Influence of Meaning-Making and Self-Determination on Problem Perception and Solution-Finding

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Abstract

This study investigates the influence of meaning-making processes on problem perception and solution finding among bachelor-level psychology students, and how concepts from self-determination interact with students perceptions of their problems and solutions. Meaning-making, a process where individuals interpret and assign significance to their experiences, is important for personal development and behavioural change. In order to gauge students meaning-making processes, Loevinger's Theory of Ego Development was implemented, specifically to get an idea of students cognitive and emotional maturity. Self-Determination Theory (SDT) was implemented to assess the role of autonomy and relatedness in students experiences. This research examines how ego development, autonomy, and relatedness impact students' identification of problems and their proposed solutions. A qualitative cross-sectional design was employed, collecting data via the Washington University Sentence Completion Test (WUSCT) and a qualitative Self-Determination Scale. The findings indicate that students' meaning-making processes are significantly influenced by their levels of ego development and their perceptions of autonomy and relatedness. Higher levels of ego development were seen in individuals with a greater ability to identify and address complex problems. This study underscores the importance of tailored interventions that consider individual psychological needs and developmental states to foster meaningful change and personal growth.

Keywords: Meaning-making, ego development, problem perception, solution-finding, autonomy, relatedness, personal growth

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Introduction

In today's rapidly changing world, individuals are constantly confronted with many challenges and opportunities that require adaptation and growth. This process of personal development is influenced by the acts of meaning-making and problem solving. Meaning making and problem solving are interconnected processes that influence our understanding, decision-making, and personal growth. Meaning-making involves assigning significance and coherence to our experiences (Park, 2010). It's how we interpret events, emotions, and relationships; creating a meaningful narrative. As we engage in problem-solving, our meaning-making abilities shape how we perceive challenges, find purpose, and seek solutions (Park, 2010). For example, when faced with a difficult situation, the interpretation of its meaning influences our approach to solving it. Viewing a setback as a learning opportunity fosters resilience and adaptive problem solving. Problem-solving, on the other hand, is the process of problem identification and solution finding; identifying, analysing, and resolving challenges or obstacles. It requires creativity, critical thinking, and decision-making (Reed, 2017).

An individual's meaning-making lens affects how we frame problems. What we consider significant or relevant influences the solutions we seek. Meaningful goals drive problem solving efforts. When a problem aligns with our values or purpose individuals are more motivated to find effective solutions (Gagne & Deci, 2005). Meaning-making is also closely connected to ego development. Both are processes that shape our understanding of the world and our place in it. Ego development influences our capacity for meaning making (Loevinger, 1997; Kegan, 1982; Cook-Greuter, 1999). As our ego matures, our ability to construct meaningful narratives grows. Autonomy and relatedness also play important roles in ego development and meaning-making (Loevinger, 1997; Cook-Greuter, 1999). As individuals evolve throughout the stages of ego development, so do their perceptions of autonomy and relatedness; autonomy becoming more pronounced and self-directed. At the same time, relatedness evolves from basic self-centred interaction to empathetic connections, thus influencing problem-solving and personal growth (Loevinger, 1997; Cook-Greuter, 1999). It is important to understand what meaning-making theory is and how meaning-making and problem solving, specifically problem identification and solution finding are connected.

Meaning-Making Theory

Meaning-making is a fundamental cognitive and emotional process through which individuals interpret their experiences, thereby shaping their understanding of themselves and their environment (Park, 2010). Meaning-making helps us adapt and learn from setbacks. While distinct, decision-making is often part of problem-solving, individuals make choices during problem-solving, selecting the most appropriate solution based on our interpretation of the situation. Viewing meaning-making and problem-solving as interconnected allows us to approach challenges with depth, considering both practical solutions and their broader significance. In organisational and academic contexts, meaning-making is essential because it provides people with a framework to understand changes, challenges, and successes, thereby influencing their behaviour and decision-making processes (Park, 2010). In order to gain insights into individuals problem solving and solution finding processes.

In academic settings, meaning-making is particularly significant as students navigate difficult educational environments, forming their identities and future directions. Understanding how people construct meaning within these settings is not just important, but essential in order to design methods that align with their values, beliefs, and aspirations (Park, 2010; Park, 2013). This relevance is vital as it underscores the necessity to explore meaning-making in academic settings where students constantly encounter new and complex situations requiring interpretation and integration into their existing knowledge. Through understanding meaning-making, educators can potentially create supportive environments that improve students' ability to manage stress, maintain motivation, and achieve academic success. To understand how individuals develop mature and integrated ways of livings and dealing with problems, ego development theory serves as a framework to categorise individuals to understand their meaning-making processes and capabilities more thoroughly (Cook-Greuter, 1999; Hauser, 2001).

Ego Development Theory

Ego development serves as a way to gauge individuals meaning-making processes. Ego development refers to the progression of our self-identity, self-awareness, and cognitive complexity. It involves how we perceive ourselves, and the environment. According to Loevinger (1997) there are nine fundamental stages that represent different levels of cognitive and emotional maturity. At each ego development stage, individuals perceive and interpret the world differently. Our meaning-making evolves alongside our ego development. Understanding

this connection helps us appreciate how ego development shapes our worldview and influences our interpretations. As our ego evolves, our capacity for nuanced meaning-making expands. individuals become more adept at navigating life's challenges, forming relationships, and finding purpose (Loevinger, 1997; Cook-Greuter, 1999).

Each stage of ego development reflects a higher level of self-understanding and the ability to navigate life challenges and interpersonal relationships. The impulsive stage is characterised by egocentrism and lac of impulse control, where behaviour is driven by immediate desires and needs (Loevinger, 1997). The self-protective stage is marked by manipulative behaviour and a focus on avoiding punishment and maximising personal gain (Loevinger, 1997). The conformist stage is where individuals start to adhere to social norms and seek approval from others, deriving their identity from group membership (Loevinger, 1997). The self-aware stage is marked by an emerging self-awareness and the ability to see oneself as distinct from the group, recognising personal and others' feelings (Loevinger, 1997). The conscientious stage is where a strong sense of responsibility and commitment to principles, emphasising self-improvement (Loevinger, 1997). The individualistic stage is where individuals obtain a deeper understanding of individuality, respect for each person's complexity and uniqueness, and awareness of inner conflicts (Loevinger, 1997). The autonomous stage is marked by high self-acceptance and psychological maturity, maintaining solid personal values and deep, meaningful relationships (Loevinger, 1997). And finally, the integrated stage, representing the height of ego development, characterised by wisdom, empathy, and a profound sense of interconnectedness with other (Loevinger, 1997).

Understanding ego development is essential because it provides insights into the cognitive and emotional capacities of individuals at different stages. At lower stages individuals may struggle to integrate complex experiences into a coherent narrative, leading to higher levels of distress and maladaptive coping strategies (Bauer & McAdams, 2004; Loevinger, 1997). As individuals progress to higher stages, their ability to reflect on their experiences and derive meaningful insights improves, fostering greater resilience and psychological well-being (Helson & Roberts, 1994; Bauer, 2008). Understanding how individuals perceive problems and identify solutions at each stage is essential for developing targeted interventions that can enhance their problem-solving skills and overall well-being. On top of this it is also important to understand

concepts from self-determination theory and how they are interconnected with meaning-making and ego development.

Self-Determination Theory

Self-Determination Theory (SDT) provides further insight into the meaning-making processes by defining two psychological needs: autonomy and relatedness. Autonomy refers to self-direction and control in decision-making, where individuals feel empowered to act according to their values and interests (Deci & Ryan, 1985). Relatedness refers to the quality of interpersonal connections and belongingness, highlighting the importance of social support and connection (Deci & Ryan, 2000). Exploring perceptions of autonomy and relatedness in different stages of ego development can highlight how individuals perceptions and experiences influence their capacity for problem perception and solution finding. In Academic settings, students often face problems that require navigating complex social dynamic, managing academic pressures, and making decision about their future. The interplay between autonomy and relatedness in these contexts can significantly impact their ability to make sense of their experiences and develop strategies to overcome their problems. By understanding these dynamics, educators can create environments that support students' psychological needs, enhancing their motivation, engagement, and academic success. Autonomy and relatedness are essential components of intrinsic motivation and psychological well-being, which are important for students to thrive in their academic endeavours.

Loevinger (1997), provides a framework for understanding the evolution of an individual's cognitive, emotion and interpersonal capabilities across distinct stages. These developmental processes encompass changes in how individuals perceive themselves, their relationships, and the broader world, highlighting a progressive increase in complexity and depth of understanding. Central to this evolution is the concept of autonomy and relatedness, which interact and transform as individuals advance through the stages of ego development. Loevinger (1997) posited that autonomy is limited at lower stages, such as the impulsive stage, and individuals rely heavily on external validation and immediate gratification. As individuals progress to higher stages, like the self-aware, conscientious, and individualistic stages, their sense of autonomy becomes more pronounced and self-directed. Concurrently, the capacity for relatedness evolves from basic, self-centred interactions to more sophisticated and empathetic

relationships, characterised by genuine emotional connections and mutual respect (Loevinger, 1997). This transformation underscores the interconnected nature of autonomy and relatedness in shaping an individual's ability to navigate and resolve complex problems, ultimately contributing to their personal growth and social integration.

Conceptual model

To visualise the connections between key concepts, the following conceptual model is proposed: Meaning-making is the central process through which students interpret their experiences; Ego Development contains the stages that influence cognitive and emotional capacities for meaning-making; Autonomy and Relatedness are the psychological needs that impact students' motivation and well-being; Problem Perception and Solution Finding are outcomes influenced by the interplay of meaning-making, ego development, autonomy and relatedness. This model provides a coherent framework for understanding how these concepts interact and influence students' ability to navigate academic challenges.

This thesis aims to explore the role of meaning-making, ego-development, autonomy, and relatedness in shaping students' perceptions of problems and their approaches to identifying solutions. Specifically, it addresses the following research questions: What problems that warrant change do students perceive, and how is this related to their perceptions of autonomy and relatedness? What solutions do they identify for those problems, and how are they related to their perceptions of autonomy and relatedness? A qualitative cross-sectional design will be employed to answer these questions. This approach will provide in-depth insights into students' problem perceptions and solution-finding processes. Data will be collected through open survey questions with students using Qualtrics; The findings will be analysed through deductive coding to identify common themes and patterns related to problem perception, solution-finding, autonomy, and relatedness.

Methodology

Research Design

The study focused on investigating students' perceptions of problems, the solutions they come up with, and their corresponding perceptions of autonomy and relatedness. Specifically, it aimed to discern how students' ego development, perceptions of autonomy and relatedness

influenced their identification of problems warranting change and proposed solutions. Employing a qualitative cross-sectional research design, the investigation delved into meaning-making processes underlying these perceptions. Through the administration of open survey questions on Qualtrics, participants were encouraged to articulate their perspectives, allowing for a deep understanding of their lived experiences. Kintzer (1977) concluded that open-response question could verify previously given answers, reveal degrees of emotions, and provide improvements. The answers given on the sentence completion scale provided a means to measure ones ego development state, while the open questions on the self-determination scale provided a means to delve deeper into their experiences.

Participants

The study's sample consisted of 60 participants recruited via convenience sampling. The sampling technique was a non-probability technique that involved obtaining readily available participants to fill out the survey (American Psychological Association, 2024). It was chosen for its flexible, quick, and cost-effective way of getting students to complete the survey. Table 1 shows the sample demographics from the Qualtrics survey, including 29 males, 28 females, and three non-binary individuals. The participants had a mean age of 23.8 with a standard deviation of 4.58. The participants were predominantly Dutch, making up 48.3% of the sample, with 29 individuals identifying as Dutch. The sample also included 17 German participants and 14 participants from other nationalities. The sample was predominantly made up of bachelor's students in the behavioural management and social sciences (BMS) faculty who were sampled from the SONA system study credit pool in order to meet the 15 SONA credit graduation requirement.

Table 1

Sample Demographics

Sample Characteristics	*n*	*%*	*M*	*SD*
Gender				
Male	29	48.3		
Female	28	46.7		
Non-Binary	3	5.00		
Age			23.8	4.58

Nationality		
Dutch	29	48.3
German	17	28.3
Other	14	23.3

Survey Method

In order to collect data regarding students' stage of ego development and gain some insight into their meaning-making processes, the Washington University Sentence Completion Test (WUSCT) was used to measure each student's overall ego development stage. The WUSCT is a psychological assessment tool developed by Loevinger (1997) to measure ego development; the test was designed to capture the complexity and maturity of students' ego functioning, reflecting their self-understanding, interpersonal relations, and worldview. The WUSCT used in the data collection process consisted of items asking students to fill out a series of sentence stems (Figure A1). Only seven items were included to reduce the amount of time taken by students and to reduce fatigue. Typically, there are 36 items, each designed to elicit responses that reveal the respondents' underlying attitudes, beliefs, and cognitive styles. The questions that were included in the survey specifically gauged the type of problems students identified throughout their academics and the solutions they come up with to overcome their problems. The number of questions was still able to accurately measure the students' stage of ego development compared to the original questionnaire. Responses were coded according to a predefined manual, categorising each response into one of the stages of ego development. The stages range from Impulsive to Integrated, as described in Loevinger (1997).

An open-essay box survey collected participants' perceptions and experiences of autonomy, relatedness, and problem-solving. Unlike traditional quantitative Self-Determination Theory (SDT) scales, this approach was designed to elicit more narrative responses, providing deeper insights into students' subjective experiences. This methodology allowed for a deep exploration of how autonomy and relatedness influence perceived problems and solutions. The survey comprised a series of open-ended questions to prompt participants to reflect deeply on their thoughts, feelings, and behaviours (Figure A2). The first question was derived from the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS) (Chen et al., 2015). The

first question was designed to uncover intrinsic motivation and personal significance, drawing directly from concepts in SDT related to autonomous motivation (Deci & Ryan, 2000). The second question was based on the Work-Related Basic Need Satisfaction Scale (W-BNS) (Van den Broeck et al., 2010), which assesses the quality of workplace relationships and their influence on motivation and well-being (Van den Broeck et al., 2010)—the second question aimed to delve into relatedness, examining how interpersonal relationship impact engagement and satisfaction. The third question was inspired by SDTs' focus on relatedness and its role in fostering long-term goal pursuit and intrinsic motivation (Deci & Ryan, 2000). The third question was also derived from the BPNSFS (Chen et al., 2015). These questions were carefully designed to probe participants' understanding of autonomy and relatedness and their implications for problem perception and solution-making. By drawing from established SDT scales and the WUSCT, the approach provided detailed insights into individual experiences. It facilitated a broader understanding of the psychological processes underlying autonomy, relatedness, and meaning-making in academic contexts.

Procedure

Before administering the surveys, ethical approval was obtained from the BMS ethics committee. Once approval was granted, the participants were sampled via the SONA system; the survey was put on the SONA test pool website, where psychology students could take part in studies to obtain study credits to fulfil their Sona graduation requirements. Participation in the study was voluntary; informed consent was obtained for each participant in the survey. Participants were provided with the survey in an online format and were instructed to respond to the questions honestly and to the best of their ability. Participants were assured of confidentiality and anonymity of their responses. The survey was worth 0.5 sona credits, lasting approximately 15-30 minutes. The data in the form of responses was cleaned before analysing; there were a total of 60 responses, see table 1; however, only 55 of the participants had answered the items on the WUSCT scale after the demographics section and there were six students that did not answer the self-determination scale, therefore all of their data could not be used for all of the analysis since it was possible to calculate their ego development stage but with no further insights into their perceptions of autonomy and relatedness. Therefore, the total number of students included in the findings was 49.

Analysis

To analyse the data from both scales, deductive coding was employed to assign codes/responses to their respective categories. For the WUSCT scale, eight categories were made beforehand, along with a brief description of each category (Table C1): impulsive, self-protective, conformist, self-aware, conscientious, individualistic, autonomous, and integrated. These categories were based off of the stages of ego development outlined by Loevinger (1997). For the SDT scale open questions, eight categories were prepared beforehand, representing low/high levels of autonomy and relatedness in students' responses (Table C2). The categories for coding indications of high/low levels of autonomy were Self Directed Goals, Intrinsic Motivation, External Control and Lack of Choice. The categories for coding indications of high/low levels of relatedness in students' responses were Supportive Relationships and Sense of Belonging. Isolation and Lack of Support. These categories were based on concepts from SDT literature that represent low/high levels of autonomy and relatedness (Ryan & Deci, 2000).

Responses from the SDT scale were analysed by assigning a category indicating low/high autonomy or relatedness and numerical scores representing those categories were used in order to calculate the reliability of the scoring process. The scores used ranged from one to eight in order to analyse discrepancies between both raters scores. Responses from the WUSCT scale were analysed by scoring each participant's response according to the appropriate stage-based numerical rating. Frequency tables were made of the ratings, and frequency distributions were made to apply the ogive rules.

The ogive rules were applied to determine each participant's Total Protocol Rating (TPR), which is their overall stage of ego development. The rules are (1) The mode level can be assigned as the overall stage if it constitutes at least 50% of the responses and the responses do not widely deviate from this mode; (2) if the mode level is not 50% but is the highest frequency, check the distribution of other scores. The overall stage can be the mode level if the scores mostly fall within one stage above or below the mode; (3) if there is no single mode level but two adjacent levels have nearly equal high frequencies, the higher of the two can be considered if supported by the distribution pattern; (4) in cases of no transparent mode and a widely spread distribution, a more nuanced evaluation is needed. The median level and the overall pattern of scores should be examined closely to identify the most appropriate stage (Hy, 1998). The overall

ego development score for the individual is usually the median or mode of the individual item score, reflecting their general level of ego maturity. Afterwards, each response was holistically reviewed and scored by doing an impressionistic rating and verifying that there were no discrepancies between the ogive method and impressionistic rating.

To ensure the reliability of the findings, as is good practice in qualitative analysis, all responses in the WUSCT and SDT scales were coded by more than one rater (Intercoder reliability). This improved the coding process's systematicity, communicability, and transparency (O'Connor & Joffe, 2020). Cohen's Kappa was calculated as the reliability coefficient to determine the reliability of each question on the WUSCT. RStudio was used in order to calculate the weighted kappa values for each item. Table 2 shows the Cohens Kappa scores for each question on the two scales. For the WUSCT, the range of kappa values indicates a moderate agreement to almost perfect agreement among the raters, this shows the robustness and reliability of the coding process and scoring system. The SDT scale intercoding showed almost perfect agreement on the scores between both raters, see on Table 3. The greater the kappa values suggests a greater consistency, which indicates that each rater had a high level of agreement when rating the items. This level of reliability is important for ensuring the replicability of the research findings. The first item had the lowest kappa value, only showing moderate agreement, while showing some discrepancies in scores, but it still falls within an acceptable range, suggesting that the ratings were relatively consistent across all items.

Table 2

Interrater Reliability Results of Sentence Completion Test

Item	Kappa	Agreement Level
When I am criticised…	0.58	Moderate agreement
I am…	0.74	Substantial agreement
A good student…	0.85	Almost perfect agreement
My main problem or challenge is...	0.89	Almost perfect agreement
The most important way to address or solve that problem is…	0.72	Substantial agreement

I am afraid that…	0.80	Almost perfect agreement
The thing I like about myself…	0.82	Almost perfect agreement

Table 3

Interrater Reliability Results of SDT Open Questions

Item	Kappa	Agreement Level
Can you think of a time in your academic career when you pursued a goal or activity that truly interested you? Describe this experience and explain why it was meaningful to you.…	0.90	Almost perfect agreement
Describe a time when you collaborated with others on a project or activity. How did the quality of your interpersonal connections influence your level of engagement and satisfaction with the task?…	0.98	Almost perfect agreement
Think about your long-term goals and aspirations. How do your relationships and connections with others influence your pursuit of these goals?…	0.84	Almost perfect agreement

Findings

This section presents the findings from the analysis of student responses to the WUSCT to measure their overall stage of ego development, note the differences in how they perceive problems and identify solutions. The findings from the qualitative SDT scale also contribute to how their problems and solutions relate to their perceptions of autonomy and relatedness. Specifically, it explores the solutions students identify for these problems and examines how these solutions are connected to their perceived levels of autonomy and relatedness. Respondents only fell into the impulsive, self-aware, and conscientious stages of ego development. The analysis revealed several key insights into the problems students perceive, which are closely tied to their levels of autonomy and relatedness. Furthermore, the findings describe the extent to which problem and solution conceptions differ across various ego development stages and how students' perceptions of autonomy and relatedness vary across these stages.

Problems and Solutions in the Impulsive Stage

The impulsive stage of ego development is characterised by simplistic and immediate reactions to problems. Students in this stage struggled to articulate specific problems, provided vague and superficial responses, and a lack of specificity and depth in problem recognition and analysis. Only one student had an overall total protocol rating of two, which signified that they were in the impulsive stage. As demonstrated by the student, there was a struggle to articulate a specific problem, instead providing a vague and superficial response; for example, the student shared “My main problem or challenge is…” (Participant 19, Q33) as their problem signifying that they could not identify or perceive their problem properly. However, they did share how they would overcome the problem “to analyse it” (Participant 19, Q34). This lack of specificity and depth is a hallmark of the impulsive stage, where individuals have not yet developed the capacity for complex problem recognition and analysis. The solution identified provided by the student, reflects an awareness of the need for analysis but lacks the detailed planning and insight characteristic of higher stages. This response shows a rudimentary understanding that analysis is part of problem-solving, but it does not extend to a thorough or reflective approach.

Autonomy and Relatedness in the Impulsive Stage

Further analysis into the student's perceptions of autonomy and relatedness in relation to their problems and solutions revealed some interesting insights. The responses to the open questions revealed some more depth to their problems. The students responses were categorized under intrinsic motivation, which indicated high levels of autonomy, and external control which indicated low levels of autonomy. In responses where the student indicated high levels of autonomy, the student reported feeling more satisfied and reported fewer problems in their academic careers and found that they were more motivated to pursue their goals and overcome challenges. The student noted that “Since I did technical engineering, but naturally am very creative and like to make whatever I feel like, 3D designing is something I liked a lot, because it gives you so many possibilities to create. This was very meaningful to me because I discovered something I like and am now making my career out of it :)” (Participant 19, Q37). This response highlights the student's strong intrinsic motivation, which is a core aspect of autonomy.

In responses where the student indicated low levels of autonomy, the student identified problems having to do with conformity and lack of advocacy and having to conform to others' ideas in group settings to avoid conflict. The student shared "Whenever I work with other people I tend to just follow other people's ideas because I don't want to be bothered to fight for my ideas like that. Because if I really want to do something my way I can do it alone. It makes things much easier. Of course, it takes away all the fun and you don't end up learning the things you would want. I am a perfectionist so if I want something my way I don't like to depend on others." (Participant 19, Q38). This demonstrates how external control and social dynamics in group work limit students' autonomy. The need to conform or overcompensate in group settings restricts the students ability to freely express and pursue their ideas, leading to frustration and reduced learning opportunities. The student also expressed high levels of relatedness, via supportive relationships, sharing "People around me inspire me and help me carve ways that suit me best. If needed I'm good at finding connections that I need and will do when I am at a point where it is needed. But I am a very slow worker and I like it that way. Works for me!". The students perceptions of relatedness indicate that they view relatedness as more than just a way to fulfil basic needs, the statement highlights the students ability to draw inspiration and support from their existing relationships while also being capable of building new connections as needed. Additionally, it emphasizes the comfort they gain with a slower working pace, which proves effective for their personal and professional growth.

Problems and Solutions in the Self-Aware Stage

The Self-aware stage of ego development is characterised by increased self-reflection, insight into one's behaviours and motivations, and a greater capacity for self-regulation. Students in this stage demonstrated these characteristics through their recognition of personal issues and thoughtful approaches to solving them though the depth and specificity varied. The problems and solutions identified by these students align well with the characteristics of the self-aware stage of ego development. They demonstrated their capacity for thoughtful self-examination and deliberate, albeit sometimes simplistic, problem-solving approaches.

Some students identified common self-aware challenges, the discrepancy between perceived self-knowledge and actual self-knowledge, "Thinking I know myself better than I actually do" (Participant 6, Q33). The solution they provided, "Staying true to yourself"

(Participant 6, Q34), indicates a recognition of the importance of authenticity and integrity in overcoming these issues. This reflects the self-aware stage's focus on maintaining a coherent and genuine self-concept. Another students response highlighted a journey of self-discovery, a central theme in the self-aware stage "Finding myself" (Participant 13, Q33). The solution provided a comprehensive exploration of the self, demonstrating an understanding that self-awareness is a complicated and ongoing process that requires open-mindedness and thorough self-examination "To explore myself from all the different directions" (Participant 13, Q34). Other students addressed existential concerns and the value of effort, which is a reflective and introspective issue typical of the self-aware stage. "Sometimes you do not know if all the hard work is worth it" (Participant 37, Q33). The solution "following your heart" (Participant 37, Q34) suggests an alignment with internal values and passions, indicating a balance between rationality and emotional guidance in decision-making.

Some students identified problems of overthinking, which reflects heightened self-awareness and cognitive processing. One student noted "to stop overthinking" (Participant 43, Q33), and their solution "distraction" (Participant 43, Q34) shows an understanding of the need to manage to overthink, though it might suggest a temporary rather than a deep or long-term coping strategy. Another participant shared a problem regarding personal growth and taking risks "to come out of my comfort zone more often" (Participant 45, Q33). Their solution "to face the fear" (Participant 45, Q34) aligns with the self-aware characteristic of confronting internal barriers and striving for personal development despite discomfort. Another student shared a more concrete and practical problem related directly to academic performance, "studying" (Participant 46, Q33). Their solution involved a structured and balanced approach, indicating self-awareness in recognising the need for focus, rest, and adaptive strategies. This reflects the self-aware stage's emphasis on self-regulation and effective problem-solving techniques "Focus, take breaks, try other ways of studying" (Participant 46, Q34).

Autonomy and Relatedness in the Self-Aware Stage

In the self-aware stage of ego development, autonomy is characterised by the pursuit of self-directed goals and the ability to navigate challenges independently. Relatedness involves forming meaningful connections that enhance collaborative experiences and personal satisfaction. The responses of students at this stage reveal how their perceptions of autonomy and

relatedness align with these characteristics. One student who reflected a high level of autonomy, shared "When I applied for studying psychology because for a long time I didn't know what I wanted to do in the future and after I realized that I wanted to be a psychiatrist, I thought that this wouldn't be possible because my grades weren't good enough to study psychology in Germany, but luckily it was possible to do so in the Netherlands as there was no numerous clauses." (Participant 46, Q37). This student initially struggled with uncertainty about their future career but eventually decided to become a psychiatrist. This self-realisation represents a vital point of autonomy, where individuals determine their path based on personal interests and aspirations. Despite facing the obstacle of stringent academic requirements, the student did not abandon their goal. Instead, they adapted by seeking alternative solutions, such as studying in the Netherlands. This adaptability and persistence are key aspects of autonomy, as the student actively sought ways to achieve their self-directed goals.

Responses where student reflected low levels of autonomy contained problems that had to do with imbalances in group work and absence of passion. One student shared "The first thing that came to mind was a group project where I put in more work than the others. Not because I had to. But because I felt the end result would be better if I did more of the work myself than it would have been working together." (Participant 6, Q38). This highlights the perceived need to take on more work in group projects to ensure a higher quality outcome. This imbalance, where one student feels compelled to do more work, points to a lack of equitable collaboration and a perceived external pressure to ensure success. However, this student also shows a high degree of self-reliance, choosing to take on additional responsibilities to ensure success. However, this also suggests a potential struggle with collaborative autonomy, where the need for control and high standards may limit the ability to delegate and trust others.

The same student mentioned "I didn't have an academic moment where I was pursuing something that truly interested me." (Participant 6, Q37). This quote similarly indicates an absence of passion in academic endeavours. The student never experienced pursuing something exciting, pointing to a constrained environment where choices were limited and did not align with their interests. This students lack of engaging academic moments indicates a constrained sense of autonomy, where external pressures or limitations may have prevented the pursuit of personally meaningful goals. This reflects a desire for more self-directed and passionate

involvement in their studies. The acknowledgement of an unfulfilled academic experience reflects a desire for more meaningful, self-directed involvement. This introspection and desire for alignment with personal interests are typical of the self-aware stage.

Students who indicated high levels of relatedness in their responses had experiences mainly about how having genuine relationships helped collaboration and satisfaction and experienced problems when it came to formal interactions. One student shared "Having meaningful and interpersonal connections makes the project feel easier. I prefer that over formal interactions only. In my experience, just formal interactions did not satisfy me." (Participant 13, Q38). This response reflects dissatisfaction with formal interactions, emphasising a preference for meaningful interpersonal connections that make collaborative tasks easier and more fulfilling. It further emphasises the value of building meaningful and interpersonal connections over mere formal interactions. This approach enhances satisfaction and effectiveness in group projects. This response underscores the importance of meaningful relationships for students. They find greater satisfaction and effectiveness in group work when it involves genuine connections, highlighting the role of relatedness in their collaborative experiences. This student values genuine relationships over formal interactions, recognising that meaningful connections enhance collaboration and satisfaction. This insight aligns with the self-aware stages' emphasis on deeper interpersonal understanding and relatedness.

Another student shared, "When I worked in a group where the group members had a great interpersonal connection and we liked each other a lot, we were more motivated and having fun during the project and were more satisfied with the results and the time spent together." (Participant 45, Q38). This quote emphasises the importance of creating bonds and having good interpersonal connections within the group. Without these connections, motivation and satisfaction in group projects may be lacking. This shows that strong interpersonal connections within a group lead to greater motivation, fun, and satisfaction with the project. Promoting these connections is key to a positive group experience. This shows that positive relationships within a group enhance motivation and satisfaction, reinforcing the value of relatedness. Effective collaboration is seen as dependent on strong interpersonal connections. This students focus on building strong relationships within the group demonstrates an understanding of the importance

of positive relatedness for motivation and satisfaction. This reflects the self-aware stage's recognition of the value of interpersonal connection.

Students with indications of low relatedness shared problems with group conflict at the cost of academic performance, one student shared "I remember a time when my group members and I did not really like each other, which caused us to be angry rather than completing the task well." (Participant 43, Q38). This describes a situation where group members did not like each other, leading to anger and poor task performance. This lack of positive interpersonal relationships undermines the group's ability to work effectively together. This shows that interpersonal dislike and anger create a toxic group dynamic, negatively impacting relatedness and overall group performance. This highlights the impact of poor relationships on group performance, underscoring the necessity of positive relatedness. The lack of interpersonal harmony disrupts the group's functionality, emphasising the importance of fostering positive relationships for effective collaboration. The negative impact of poor relationships on group performance highlights the importance of promoting positive relatedness. This awareness of interpersonal dynamics and their effect on collaboration is consistent with the self-aware stage's focus on meaningful connections.

Problems and Solutions in the Conscientious Stage

The conscientious stage of ego development is characterised by a focus on responsibility, self-discipline, and a structured approach to solving problems. In the analysis many problems and solutions identified were in line with these characteristics. For instance, one student noted that their main problem was "To overcome my procrastination" (Participant 1, Q33), this student identified procrastination as a key issue, which indicates a recognition of a behavioural pattern that hinders productivity. Their solution was "To have a schedule" (Participant 1, Q34); creating a schedule reflects a structured, disciplined approach to managing time and responsibilities. It shows the participant's focus on self-regulation and organisation, which are hallmarks of the conscientious stage. Another student shared that their main problem was 'Procrastination" (Participant 35, Q33)' similar to the previous student, they identified procrastination as a significant issue, demonstrating self-awareness and a desire to improve time management. Their solution was "Making an action plan and sticking to it" (Participant 35, Q34); creating an action plan and committing to it reflects a structured, disciplined approach to overcoming

procrastination. This aligns well with the conscientious stage's focus on planning, organisation, and adherence to goals.

Other problems identified had to do with future goals and career path; one student noted that they had problems with "What to do with my life after studying" (Participant 12, Q33); the uncertainty about post-study life reflects a conscientious awareness of the need for future planning and goal setting. The student's solution was to "Search options and try different things" (Participant 12, Q34); exploring options and experimenting aligns with the conscientious stage's proactive and systematic approach to decision-making. It shows a structured plan to gather information and make informed choices about the future. Another student shared that their main problem was "That I can be very lazy" (Participant 16, Q33); acknowledging sedentary behaviour indicates self-awareness and a desire for self-improvement. Their proposed solution was "Seeking encouragement from friends" (Participant 16, Q34). Seeking encouragement from friends reflects a structured use of social support to enhance motivation. This approach demonstrated the conscientious stage's emphasis on leveraging external resources and relationships to achieve personal goals.

Some students in this stage started directly identifying problems relating to self-determination principles before the qualitative SDT scale. One student shared that their main problem was "I don't always see the point of an assignment or task, so I lose motivation" (Participant 24, Q33); this problem indicates a struggle with finding intrinsic motivation and understanding the relevance of tasks. Their solution was "Good and clear communication" (Participant 24, Q34); this suggests a methodical approach to understanding the purpose and importance of tasks. This reflects the conscientious stage's preference for clarity, structure, and the practical application of communication to resolve motivational issues. Another student shared that their main problem or challenge was "Not letting feelings get a hold of me" (Participant 5, Q33); this problem highlights an awareness of the impact of emotions on behaviour and decision-making, suggesting a deeper understanding of personal emotional dynamics. The solution identified was "Communicate and relate" (Participant 5, Q34); the emphasis on communication and relating to others as a solution indicates a methodical approach to managing emotions. This reflects the conscientious stage's tendency to use structured interpersonal strategies to maintain emotional control and improve relationships.

Autonomy and Relatedness in the Conscientious Stage

In the conscientious stage of ego development, individuals exhibited high levels of autonomy and relatedness characterised by a structured, responsible approach to achieving personal and collective goals. This stage emphasises self-discipline, planning, and a strong sense of duty. Individuals in this stage are also adept at forming meaningful relationships that support their goals, yet they may struggle with issues like perfectionism and over-reliance on self-regulation.

Responses that indicated high levels of autonomy were categorised under intrinsic motivation and self-directed goals. One student who showed high levels of autonomy via intrinsic motivation shared “In college, I got involved in a project renewable energy, focusing on solar power. It was intriguing to explore how solar panels work and their potential benefits. I spent a lot of time in the lab, testing different materials to see which worked best. This hands-on experience was rewarding because it combined my interest in science with real-world applications. Presenting my research at a conference was a great bonus, showing the value of following what genuinely interests you." (Participant 1, Q37). This students experience shows a high level of autonomy through intrinsic motivation. They pursued a project that aligned with their interests and found personal satisfaction in their work. This pursuit of passion within their studies highlights the importance of autonomy in promoting motivation and development in the conscientious stage.

Another student who displayed high levels of autonomy via self-directed goals shared “They told me that I wasn't fitted for a higher degree. I'm finishing my bachelor’s degree in a few months. It makes me feel strong." (Participant 24, Q37). Despite external discouragement, this student demonstrated resilience and determination to achieve their goals. This example underscores the empowering effect of autonomy, as the student maintained intrinsic motivation and perseverance, reflecting the conscientious stage’s focus on personal achievement and self-reliance. Both of these students describe a personal journey of discovering and pursuing a passion within the framework of their studies. This exemplifies the positive outcomes associated

with high levels of autonomy and illustrates the profound impact of autonomy on motivation and development. This highlights the need to allow students the freedom to explore their interests and providing supportive environments.

Some students displayed low levels of autonomy via external control and lack of choice. One student shared "No, unfortunately I did not have an experience where I was truly interested in pursuing some kind of academic goal. It all feels like a chore." (Participant 16, Q37). This conveys a lack of intrinsic interest in academic goals and a perceived lack of practical relevance in the curriculum. This student felt that much of their learning did not align with their personal goals, and it felt more like a chore. This lack of engagement suggests that the student had little choice in their academic pursuit, leading to a sense of obligation rather than motivation. This student's lack of interest and perceived obligation in their academic pursuits highlights the negative impact of limited autonomy on motivation and development.

Relatedness in the conscientious stage involves forming supportive relationships that enhance motivation and performance, although challenges such as trust issues and isolation can hinder effective collaboration. Responses that indicated high levels of relatedness were categorised under supportive relationships and Sense of Belonging. One student shared "My relationships with others influence me positively, because on one side I have people who inspire me as they truly live up to their potentials, and on the other side I have people who make me realise that I should work harder than them as I do not believe they are doing everything they can to have a good future." (Participant 35, Q39). This quote highlights how relationships with others can inspire greater effort and motivation. The presence of both inspiring peers and those perceived as underperforming drives the participant to work harder. This indicates that relationships with a diverse range of individuals can provide both inspiration and a competitive drive, contributing to a sense of belonging and a desire to improve. This sense of relatedness aligns with the conscientious stage's value on forming meaningful connections that support personal and collective goals.

Responses that indicated low levels of relatedness were categorised under Isolation and Lack of Support. One student shared, "I have family in a country and friends in another country, so these relationships strongly me in my choice for the future. I feel like no matter what I choose, I lose something" (Participant 12, Q39). This reflects the challenge of being separated

from family and friends. This situation creates a feeling of isolation, as the student felt torn between different locations and relationships, resulting in a sense of loss regardless of the choice made. The separation from family and friends creates a sense of isolation and emotional dilemma, impacting the student's sense of belonging. This struggle to maintain connections underscores the importance of relatedness and the emotional challenges that can arise when supportive relationships are distant or fragmented. Another student shared "I have problems when working with others in avoiding conflict, still trying to understand myself why it's so hard despite me needing others, to work with them. I just have trust issues that when I leave a task to others they won't have the same passion I have in taking it to conclusion or just not be up to perform at the same level I would have." (Participant 5, Q38). This student's difficulties with trust and conflict avoidance highlight barriers to effective collaboration. The lack of trust in others commitment and abilities hinders relatedness, reducing the sense of support and cooperation essential for collective success in the conscientious stage.

Conclusion

The research aimed to uncover the problems students perceive that warrant change and how these perceptions relate to their senses of autonomy and relatedness. Additionally, it sought to identify the solutions students propose for these problems and how these solutions are related to their perceptions of autonomy and relatedness. At the impulsive stage, students struggled to articulate specific problems, often providing vague and superficial responses lacking depth or detailed analysis. As students' progress to the self-aware stage, they demonstrate increased self-reflection and insight into their behaviours and motivations. Problems identified at this stage include discrepancies between perceived and actual self-knowledge, overthinking, and balancing academic performance. Moving further to the conscientious stage, students exhibited higher-order problem recognition and analysis, focusing on long-term goals and ethical considerations. Autonomy and relatedness significantly influenced how students perceived their problems. Indications of high levels of autonomy were associated with deeper engagement in problem-solving, intrinsic motivation, and self-directed goals. Low levels of autonomy lead to conformity, frustration, and poor academic performance. Strong interpersonal connections and a sense of belonging enhanced student's ability to perceive and address problems effectively. Those who felt isolated or disconnected often struggled with identifying and solving problems.

Solutions identified by students varied across the stages of ego development. At the impulsive stage, solutions were rudimentary and lacked detailed planning and insight. In the self-aware stage, students proposed solutions such as staying true to oneself, exploring personal identity, following one's heart, and implementing structured academic strategies, reflecting thoughtful self-examination and deliberate problem-solving. At the conscientious stage, students offered detailed and reflective solutions involving long-term planning and self-discipline.. The effectiveness of the solutions students proposed was closely related to their perceptions of autonomy and relatedness. Higher autonomy led to more effective problem-solving, as students were more intrinsically motivated and capable of self-directed learning, resulting in more robust and reflective solutions. A supportive environment that promoted relatedness improved problem-solving abilities by providing emotional support and validation, essential for developing adaptive coping mechanisms. Overall higher levels of autonomy and relatedness facilitated better problem recognition and more effective solutions, while lower levels corresponded to vaguer problem perceptions and less effective solutions.

Discussion

This research aimed to investigate the problems and solutions students identify and how they're related to their perceptions of autonomy and relatedness. As the findings revealed significant variations across different stages of ego development; students in the lower stage struggled to identify specific problems, students in higher stages of ego development, such as in the self-aware and conscientious stages, showed problem identification to be more reflective, encompassing discrepancies between perceived and actual self-knowledge, overthinking, and balancing academic performance. Students also demonstrated higher-order problem recognition at the higher stages. The influence of autonomy and relatedness was somewhat evident throughout the stages; high levels of autonomy were associated with deeper engagement in problem-solving, intrinsic motivation, and self-directed goals. Conversely, low levels of autonomy led to conformity, frustration, and poor academic performance. Relatedness, characterised by strong interpersonal connections and a sense of belonging, is a factor in students' ability to perceive and address problems effectively. Those who felt isolated or disconnected struggled more with problem identification and resolution.

The study corroborates Self-Determination Theory (SDT), which posits that autonomy and relatedness are essential for intrinsic motivation and psychological well-being. This research adds on by illustrating how these needs specifically interact with problem perception and solution-finding in an academic context. The findings are supported by existing theories demonstrating that higher measured stages of ego development are characterised by enhanced meaning-making abilities; identification and engagement with stronger more complex problems and solutions. Loevinger's (1997) theoretical framework supports these findings as the qualitative evidence gathered shows how individuals at higher stages demonstrate more developed complex problem identification and solution generation.

The survey responses from the student categorised at the impulsive stage, indicated a rudimentary understanding of the need for analysis but fell short of the detailed, reflective planning seen in higher stages of ego development. Loevinger's (1997) ego development theory outlines how individuals meaning-making processes differ across the different stages of ego development, thus providing a good foundation for whether the findings are in line with existing theory. According to Loevinger (1997), in the impulsive stage, individuals are generally driven by immediate desires and needs with minimal understanding of consequences. Problem perception at this stage tends to be rudimentary, for instance, a student might see a poor grade as a mere obstacle to receiving rewards without understanding its long-term implications (Cohn & Westenberg, 2004). Solution finding is equally impulsive, aimed at quick fixes rather than addressing root causes. A student at this stage might cheat or blame others instead of improving study habits (Noam, 1988). The findings showed that the student in the impulsive stage offered vague problems and superficial solutions which highlighted the impulsive stage's typical lack of specificity and depth. The findings are in line with the original framework proposed by Loevinger (1997), this does not include perceptions of autonomy and relatedness.

In regard to the students perceptions of autonomy and relatedness, the findings are not in line with how Loevinger (1997) outlined autonomy and relatedness in the impulsive stage. Perceptions of autonomy are minimal, driven by immediate impulses and external controls (Loevinger, 1997). Relatedness is limited, with interactions centred around basic needs. However, in the findings, the student demonstrated more developed perceptions of autonomy demonstrating high levels of intrinsic motivation and personal satisfaction with their academic career and long-term goals. There was only one students who came out with a total protocol

rating indicting the impulsive stage, but it's possible that the answers they provided on the survey did not give an accurate representation of the students level of cognitive and emotional development. From their responses, low levels of autonomy were also marked by conformity and avoidance of conflict in group settings, leading to frustration and reduced learning opportunities. The students perceptions of relatedness indicated that they view relatedness as more than just a way to fulfil basic needs, their responses highlighted their ability to draw inspiration and support from existing relationships while also being capable of building new connections as needed in order to achieve personal and professional growth at a comfortable pace. Had there been a way to collect a more accurate measurement of their ego development such as measuring an aggregate TPR after a certain period of time and scale administration then their perceptions of autonomy and relatedness might've better reflected their stage.

Individuals in the self-aware stage of ego development typically begin to perceive themselves as distinct from the group and develop an understanding of personal and others' emotions (Loevinger, 1997). Problem perception becomes more nuanced, considering personal learning styles and emotional states. Solution finding involves self-reflection and personal responsibility. For instance, students might develop personalised study strategies or seek help to address specific academic difficulties (Noam, 1988). In the findings, students in the self-aware stage exhibited a capacity for thoughtful self-examination and deliberate problem-solving. Their responses aligned with the self-aware stage's characteristics by recognising personal issues, authenticity, the journey of self-discovery, and balancing rationality with emotional guidance (Loevinger, 1997). However, solutions varied in depth, highlighting both immediate coping mechanisms and more profound, long-term strategies for personal growth and self-regulation.

In regard to autonomy and relatedness, self-aware individuals develop a more independent sense of autonomy, recognising their preferences and values (Loevinger, 1997). Relatedness involves understanding personal and other people's emotions and promoting authentic connections. Students in this stage exhibited characteristics of autonomy through the pursuit of self-directed goals and resilience in overcoming challenges. Their responses indicated preferences for meaningful, interpersonal connections that enhance collaboration and satisfaction, aligning with the stage's emphasis on relatedness. However, issues such as imbalances in group work and the absence of intrinsic motivation indicated areas where

autonomy and relatedness can be constrained. Overall, these insights reflect the self-aware stage's focus on introspection, meaningful engagement, and the development of supportive relationships.

The problems and solutions identified by participants in the conscientious stage reflected the stages' characteristics of responsibility, discipline, and structured problem-solving (Loevinger, 1997). Each student clearly recognised personal challenges and a desire for self-improvement. Solutions typically involved organised, methodical strategies such as scheduling, planning and clear communication. Some solutions involved leveraging relationships and communication, demonstrating the conscientious stage's balanced approach to autonomy and relatedness.

The conscientious stage is marked by a strong internal sense of autonomy, guided by personal principles and a commitment to self-improvement (Loevinger, 1997). Relatedness is based on mutual respect and shared values. Students in this stage showed high levels of autonomy through structured, self-directed approaches to personal goals and intrinsic motivation. Students' responses illustrated these characteristics through their proactive problem-solving skills and persistence in facing challenges. However, low levels of autonomy were evident when students felt constrained or obligated, leading to decreased motivation. Students showed high levels of relatedness via the formation of supportive relationships that enhanced motivation and performance, low levels of relatedness were shown with issues like trust and isolation that impeded effective collaboration. The students' responses reflect how autonomy and relatedness are typically viewed in the conscientious stage.

Research investigating self-determination theory and academic performance has already found that students with a high sense of autonomy are likelier to engage in self-directed learning and pursue academic goals that align with their interests and values. This intrinsic motivation enhances their engagement and perseverance in the face of challenges (Deci & Ryan, 2000; Vansteenkiste et al., 2004). Research has also shown that autonomy supportive environments promote greater intrinsic motivation, leading to improved academic outcomes and psychological well-being (Reeve et al., 2004). Conversely, students who lack autonomy may feel disempowered and struggle to find meaning in their academic pursuits, leading to disengagement and poor academic performance (Deci & Ryan, 2000; Niemiec & Ryan, 2009). Similarly, relatedness plays a vital role in academic performance. Strong interpersonal connections and a

sense of belonging provide emotional support and validation, which are essential for coping with academic stressors (Baumeister & Leary, 2017; Deci & Ryan, 2000). Students who feel connected to their peers, teachers, and academic community are more likely to experience a sense of purpose and fulfilment in their studies (Furrer & Skinner, 2003). On the other hand, students who feel isolated or disconnected may struggle to find meaning in their academic experiences, leading to increased stress and lower academic achievement (Osterman, 2000). The findings of how autonomy and relatedness interact with students problem identification and solution finding at each stage makes sense, however it should be noted that students perceptions of autonomy and relatedness aren't necessarily related to their stages of ego development, however their stages of ego development are related to their perceptions of autonomy and relatedness, the findings suggest that the responses given by students were not necessarily because of what stages they were categorised under, nor did it dictate what perceptions they have.

Implications

A novel contribution of this study is the detailed exploration of how meaning-making, ego development, and concepts from self-determination interact to shape problem perception and solution finding. The use of qualitative methods, including the Washington University Sentence Completion Test (WUSCT) and a qualitative SDT scale, yielded rich, narrative data that offered deeper insights into student's subjective experiences.

The research provides a deeper understanding into how educational practitioners aiming to improve student engagement and performance can tailor certain strategies to students by understanding that students at different stages of ego development perceive and solve problems differently. For instance, strategies that promote autonomy and relatedness could be particularly beneficial for students at lower stages of ego development, helping them develop more reflective and effective problem-solving skills. For students at higher stages of ego development, fostering an environment that supports their advanced problem identification and solution generation capabilities can further improve their academic performance and personal growth. Educators should consider incorporating activities that challenge students critical thinking and self-reflection abilities, as well as opportunities for meaningful interpersonal connections that reinforce their sense of relatedness. Additionally, recognising the impact of low autonomy and relatedness on academic performance highlights the importance of creating supportive and

inclusive academic performance linked to low autonomy, and promoting strong interpersonal connections to combat isolation, can significantly improve student outcomes.

This study extends our understanding of Self-Determination Theory (SDT) by showing the nuances of how autonomy and relatedness interact with problem perception and solution finding in an academic context. The findings were supported by Self-Determination theory's emphasis on autonomy and relatedness as important factors for promoting intrinsic motivation and psychological well-being. In addition, this research aligns with Loevinger's (1997) ego development framework by demonstrating how higher stages of ego development correspond with more complex problem identification and solution generation. Specifically, it shows that students at higher ego development stages exhibit more developed meaning-making abilities, leading to more reflective and sophisticated problem-solving strategies.

However, the study also highlights a discrepancy between Loevinger's (1997) descriptions of the impulsive stage and the observed perceptions of autonomy and relatedness among students at this stage. While Loevinger characterises this stage as driven by immediate impulses and external controls, the findings suggest that even at this stage, students are capable of demonstrating significant intrinsic motivation and personal satisfaction with their academic pursuits. This was observed, however in only one student, and while this student may be an outlier, further research into students at the impulsive stage and how perceptions of autonomy and relatedness vary in students throughout this stage could offer more insights into perhaps other factors at play. This also invites a re-evaluation of the scoring process for the WUSCT in cross-sectional research, and how students who are categorised should be done more thoroughly and over a certain time interval in order to capture different protocol ratings over time to consider response biases, since the student who was categorised as impulsive was only done so because of their responses at that point in time and they showed more developed perceptions of their experiences, and how autonomy and relatedness play a role in their experiences, from the more holistic SDT scale. The findings underscore the importance of using a developmental perspective in educational research, especially when examining how students identify and solve problems. Future studies could benefit from longitudinal designs that track changes in ego development stages over time, providing deeper insights into how meaning making and concepts from self-determination theory evolve and influence academic behaviours.

Strengths

The main strengths of this study lie in its theoretical integration, methodological rigor, and the thorough scoring process of developmental stages. The study effectively integrated several established theories, including meaning-making, ego development theory, and self-determination theory, providing a comprehensive framework for understanding the complex dynamics of problem perception and solution finding among university students. This integration allowed for a more nuanced exploration of how different psychological constructs interact, enriching the theoretical landscape and offering deeper insights into students' experiences (King et al., 2006; Ryan & Deci, 2000).

The use of both the Washington University Sentence Completion Test (WUSCT) and a qualitative Self-Determination Theory (SDT) scale provided a robust methodological approach. This combination facilitated a through scoring of ego development stages while also yielding holistic insights into students' personal experiences and reflections. Furthermore, the detailed analysis of how problem perception and solution finding evolved across different stages of ego development is a significant strength. This level of depth provides valuable insights into the developmental processes underpinning students' academic and personal growth. By examining these processes across varied stages, the study contributes to a deeper understanding of the individual differences in cognitive and emotional development during university years. The integration of intercoding also contributed to the reliability of the scoring process and the reliability of the findings as a whole (O'Connor & Joffe, 2020).

Limitations

The limitations of this study have to do with the cross-sectional design, sample diversity, self-reported data collection, the number of questions included in the WUSCT and the use of deductive coding in the analysis. While the cross-sectional design offered a snapshot of variations across ego development stages, it limited the ability to observe developmental changes over time (American Psychological Association, 2018). The static nature of the cross-sectional research design could've led to issues with temporal validity, where observed relationships may not have been consistent over time (Miller, 1998; Burbridge, 1999); for instance, a student who scored in the self-aware stage might've moved to the conscientious stage after the data collection process. Another example is the student who had a total protocol rating of two which signified they were in the impulsive stage of ego development. This one outlier limits the representativeness of the findings and demonstrates. While they were categorised under the

impulsive stage they clearly demonstrated higher levels of cognitive and emotional processing from the qualitative SDT scale that came after. The inclusion of only seven out of 36 of the sentence completion tests might have also limited the extent to which the scoring process accurately categorized students into their appropriate ego development stages.

The sample consisted of only bachelor-level psychology students from a single Dutch university with a relatively low international population, which limits the generalisability and applicability of the findings. Students from different academic disciplines or cultural backgrounds might've exhibit different patterns of behaviour. For example, cultural differences can significantly impact the development of autonomy and relatedness, which are influenced by societal norms and values (Markus & Kitayama, 1991). Therefore, the findings may not be applicable to a broader, more diverse student population.

The reliance on self-reported measures for assessing meaning making perceptions of autonomy and relatedness might've introduce numerous biases such as social desirability bias, recall bias, mood congruence, or demand characteristics. Respondents may have provided answers that they believed were more socially acceptable or favourable rather than those that reflect their true feelings or behaviours (Paulhaus, 1991). The students may not have accurately remembered past events or experiences leading to distorted or inaccurate reporting (Bradburn et al., 1987). The mood students at the time of answering the scales could've influenced their responses, with positive moods leading to more favourable responses, and negative moods leading to more critical or lacking responses (Forgas & George, 2001). Students might have altered their answers based on what they perceived the researchers expected or desired (Orne, 1962). Students may have provided answers subject to all these biases affecting the accuracy of the data. This was already show when one participant who showed an individualistic stage of ego development failed to answer the qualitative SDT scale, as well as the student who was categorised as impulsive but showed later in the survey that they could analyse experiences more in depth.

The deductive coding used throughout the analysis might have limited the depth of analysis due to the coding framework prepared beforehand. While deductive coding ensured consistency it constrained the depth of the data by not fully exploring unexpected themes or insights (Fereday & Muir-Cochrane, 2006). Inductive coding or a mixed-methods approach

might have provided a more nuanced understanding of the data, capturing emergent themes beyond the predefined categories.

Recommendations for Future Research

To address these limitations, future research should consider the use of a longitudinal design, including more diverse samples in the data collection process, and less rigid qualitative analysis. Implementing longitudinal designs to observe developmental changes over time. Including or broadening the participants, from various academic disciplines and universities, to enhance the generalisability of the findings. Utilising a mixed methods approach to balance the strengths of both quantitative and qualitative data, reducing reliance on self-reports and incorporating more objective measures. It would also be recommended in future research to include more or even all of the questions from the WUSCT especially if more time is allocated to the data collection stage, in order to assign more ratings of students responses to calculate their total protocol ratings, to categorise students more accurately stage of ego development. Finally, employing inductive or hybrid coding strategies to capture richer, more emergent themes from the qualitative data.

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Appendices

Appendix A

Questionnaire Items

Figure A1

WUSCT Items

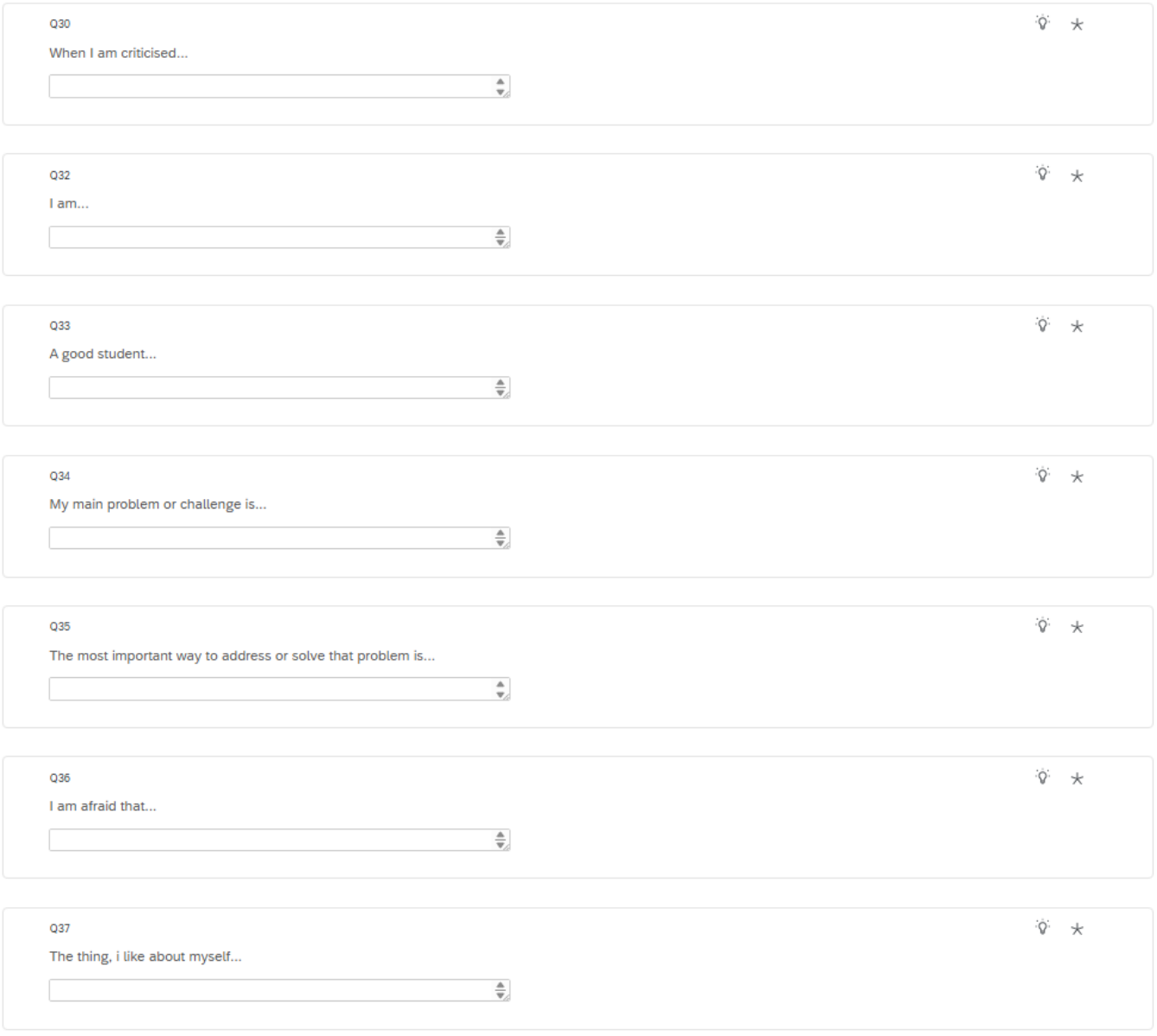
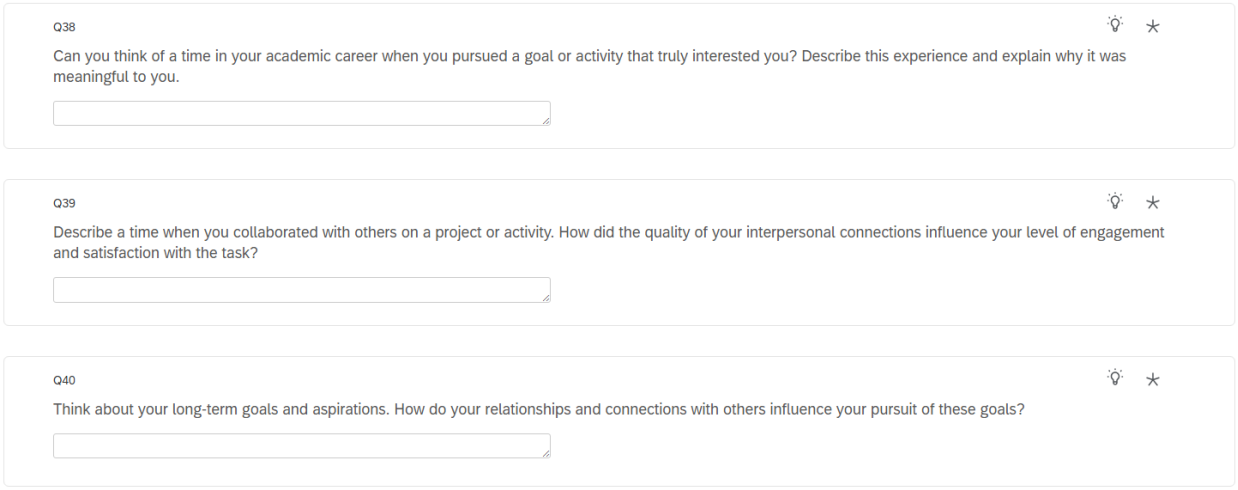


Figure A2

SDT Open Questions



Appendix B

Coding Schemes

Table B1

WUSCT Coding Scheme Categories

Category	Numerical Scoring	Description
Impulsive	2	The participant displays spontaneous and immediate reactions.
Self-Protective	2/3	The participant exhibits self-serving and cautious behaviour.
Conformist	3	The participant shows adherence to group norms and conventions.
Self-Aware	3/4	The participant reflects on self and personal growth.
Conscientious	4	The participant demonstrates responsibility and organisation.

Individualistic	4/5	The participant values individuality and personal principles.
Autonomous	5	The participant exhibits autonomy and self-directed actions.
Integrated	5/6; 6	The participant displays integration of diverse perspectives and values.

Table B2

Autonomy and Relatedness Categories

Category	Description
Self-Directed Goals	Instances where students express their own goals and initiatives.
Intrinsic Motivation	Expressions of internal motivation driven by personal interest enjoyment or satisfaction.
External Control	Instances where students feel their actions are controlled by external forces.
Lack of Choice	Situations where students feel they have no choice or control over their actions.
Supportive Relationships	Mentions of positive supportive interactions with peers, teachers, or family.
Sense of Belonging	Feelings of belonging and being part of a group or community.
Isolation	Feelings of being isolated or disconnected from others.
Lack of Support	Mentions of the absence of support or encouragement from others.

Appendix D

Excel Data and RStudio Output

WUSCT Scoring

https://1drv.ms/x/s!Ajrd5xkvD48FgvZdmSVbi6uypW0cvg?e=7RCMsM

https://1drv.ms/x/s!Ajrd5xkvD48Fgvk5QdWEk6ijXKa1Ew?e=gxNMtf

WUSCT Ogive Distributions

https://1drv.ms/x/s!Ajrd5xkvD48FgvZf-hWl6qVWGY2ZNQ?e=3TpcB2

SDT Scoring

https://1drv.ms/x/s!Ajrd5xkvD48Fgvc_OXG5N-MBIhOwIw?e=voJdXb

https://1drv.ms/x/s!Ajrd5xkvD48Fg4ZnQJzH3s_MeeuZMA?e=aDaWyp

Appendix E

RStudio Output Cohens Kappa

```
#kappa results using psych package#

install.packages("psych")

library(psych)


#Creating dataframes#

#Question 1#

ratings <- data.frame(

  Rater1 = c(3/4, 4, 3, 4, 2/3, 3/4, 2, 2, 2/3, 4, 2/3, 3/4, 3, 3, 4, 4, 3/4, 2/3,

             4, 3, 4/5, 4, 3/4, 4, 4, 4, 3, 4, 4, 4,4, 2, 5/6, 3, 3, 2, 3, 3, 4, 4,
```

```
        4/5, 2, 2, 2/3, 2, 4, 2/3, 2, 4, 4, 4/5, 2/3, 3, 4, 4/5, 4),
  Rater2 = c(3/4, 4, 3, 4, 3, 3/4, 2, 2, 3, 4, 3, 3/4, 3, 3, 4, 4, 3/4, 3, 4, 3,
        4, 4, 3/4, 4, 4, 3, 4, 3, 4, 4, 2, 5/6, 3, 3, 2, 3, 3, 4, 4, 4, 2, 2,
        3, 2, 4, 2/3, 2, 4, 4, 4/5, 3, 3, 4, 4/5, 4)
)

#Question 2#
ratings2 <- data.frame(
  Rater1 = c(2, 4, 3, 2, 4/5, 3/4, 3, 4, 2, 4/5, 2, 3, 2, 4, 2, 3, 4, 3, 2, 3/4,
        3/4, 4, 3, 3, 4/5, 3, 4, 2, 4, 4, 4, 3, 3, 4, 2, 3, 4/5, 3, 3, 3, 3/4,
        4, 3, 3, 4, 3, 3, 2, 4, 4, 3, 4/5, 2, 4/5, 2),
  Rater2 = c(2, 4, 3, 3, 4/5, 3/4, 3, 4, 2, 4, 2, 3, 3, 4, 2, 3, 4, 3, 2, 3/4,  3/4,
        4, 3, 3, 4/5, 3, 4, 3, 4, 4, 4, 3, 3, 4, 3, 3, 4, 3, 3, 3, 4, 4, 3, 3,
        4, 3, 3, 2, 4, 4, 3, 4/5, 3, 4/5, 2)
)

#Question 3#
ratings3 <- data.frame(
  Rater1 = c(4, 3, 4, 4/5, 3/4, 3, 4, 4, 4, 4, 4, 3, 4, 3/4, 4, 3, 3, 3, 3, 3/4,
        3/4, 4, 4/5, 3, 3, 3/4, 3/4, 4, 4, 4, 3, 3/4, 4, 3, 4, 4, 4, 4, 3,
        3/4, 3, 3, 4, 4, 4, 3, 3, 3, 4, 3, 4/5, 3/4, 3/4, 4, 2/3),
  Rater2 = c(4, 3, 4, 4, 3/4, 3, 4, 4, 4, 4, 4, 3, 4, 3/4, 4, 3, 3, 3, 4, 3/4,
        3/4, 4, 4, 3, 3, 3/4, 3/4, 4, 4, 4, 3, 3/4, 4, 3, 3, 4, 4, 4, 4, 3/4,
```

```
            3, 3, 4, 4, 4, 3, 3, 4, 4, 3, 4/5, 3/4, 3/4, 4, 3)
)

#Question 4#
ratings4 <- data.frame(
  Rater1 = c(4, 3/4, 3/4, 4/5, 4, 3/4, 4, 4, 3/4, 4, 3/4, 3/4, 3/4, 3/4, 3, 3/4,
             4, 4/5, 2, 3/4, 3/4, 3/4, 3/4, 3/4, 3/4, 4, 3/4, 4, 4/5, 4, 3/4, 3/4,
             4, 4, 4, 3/4, 3/4, 4, 4, 4, 4, 4, 3/4, 3/4, 4, 3/4, 4, 3, 3/4, 2, 3/4,
             3/4, 3/4, 4/5, 4),
  Rater2 = c(4, 3/4, 3/4, 4/5, 4, 3/4, 4, 4, 4, 4, 3/4, 3/4, 3/4, 3/4, 3, 3/4, 4,
             4, 2, 3/4, 3/4, 3/4, 3/4, 3/4, 3/4, 4, 3/4, 4, 4/5, 4, 3/4, 3/4, 4,
             4, 4, 3/4, 3/4, 4, 4, 4, 4, 4, 3/4, 3/4, 4, 4, 4, 3, 3/4, 2, 3/4, 3/4,
             3/4, 4/5, 4)
)

#Question 5#
ratings5 <- data.frame(
  Rater1 = c(4, 4/5, 4, 3/4, 4, 4/5, 4, 4, 4, 4, 4, 4/5, 4/5, 4, 3, 4, 4, 4, 4, 3/4, 4,
    4/5, 4, 4, 4, 4, 3/4, 4, 4/5, 4, 4, 3/4, 4, 4, 4, 4, 4/5, 4, 4, 4, 4, 4,3/4,
    3/4, 4, 3/4, 4, 4, 3/4, 4, 3/4,4, 4, 4, 2),
  Rater2 = c(4, 4/5, 4, 3/4, 4, 4/5, 4, 4,4, 4, 4, 4/5, 4/5, 4,3, 4, 4, 4, 4, 3/4,
             4, 4, 4, 4, 4, 4, 3/4, 4, 4/5, 4, 4, 3/4, 4, 4, 4,  4, 4/5, 4, 4, 4,
             4, 4, 4, 4, 4, 4, 4, 4, 4, 4,3/4, 4, 4, 4, 2)
```

```
)

#Question 6#
ratings6 <- data.frame(
  Rater1 = c(3/4, 3/4, 3/4, 4, 3/4, 3/4, 3/4, 3/4, 4, 3/4, 3/4, 4, 3/4, 3/4, 4,
             3/4, 3/4, 4, 2, 3/4, 3/4, 4, 3/4, 4, 3/4, 4, 3/4, 3/4, 4/5, 4, 3/4,
             3/4, 4, 4, 3/4, 3/4, 3/4, 4, 4, 2, 4, 4, 3/4, 3/4, 3/4, 3/4, 4, 4, 4,
             4, 4, 3/4, 3/4, 4/5, 3/4),
  Rater2 = c(3/4, 3/4, 3/4, 3/4, 3/4, 3/4, 3/4, 3/4, 4, 3/4, 3/4, 4, 3/4, 3/4, 4,
             3/4, 3/4, 3/4, 2, 3/4, 3/4, 4, 3/4, 3/4, 3/4, 4, 3/4, 3/4, 4/5, 4, 3/4,
             3/4, 4, 4, 3/4, 3/4, 4, 4, 4, 2, 4, 4, 3/4, 3/4, 3/4, 3/4, 4, 4, 4,
             4, 4, 3/4, 3/4, 4/5, 4)
)

#Question 7#
ratings7 <- data.frame(
  Rater1 = c(3/4, 4, 3/4, 4, 4, 4, 4, 3/4, 3/4, 4, 4, 4, 3/4, 3/4, 4, 4, 4/5, 3/4,
             4/5, 4, 3/4, 4, 4, 4, 4, 4, 3/4, 4, 4, 4, 4, 4, 4, 4, 3/4, 4, 3/4, 4,
             3, 4, 4, 4, 4, 4, 4, 4, 3/4, 4, 4, 4/5, 4, 4/5, 4/5, 4, 4),
  Rater2 = c(3/4, 4, 3/4, 4, 4, 4, 4, 3/4, 3/4, 4, 4, 4, 3/4, 3/4, 4, 4, 4, 4, 4/5,
             4, 3/4, 4, 4, 4, 4, 4, 3/4, 4, 4, 4, 4, 4, 4, 4, 3/4, 4, 4, 4, 3, 4, 4,
             4, 4, 4, 4, 4, 3/4, 4, 4, 4, 4, 4/5, 4, 4, 4)
)
```

```
kappa_results <- cohen.kappa(ratings)

print(kappa_results)


kappa_results2 <- cohen.kappa(ratings2)

print(kappa_results2)


kappa_results3 <- cohen.kappa(ratings3)

print(kappa_results3)


kappa_results4 <- cohen.kappa(ratings4)

print(kappa_results4)


kappa_results5 <- cohen.kappa(ratings5)

print(kappa_results5)


kappa_results6 <- cohen.kappa(ratings6)

print(kappa_results6)


kappa_results7 <- cohen.kappa(ratings7)

print(kappa_results7)

#SDT Intercoding#
```

```
#kappa results using psych package#

install.packages("psych")

library(psych)


#Creating dataframes#

#Question 1#

SDTratings1 <- data.frame(

  Rater1 = c(2, 4, 4, 1, 2, 4, 2, 1, 2, 2, 2, 2, 2, 2, 2, 4, 2, 4, 2, 4, 2, 2, 2,

             1, 2, 2, 2, 2, 2, 2, 2, 4, 2, 2, 2, 2, 2, 2, 4, 4, 1, 1, 2, 2, 2, 2, 1,

             2, 1, 1),

  Rater2 = c(2, 4, 4, 1, 2, 4, 2, 1, 2, 2, 1, 2, 2, 1, 2, 4, 2, 4, 2, 4, 2, 2, 2,

             1, 2, 2, 2, 2, 2, 2, 2, 4, 2, 1, 2, 1, 2, 4, 4, 1, 1, 2, 2, 2, 2, 1,

             2, 1, 1)

)

#Question 2#

SDTratings2 <- data.frame(

  Rater1 = c(5, 5, 7, 5, 8, 3, 6, 8, 5, 5, 7, 5, 5, 1, 2, 5, 6, 6, 3, 5, 5, 6, 5,

             5, 7, 5, 5, 6, 5, 8, 8, 5, 6, 8, 7, 5, 8, 5, 5, 3, 5, 5, 8, 6, 6, 5,

             5, 6, 5),

  Rater2 = c(5, 5, 7, 5, 8, 3, 6, 8, 5, 5, 7, 5, 5, 1, 2, 5, 6, 6, 3, 5, 5, 6, 5,

             5, 7, 5, 5, 6, 5, 8, 8, 5, 6, 8, 8, 5, 8, 5, 6, 3, 5, 5, 8, 5, 6, 6,

             5, 6, 5)

)
```

```
# Question 3#

SDTratings3 <- data.frame(

  Rater1 = c(5, 5, 8, 5, 5, 5, 5, 5, 6, 5, 8, 7, 5, 7, 8, 5, 5, 6, 5, 8, 1, 1, 5,

             5, 7, 5, 5, 5, 5, 2, 6, 5, 2, 5, 5, 1, 5, 6, 6, 5, 5, 5, 1, 5, 5, 5,

             5, 5, 5),

  Rater2 = c(5, 5, 8, 5, 5, 5, 5, 5, 6, 5, 8, 8, 5, 7, 7, 5, 5, 6, 5, 8, 1, 7, 5,

             5, 7, 5, 5, 5, 5, 2, 5, 5, 2, 5, 5, 1, 5, 5, 5, 5, 5, 5, 1, 5, 5, 5,

             5, 5, 5)

)

#Kappa Results#

SDTkappa_results1 <- cohen.kappa(SDTratings1)

print(SDTkappa_results1)


SDTkappa_results2 <- cohen.kappa(SDTratings2)

print(SDTkappa_results2)


SDTkappa_results3 <- cohen.kappa(SDTratings3)

print(SDTkappa_results3)
```