

# PERSONALITY TYPE DIVERSITY MANAGEMENT

The effect of personality type diversity management on team performance.



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## Introduction

“What an idiot!”

In professional settings, encountering individuals who behave differently from our expectations may evoke the initial thought of "What an idiot!" However, such behaviour often stems from individuals perceiving their actions as normal, just as they might view our actions in the same light. Conflicts within teams are not uncommon; however, gaining insight into the influence of personality types can provide a valuable understanding of these diverse behaviours.

Over the past decades, the adoption of team-based work has notably increased (Stock, 2004). The objective of a team is to achieve greater effectiveness than that of an individual. It is essential to differentiate between teams and groups; while groups prioritize individual goals and performance, the performance of a team is measured based on the collective products or solutions generated (The Basics of Working on Teams | MIT Human Resources, n.d.). Notably, a majority of vacancies advertised by prominent Dutch employment agency Randstad emphasize the importance of working in teams, indicating the significance both employers and employees place on collaborative endeavours (Vind Jouw Baan | Vacatures, n.d.). Nonetheless, working in teams can prove challenging, often accompanied by the presence of team members perceived as "idiots." These individuals may display diverse working methods, communication styles, or differing opinions. The crucial question to address is whether teams can cultivate skills to effectively collaborate with members exhibiting contrasting behavioural profiles instead of resorting to labelling them as "idiots."

Extensive research has been conducted on team dynamics, exploring various types of teams, such as functional teams, cross-functional teams, self-managing teams, troubleshooting teams, project teams, and task-force teams (Indeed Editorial Team, 2022). While some studies concentrate on team composition (Barr, Dixon, & Gassenheimer, 2005) or team members' levels of experience (Amato & Amato, 2005), others seek explanations for team ineffectiveness. Bradley and Hebert (1997) conducted research on the impact of personality types on team productivity, communication, heterogeneity, and cohesion as influential factors. This model implies that a team's performance can be optimized by carefully considering these aspects in its composition. Kichuk and Wiesner (1997) assert that selectively composing and manipulating team composition can maximize the likelihood of success while neglecting this

aspect may lead to chaotic or disastrous outcomes. Notably, personality traits often are considered during the process of team member selection.

However, to be able to select a team a manager needs options to select from. The number of vacancies is increasing (Centraal Bureau voor de Statistiek, 2022), resulting in a decline in unemployment rates in the Netherlands (Centraal Bureau voor de Statistiek, n.d.), contributing to a significant staff shortage. Consequently, employers may face constraints in forming the most optimal teams and must rely on the existing workforce. This limitation raises the crucial inquiry of whether team effectiveness can be enhanced through fostering effective interactions and collaborations among team members rather than attempting to assemble the ideal team.

Building upon the model initially introduced by Yadav and Lenka in 2020, the primary objective of this research is to make a substantive contribution to the existing body of literature pertaining to diversity management. Specifically, this study seeks to delve into the complex relationship between team members' cognizance of one another's personality traits and the subsequent impact on team performance. In this context, the diversity under inspection is characterized by the inherent diversity within teams based on their distinct personality types. The mediating factor under examination involves a comprehensive explanation of these personality types, while the resultant consequence centres on the actual performance exhibited by the teams.

It is noteworthy that a research gap, as identified by Lancellotti and Boyd in 2008, has underscored the need for future investigations in this domain. The earlier research by Lancellotti and Boyd primarily concentrated on the personality type of an individual team member, thereby leaving uncharted territory in the analysis of collective personality dynamics within groups. In contrast, the present study addresses this gap by focusing on the entirety of personality types within team contexts.

A methodological approach involving an escape room challenge has been adopted to assess team performance. This investigation employs two distinct sample groups, with one group comprising teams familiar with both their individual and their fellow members' personality types, while the other constitutes a control group composed of teams lacking awareness regarding personality types.

By attempting to explain the manner in which teams' consciousness of personality types influences their performance, this research aspires to provide valuable insights into the domain of team dynamics and collaborative practices. In doing so, it seeks to contribute to the

enhancement of team efficacy, nevertheless potential constraints in the composition of teams in various contexts.

## Theoretical background

This chapter presents the theoretical background of the thesis. First different personality type models are discussed. Then the theories about teams are discussed.

### Teams

Depending on the context, the definition of the term “team” can be described in various ways. According to the Van Dale dictionary (Van Dale, n.d.), a team is defined as “a group of people working together.” However, Katzenbach and Smith (2007) provide a more detailed definition, stating that a team consists of a small number of individuals who possess complementary skills and are committed to a common purpose, a mutually accountable approach, and a specific set of performance goals. This definition emphasizes a key difference from the previous one, emphasizing that mere collaboration does not necessarily equate to functioning as a team. A group must possess a shared purpose, defined performance objectives, and an agreed-upon approach to qualify as a team.

Diverse types of teams exist in organizational settings. Robbins and Judge (2018) outline four primary categories: problem-solving teams, cross-functional teams, self-managed teams, and virtual teams. Teams of people that work together to solve problems, or problem-solving teams, typically comprise individuals from the same department and focus on increasing efficiency, and quality, and removing obstacles hindering progress. It is important to note that these teams often lack the authority to immediately implement the solutions, this limits their deliverable to recommendations. Cross-functional teams, on the other hand, are made up of employees occupying similar hierarchical levels but working in different functional areas within the company. The primary objective of these teams is to accomplish specific tasks. In contrast, self-managed teams operate autonomously, taking full responsibility for their planning, task execution, decision-making, and actions. Unlike the aforementioned teams, they operate without a direct supervisor. Finally, virtual teams use computer technology to collaborate, as physical meetings are impractical for a variety of reasons, including geographic limitations. It is worth mentioning that some teams cannot be neatly classified into a single type but rather embody a combination of two or more types.

In summary, teams represent more than just a collection of individuals working together. To be qualified as a team they require a shared purpose, defined performance goals, and a mutually agreed-upon approach. Organizational contexts encompass various types of teams, such as problem-solving teams, cross-functional teams, self-managed teams, and virtual

teams. While each type has its unique characteristics, there are times when teams exhibit a combination of two or more types.

## Diversity management

In the pursuit of enhancing team performance through the optimization of decision-making and problem-solving processes, organizations have increasingly turned to diversity management as a strategic important aspect (Pelled, 1996). Diversity management, within this context, is oriented toward enhancing the performance of a workforce characterized by heterogeneity across various dimensions, including ethnicity, gender, cultural and educational backgrounds, as well as behavioural attributes (Tsui et al., 1992). An important foundational contribution to the understanding of diversity management was made by Yadav and Lenka (2020), who conducted an extensive literature review in this domain. The primary aim of their comprehensive review was twofold: first, to enlighten the multifaceted dimensions of diversity, and second, to construct a conceptual framework for comprehending the dynamics of diversity management.

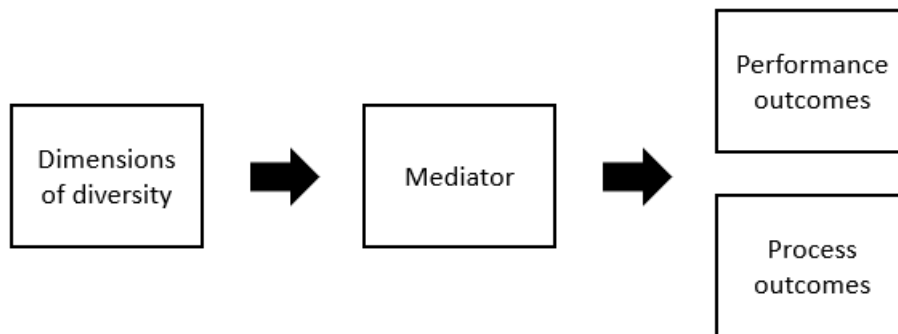
Yadav and Lenka's (2020) taxonomy define four distinct categories of diversity, originating from a dual-classification scheme. The first taxonomy distinguishes between surface-level and deep-level diversity. Surface-level attributes are readily observable characteristics, whereas deep-level attributes remain concealed beneath the surface. The second classification scheme proposed by Yadav and Lenka differentiates job-oriented attributes from relations-oriented attributes. This yields surface-level job-oriented attributes, encompassing factors such as team tenure, educational background, and functional expertise, as opposed to the less overt, deep-level job-oriented attributes, which encompass knowledge, experience, and skills. Surface-level relations-oriented attributes include observable characteristics like age, gender, race, and nationality, while the deeper stratum of relations-oriented attributes encompasses social status, attitudes, and personality traits.

Within the framework developed by Yadav and Lenka (2020), an integrative model of diversity management is presented. This model posits a sequence commencing with the categorization of diversity dimensions, followed by the identification of a mediator – an intervening mechanism, such as conflict, group identification, or team efficacy. This mediator subsequently gives rise to consequences, which are divided into process outcomes and performance outcomes. Process outcomes encompass facets such as job satisfaction,



organizational commitment, and social integration, while performance outcomes entail tangible manifestations of effectiveness, creativity, and overall firm performance.

The focal point of the current research centres on personality type diversity, with group identification serving as the designated mediator. In the context of group identification, teams acknowledge the presence of diversity and gain an acknowledgment of its effects, thereby causing heightened awareness within the group dynamic.



*Figure 1 Simplified integrative model of diversity management.*

### Mediator: Awareness

There is an observable shortfall in the existing academic discussion related to the impact of heightened awareness of personality types within team dynamics Yadav and Lenka (2020). In response to this gap, Lancellotti and Boyd conducted an important analysis in 2008, which formulated and tested three hypotheses designed to enlighten the complex relation among personality awareness, team satisfaction, and performance outcomes.

The first hypothesis analyzed by Lancellotti and Boyd sought to determine whether individuals who engaged in structured personality awareness exercises would exhibit elevated levels of satisfaction with regard to both the cohesiveness of their team and the quality of the collective work produced. The empirical findings from their research unequivocally supported this hypothesis, revealing that participants who actively participated in personality awareness exercises registered significantly heightened levels of satisfaction concerning both team cohesion and output quality.

The second hypothesis delved into the connection between self-regulation and amplified levels of team satisfaction. The research outcomes underscored a statistically robust positive relationship between heightened self-regulation competencies, characterized by the skilled management of one's behaviour in correspondence with their personality traits, and raised

levels of satisfaction within the team atmosphere. This empirically substantiated the presumption that individual self-regulation proficiency plays an essential role in fostering heightened overall satisfaction within team contexts.

The third and final hypothesis aimed to examine whether the enhancement of satisfaction levels would lead to significant enhancements in team performance. While preliminary findings hinted at a positive association between augmented satisfaction and improved team performance, specifically manifested in terms of academic grades, it is necessary to acknowledge that this relationship did not obtain statistical significance, a limitation ascribed to the relatively modest sample size under investigation.

In light of the study's exclusive emphasis on individual-level personality awareness, it is relevant to advocate for subsequent scholarly investigations into the potential consequence of team-wide personality awareness on team performance. Such inquiries carry profound significance in the contemporary employment landscape, characterized by a pronounced shortage of available personnel, and hold the promise of providing strategic insights into managerial interventions aimed at optimizing team effectiveness by fostering heightened awareness and enhanced collaboration among team members, grounded in a comprehensive understanding of each other's personality profiles.

### Consequence: Performance

Yadav and Lenka (2020) have induced a theoretical framework wherein the mediation process results in discernible consequences. In consonance with this framework, the present research aims to determine the relationship between the aforementioned awareness of personality types and, consequently, the performance exhibited by teams. As highlighted by Guzzo and Dickson (1996), the evaluation of team performance is an intricate construct, requiring a multifaceted perspective. They argue that a comprehensive appraisal of team performance necessitates the consideration of various dimensions, encompassing not only the tangible outputs generated by the team but also the impact of the team on individual team members and the team's potential for future performance.

In a comprehensive meta-analysis conducted by Peeters et al. (2006) focusing on the relationship between personality and performance, it is elucidated that performance assessments frequently adopt a subjective orientation, predicated on the evaluations expected by supervisors or instructors overseeing a team. These assessments typically encompass a multifactorial appraisal, encompassing dimensions such as quality, quantity, and planning. In

a united effort to mitigate the subjectivity inherent in team performance evaluations, the present research adopts a methodological approach centred on a singular supervisory authority. Moreover, it employs objective metrics to measure the performance of the teams under close examination, thereby advancing a more objective and quantifiable assessment paradigm.

In investigating the drivers of team performance, a literature review was conducted by Stock (2004) that identified several indicators. Team effectiveness and efficiency are among the most commonly used indicators. Effectiveness refers to the degree to which objectives are achieved and is often associated with the quality of team outcomes. On the other hand, efficiency relates to the ratio of input to useful output and is often associated with speed. Additionally, the cooperativeness of a team is also considered as a performance indicator, measuring the extent to which all team members contribute to the team's objectives. Furthermore, the presence of conflict within a team is another dimension of team performance. It is worth noting that conflicts themselves are not inherently damaging to team performance, but rather how conflicts are managed and resolved that influences overall team effectiveness (Bartos & Wehr, 2003).

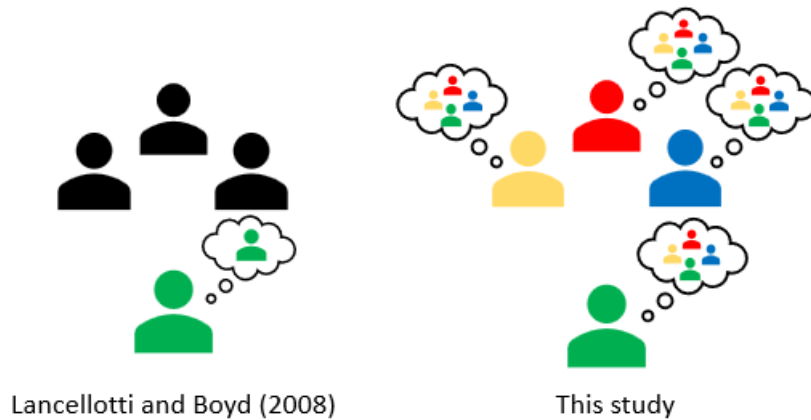
In addition to performance indicators, Stock (2004) identifies various factors that can influence team performance. Team size is one such factor. The hierarchical structure within a team and the level of openness also plays significant roles. Moreover, team composition has a substantial impact on team performance according to extensive research. The composition of a team affects group norms, stability, consensus, and other crucial aspects. Notably, heterogeneity has been thoroughly explored. This includes variations in attitudes, backgrounds, gender, and personalities. Jackson et al. (1995) found that heterogeneity positively correlates with decision-making effectiveness. Furthermore, the familiarity of team members has been linked to higher productivity levels (Goodman & Leyden, 1991), and greater familiarity is associated with increased decision-making effectiveness (Watson et al., 1991).

Another important element influencing team performance is leadership. Managers can enhance team performance by improving individual performance and demonstrating excellent tactical abilities (Jacobs & Singell, 1993). In addition, the size of the top management team has been found to impact team performance, with larger management teams associated with increased performance (Halebian & Finkelstein, 1993). Furthermore, Devine and Philips (2001) examined the relationship between cognitive ability and team performance, revealing a positive association between these two constructs.

Within the context of heterogeneity, personality types have received significant attention. Bradley and Hebert (1997) investigated the impact of personality type composition on team performance in information system development teams. Their findings suggest that the composition of personality types influences team performance. This is due to the fact that certain personality types perform better in certain roles. For instance, some personality types describe a person as a natural leader, each team should consist out of one person with that personality type.

In conclusion, evaluating team performance requires considering multiple dimensions. Various indicators such as effectiveness, efficiency, cooperativeness, and conflict management contribute to understanding a team's performance. Factors including team compositions, hierarchy, openness, size, leadership, familiarity, cognitive ability, and personality types play crucial roles in influencing team performance.

Drawing upon the comprehensive framework of diversity management constructed by Yadav and Lenka (2020), this study theorizes a series of hypotheses aimed at investigating the intricate relation within the context of diversity typology, specifically personality, mediated by the construct of group identification, and subsequently yielding different consequences, namely, performance efficiency and performance effectiveness. Notably, the research by Lancellotti and Boyd (2008) has provided empirical substantiation for the proposition that an enhanced awareness of one's personality type, coupled with a conscientious acknowledgment thereof, leads to heightened levels of satisfaction as well as team dynamics and interactions. Furthermore, their findings suggest a directional relation wherein enhanced satisfaction leads to a positive influence on team performance. The difference between this study and the study performed by Lancellotti and Boyd can be found in the figure below.



*Figure 2 Difference between studies*

The figure shows that the study of Lancellotti and Boyd (2008) focused on one person and the effect of knowing their personality type on team performance. Lancellotti and Boyd (2008) based their research on the following construct. A person who is aware of their personality knows their strengths and weaknesses. This person then is able to use this to in teamwork, by for instance taking the role of leader of the group because his personality tells that this person has natural leadership skills. This would then benefit the teamwork since the person will take the role which suits him best.

This study extends the construct proposed by Lancellotti and Boyd (2008). If a person who is aware of their own personality type improves the teamwork and performance of the team, would this be even better when the person is also aware of all the other personality types in the team? This shows the right side of Figure 2, the four people in the team know the personality type of themselves, but also the other three personalities in the team. I think this must even further improve the performance of the team because now the team members can assign different tasks to a specific person that will suit his or her personality type. This will then result in an even better team performance. Building upon these foundational insights, the present study aims to analyze the following hypotheses:

Hypothesis 1: Teams characterized by awareness of each other's personality types will exhibit higher efficiency.

Hypothesis 2: Teams characterized by awareness of each other's personality types will demonstrate higher effectiveness.

The third hypothesis in this study which is also based on the framework of Yadav and Lenka (2020) maintains continuity by focusing on the dimension of personality types as its core

diversity variable while retaining the mediator of group identification as in the prior hypotheses. However, the consequence is a process outcome instead of a performance outcome. Process outcomes, characterized by dimensions such as conflict resolution, communication effectiveness, and job satisfaction, assume outstanding importance in enlightening the dynamics of team functioning. Importantly, this hypothesis shifts the focus towards evaluating the influence of personality awareness and group identification on the process outcome of team integration, thereby contributing to a comprehensive understanding of how these factors impact the complex structure of team interactions and cohesion.

Hypothesis 3: Individuals within teams possessing an awareness of each other's personality types will perceive a greater sense of contribution, leading to increased cooperativeness among team members.

It is important to note that the concept of "awareness of each other's personality type" extends beyond mere knowledge of different personality types. It also entails understanding how to effectively collaborate and work synergistically with individuals possessing diverse personality types.

### Diversity: Personality types

The present chapter serves as a comprehensive survey of diverse models regarding personality types, offering an analytical examination of their respective strengths and constraints within the specific boundaries of the ongoing study. The rationale underlying this exploration lies in the imperative of discerning variances among personality type models, given that identical personality types may be different in distinct manners across these models. The outcomes of this chapter are instrumental in guiding the selection process, ultimately culminating in the identification and adoption of a singular personality type model that aligns with the research objectives and parameters of the present study.

The foundation of the modern personality type models can be traced back to Carl Gustav Jung's pioneering work on archetypes, which he initially conceptualized as patterns of behaviour and thought-seeking realization. Over time, these archetypes developed into what we currently know as personality types. One of Jung's theories from 1921 introduced the concepts of extraversion (E) and introversion (I) as fundamental attitudes, forming the basis for personality type classification (Redactie Insights, n.d.). In further developing his ideas, Jung identified four pairs of functions that make up consciousness, including sensation (S) vs. intuition (N), and thinking (T) versus feeling (F) (Wilde, n.d.). Katherine Briggs and her

daughter Isabel Myers expanded upon Jung's work by introducing a second attitude pair: perception (P) versus judgement (J) (Myers IB, 1975). The combination of these two attitude pairs, along with the two function pairs, resulted in the classification of 16 distinct personality types (Wilde, n.d.). Numerous personality type models, including G. Domino's adjective checklist, which seeks to identify individuals with creative potential, have drawn influence from Jung's archetypes (Albaum & Baker, 1977). Domino (1970) suggests that the creativity scales within the adjective checklist can be utilized to identify creative individuals among a broader population. The models discussed subsequently draw inspiration from the archetypes proposed by Carl Gustav Jung.

### Myers-Briggs Type Indicator

The Myers-Briggs Type Indicator (MBTI), as mentioned earlier, is grounded in the psychological typology proposed by Carl Gustav Jung. The before mentioned system incorporates four pairs, resulting in a total of 16 distinct personality types. For instance, the ISTJ type is characterized by reliability, practicality, and attention to detail. The ISFJ type embodies a habit of assisting others and kindness. INFJ individuals are often perceived as introspective and inspirational while displaying visionary qualities. The INTJ type manifests independence, innovation, and a preference for long-term visioning. ISTP individuals exhibit calmness, strong analytical skills, productivity, and a practical outlook. ISFP types are known for their cooperative nature gentleness, and loyalty. INFP individuals act according to their core values and possess deep insight into the concerns of others. INTP personalities demonstrate analytical skills, independence, a theoretical mindset, and a preference for intellectual challenges.

The ESTP type is characterized by enthusiasm, high energy, and the ability to motivate and energize others. ESFP individuals are typically playful, friendly, and spontaneous, and often embody the qualities of an entertainer. ENFP personalities exhibit a relentless pursuit of possibilities and solutions, accompanied by a motivational attitude, even though they have a tendency towards indecisiveness. Similarly, the ENTP type possesses a preference for exploration and problem-solving, besides that, this type exhibits improved decision-making abilities. This type often uses a strategy in their approach to solve a problem. The ESTJ personality type is organized, decisive, and analytical, whereas ESFJ types are closely engaged with others, assuming a supportive and contributing role. ENFJ personalities are excellent in decision-making while taking into account the values of others. Lastly, the ENTJ

type represents natural leadership, characterized by organizational skills, decisiveness, and determination. (*MBTI® Personality Types*, n.d.)

### The Keirsey Temperament Sorter

The Keirsey Temperament Sorter, developed by David Keirsey, presents a personality type model that draws inspiration from earlier studies by Plato and Hippocrates. Artisan, Guardian, Idealist, and Rational are the four distinct temperaments that Keirsey identified. Each temperament is further subdivided into two categories resulting in a total of 16 types that align with the Myers and Briggs type indicators. The Artisan temperament, represented by the color red, includes individuals who exhibit optimistic, playful, excited, and daring behaviors. Approximately 30% of the global population consists of Artisans. Artisans include four types: Promoters, Crafters, Performers, and Composers. Around 45% of the world's population have the Guardian temperament, represented by the color yellow. Guardians are known for their attention to detail, logistical thinking, and focus on factual information. The four guardian types are Supervisors, Inspectors, Providers, and Protectors. Idealists, associated with the green temperament, make up approximately 15% of the global population. These individuals are characterized as being imaginative, sensitive, intuitive, and kindhearted. The four idealist types are Champions, Teachers, Counselors, and Healers. The final temperament is the blue Rational temperament. Rationals exhibit traits such as logical thinking, strategic planning, independence, and innovation. Keirsey identified four types of rationals: Masterminds, Inventors, Field Marshals, and Architects (*Keirsey Temperament Assessment*, n.d.).

### The big five personality traits

An alternative model used to describe personality types is the Big Five personality traits. This model consists of five main factors: Extraversion, Conscientiousness, Emotional Stability, Agreeableness, and Openness to Experience. Extraversion has to do with how talkative and sociable a person tends to be. Conscientiousness is characterized by the degree of organization exhibited by an individual. The emotional stability factor is indicative of a person's level of calmness. The traits of gentleness and cooperativeness in a person are included in the factor of Agreeableness. Lastly, Openness relates to an individual's tendency towards imagination and curiosity (Peeters et al., 2006).

### Four Insight Colors

The concept of four insight colors, as introduced by Redactie Insights (n.d.), offers a simplified representation of the 16 Myers and Briggs personality types, focusing on two



fundamental dimensions: thinking versus feeling and introversion versus extraversion. The model is designed to be understandable by everyone, making it accessible to individuals with limited prior knowledge of personality typology.

#### *Blue – Introverted Thinking*

Erikson (2019) characterizes individuals with the blue personality as systematic workers who appear reserved and may exhibit a sense of insecurity. Analytical and perfectionistic, they also possess a pragmatic outlook. Although they appear calm, they remain highly observant of their surroundings, engaging in tasks that involve analysis, classification, and evaluation (Erikson, 2019).

#### *Red – Extraverted Thinking*

The red personality type actively seeks to take control of circumstances and manifests a preference for clear direction. Determined and driven, these individuals strive for tangible outcomes (Redactie Insights, n.d.-a). They are generally seen as having alpha personalities, they assert themselves confidently, frequently voicing their opinions and offering input on various topics (Erikson, 2019).

#### *Yellow – Extraverted Feeling*

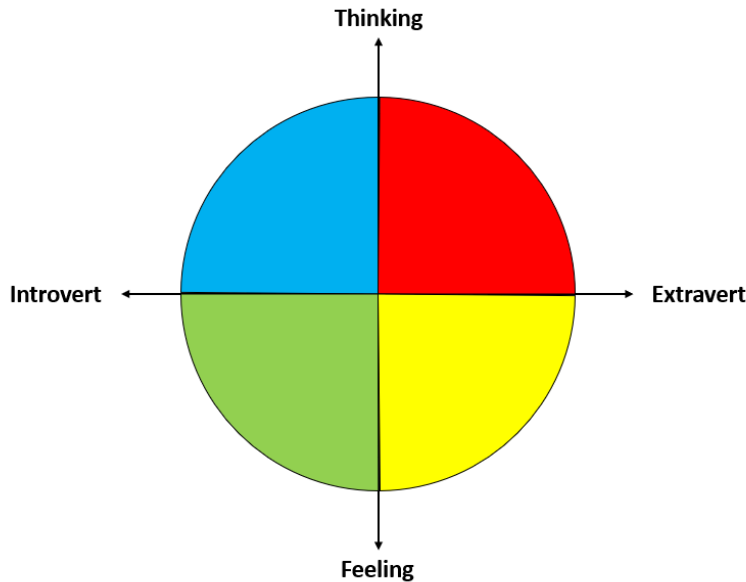
Individuals with the yellow personality give out optimism, enthusiasm, and a cheerful character. They flourish in social environments, with a focus on cultivating and managing relationships (Erikson, 2019). Seeking recognition and appreciation from others, yellows often demonstrate creativity and an outlook that views opportunities in every situation (Redactie Insights, n.d.-a).

#### *Green – Introverted Feeling*

The green personality type exhibits a more passive attitude compared to other types, showing a tendency to avoid offending others. Greens prioritize harmonious relationships and place great emphasis on their interactions with others. They excel as attentive listeners and cooperative team players (Erikson, 2019). Additionally, greens value democratic processes that allow individuals to freely express their opinions and guarantee that all perspectives are considered respectfully (Redactie Insights, n.d.-a).

The four insight colors are visually represented in a circular diagram, with thinking and feeling plotted along the y-axis and introversion and extraversion along the x-axis. Each

quadrant of the circle corresponds to a specific personality type. It is important to note that individuals can display varying degrees of each insight color, leading to subtle variations within the four distinct personality types.



*Figure 3 Personality type circle*

### Pros and Cons of Personality Type Models in Research

Various personality type models are used in different research contexts, each with distinct advantages and limitations. A key difference among these models lies in their level of simplicity. Notably, the MBTI and the Keirsey model stand out with the most extensive number of personality types, totaling sixteen. In contrast, the Big Five model and the Insights model present a more concise classification with five and four personality types.

The MBTI personality types are overwhelmingly preferred in academic publications, whereas the utilization of the Insights model is comparatively less frequent. However, it is important to recognize that the MBTI model and the Insights model are essentially related, thereby sharing a foundational connection Redactie Insights (n.d.).

The Insights model, despite featuring a lower number of personality types, remains valuable in facilitating an understanding of interpersonal dynamics and effective communication strategies. The Insights model's manageability is useful, especially in understanding the challenges of working with various personality types. Additionally, it is crucial to understand that using a model with an excessive number of personality types necessitates a more

extensive set of test questions. As a result, this could lead to more time and effort demands on research participants, which is not desirable from a practical standpoint.

In summary, the selection of personality type models in research depends on specific research objectives, considering both the level of simplicity required and the practical feasibility of implementation. The Insights model offers a strong alternative to the MBTI and offers insightful information about interpersonal interactions, even if the MBTI remains a popular choice in the literature. However, researchers must be mindful of the potential trade-offs concerning the number of personality types and their impact on the research process, particularly in terms of participant burden.

### Research question

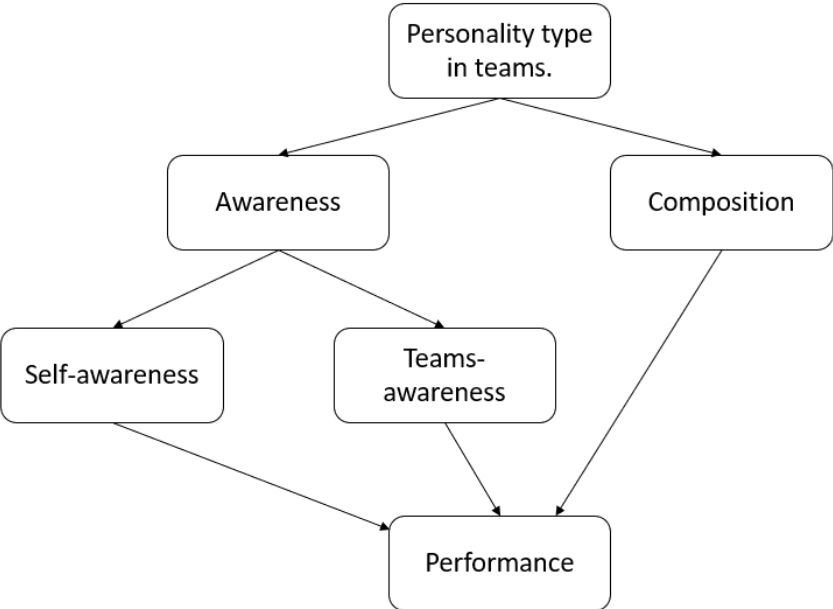


Figure 4 Framework literature on personality types and performance

Figure 2 presents the framework derived from the relevant literature on personality types and their impact on performance. Extensive research exists on the impact of personality type composition within a team and its consequent effects on team performance. Notably, Lancelotti and Boyd (2008) solely investigated the impact of self-awareness of personality types within teams on team performance. There is, however, almost no research on teams’ understanding of personality types and how that affects team performance. Teams-awareness, in this context, refers to the extent to which team members are aware of the personality types of their fellow team members and possess the ability to effectively navigate and engage with these different personality types.

Thus, the research question is: Does awareness of the personality types of one's fellow team members (teams-awareness) significantly influence team performance? By addressing this research gap, the current study seeks to shed light on the relationship between teams-awareness and team performance, exploring the potential impact of such awareness on enhancing team interactions and overall performance.

## Methodology

### Research Design

This chapter outlines the research design aimed at addressing the research question. Additionally, it addresses the reliability, validity, and limitations inherent in the study.

### Experimental Research

The current scientific investigation adopts an experimental research design, featuring two key variables: team performance and teams-awareness regarding personality types. Team performance serves as the constant variable, enabling the measurement of differences in teams-awareness. To achieve this, a true experimental design will be implemented.

The experiment will involve random group assignments to engage in solving an escape room puzzle. The control group will remain unaware of the personality types present within the team, whereas the experimental group will receive explanations regarding the personality types within their team and strategies for effectively managing interactions with these varied personality types. Both groups' performance will be precisely measured.

### Sample size

To assess the potential influence of the sample size on the results, a power analysis was conducted using G\*Power (Faul et al., 2007) with an effect size of 0.5, an alpha of 0.05, and a power of 0.95. The results of this analysis indicated that the study would require a minimum sample size of 210 groups or 840 participants. However, due to the inherent time limitations, achieving such a large sample size may not be feasible, thus impacting the statistical power of the study. However, this research aims to find the highest number of participants possible.

### Escape Room Methodology

This research employs a unique approach, utilizing an escape room puzzle to assess team performance. According to Griggs et al. (2022), escape rooms present team-based activities where groups collaboratively tackle multiple tasks while confined in a room, within a predetermined time limit. Escape rooms have been successfully utilized in studies concerning

group cohesion, team orientation, and teamwork skills. The escape room puzzle for this research follows an open-path approach, allowing groups to perform actions in any order.

Performance in the escape room can be measured by evaluating the time taken to solve the puzzles and the number of hints used by the team, which serve as the primary performance indicators. Particularly, the time taken is a significant metric, as puzzles typically progress through four phases: puzzle discovery, collection of related objects, connection of puzzle clues (most challenging phase), and puzzle resolution.

### Reliability, Validity, and Limitations

The research design ensures a high degree of reliability, as all groups will encounter the same escape room puzzle and receive identical explanations. The research protocol will be carefully designed to ensure rigorous monitoring and standardization of treatment across all participant groups, thereby safeguarding the attainment of research reliability. Nevertheless, the pursuit of high validity presents a more formidable challenge, given the multifaceted nature of team performance, which is susceptible to the influence of multiple variables beyond the domain of personality awareness. Consequently, the study will take into account additional variables, notably those related to team relationships (e.g., interpersonal bonds, familial associations, or professional affiliations), as well as factors such as age. To mitigate the potential confounding effects of extraneous variables, the formation of research groups will be randomized, a strategy that augments the research's internal reliability. However, it is important to acknowledge that despite the adoption of random group assignment, inherent limitations persist, as complete control over all potentially influential variables remains an elusive goal. Nevertheless, the utilization of randomized groups serves as a pragmatic means to decrease the excessive influence of unaccounted variables, thus enhancing the internal validity of the study. A significant constraint is time, as conducting escape room puzzles for each group requires considerable effort. The research will be conducted within a limited timeframe, impeding more in-depth exploration. Additionally, the sample size must be adequate to ensure the credibility of the research findings.

### Data collection

The present study employs a mixed-methods approach, utilizing both quantitative and qualitative data to comprehensively address the research objectives. The data collection process was conducted in three distinct phases throughout the experiment.

In the initial phase, participants completed the "Jung Persoonlijkheidstest," designed by the 123test team (Jung Persoonlijkheidstest en MBTI ® Types test - 123test, n.d.). The test consisted out of 28 questions, with participants required to choose between two options. The test results provided an assessment of each participant's placement on the introversion-extraversion and thinking-feeling scales. Based on these scores, the researcher categorized the participants into specific personality type colors. After the personality type test, the researcher gave an explanation about the personality types and stated which personality type each participant had. The explanation stated some signs of behavior that are related to a specific personality type. Next to that, the explanation also stated how each personality type would act most of the time in an escape room. The complete explanation can be found in Appendix 1: Personality type explanation. Additionally, the researcher noted whether each group received an explanation regarding personality types and their presence within the group before starting the puzzle. All data were carefully recorded for each participant within their respective teams.

Subsequently, in the second phase of the experiment, the escape room puzzle challenge was conducted. Throughout this phase, various performance metrics were recorded, including the time taken to complete the first puzzle, the number of hints requested, the number of puzzles solved within 20 minutes, the overall number of puzzles solved, and the corresponding time taken to solve them. These comprehensive performance metrics provided crucial insights into team dynamics during the puzzle-solving process.

Finally, in the third phase, participants completed a brief questionnaire consisting of two sections. The first section gathered personal information, including age, gender, and educational attainment. The second section focused on participants' perceptions and experiences during the escape room puzzle challenge. This section comprised ten statements, with response options based on a Likert scale to gauge the participants' levels of agreement or disagreement with each statement.

The study involved 22 groups, each consisting of four participants, yielding a total of 88 individuals. Of these groups, 12 comprised colleagues from Prinzen, representing various departments within the organization. Prinzen is a local company that was approached because of its relationship with the researcher. Prinzen is a company that builds machines for egg-handling. The remaining 10 groups comprised friends or family members of the researcher. Participants' ages ranged from 16 to 63 years, with 28 female participants and 60 male participants. Furthermore, the educational backgrounds of the participants encompassed a

diverse range of levels, spanning from lower to higher education, including secondary education, senior secondary education, and higher education.

By employing a rigorous data collection process with careful consideration of quantitative and qualitative elements, this study aims to offer valuable insights into the relationship between team dynamics, personality types, and performance during escape room challenges.

### Measurement instruments

The present study utilized several measurement instruments to assess various aspects of team performance during the escape room puzzle challenge.

#### *Efficiency: time till Completion of First Puzzle*

The time taken by each group to complete the first puzzle served as a crucial measurement instrument. This initial puzzle is considered the most challenging, as it necessitates the execution of all four puzzle-solving phases: puzzle discovery, collection of related objects, connection of puzzle clues, and puzzle resolution. Efficient completion of the first puzzle is indicative of the group's speed and efficacy in problem-solving (Stock, 2004). Groups exhibiting higher efficiency are expected to have shorter times till completion of the first puzzle.

#### *Effectiveness: number of Puzzles Solved at the 20-minute Mark*

Another essential measurement instrument was the number of puzzles solved by each group at the 20-minute mark. While it is possible to solve all four puzzles within this timeframe, some groups may take longer to achieve this. The number of puzzles solved by a group reflects its overall performance quality. Correct answers lead to shorter solving times, while incorrect answers extend the solving process. Consequently, higher numbers of puzzles solved indicate greater group effectiveness (Stock, 2004).

#### *Cooperativeness: cooperation Score*

Upon completing the escape room puzzle, participants responded to a questionnaire containing ten questions that assessed group cooperation during the challenge. The questions encompassed both individual and group behaviors, such as contribution to problem-solving, support for efficient approaches, idea-sharing, and overall team dynamics. Participants rated their agreement with each statement on a 7-point Likert scale, ranging from "totally disagree" (1) to "totally agree" (7). Statements 6, 7, 8, and 10 were reverse coded for analysis. The total scores per person provided valuable insights into their perceived level of cooperation during the escape room challenge. The questionnaire can be found in Appendix 2.

### *Efficiency: expected Total Time of Completion*

Given the constraint of a 30-minute time limit for the experiment, not all participants completed the entire escape room puzzle. However, the time taken to solve the first puzzle, along with the number of completed puzzles and their respective solving times, were recorded. This data allowed for the calculation of the expected total time of completion. Assuming that subsequent puzzles would be solved at the same pace once the first puzzle was completed, the expected total time of completion became an additional measure of team efficiency.

By employing a comprehensive set of measurement instruments, this study sought to gain a nuanced understanding of team performance dynamics during the escape room challenge. The combination of objective time-based metrics and participants' subjective cooperation scores provided a robust foundation for examining the influence of personality types and team awareness on overall team performance.

### **Data Analysis**

Data analysis encompasses a series of systematic procedures aimed at extracting valuable insights from gathered data. This process involves reviewing, transforming, coding, cleaning, and modeling data using analytical and statistical methods (Stevens, 2023). For this study, data analysis was conducted using SPSS version 27, a software program known for its capability to translate experimental data into graphical representations and tables. The outcomes of the analysis serve to determine the presence and significance of relationships between variables, ultimately informing the acceptance or rejection of the hypotheses.

Descriptive statistics, containing numeric measures such as the mean, standard deviation, minimum, and maximum, were employed to summarize and describe the data. The first two hypotheses were tested by comparing the means of the two sample groups. To achieve this, an Independent T-test was initially considered, subject to specific assumptions. Firstly, the dependent variable must exhibit a normal distribution, which can be confirmed through the Shapiro-Wilk test. However, due to some instances of non-normality in the dependent variable, the Mann-Whitney U test was used to assess the significant differentiation of means between the sample groups. Additionally, the samples were composed of distinct and random participants, with no overlap between the groups. Lastly, the assumption of homogeneity of variance was taken into account, indicating approximate equality in the standard deviations of the two samples.



To address the last hypothesis, the reliability of the questions used in the third phase of the experiment was assessed using Cronbach's Alpha. Subsequently, a Mann-Whitney U test was conducted to investigate whether groups that received explanations about personality types exhibited significantly better cooperation scores. For this test to be valid, the dependent variable should be either ordinal or continuously measured, while the independent variable should consist of two categories. Furthermore, the observations within the samples must be independent.

By adhering to these rigorous analytical procedures, the study aimed to draw meaningful conclusions regarding the relationship between team awareness of personality types and team performance during the escape room challenge. The robustness of the data analysis ensures the reliability and validity of the findings, contributing to the scientific knowledge in this field.

## Results

### Efficiency

To test if the first hypothesis would be rejected the efficiency measurement instruments were used. The first measurement instrument focused on the time taken for the groups to complete the initial puzzle. Tables 1, 2, and 3 below provide a descriptive analysis of the time till completion of the first puzzle. The analysis involved two factors: the first group, denoted as "ja," received an explanation of the personality types before the escape room, while the second group, labeled as "nee," did not receive any explanation. A total of 11 groups participated in the experiment for each factor, as displayed in Table 1. As depicted in Table 2, the sample group that received the explanation ("ja") exhibited a mean completion time of 650 seconds, with a standard deviation of 206 seconds. On the other hand, the sample group without an explanation ("nee") had a mean completion time of 711 seconds, accompanied by a standard deviation of 120 seconds. To assess the normality of both samples, the Shapiro-Wilk test was conducted due to their sample sizes being smaller than 50. The results of the Shapiro-Wilk test, presented in Table 3, indicated that both samples followed a normal distribution. This conclusion was supported by the significance values of 0.368 for the "ja" sample and 0.450 for the "nee" sample, both greater than the threshold of 0.05, enabling the assumption of normality.

Efficiency	Explanation	N	Cases Missing
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Time to complete the initial puzzle	ja	11	0
	nee	11	0

Table 1 Case Processing Summary "Time till completion of the first puzzle"

Efficiency	Explanation	Statistic	
Time to complete the initial puzzle	ja	Mean	649,73
		Median	635,00
		Variance	42490,618
		Std. Deviation	206,133
		Skewness	0,063
		Kurtosis	-1,591
	nee	Mean	710,73
		Median	692,00
		Variance	14332,818
		Std. Deviation	119,720
		Skewness	-0,029
		Kurtosis	-1,471

Table 2 Descriptives "Time till completion of the first puzzle"

Efficiency	Explanation	Statistic	df	Sig.
Time to complete the initial puzzle	ja	0,926	11	0,368
	nee	0,934	11	0,450

Table 3 Tests of Normality "Time till completion of the first puzzle"

Due to the normal distribution of both samples, the subsequent step to compare their means involves conducting an independent-sample t-test. However, prior to the t-test, the assumption of equal variances needs to be examined. The Levene's Test for Equality of Variances, presented in Table 4, yields a value of 0.032, indicating that the assumption of equal variances cannot be upheld for these samples, therefore we look at the column of equal variances not assumed. Proceeding with the independent-samples t-test, the obtained p-value is 0.409. As a result, the null hypothesis cannot be rejected, implying that there is no statistically significant difference between the means of both samples. This means that the first hypothesis is rejected, with regard to this measurement instrument.

Time to complete the initial puzzle	Equal variances assumed	Equal variances not assumed
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Levene's Test for Equality of Variances	F	5,300	
	Sig.	0,032	
t-test for Equality of Means	t	-0,849	-0,849
	df	20	16,057
	Significance Two-Sided p	0,406	0,409

Table 4 Independent Samples Test "Time till completion of the first puzzle"

The other measurement instrument used to support the first hypothesis is the expected total time of completion. Similarly, the same factors as in the previous test are employed, as depicted in Table 5. The sample group that received an explanation had a mean of 1268 seconds, with a standard deviation of 252 seconds. In contrast, the group that did not receive an explanation displayed a mean of 1397 seconds, with a standard deviation of 177 seconds, as indicated in Table 6. To assess whether the means of both samples differ significantly, an examination of the distribution of both samples is necessary. The Shapiro-Wilk Test, presented in Table 7, indicates that both samples have a normal distribution, as evidenced by the values of 0.851 for the sample that received an explanation and 0.623 for the sample that did not receive an explanation.

Efficiency	Explanation	N	Cases Missing
Expected total time of completion	ja	11	0
	nee	11	0

Table 5 Case Processing Summary "Expected total time of completion."

Efficiency	Explanation	Statistic	
		Mean	1268,00
Expected total time of completion	ja	Median	1232,00
		Variance	63393,80
		Std. Deviation	206,133
		Skewness	0,120
		Kurtosis	-0,713
		nee	Mean
	Median		1425,00
	Variance		31241,41

		Std. Deviation	176,75
		Skewness	-0,449
		Kurtosis	-0,518

Table 6 Descriptives "Expected total time of completion."

Efficiency	Explanation	Statistic	df	Sig.
Expected total time of completion	ja	0,967	11	0,851
	nee	0,948	11	0,623

Table 7 Tests of Normality "Expected total time of completion."

Since it can be assumed that both samples follow a normal distribution, the independent-sample T-test is once again employed. In contrast to the previous test, the null hypothesis of Levene's Test for Equality of Variance cannot be rejected, indicating that equal variances are assumed with a p-value of 0.365. However, the results of the independent-sample T-test indicate that the null hypothesis cannot be rejected. The obtained p-value of 0.209, as presented in Table 8, is greater than 0.05, suggesting that there is insufficient evidence to support significant differentiation between the means of the two samples. Which again shows that the first hypothesis is rejected.

Expected total time of completion		Equal variances assumed	Equal variances not assumed
Levene's Test for Equality of Variances	F	0,859	
	Sig.	0,365	
t-test for Equality of Means	t	-1,299	-1,299
	df	20	19,225
	Significance Two-Sided p	0,209	0,209

Table 8 Independent Samples Test "Expected total time of completion."

## Effectiveness

To test the second hypothesis the effectiveness measurement instruments were used. The effectiveness of the groups can be assessed by measuring the number of puzzles solved at the 20-minute mark. Out of the total sample of 22 groups, 11 groups received an explanation before the escape room ("ja"), while the remaining 11 groups did not receive any explanation before the escape room ("nee"), as indicated in Table 9. Upon analyzing Table 10, it is evident

that the sample group characterized by receiving an explanation before the escape room had a mean of 3.36 puzzles solved at the 20-minute mark, with a standard deviation of 0.674. Conversely, the other group, which did not receive any explanation, had a mean of 2.82 puzzles solved at the 20-minute mark, with a standard deviation of 0.751. Before proceeding with a test to compare the means of both samples, the normality of the samples was assessed. According to the Shapiro-Wilk test results in Table 11, neither sample is normally distributed. The p-value for the sample characterized by the explanation was 0.006, while for the other sample, it was 0.018, both of which are less than 0.05, leading to the rejection of the null hypothesis of normality for both samples.

Effectiveness	Explanation	N	Cases Missing
Number of puzzles completed at 20-minute mark	ja	11	0
	nee	11	0

Table 9 Case Processing Summary "Number of puzzles completed at the 20-minute mark"

Effectiveness	Explanation	Statistic	
Number of puzzles completed at 20-minute mark	ja	Mean	3,36
		Median	3
		Variance	0,455
		Std. Deviation	0,674
		Skewness	-0,593
		Kurtosis	-0,293
	nee	Mean	2,82
		Median	3
		Variance	0,564
		Std. Deviation	0,751
		Skewness	0,329
		Kurtosis	-0,878

Table 10 Descriptives "Number of puzzles completed at the 20-minute mark"

Effectiveness	Explanation	Statistic	df	Sig.
	ja	0,786	11	0,006

Number of puzzles completed at the 20-minute mark	nee	0,822	11	0,018
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Table 11 Test of Normality "Puzzles completed at the 20-minute mark."

As both samples were not normally distributed, the Mann-Whitney U test was employed to assess if the samples had different means. Similar to the independent samples T-test, the Mann-Whitney U test examines whether the means of both samples differ from each other. Table 12 presents the mean rank and the sum of ranks for each group. The group with the highest sum of ranks had the most puzzles solved at the 20-minute mark. However, to determine if this difference is statistically significant, the p-value must be taken into account. The p-value of the Mann-Whitney U test is calculated using the exact method, which takes into consideration all possible permutations of the data. The p-value, as computed in SPSS and shown in Table 13, was found to be 0.149. Consequently, based on the Mann-Whitney U test, it cannot be statistically proven that the means of both samples significantly differ from each other. Thus, the second hypothesis is rejected.

Puzzles completed at the 20-minute mark	Explanation	N	Mean Rank	Sum of Ranks
	nee	11	9,50	104,50
	ja	11	13,50	148,50

Table 12 Ranks "Puzzles completed at the 20-minute mark."

Puzzles completed at the 20-minute mark	
Mann-Whitney U	38,500
Wilcoxon W	104,500
Z	-1,871
Asymp. Sig. (2-tailed)	0,061
Exact Sig. (2-tailed)	0,149

Table 13 Test Statistics "Puzzles completed at the 20-minute mark."

## Cooperativeness

The third hypothesis was tested with the use of the measurement instrument for cooperativeness. Cooperation was measured using the cooperation score, which was calculated based on the responses provided by participants in the questionnaire after the escape room. As illustrated in Table 14, the total sample consisted of 88 participants, as the questionnaire was completed individually rather than as a group. Among these participants, 44 received an explanation of personality types before the escape room (coded as "1"), while

the remaining 44 did not receive such an explanation (coded as "0"). The mean cooperation score for the group that received the explanation is 52.59, as shown in Table 15, whereas the group without an explanation had a mean score of 53.95. Notably, the standard deviations for both samples are quite similar, with Sample 1 having a standard deviation of 5.24 and Sample 2 having a standard deviation of 5.30. To test the normality of both samples, the Shapiro-Wilk test was utilized. The results can be found in Table 16. Interestingly, the sample that did not receive an explanation is not normally distributed, while the sample that received an explanation follows normal distribution. However, given that not both samples exhibited normal distribution, the Mann-Whitney U test was employed for analysis.

Cooperativeness	Explanation	N	Cases Missing
Cooperation scores	nee	44	0
	ja	44	0

Table 14 Case Processing Summary "Cooperation scores"

Cooperativeness	Explanation	Statistic	
Cooperation scores	nee	Mean	53,95
		Median	54,00
		Variance	28,184
		Std. Deviation	5,308
		Skewness	-0,034
		Kurtosis	-0,011
	ja	Mean	52,95
		Median	53,50
		Variance	27,503
		Std. Deviation	5,244
		Skewness	-1,078
		Kurtosis	4,696

Table 15 Descriptives "Cooperation scores"

Cooperativeness	Explanation	Statistic	df	Sig.
Cooperation scores	nee	0,987	44	0,006
	ja	0,890	44	< 0.001

Table 16 Tests of Normality "Cooperation scores"

The Mann-Whitney U test was conducted to determine if the two samples significantly differ based on their means. As presented in Table 17, it is evident that the group that did not

receive an explanation about their personality types achieved a higher Sum of ranks. Nevertheless, to establish the statistical significance of this observation, it is crucial to examine the p-value of the Mann-Whitney U test. Table 18 displays the p-value, which is calculated to be 0.323. This indicates that there is no significant evidence to support the claim that the means of the two samples differ significantly from each other. Therefore, the third hypothesis is rejected.

Cooperation scores	Explanation	N	Mean Rank	Sum of Ranks
	nee	44	47,18	2076,00
	ja	44	41,82	1840,00

Table 17 Ranks "Cooperation scores"

Cooperation scores	
Mann-Whitney U	850,00
Wilcoxon W	1840,00
Z	-0,988
Asymp. Sig. (2-tailed)	0,323

Table 18 Test Statistics "Cooperation scores"

## Discussion

This research is based on the research by Lancelotti and Boyd (2008) due to the limited exploration of teams' understanding of personality types and their effects on performance. The concept of teams-awareness was introduced, which refers to comprehending the personality types present in a team and how to manage them. The research aimed to answer the research question: Does awareness of fellow team members' personality types (teams-awareness) significantly influence team performance? Three hypotheses were formulated to address this question.

The first hypothesis aimed to establish a relationship between efficiency and awareness of each other's personality types. Watson et al. (1991) found that greater familiarity between team members leads to enhanced decision-making effectiveness and increased efficiency. The research utilized two measurement instruments: the time till completion of the first puzzle and the expected total time of completion. Although both measures suggested a positive correlation between awareness of each other's personality types and efficiency, the analysis in SPSS could not significantly prove this relationship. This result was similar to Lancelotti and



Boyd's (2008) findings regarding the relationship between awareness of one's personality type and performance.

The second hypothesis focused on identifying the relationship between awareness of each other's personality types and effectiveness, measured by the number of puzzles completed at the 20-minute mark. Jackson et al. (1995) revealed that heterogeneity positively correlates with effectiveness. The measurement instrument indicated a positive correlation between awareness and effectiveness, with the aware group solving on average more puzzles than the control group. However, once again, the analysis in SPSS did not significantly prove this relationship, likely due to the limited number of participating groups. This result aligned with the findings by Jackson et al. (1995).

Both of the above results lacked statistical significance, possibly due to the small number of participating groups or the influence of other factors on performance. Figure 3 illustrates the participating groups in a graph, with expected completion time on the x-axis and average age on the y-axis. Though not statistically tested, it suggests a potential relationship between age and escape room performance. Another factor that could influence performance is the educational level within each group.

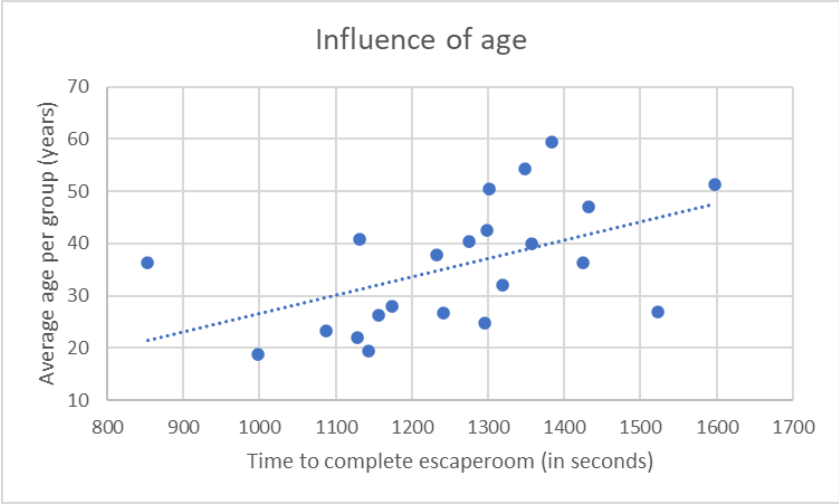


Figure 5 Influence of age on performance in escape rooms

The third hypothesis explored cooperation within teams, with Stock (2004) and Jackson et al. (1995) finding that heterogeneity impacted cooperation, and Goodman and Leyden (1991) revealing that familiarity among team members led to improved cooperation. A questionnaire was used as the measurement instrument, and the hypothesis suggested that teams aware of each other's personality types would score higher in cooperation. However, the means of both samples did not significantly differ, as indicated by the Mann-Whitney U test. It is possible

that awareness does not significantly affect cooperation. Another aspect explored in SPSS was the reliability of the questionnaire, as shown in Table 19. The Cronbach's Alpha, testing the internal consistency of the questionnaire answers, yielded a low score, indicating that a better-scoring questionnaire might have provided different results to support this hypothesis.

<b>Reliability Statistic Cooperation scores</b>	
Cronbach's Alpha	N of items
0,563	10

*Table 19 Reliability Statistics*

This study, in its singular focus on personality types as the exclusive dimension of diversity within team compositions, yields results that do not substantiate a definitive assertion regarding the beneficial effects of personality-focused interventions on overall team performance. As expounded by Yadav and Lenka (2020), team diversity encompasses a spectrum of dimensions, rendering this research notably limited in its scope. The study, aware of the potential confounding influence of surface-level relations-oriented diversity factors, such as age, gender, race, and nationality, adopted a random group formation approach to temper these effects. Nevertheless, the study acknowledges the potential for unaccounted variables, notably deep-level attributes, which prove challenging to control in an experimental setting. For example, variations in social status within a group may exert a subtle yet perceptible influence on group dynamics and performance. Furthermore, the study did not factor in the participants' diverse skill sets, particularly in domains such as problem-solving and escape room familiarity, potentially introducing an uncontrolled source of variance and complicating the interpretation of results.

An additional unexamined facet of the experiment relates to the extent of participants' comprehension and memory of the provided explanations regarding personality types. Observations during the experiment suggested that, once participants were immersed in the escape room activity, prior explanations faded from consciousness. This phenomenon introduces an important methodological consideration, as it raises the question of whether the experiment effectively tested the relationship between personality type awareness and team performance, given the potential for reduced awareness during the experimental task. Consequently, this element of the study warrants closer analysis and underscores the need for further inspection into the complexity of the relationship between personality awareness and team performance.

## Practical Implications

Although the results of this study did not align with the initial expectations, one noteworthy recommendation for companies emerges from the findings. It is advised that companies adopt a specific personality type model and integrate it throughout the organization. This involves providing all employees with comprehensive training on how the chosen model operates and how to discern the personality types of their colleagues based on observable behaviors. Additionally, experts in personality types can offer guidance on how to effectively interact with individuals possessing diverse personality traits. Implementing such measures is believed to mitigate conflicts within the company significantly. Although this study does not find statistical proof for better performance if employees know each other's personality type, the results showed that on average the performance would be better.

To foster a harmonious work environment, a more proactive approach entails testing each employee's personality type and sharing the results with their direct colleagues. This practice can cultivate a deepened understanding that there are not inherently "bad" behaviors, and many actions can be attributed to an individual's unique personality type. Through the experiments conducted at Prinzen, it was evident that even the mere act of engaging in the experiment spurred conversations among employees about personality types. Increased awareness led them to speculate about the personality types of their peers, facilitating improved mutual comprehension and effective interpersonal interactions after they took part in the experiment.

By enhancing awareness of personality types and encouraging open discussions within the organization, employees can gain valuable insights into each other's strengths and preferences. Consequently, they can better navigate interactions and optimize collaboration. This approach serves to establish a more cohesive and empathetic work environment, promoting teamwork and productivity.

## Limitations

One of the key limitations of this study pertains to the time constraint under which the research was conducted. This constraint resulted in a restricted timeframe for executing the experiment, leading to a smaller sample size. Nonetheless, it is noteworthy that the response rate was relatively satisfactory, with 88 participants engaging in the experiment. To assess the potential influence of the sample size on the results, a power analysis was conducted using

G\*Power (Faul et al., 2007) with an effect size of 0.5, an alpha of 0.05, and a power of 0.95. The results of this analysis indicated that the study would require a minimum sample size of 210 groups or 840 participants. However, due to the inherent time limitations, achieving such a large sample size was not feasible, thus impacting the statistical power of the study.

The time limitation not only affected the research from the researchers' perspective but also imposed constraints on the participants. Specifically, participants were allocated only 30 minutes to complete the escape room challenge. For certain groups, this duration might have been insufficient, as some escape room scenarios typically demand more time for resolution. Striking a balance between the feasibility of participant commitment and obtaining sufficient data for the experiment posed a challenge. Although a shorter time allocation could potentially increase the sample size, it might compromise the reliability of the experiment's outcomes.

Another noteworthy limitation is the exclusion of considering participants' prior experience with escape rooms. Individuals with prior exposure to such experiences may possess enhanced problem-solving skills in these scenarios, thus potentially influencing their performance. For instance, employees of Escaperoom Terborg, who have engaged in various escape room activities, exhibited faster completion times compared to regular groups due to their familiarity with escape room puzzles. Likewise, the composition of group members might also impact performance. Groups with pre-existing familiarity, such as those who have known each other for an extended period, could potentially outperform groups formed ad hoc for the experiment due to their improved communication and cooperation.

## Future research

At the start of this study, the necessity for a substantial sample size to establish a conclusive relationship between team performance and awareness of fellow team members' personality types was not fully anticipated. Hence, as a valuable recommendation for future research, it is advisable to replicate the experiment with a significantly larger sample size, as the outcomes hold significant relevance for companies seeking to optimize team dynamics.

Another promising avenue for future investigation lies in exploring the correlation between the ability to self-manage within a team and the awareness of each team member's personality type. Knowing who are the natural leaders in a group might make the team more self-manageable. An effective metric for measuring a team's self-management proficiency could involve considering the number of hints asked during the escape room challenge, as each hint

reflects a request for external assistance. Given the growing prevalence of self-managing teams in organizational settings, delving into this area could yield valuable insights for future research. In this regard, during the current experiment, the number of hints was measured. Notably, Table 20 presents the mean and standard deviation for both sample groups. The group that did not receive an explanation about personality types required an average of 3 hints during the escape room, while the group that received the personality types explanation needed 2.36 hints on average. An independent samples test demonstrated a significant difference between the means of the two samples, suggesting that teams characterized by awareness of each other's personality types tend to rely less on external assistance when undertaking tasks. It is important to emphasize that this specific investigation was beyond the scope of the present study, thereby presenting an intriguing prospect for future research to dive deeper into this aspect.

Number of hints	Explanation	N	Mean	Std. Deviation	Std. Error Mean
	nee	11	3,00	0,632	0,191
	ja	11	2,36	0,674	0,203

Table 20 Group Statistics "Number of hints"

Number of hints		Equal variances assumed	Equal variances not assumed
Levene's Test for Equality of Variances	F	1,490	
	Sig.	0,236	
t-test for Equality of Means	t	2,283	2,283
	df	20	19,919
	Significance Two-Sided p	0,033	0,034

Table 21 Independent Samples Test "Number of hints"

## Conclusion

The primary objective of this study was to investigate the relationship between team members' awareness of their fellow teammates' personality types and their potential impact on overall team performance. To achieve this, a unique experimental approach was employed, namely an escape room experiment. While the initial results suggested a positive correlation between team members' awareness of each other's personality types and team efficiency and

effectiveness, the findings could not attain statistical significance. Additionally, the experiment failed to provide conclusive evidence supporting the notion that awareness of team members' personality types positively influences team performance. As a result, further research is necessary to comprehensively address the research question. This paper has expounded upon the research question, discusses the limitations encountered during the study, proposes practical applications of the research findings, and states future research opportunities.

## Appendix 1: Personality type explanation

Uitleg persoonlijkheden aan helft van de groepen. LET OP! Er zijn geen goede of foute persoonlijkheden.

Blauw:

Iemand met een blauwe persoonlijkheid is iemand die heel analytisch is. Hij of zij gaat graag gestructureerd te werk. Ook is het belangrijk dat alle goed gebeurt, er mogen geen fouten gemaakt worden. Verder stelt deze persoon vaak de waarom vraag. Waar deze persoon voor moet waken is dat die niet besluiteloos wordt. Verder kan deze persoon ook als kil worden gezien, of afstandelijk.

Rood:

Iemand met een rode persoonlijkheid is iemand die graag de leiding neemt. Hij of zij is erg competitief. Deze persoon houdt heel erg van uitdaging. Deze persoon is goed in het maken van afwegingen en keuzes. Echter kan deze persoon ook over komen als agressief. Ook kan deze persoon een control-freak zijn.

Geel:

Iemand met een gele persoonlijkheid is heel enthousiast. Hij of zij staat heel erg open voor nieuwe avonturen. Deze persoon is ook erg sociaal en goed in het maken van connecties met anderen. Deze persoon kan heel makkelijk van taak wisselen, ook al is deze nog niet afgerond. Waar deze persoon voor moet waken is dat die afgeleid raakt. Het kan gebeuren dat deze persoon haastig aan de slag gaat en zo het overzicht verliest.

Groen:

Iemand met een groene persoonlijkheid is iemand die je kunt vertrouwen. Deze persoon doet er alles aan om de relatie met jou goed te houden. Hij of zij is heel loyaal. Daarnaast probeert deze persoon iedereen in een team aan te moedigen. Ook zorgt hij of zij ervoor dat iedereen zich goed voelt. Een valkuil voor deze persoon is dat hij zich gaat afsluiten van de groep. Deze persoon kan dan overgevoelig raken. Of juist een beetje koppig.

Hoe werken deze persoonlijkheden dan samen in een groep?

Rood zal in de meeste gevallen de leiding nemen. Blauw gaat in de meeste gevallen analyseren. Terwijl geel met de creatieve mogelijke oplossingsrichtingen zal komen. Groen probeert in dit alles ervoor te zorgen dat je samen als team het probleem op lost.

Nu je weet van elkaar wat ze zijn gaan jullie de escaperoom spelen.

## Appendix 2: Questionnaire

Vragenlijst: Experiment Persoonlijkheden

1. Wat is uw geslacht?

Man / Vrouw / Anders

2. Wat is uw leeftijd?

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3. Wat is uw hoogst behaalde diploma?

PHD / Master / WO / HBO / MBO / Geen / Andere: \_\_\_\_\_

4. Wat is uw relatie met de overige deelnemers in uw groep?

Vrienden / Familie / Collega's / Anders: \_\_\_\_\_

Beantwoord bij de volgende vragen in welke mate u het eens bent met de volgende stellingen:

Vraag	Helemaal mee oneens	Oneens	Neutraal	Eens	Helemaal mee eens
Ik heb bijgedragen aan het oplossen van de escaperoom.					
Ik sta achter de aanpak om de escaperoom zo snel mogelijk op te lossen.					
Ik heb mijn ideeën kunnen delen met de groep.					



Het team werkte goed samen in de escaperoom.					
Ik heb naar andere ideeën geluisterd.					
Ik heb mijn zin doorgedrukt bij de rest van mijn team.					
Het team had de escaperoom kunnen oplossen zonder mij.					
Het team werkte chaotisch samen in de escaperoom.					
Er werd naar mij geluisterd.					
Er waren conflicten tussen personen in het team tijdens de escaperoom.					

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