (reversed)	29,24	34,917	0,425	0,745
I need to feel that there are people I can turn to in times of need.	28,43	37,368	0,320	0,758
I want other people to accept me.	28,20	36,220	0,543	0,735
I do not like being alone.	29,76	26,894	0,319	0,759
Being apart from my friends for long periods of time does not bother me. (reversed)	29,15	36,170	0,317	0,761
I have a strong need to belong.	29,07	33,517	0,552	0,727
It bothers me a great deal when I am not included in other people's plans.	28,98	35,896	0,447	0,742
My feelings are easily hurt when I feel that others do not accept me.	29,40	33,418	0,549	0,727

## Autonomy

### Reliability Statistics

Cronbach's Alpha	N of Items
0,917	4

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Freedom to perform work	5,94	4,055	0,720	0,921
Determine how to work	6,06	3,761	0,894	0,865
Determine how much time	6,26	3,550	0,824	0,887
Organize work yourself	6,17	3,617	0,811	0,891

## Competence

### Reliability Statistics

Cronbach's Alpha	N of Items
0,885	22

### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Work private life balance	90,88	127,837	0,397	0,883
Work conditions balance	91,01	127,560	0,429	0,882

Development balance	91,24	127,108	0,434	0,881
Personal colleagues balance	91,07	127,415	0,484	0,880
Explore other work	91,69	125,236	0,381	0,885
Apply new skills	91,21	124,819	0,528	0,879
New developments	91,64	123,289	0,517	0,879
Skills knowledge	91,38	125,646	0,487	0,880
Support business processes	91,19	123,627	0,497	0,880
Share responsibilities	91,11	123,760	0,556	0,878
Participate common vision	91,51	123,344	0,492	0,880
Share knowledge	90,75	125,778	0,519	0,879
Safe with few errors	90,56	128,613	0,441	0,881
Decisions work approach	90,69	128,412	0,485	0,880
Set priorities	90,60	125,733	0,526	0,879
Choices working methods	90,51	128,374	0,550	0,879
Level of skills	90,65	130,442	0,435	0,882
Adapt to changes	90,62	127,627	0,499	0,880
Adapt to developments	90,68	127,295	0,584	0,878
Respond to changes	90,75	126,582	0,548	0,878
Duties	90,50	129,575	0,428	0,882
Changes in function	90,77	128,393	0,478	0,880

## Descriptive analysis

### Descriptive Statistics

	Mean	Std. Deviation	N
Need for belongingness	32,31	6,416	455
Organizational commitment	4,17	1,205	362
Autonomy	8,143	2,545	35
Competence	90,604	11,213	356

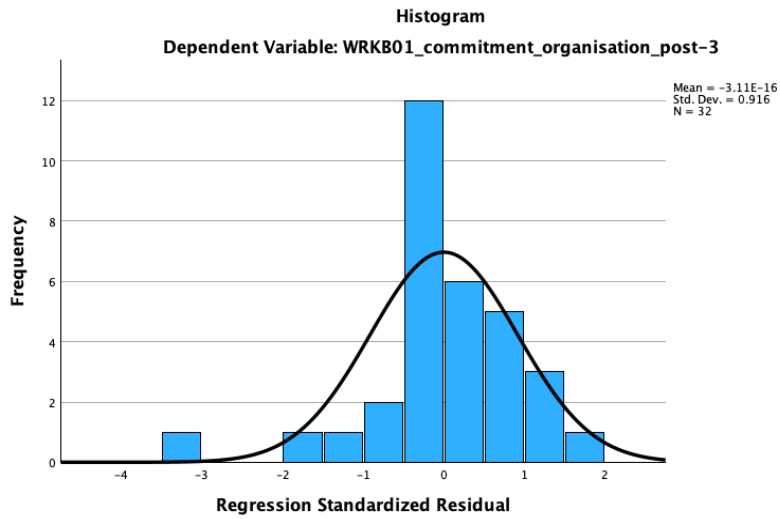
## Correlation analysis

		OfficeWork	PhysicalWork	PerceivedHealth	Mobility Supporting Activities
Organizational commitment	Pearson Correlation	1	0,337**	-0,024	0,409*
	Sig. (2-tailed)		<0,001	0,647	0,018
	N	362	329	362	33
Competence	Pearson Correlation	0,337**	1	-0,069	0,669**
	Sig. (2-tailed)	<0,001		0,195	<0,001
	N	329	356	356	35
Need for belongingness	Pearson Correlation	-0,024	-0,069	1	-0,279
	Sig. (2-tailed)	0,647	0,195		0,104
	N	362	356	455	35
Autonomy	Pearson Correlation	0,409*	0,669**	-0,279	1
	Sig. (2-tailed)	0,018	<0,001	0,104	
	N	33	35	35	35

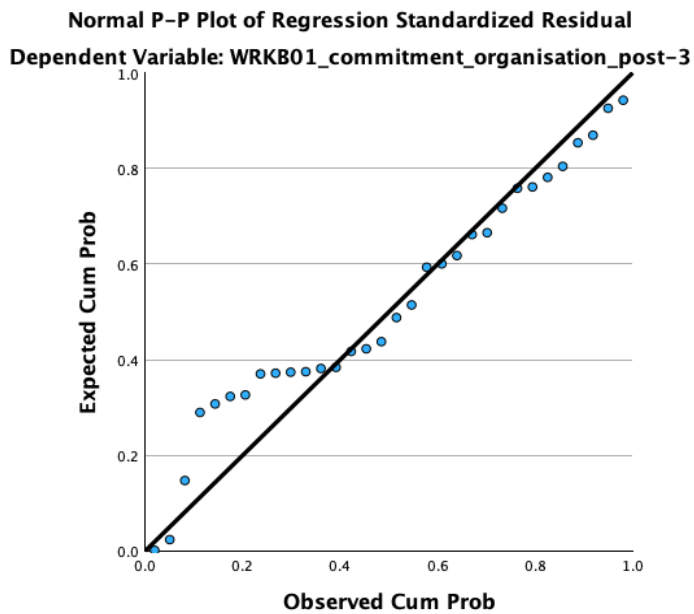
\*\* Correlation is significant at the 0.01 level (2-tailed).  
\* Correlation is significant at the 0.05 level (2-tailed).

## Assumptions of regression

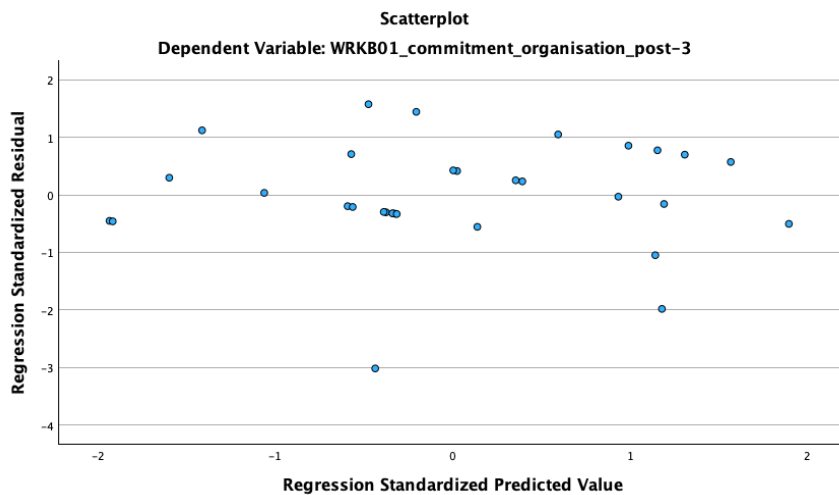
### Normality



### Linearity



## Homoscedasticity



## Multicollinearity

### Multicollinearity

Model		Tolerance	VIF
1	(Constant)		
	Type of employment	0,916	1,092
	Contract hours	0,916	1,092
2	(Constant)		
	Type of employment	0,828	1,208
	Contract hours	0,773	1,294
	Autonomy	0,503	1,987
	Competence	0,494	2,024
3	(Constant)		
	Type of employment	0,786	1,272
	Contract hours	0,698	1,432
	Autonomy	0,470	2,127
	Competence	0,492	2,033
	Need for belongingness	0,829	1,206

## Multiple regression analysis

### Descriptive Statistics

	Mean	Std. Deviation	N
Organizational commitment	4,53	1,135	32
Type of employment	0,156	0,369	32
Contract hours	0,688	0,471	32
Autonomy	8,219	2,549	32
Competence	95,313	10,903	32

Need for belongingness	30,84	7,229	32
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### Model Summary<sup>d</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change
						F Change	df1	df2	
1	0,128 <sup>a</sup>	0,016	-0,052	1,164	0,016	0,240	2	29	0,788
2	0,470 <sup>b</sup>	0,221	0,105	1,074	0,204	3,541	2	27	0,043
3	0,473 <sup>c</sup>	0,224	0,075	1,092	0,003	0,106	1	26	0,748

a. Predictors: (Constant), ContractHours, TypeEmployment

b. Predictors: (Constant), ContractHours, TypeEmployment, Autonomy, Competence

c. Predictors: (Constant), ContractHours, TypeEmployment, Autonomy, Competence, NeedBelongingness

d. Dependent Variable: OrganizationalCommitment

### ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0,651	2	0,326	0,240	0,788 <sup>b</sup>
	Residual	39,318	29	1,356		
	Total	39,969	31			
2	Regression	8,820	4	2,205	1,911	0,137 <sup>c</sup>
	Residual	31,149	27	1,154		
	Total	39,969	31			
3	Regression	8,946	5	1,789	1,500	0,224 <sup>d</sup>
	Residual	31,022	26	1,193		
	Total	39,969	31			

a. Dependent Variable: OrganizationalCommitment

b. Predictors: (Constant), ContractHours, TypeEmployment

c. Predictors: (Constant), ContractHours, TypeEmployment, Autonomy, Competence

d. Predictors: (Constant), ContractHours, TypeEmployment, Autonomy, Competende, NeedBelongingness

### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,600	0,368		12,493	<0,001
	Type of employment	0,388	0,592	0,126	0,655	0,517
	Contract hours	-0,188	0,464	-0,078	-0,406	0,688

2	(Constant)	1,723	1,894		0,910	0,371
	Type of employment	0,698	0,575	0,227	1,214	0,235
	Contract hours	-0,073	0,466	-0,030	-0,157	0,877
	Autonomy	0,162	0,107	0,363	1,518	0,141
	Competence	0,015	0,025	0,143	0,592	0,559
3	(Constant)	1,373	2,205		0,623	0,539
	Type of employment	0,654	0,600	0,213	1,091	0,285
	Contract hours	-0,023	0,499	-0,009	-0,046	0,964
	Autonomy	0,171	0,112	0,384	1,526	0,139
	Competence	0,014	0,026	0,138	0,558	0,582
	Need for belongingness	0,010	0,030	0,062	0,325	0,748

# Moderation analyses

## Autonomy

```
Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 4.2 *****

      Written by Andrew F. Hayes, Ph.D.      www.afhayes.com
      Documentation available in Hayes (2022). www.guilford.com/p/hayes3

*****

Model : 1
  Y : WRKB01_c
  X : NBS_sum_
  W : Autonomy

Sample
Size: 33

*****
OUTCOME VARIABLE:
WRKB01_c

Model Summary
      R      R-sq      MSE      F      df1      df2      p
      .429      .184      1.132      2.179      3.000      29.000      .112

Model
      coeff      se      t      p      LLCI      ULCI
constant      4.930      3.474      1.419      .167      -2.176      12.035
NBS_sum_      -.057      .099      -.572      .572      -.259      .146
Autonomy      -.074      .389      -.190      .850      -.869      .721
Int_1      .008      .011      .690      .496      -.015      .031

Product terms key:
Int_1      :      NBS_sum_ x      Autonomy

Test(s) of highest order unconditional interaction(s):
      R2-chng      F      df1      df2      p
X*W      .013      .476      1.000      29.000      .496
-----
      Focal predict: NBS_sum_ (X)
      Mod var: Autonomy (W)

Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/
  NBS_sum_ Autonomy WRKB01_c .
BEGIN DATA.
  23.835      5.730      4.216
  31.091      5.730      4.127
  38.347      5.730      4.039
  23.835      8.242      4.494
  31.091      8.242      4.548
  38.347      8.242      4.601
  23.835      10.755      4.773
  31.091      10.755      4.968
  38.347      10.755      5.163
END DATA.
GRAPH/SCATTERPLOT=
  NBS_sum_ WITH WRKB01_c BY Autonomy .
```

# Competence

```

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 4.2 *****

      Written by Andrew F. Hayes, Ph.D.      www.afhayes.com
      Documentation available in Hayes (2022). www.guilford.com/p/hayes3

*****
Model : 1
  Y : WRKB01_c
  X : NBS_sum_
  W : Competen

Sample
Size: 329

*****
OUTCOME VARIABLE:
  WRKB01_c

Model Summary

      R          R-sq      MSE          F      df1      df2      p
      .340      .116      1.232      14.157      3.000      325.000      .000

Model

      coeff      se          t          p      LLCI      ULCI
constant      2.488      2.785      .893      .372      -2.991      7.967
NBS_sum_      -.049      .087      -.565      .572      -.220      .122
Competen      .017      .030      .550      .582      -.043      .076
Int_1          .001      .001      .641      .522      -.001      .002

Product terms key:
  Int_1      :      NBS_sum_ x      Competen

Test(s) of highest order unconditional interaction(s):

      R2-chng      F      df1      df2      p
X*W      .001      .411      1.000      325.000      .522
-----
      Focal predict: NBS_sum_ (X)
      Mod var: Competen (W)

Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/
  NBS_sum_ Competen WRKB01_c .
BEGIN DATA.
  25.759 79.772 3.804
  32.213 79.772 3.800
  38.666 79.772 3.796
  25.759 90.881 4.163
  32.213 90.881 4.203
  38.666 90.881 4.243
  25.759 101.990 4.523
  32.213 101.990 4.606
  38.666 101.990 4.690
END DATA.
GRAPH/SCATTERPLOT=
  NBS_sum_ WITH WRKB01_c BY Competen .

```