



**UiT** The Arctic University of Norway

Department of Psychology

## **Can Difficult Lectures be Interesting AND Pleasant?**

Hedonic and Eudaimonic Feelings as a Function of Perceived Difficulty

**Håvard Ivan**

Master's thesis in Psychology - PSY-3900. December 2022



## Preface

This thesis first came to realization after a bit of back and forth between my supervisor Joar Vittersø and I, as we were trying to find a suitable project for my masters. Long story short, I was presented with an opportunity to partake in a study that delved into the world of positive psychology. Our study investigating the function of feelings, and how difficult perceptions could alter our perceived pleasantness and interest. Prior to my inclusion, and using a relational design, Joar had gathered data across two psychology classes. I performed data entry, and analyses were split between us both. I would always receive assistance if I found myself presented with a challenge or in the need for guidance. I truly found the process of writing this thesis to be both interesting and inspiring.

Incidentally, I would like to thank my supervisor, Joar, who introduced me to literature, theories, and studies that, although at times were perceived as complicated and confusing, I generally found to be delightfully compelling and amusing. Thank you for your patience, your guidance, and last but not least, thank you for your ability to inspire and motivate. On that note, I would also like to thank UiTs' department of psychology, including all lecturers, professors, and staff. Over the course of my masters, I as a student have been given pretty much carte blanche to explore and appreciate the field of psychology. I will bring with me the knowledge and experiences acquired over the past years for the rest of my life, and for that I am grateful. Finally, to the three favorite women in my life; my sister, my aunt, and my grandmother – Thank you for supporting me all the way.



Håvard Ivan

Master student



Joar Vittersø

Supervisor



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### Sammendrag

Hva er det som gjør utfordringer og det komplekse så appellerende for mennesker? Dette spørsmålet har forskning innen retningen positive psykologi forsøkt å besvare, og i prosessen har man funnet evidens som tyder på at mennesker opplever forskjellige følelser ettersom at opplevelsen av vanskelighet øker. I dette studie, som baser seg på Gudrun Eckblad's scheme theory, har vi gjort antagelser om at rapporterte følelser av behag vil være mest instans ved lavere nivåer av vanskelighet, og at rapporterte følelser av interesse ville være mest intens ved høye nivåer av vanskelighet. I tillegg ble det gjort antagelser om at behag og vanskelighet ville ha en sterkere negativ korrelasjon, enn hva interesse og vanskelighet hadde, og at korrelasjon mellom og behag og interesse ville være positiv, men moderat. Ved bruk av et føloimeter, et verktøy for kontinuerlig måling av følelser, ble det samlet inn kvantitative data fra to separate psykologiforelesninger, statistisk psykologi ( $n = 60$ ) og samfunnspsykologi ( $n = 38$ ). Variablene var ble korrelert, og multilevel analyse ble gjennomført. Resultater av studiet fant negative korrelasjoner mellom opplevd vanskelighet, og både interesse og behag. Bare én av path-analysene viste en sterkere relasjon mellom behag og vanskelighet, i motsetning til interessant og vanskelig. Positiv og moderate korrelasjoner mellom behag og interesse ble funnet i noen tilfeller. Resultatene ble diskutert, og støttende litteratur ble foreslått samt svakheter ved studien.

*Nøkkelord:* Hedonisme, eudaimonia, emosjon, positiv psykologi, well-being.

### Abstract

What is it that makes challenge and complexity so appealing to humans? Research derived from positive psychology have tried to answer this question, and in the process found evidence suggesting that people experience different feelings as the perception of difficulty rises. In this study, using Gudrun Eckblad's scheme theory as premise, we predicted that reported feelings of pleasure would be most intense at lower levels of difficulty, and that reported feelings of interest would be most intense at higher levels of difficulty. Predictions were also made that pleasure and difficulty would have a stronger negative correlation than interest and difficulty, and that correlations between pleasure and interest would be positive, but moderate. Using a "feelometer", a tool for continuous measurements of feelings, quantitative data were collected across two separate psychology lectures, statistical psychology ( $n = 60$ ) and community psychology ( $n = 38$ ). The variables were correlated, and multilevel analysis were conducted. Results of the study found negative correlations between perceived difficulty and both interest and pleasantness. Only one of the path-analysis showed a stronger relationship between pleasure and difficulty, oppose to interest and difficulty. Positive and moderate correlations between pleasure and interest were found in some cases. Results were discussed, and supporting literature were proposed as well as limitations of the study.

*Keywords:* Hedonic, eudaimonic, emotion, positive psychology, well-being.

## **Can Difficult Lectures be Interesting AND Pleasant? Hedonic and Eudaimonic Feelings as a Function of Perceived Difficulty**

Written by saxophonist Paul Desmond and recorded by The Dave Brubeck Quartet in 1959, the song “Take Five” is one of the most popular and instantly recognizable works to emerge from the mid 20<sup>th</sup> century jazz era. The complementary album went on to become the best-selling jazz album of all time. While unusual, the 5/4 meter, the dissonance in the chords and the un-expectancy of the improvisation is also the reason for the popularity of this piece of music. It’s complex, and it has a certain strangeness to it. This complexity and strangeness seem to evoke a set of feelings that does not respond with pleasure, but rather interest, engagement, and awe (Vittersø, 2016). As such, it seems humans are adapted with a set of feelings that responds differently when presented something complex or strange, contrary to when presented with something pleasant and simple. Some theories of well-being (as will be further examined in this study) elaborate on this assumption, stating that well-being is a result of the functioning of both simple and complex feelings, what Vittersø (2016; 2018) refers to as hedonic and eudaimonic well-being.

According to Jaak Panksepp (Panksepp, 2013, 0:40) “We have feelings because they tell us what supports our survival, and what subtracts from our survival”. With this statement, Panksepp illustrate the shared need all living organisms have in common; the need to regulate stability (Vittersø, 2016). Hedonic well-being is a goodness associated with regulating said stability, reflected through pleasant (or unpleasant) feelings which functions is to reflect the surrounding environment. From an evolutionary point of view, this is what keeps every organism alive (Panksepp, 1998; Vittersø, 2016). Hedonic feelings require little knowledge about our environment, yet they are able to roughly inform us about the goodness or badness around us. Humans drink, eat, sleep, all because hedonic feelings regulate the homeostatic mechanisms needed to stay alive. Even in hungry or sleepy infants, the emotional expressions

of crying can be seen as a result of the hedonic feeling of unpleasantness (Izard & Ackerman, 2000). Infants have no knowledge about healthy nutrition, or sleeping patterns, yet hedonic feelings, displeasure of hunger or lack of sleep, allow for the appropriate response to set in motion, and thus regulate stability. Hedonic well-being in such is the type of goodness associated with regulating stability. However, equally important for a well-functioning organism is the ability to change, when necessary. A human change from childhood to adulthood as a consequence of development, the working skills of a modern worker have changed as a consequence of different work environments. But the emotions associated with these changes are typically not hedonic, rather they are associated with feelings of interest, engagement immersion and an urge to overcome a challenge. (Vittersø, 2016; 2018). This type of well-being is what Vittersø refers to as eudaimonic, and arguably, it is the result of millennials worth of research and philosophy.

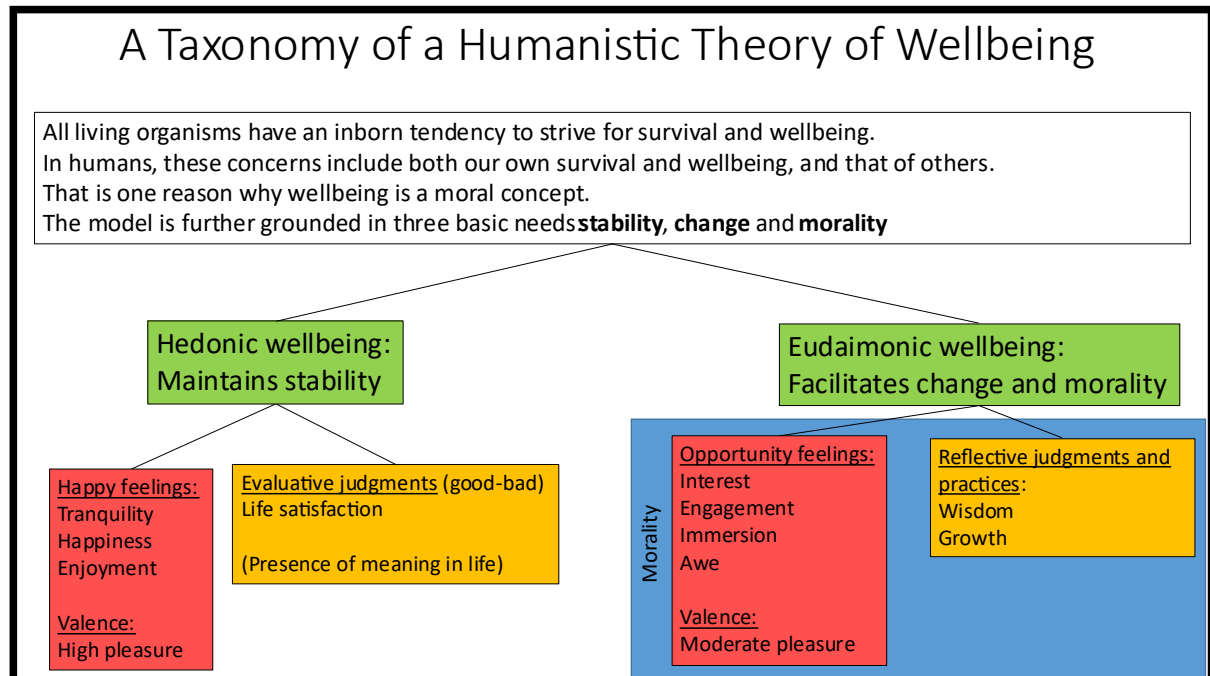
The word eudaimonia stems from ancient Greek, and is conventionally translated to happiness (Sagdahl, 2021). However, when Aristotle referred to eudemonia in *Nicomachean Ethics*, he arguably described a concept that is closer to what modern theories refer to as well-being in the sense of leading a good life (Plamper, 2015). According to Aristotle, the ultimate goal was the realization of human potential, and the philosopher's idea of true happiness was living a virtuous life, and in so doing what is worth doing (Ryan & Deci, 2001; Vittersø, 2016). Aristotle's recipe of well-being has since been heavily criticized (Ryan & Deci, 2001; Vittersø; 2016; 2018), but emerging in the second half of the 20<sup>th</sup> century, came theories of positive psychology that expanded on the philosopher's ideas that humans strive towards goals. Self-determination theory (STD) is an example of such (Deci & Ryan, 2012). This modern theory of motivation, state that humans have an inherent tendency toward growth, which is regulated by psychological needs for competence, autonomy, and relatedness. In short, the theory states that the need for growth drives behavior, and that by



acting in certain ways toward goals that are important to oneself, we will feel competence, autonomy, and relatedness. However, when it comes to well-being, SDT articulates that feelings of competence, autonomy, and relatedness are not necessarily feelings of well-being in them self, but rather means to reach another set of feelings that are, according to SDT are rewarding in and by themselves, such as pleasure or satisfaction. As such, it seems STD fails to recognize that the experiences related to change itself, such as interest and engagement, can themselves be constituents of well-being. To SDT these feelings are rather means that leads to hedonic wellbeing, i.e., the experience of pleasure and satisfaction. A theory of well-being in which well-being is a result of both feelings associated with hedonia as well as feelings associated with eudaimonia is presented in the functional wellbeing approach bellow.

### **Functional wellbeing approach**

The functional wellbeing approach (FWA) is an activity theory of wellbeing developed by Vittersø (Vittersø, 2016; 2018). Here, well-being is divided into two major components: hedonic wellbeing (HWB) and eudaimonic wellbeing (EWB). The classification system is based on two major processes of adaptation in all living organisms: regulation of stability and regulation of change. These two types of adaptations, the second level of the FWA taxonomy, are referred to as hedonic wellbeing and eudaimonic wellbeing as seen in Figure 1 below (Vittersø, 2022).

**Figure 1.***The FWB Taxonomy of Wellbeing*

The function of hedonic wellbeing is to regulate a homeostatic stability of pleasure (Vittersø, 2016; 2018; 2022). The idea is that feelings of psychological, biological and social discomfort will result in behavior that aims to re-establish homeostasis. The third level of the FWA taxonomy distinguishes between two sub-components of wellbeing: feelings, and judgments. Feelings can be hedonic (aka happiness feelings) or eudaimonic (aka opportunity feelings). Judgments can be evaluative (good or bad) or reflective (right or wrong). Hedonic judgments comprises satisfaction and some element of meaning in life. Eudaimonic judgments comprises wisdom and practices that stimulates personal growth. There is an element of improvement or betterment embedded in EWB that is not required for HWB.

The role of eudaimonic wellbeing is to regulate change, and it is arguably more complex and harder to conceptualize than hedonic wellbeing (Vittersø 2016; 2018). Positive experiences associated with the very process of change, are feelings like engagement,

curiosity, interest, and awe. Positive experiences associated with maintaining stability are feelings like tranquility, pleasure, and satisfaction. Whereas hedonic wellbeing is involved in the regulation of homeostatic stability, eudaimonic wellbeing is non-homeostatic in the sense that it can postpone the drive towards an equilibrium. You might be hungry and tired, but the engagement to overcome a challenge keeps you motivated to go “the extra mile.”

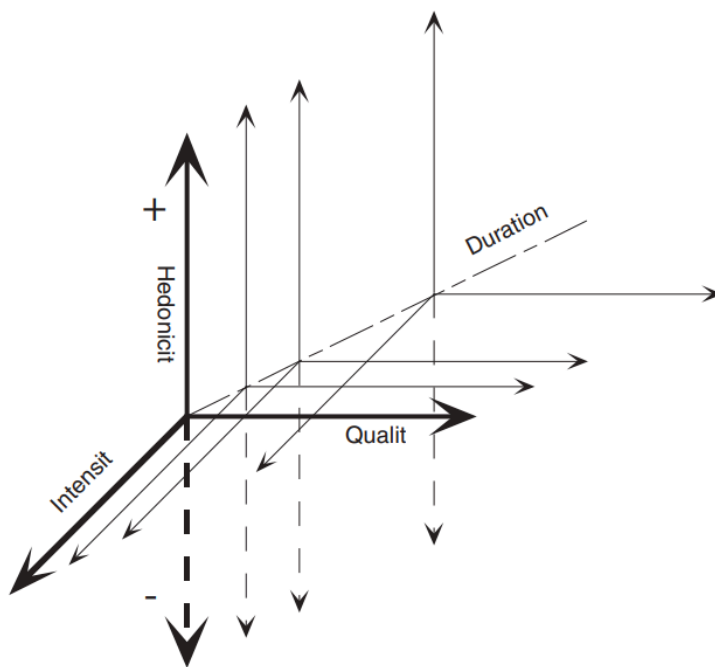
### **Dimensions of feelings and the function of pleasure**

Vittersø's FWA (2020) is a way to organize a variety of positive emotions into two main categories: hedonic and eudaimonic feelings. Hedonic feelings must not be confused with the process of characterizing a stimulus. In order to assess whether ones inner and outer environments are good or bad, even primitive organisms need to classify stimuli as pleasant or unpleasant (Vittersø, 2016). Thus, the function of pleasure, as described in the FWA, is to inform the subject whether a stimulus is a favorable or unfavorable one, and behave accordingly. This good-bad dimension is what Cabanac (1996) refers to as pleasure, later referred to by Vittersø as a hedonic dimension (Vittersø, 2016). According to Cabanac (1996; 2011), the hedonic dimension is one of four different dimensions of a feeling state, as illustrated in Figure 2. The second dimension is referred to as the quality, and it describes the nature of the stimuli presented. The third dimension is the intensity, and it describes the quantity or how much a stimulus is affecting the experience. The fourth dimension is referred to as duration; how long a stimulus is presented. It is important however to distinguish between the quality dimension and the hedonic dimension of the feeling state. Vittersø (2016) illustrate this by distinguishing hedonic and quality dimensions when consuming chocolate and considering its sweetness. “Chocolate is typically both sweet (reflecting the quality dimension) and pleasant (reflecting the hedonic dimension). But it is only pleasant until one has eaten enough. Having too much chocolate is unpleasant even if the chocolate still tastes

sweet, which shows that sweetness and pleasure are separable dimensions of a feeling state” (Vittersø, 2016, p. 259). In another example, Cabanac (2010) explains how a cold shower feels pleasant when we are hot, but at the same temperature the water feels unpleasant when we are cold. This example illustrates the distinction between the hedonic dimension (pleasant/unpleasant) and the quality dimension (cold water) of a feeling state, but also the simplicity and function of the hedonic dimension – its function is to classify stimuli as pleasant or unpleasant, and thus allow us to behave accordingly.

## Figure 2

*Multidimensional Response to a Stimulus, According to Cabanac.*



*Note.* All four dimensions of a feeling, according to Cabanac (1996).

## Eudaimonic feelings and the function of interest

As mentioned, the function of eudaimonic feelings is more complex than hedonic feelings. Whereas the function of hedonic feelings is to re-establish homeostatic stability, the

function of eudaimonic feelings is to regulate change (Vittersø, 2016). Although not limited to, eudaimonic feelings can be summarized as feelings of interest, engagement, curiosity and even awe (Vittersø 2018; 2016). According to Izard and Ackerman (2000), building on the works of Tomkins (1962), the eudaimonic feeling of interest is what motivates people to explore and learn, and it guarantees a person's engagement to the environment - an engagement that is required for adaptation and survival. Further on, Izard and Ackerman argue how interest is paramount for selective attention, and also for the motivation and mobilization needed for engagement and interaction. Subsequently, interest seems to be what allows for constructive and creative endeavor, development of intelligence and personal growth (Izard & Ackerman, 2000). The idea that interest is an essential component of learning, creativity and personal growth is well documented in literature (Ryan & Deci, 2000; Vittersø, 2016; 2018; Fredrickson, 1998; Csikszentmihalyi, 2014). Izard and Ackerman's understanding of the feeling of interest accentuate the distinction between hedonic and eudaimonic feelings, and underlines the complexity of eudaimonic feelings (Izard & Ackerman, 2000). With both Izard and Ackerman's (2000) depiction of interest, and Vittersø's FWA (2020), the function of interest becomes apparent – it allows for motivation and mobilization required for engagement and interaction, thus enabling learning, creativity and personal growth.

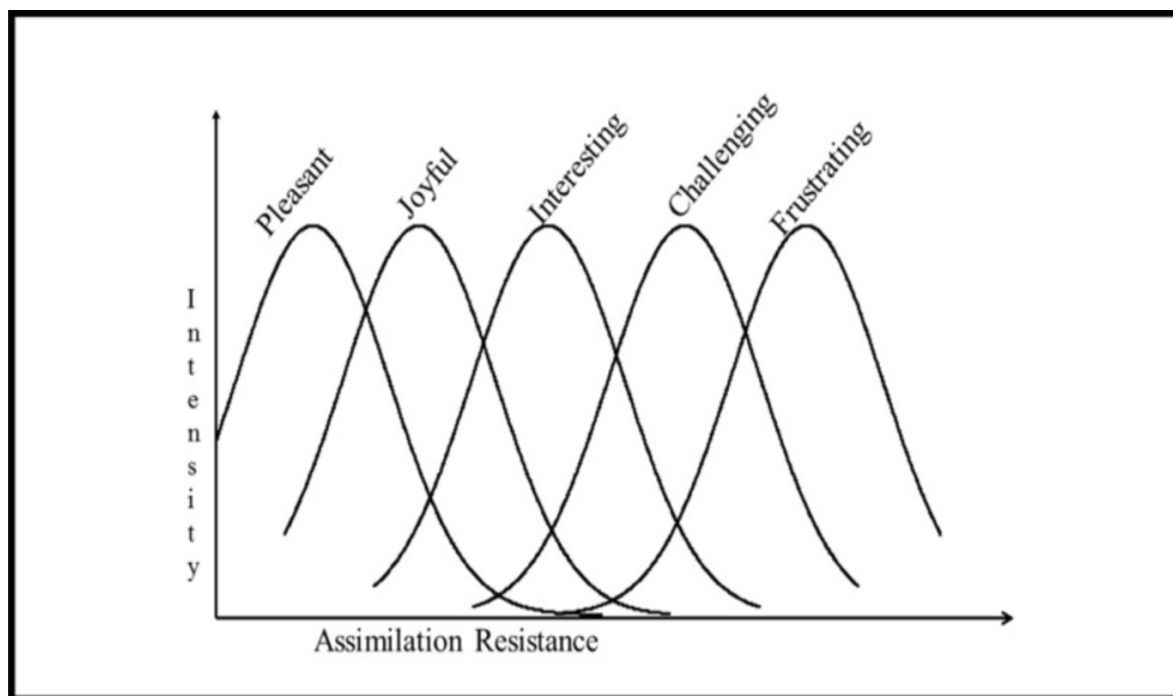
### **Functioning of feelings at different levels of perceived difficulty**

An explanation of how feelings vary as a consequence of perceived complexity comes from Gudrun Eckblad (Vittersø, 2018). In her scheme theory, Eckblad depicts a multi-curved model in which distinct feelings are generated from activities in accordance with how difficult the activity is. Inspired by Piaget, Eckblad refers to the perceived difficulty of an activity as assimilation resistance (AR) –strange, complex, and unexpected events creates AR

(Eckblad, 1981). According to Eckblad, at lower levels of AR, we typically feel pleasure. Note that in Eckblad's vocabulary, pleasure is a feeling quality and not a separate hedonic dimension. As the AR escalates, the feeling of pleasure decreases, and feelings of joy rises. In other words, pleasure will reach its maximum intensity at a relatively low level of AR. Before it reaches this maximum intensity, the correlation between AR and pleasure will be positive. After the maximum have been reached, the correlation between pleasure and AR will be negative. See Figure 3 below. Higher levels of AR provoke different kinds of feelings, such as interest, curiosity, and challenge. If an activity generates an overwhelming amount of AR, we feel frustration. The level of AR produced by a stimulus is of course dependent on a person's subjective capacity for assimilating the stimuli (Eckblad, 1981). The idea of Eckblad's Scheme theory accentuates how feelings vary as a consequence of the perceived complexity of a stimulus or an event.

**Figure 3**

*Multi-curved model of Eckblad's scheme theory*

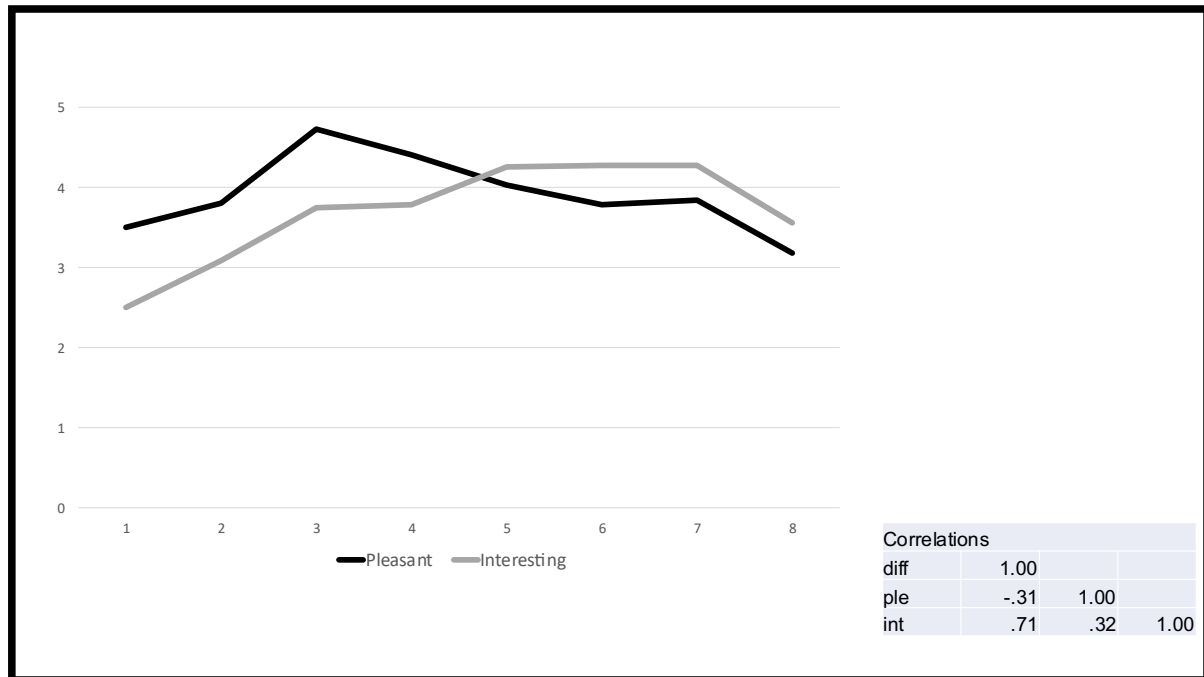


*Note.* As illustrated by the curves, increasing assimilation resistance (AR) will affect the intensity and the quality of a feeling state. Pleasure is felt most intensity at low levels of AR, whereas joy, interest, challenge, and frustration will peak at successively higher levels of AR (Vittersø, 2018).

Evidence for Eckblad's scheme theory were illustrated by means of a problem-solving experiment, where 32 students were instructed to solve eight tasks of varying complexity (Eckblad, 1981). The varying complexity of the tasks illustrated AR, from low to high. The subjects would then rate their experience of each task on six different scales; *Confused-Clear*, *Uncomfortable-Comfortable*, *Unpleasant-Pleasant*, *Boring-Interesting*, *Monotone-Varied* and *Simple-Complex*. Results from the experiment illustrated how the most interesting tasks were those that offered some, but not too much resistance to assimilation. Tasks that were perceived as highly complex and confusing (high AR), had a negative effect on perceived interest and pleasantness. The results of Eckblad's study are depicted in figure 4 below. Also depicted are the correlations of the variable difficult (AR) to pleasant and interesting. As illustrated, there was a negative correlation between variables difficult and pleasantness ( $r = -.31$ ) and a positive correlation between variables difficult and interesting ( $r = .71$ ), as well as a positive correlation between variables interesting and pleasantness ( $r = .32$ ). The results of Eckblad's problem-solving experiment provides evidence for her assumption that feelings vary as a result of AR, and that feelings of pleasure and interest are curvilinearly related to AR.

**Figure 4**

*Problem Difficulty Along the X-Axis and Intensity of Pleasant and Interesting Feeling While Solving the Problems Along the Y-Axis*



*Note.* Feelings of pleasantness and interest curvilinearly related to AR (X-axis). Also depicted, negative correlations between variables difficulty to variables pleasant and interesting.

In line with Eckblad's scheme theory and Vittersø's FWA, Løvoll and Vittersø (2014) found that the complexity of feelings rises as challenges increases. The researchers wanted to challenge the idea previously proposed by flow theory, stating that challenge and skills should be balanced in order to produce enjoyable experiences and entering "flow" (Csikszentmihalyi & Nakamura, 2010). While investigating the balance between challenges and skills, Løvoll and Vittersø found that feelings such as pleasure, happiness and satisfaction were associated with skills, whereas feelings of interest engagement and enthusiasm were associated with challenges. Løvoll and Vittersø (2014) further suggested that when challenge and skills were balanced, situations could be experienced as slightly boring, or non-



interesting. Situations with higher challenge than skill however seemed to give a closer prediction of flow indicators. Somewhat similar findings were also reported in Hetland and Vittersø's (2012) study of skydivers and BASE jumpers. Here, the researchers found that the high challenge activity (skydiving and BASE jumping) had a larger impact on eudemonic feelings (interest, engagement, and enthusiasm) than it had on hedonic feelings (pleasure, happiness and satisfaction). Both studies (Løvoll & Vittersø, 2014; Hetland & Vittersø, 2012) illustrate how challenging situations and stimuli seem to be associated with more complex eudaimonic feelings such as interest, engagement, and enthusiasm. In other words, eudaimonic feelings is a result of leaving the comfort zone of pleasantness in order to overcome a challenge, thus enabling growth processes.

Another examination of the relationship between pleasure and interest comes from appraisal theories. Appraisal theories define emotions as result of an evaluative response to a situation or a stimulus (Ellsworth, Scherer & Frijda, 2013). These evaluations are made based on a number of appraisal factors, such as a person's goals, expectations and autonomy (Clore & Ortony, 2008). Smith and Ellsworth (1985) proposed that appraised pleasantness was central to the emotion of interest. Turner and Silva (2006) wanted to test this assumption and had participants look at calming and disturbing paintings, and later asked the participants to rate their experienced interest and experienced pleasantness/unpleasantness. Their results suggested that calm and disturbing paintings did not need to be experienced as pleasant to be interesting. In fact, disturbing paintings were rated as highly interesting, but unpleasant, and the calm pictures were rated as highly pleasant, but uninteresting. Similar to the findings of Løvoll and Vittersø (2014), and Hetland and Vittersø (2012), the results of Turner and Silva's study found evidence illustrating how complex stimuli (disturbing paintings) seems to be associated with eudaimonic feelings (interest).

**Shared function of hedonic and eudaimonic feelings: the Broaden-and-Build theory**

So far, the theories and research reviewed in this study suggest that there is a distinction between hedonic and eudaimonic feelings, as well as their function. An alternative theory to this is Barbara Fredrickson's Broaden-and-Build theory. In this theory of positive emotions, Fredrickson explains how positive feelings such as joy, interest, contentment, pride, and love, although distinguishable, all share the same function; to broaden a person's momentary thought-action repertoires (TAR). The result of a broadened TAR is the ability to build enduring personal resources. Resources in question ranges from physical, intellectual, social, to psychological. In *Handbook of Emotions* (Fredrickson, 2016, p. 186), Fredrickson states that "hedonia and eudaimonia are not only positively correlated, but aspects of hedonia have been found to prospectively predict and even cause increases in eudaimonia". In other words, whereas Eckblad's (1981) scheme theory and Vittersø's (2022) FWA assume that complex situations or events needed to embrace feelings of eudaimonia, will in fact have a negative effect of hedonic feelings, Fredrickson argues that a correlation between positive hedonic and eudaimonic feelings is obvious. Fredrickson further emphasizes how positive emotions usually occur in non-life-threatening circumstances. This is an important aspect of the Broaden-and-Build theory as the function of negative emotions does not seem to share the same qualities that positive emotions have. In fact, much of Fredrickson's research and reasoning seems to be based on how people perceive negative emotions (Fredrickson, 1998; 2001). Worth noting is that Fredrickson herself specifies that positive emotions can transpire in adverse circumstances (Fredrickson, 2001). This was further examined in Tugade and Fredrickson (2004) research on positive emotions and their effects on psychological resilience, where the examiners found evidence that positive emotions (e.g., interest) could indeed still function in challenging environments. Opposite of positive emotions, the function of negative emotions is to narrow a person's TAR (Fredrickson, 1998). Negative emotions

such as fear, anxiety, anger, and frustration all share the task of constricting and focusing the mind on the stimuli in question, in order to act accordingly (escape, attack, expel). The narrow TAR, as a result of negative emotions, is simply not suitable to nurture the environment to which the building of personal resources is feasible. Incidentally, this opposite effect of negative emotions underlines the function of positive emotions according to Fredrickson (1998; 2001); positive emotions broadens a person's momentary TAR, and thus enables the building of personal resources.

### **Aim of this study**

To further understand the distinction between hedonic and eudaimonic feelings, research was conducted in two separate psychology lectures. The aim of this study is to investigate the relationship between feelings of pleasantness and interest as a function of perceived difficulty across the two psychology lectures. Based on Eckblad's Scheme theory, the following hypothesis were deduced.

**H1** Pleasure is curvilinearly related to assimilation resistance (AR) at low levels of AR.

**H2** Interest is curvilinearly related to AR at high levels of AR.

**H3** The correlations between pleasure and difficulty will be more strongly negative than the correlations between interest and difficulty.

**H4** The correlations between pleasure and interest will be positive but moderate, i.e.,  $r < .50$ .

We also wanted to investigate the following research questions

**RQ1** What are the intraclass correlations (ICC) for the three study variables across the two classes?

**RQ2** What are the cross-lagged regression pattern for the study variables across all eight teaching events for the statistics and the community classes, respectively?

## **Method**

### **Participants**

One-hundred-and-one students were recruited in two separate psychology lectures. Two participants were excluded because of non-completed forms, and one participant did not wish for their data to be included in the study. Out of the ninety-eight participants used in this study, sixty (61%) were recruited in a statistical psychology lecture, and thirty-eight (39%) were recruited in a community psychology lecture. All gave their informed consent to participate, and each participant had the option to decide whether or not they wanted their data included in the study. Other than participating in the psychology lectures, there were no inclusion criteria. Baseline characteristics were not collected for the study.

### **Measures**

For this study, the data was collected using a feelometer (Hetland & Vittersø, 2012). The data was collected one-line, from two separate psychology lectures.

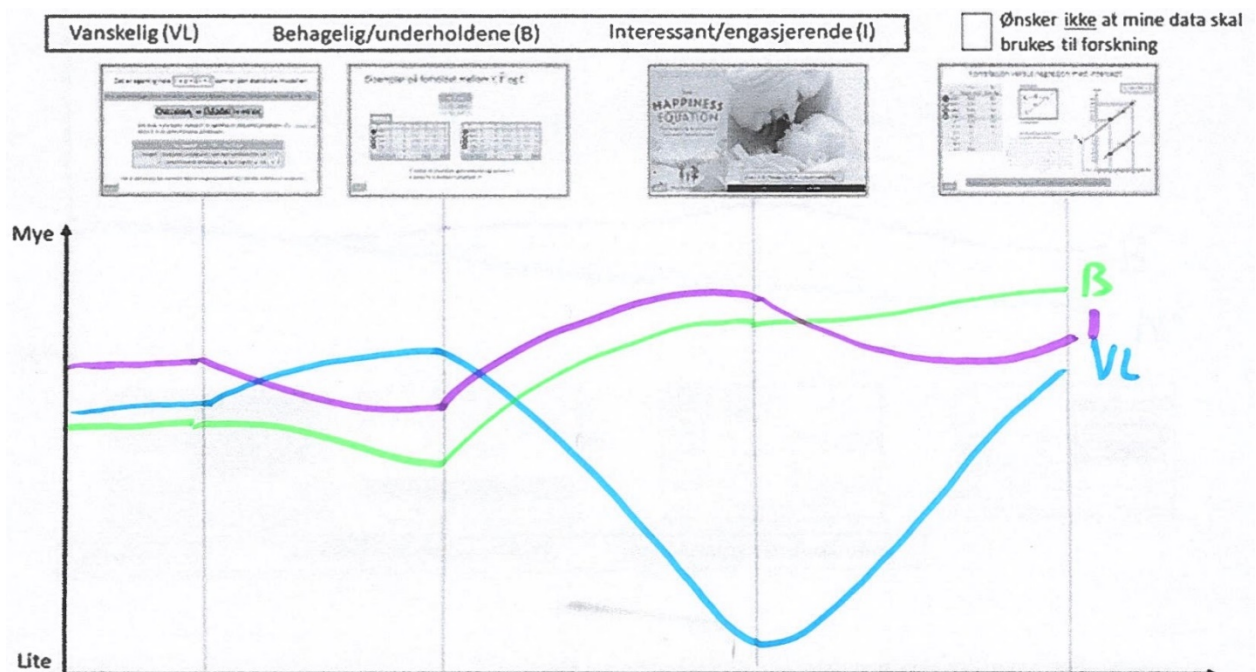
### **Feelometer**

The data from this study were collected using a feelometer (Hetland & Vittersø, 2012). The feelometer is an instrument that allows for the recording of a continuous measurement of emotional experience during a task, in this case the psychology lectures. The Y-axis of the feelometer represents the intensity of emotions, and the X-axis is a timeline of the episode. Included along the X-axis of the feelometer used in this study, were a set of eight pictures, relative to each psychology course. Each picture represented a slide in the PowerPoint presentation used by the lecturer in both the statistical and the community psychology classes, and such represented a specific section of the lecture (see Figure 5).

The Y-axis used in the feelometer of this study measured the intensity of how difficult, pleasant and interesting the participants perceived the lecture, and were visualized by an arrow marked with “little” at the bottom to “a lot” at the top. When measuring the data, all three lines were quantified in millimeters, measured with a ruler at each guideline underneath the pictures of the X-axis. This provided three different reference points at each of the eight pictures, thus creating 24 reference points from each feelometer used. The dependent variables of this study are the experience of *difficulty*, *pleasantness* and *interest* measured in both community psychology and statistical psychology (six variables). The independent variables are each of the eight pictures of the feelometer, representing segments of the lecture, both in community psychology and in statistical psychology.

**Figure 5**

*Completed feelometer used in the community psychology lecture.*



*Note.* Example of a feelometer used in the community psychology lecture, completed with all three lines with blue representing difficult, green representing pleasant and purple representing interesting. Not all feelometers were colorized.

## **Procedure**

The students of the statistical class were, independently of this study, given a handout at the start of every lecture. At the day of the data collection, two separate pages of the handout contained a feelometer, which had been positioned at the appropriate time where the participants were told to complete the feelometers. Participants were instructed how to fill out the feelometer, and told that the feelings represented should include interest, difficulty, and pleasantness. The participants were not given a description of each feeling. When the lecturer arrived at the point of the presentation relevant for the feelometer, the participants were asked to complete the feelometer. The first part of the feelometer were completed in the first part of the lecture, and the second one was completed in the second part of the lecture, after the break. When the lecture was over the students were asked to hand in the feelometers.

In the community psychology class, the participants were handed a sheet of paper with a feelometers on each page. As with the statistical class, the participants were instructed how to fill out the feelometer, and told to include lines for interest, difficulty and pleasantness. As in the statistics class, the participants were not given a description of each feeling. The participants were asked to complete the first page at towards the end of the first half of the lecture, and then asked to put the sheet of paper away. After the break, when the lecturer arrived towards the end of second half, the students were asked to retrieve the sheet of paper and complete the feelometer on the second page. The participants were then asked to hand in the sheets of paper.

## Analysis of Data

The data collected in this study were analyzed using IBM SPSS version 26 and Mplus version 8 (Muthen & Muthen, 1990-2017).

Descriptive statistics, including means, standard deviations and skewness of the study variables were analyzed. The variables were also correlated, and a two-tailed, independent *t*-test was performed to see whether the mean differences between the two classes were significantly different. Variables were also aggregated, and the variable difficult were recoded into a 1-10 scale. Multilevel analyses were conducted for interclass correlation coefficients (ICC) and regression analyses were conducted for pathway models of within-between groups, as well as cross-lagged regression models.

## Results

Table 1 shows descriptive statistics and correlations for the variables used in this study. The variables interesting and pleasant were strongly correlated in the statistical psychology group ( $r = .57, p < .001$ ). Interesting and pleasant were also moderately correlated in the community psychology group ( $r = .48, p < .001$ ). Results from three two-tailed, independent *t*-tests showed the mean differences for difficult, pleasant and interesting were statistically different for the two classes,  $t(741) = 18.47, p < .000$ ;  $t(777.) = -14.20, p < .000$ ;  $t(698.) = -10.04, p < .000$ , respectively.

**Table 1**

*Descriptive statistics and correlations for the statistics class (above the diagonal) and community psychology class (below the diagonal)*

	$M_{stat}$	$SD_{stat}$	$SK_{stat}$	1.	2.	3.
1. Difficult	63.40	28.06	-0.43	1.00	-.28	-.25
2. Pleasant	52.83	26.40	-0.12	-.16	1.00	.57
3. Interesting	60.18	24.33	-0.39	-.28	.48	1.00
$M_{comm}$				29.91	75.38	76.91
$SD_{comm}$				22.38	18.03	21.67
$Sk_{comm}$				1.07	-0.33	-1.02

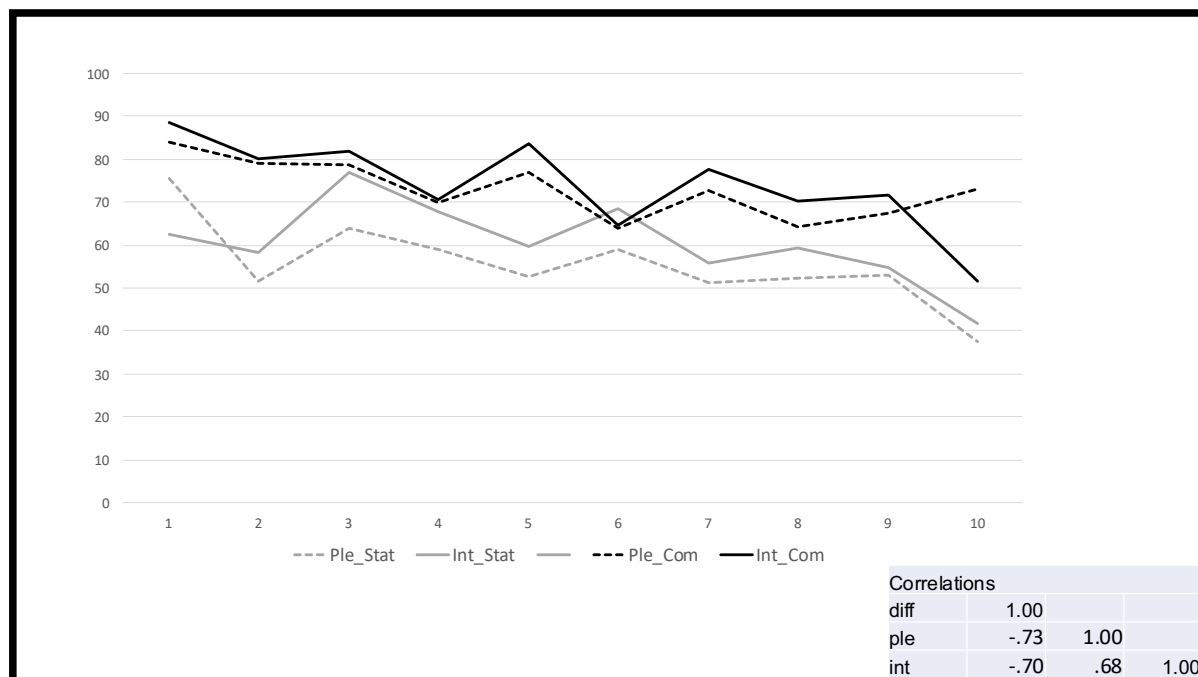
*Note.*  $N = 480$  for statistics class and  $N = 304$  for community psychology class.

Figure 6 illustrates perceived levels of interest and pleasure as a function of perceived difficulty. The data are from an aggregated file, in which the difficulty variable first was recoded into a 1 to 10 scale (using the ranking function in SPSS) and then aggregated to get the mean values of pleasure and interest, respectively, for each difficulty level. Levels of difficulty are displayed across the X-axis, and the mean values for each difficult level are plotted along the Y-axis. Pleasure and interest correlated  $-.73$  and  $-.70$  with difficulty, respectively, in these data, as the average of statistics and community classes. Pleasure and interest correlated  $.68$  with each other (all  $p$ 's  $< .001$ ). The data presented in Table 1 and Figure 6 do not support our first two hypotheses.



**Figure 6**

*Pleasure and Interest Along the Y-Axis and Difficulty Along the X-Axis*



*Note.* Ple\_Stat = Mean pleasure for the statistical class. Int\_Stat = Mean interest for the statistical class. Ple\_Com = Mean pleasure for the community psychology class. Int\_Com = Mean interest for the community psychology class.

### Interclass Correlation Coefficient

Table 2 presents intraclass correlations (ICC) for both the statistical and the community psychology group. The ICC for the difficult variable of the community psychology class ( $ICC = .50$ ) suggest that 50% of the variance in the community psychology variable is between-participants variance. In contrast, the ICC of the difficult variable in the statistics class ( $ICC = .21$ ) indicates that only 21% of the variance is between-participants variance, which suggests that most of the variance (79%) can be attributed to the difficulty of the situation, and not to individual differences in understanding. The difference in ICC for the pleasant variable ( $ICC_{stat} = .32$ ,  $ICC_{comm} = .43$ ) is lower than the differences of the ICC for the difficult variable and, although marginally, suggest that more of the variance observed for

pleasant feelings in the community class comes from differences between students, as compared with the pleasure observed in the statistics class. In other words, more of the pleasure experienced in statistic classes came from how statistics was taught, whereas more of the pleasure experienced in community classes came from differences in students' perceptions of the teaching.

**Table 2**

*Interclass Correlation Coefficient (ICC) of Statistical Psychology and Community Psychology for the Feelometer Variables.*

	Difficult	Pleasant	Interesting
Statistics.	.21	.32	.42
Community.	.50	.43	.29

*Note.*  $N = 480$  for statistics class and  $N = 304$  for community psychology class.

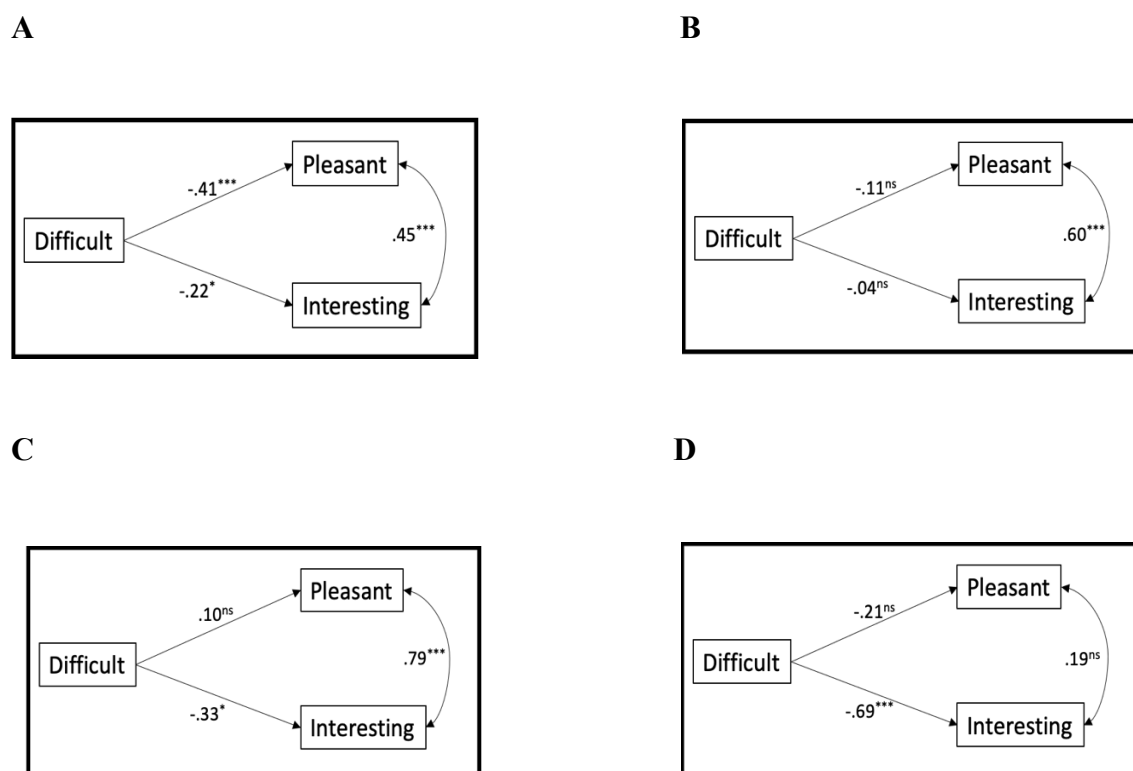
### **Multilevel analysis**

Figure 7A shows a correlational pattern (strictly speaking a standardized regression weight pattern) consistent with Hypothesis 3, because the path from difficulty to pleasant is more negative than the path from difficulty to interest, ( $\beta = -.41, p > .001$ ) and, ( $\beta = -.22, p > .05$ ), respectively. Figure 5B showed a similar tendency, but non-significant and much weaker. Figures 7C and 7D were not consistent with the hypothesis and basically H3 was only partially and weakly supported in the multilevel path analyses. Similarly, H4 was only partly confirmed, since the correlation between pleasure and interest was higher than  $r = .50$  in figures 5B and 5C. The zero-order correlations between the two variables reported in Table 1

were slightly above the cut-off criteria for H4 ( $r = .57$ ) for the statistics class and slightly below for the community psychology class ( $r = .48$ ).

**Figure 7**

*Between-Participants Analysis of Statistics Group (A), Between-Participants Analysis of Community Group (B), Within-Participants Analysis of Statistics Group (C) and Within-Participants Analysis of Community Group (D)*



Note. Figure x A illustrate a greater negative correlation between variables difficulty-pleasure, than difficulty-interest, and in such is the only path model in support of H3.

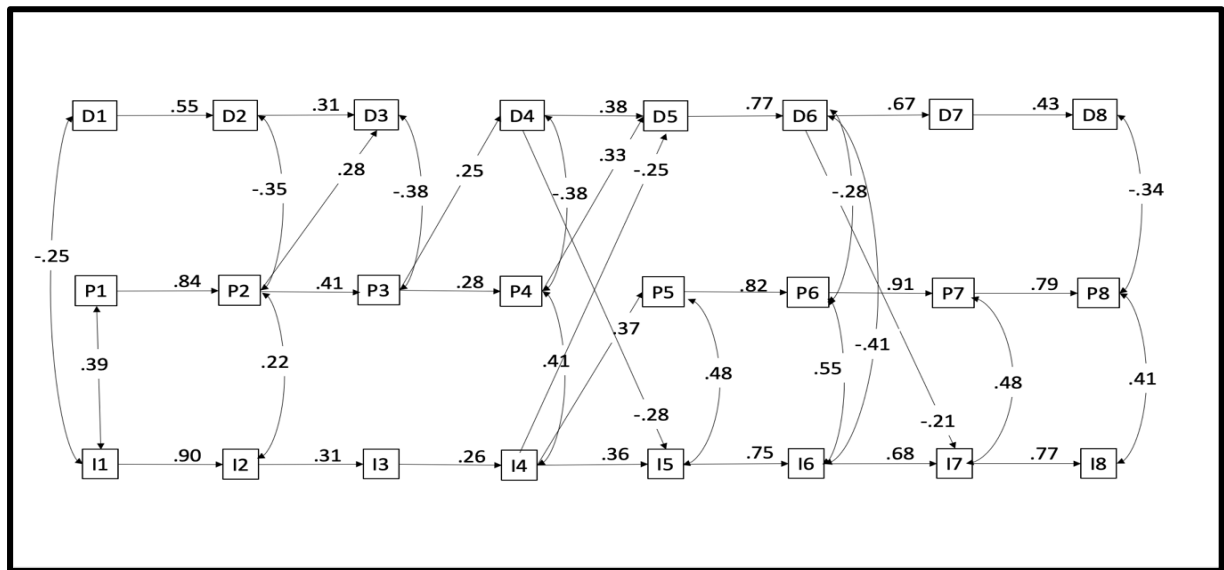
Figure 8a and figure 8b display cross lagged regression model of both statistical (a) and community (a) psychology groups. In general, the strongest correlations were found within the emotions, e.g., variable difficult at T1 (D2) to D3 of the community psychology cross lagged regression model ( $\beta = .94, p = <.001$ ). In the cross lagged regression model for

the community psychology group there seems to be a tendency for there to be moderate correlations between the variable pleasant and the variable interest, with the strongest correlation being between P5 and I5 ( $\beta = .63, p = <.001$ ). In both statistical and community regression models there is a negative correlation between I4 and D5. This is worth noting considering that the first part of the feelometers (emotions 1-4) were completed in the first period, and the second part (emotions 5-8) were completed in the second period.

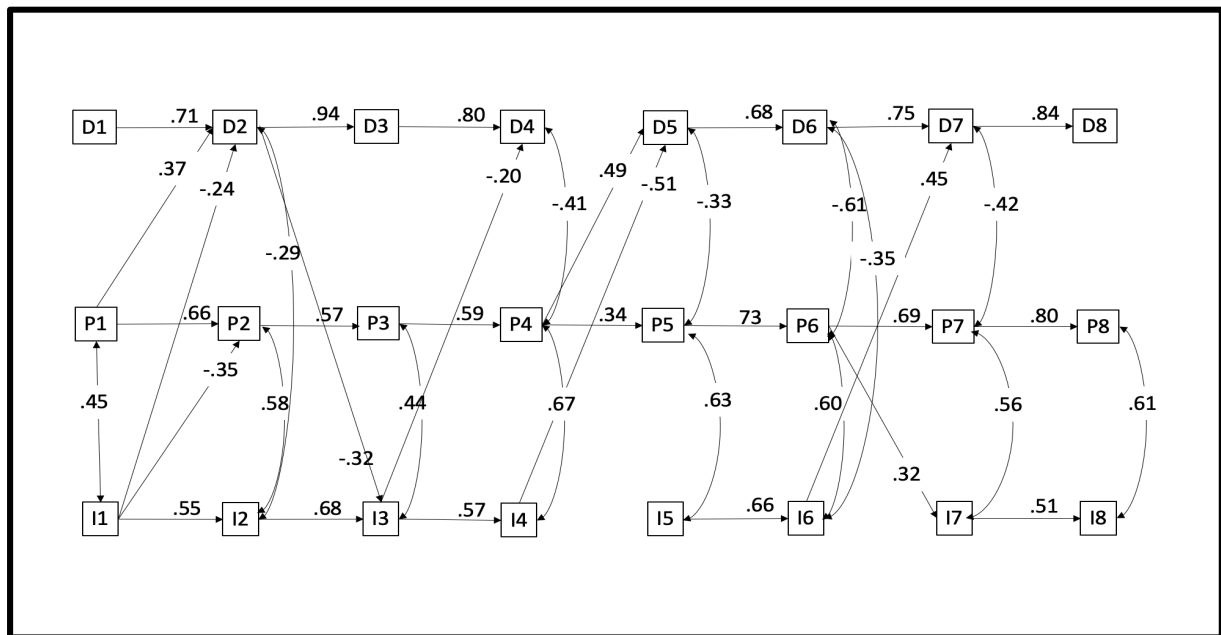
**Figure 8**

*Cross-lagged regression model of both statistical psychology group (A) and community psychology group (B).*

**A**



**B**



*Note:* Both groups illustrate a negative correlation between variables I4 and D5.

Panel plots for all 98 participants’ perceived feelings of interest, difficult and pleasant, in both community group and statistics group are depicted in appendix A – C.

**Discussion**

The findings of our study show a negative correlation between feelings of perceived difficulty and both feelings of perceived pleasure and interest in our zero-order correlations. Support for H4 was found in a strong correlation between reported interest and pleasantness in statistics group but were below cut-off criteria in the correlation between the reported experience of interest and pleasantness in community group. Participants that reported lectures as interesting, also reported the lecture as pleasant, in both the statistical and community groups. Community psychology was however perceived as more interesting and less difficult than the statistics psychology. Results from correlations between pleasure and interest as a function of perceived difficulty in our aggregated file, found that both interest

and pleasantness had a strong negative correlation with perceived difficulty. With this data, pleasure and interest also had a strong positive correlation. The results from our correlational analysis therefore did not find supporting evidence for H1 or H2.

Interclass correlation found that most of the variance observed of the difficulty variable in the statistical group could be attributed to the difficulty of the situation. In other words, most of the participants in this group agreed that this statistics class was difficult. The variance of the reported pleasantness in statistical and community psychology suggest that the pleasure experienced in statistical psychology could be attributed to how the subject was taught. In the community psychology class however the reported experience of pleasure suggests that the pleasure experienced could be attributed to the student's perception of the teaching.

Multilevel analysis of within/between groups of both statistical and community psychology classes all indicated a negative relationship between variables difficult and interesting. The only support for H3 were found in the between-participant statistical group, as there was a greater negative relationship between variables difficulty and pleasant, than difficulty and interest. As such, H3 is only partially confirmed. H4 was also partially confirmed, as correlations between pleasure and interest were higher than  $r = .50$  in both within-participant statistics group and between-participant community group.

Results of our study did not support our hypothesis 1 and 2, and only found weak evidence for hypothesis 3 and 4. The results illustrated a negative relationship between difficulty and both interest and pleasantness. Also, we found positive correlation between feelings of interest and pleasantness, both in the statistical and community psychology classes. Participants in the community psychology class reported higher levels of perceived interest and pleasantness than in the statistical psychology class, but at the same time less

difficulty. According to Eckblad's scheme theory (Vittersø, 2018; Eckblad, 1981), which was the premise for our hypothesis, feelings of interest would be a result of a higher level of perceived AR, in our case manifested as perceived difficulty. According to the scheme theory, feelings of pleasure would be felt at lower levels of AR. Although our participants reported low levels of difficulty and high levels of pleasantness, they also reported high levels of interest. Interest, according to Eckblad, is typically felt at much higher levels of AR (Eckblad, 1981). Higher levels of perceived AR, above the peak of pleasantness, would in theory lead to a negative correlation between AR and pleasantness, and such perceived pleasantness would decrease as perceived interest would increase (see figure X).

The incoherence between our results and our hypothesis can be further examined using Vittersø's research on hedonic and eudaimonic wellbeing. According to the FWA (Vittersø, 2018; 2020) there is a clear distinction between hedonic feelings and eudaimonic feelings, with the main difference being that eudaimonic feelings are much more complex and harder to conceptualize than hedonic feelings. According to Vittersø, the function of hedonic feelings (in our case pleasantness) is to regulate stability. A challenging situation or stimuli is more likely to be accompanied by eudaimonic feelings of interest and engagement. In fact, the overcoming of a challenge need not be experienced as pleasant at all. When measuring facial expression, in combination with self-reports of feelings, mountain bikers have shown that challenging events often lead to a decrease in hedonic feelings, such as pleasantness or happiness, as well as an increase in eudaimonic feelings such as interest, during a challenging task (Hetland, Kjelstrup, Mittner & Vittersø, 2019) The idea that challenging stimuli or situations are associated with eudaimonic feelings is further supported in Løvoll and Vittersø's (2014) research on the balance between challenge and skill. In this research, hedonic feelings such as pleasantness, happiness and satisfaction were associated with skill, and eudaimonic feelings such as interest, engagement, and enthusiasm were

associated with challenge. The researchers found that when challenge and skill were balanced, situations could be perceived as slightly boring or non-interesting. In other words, in order to experience eudaimonic feelings of interest, the situation seems to be required to be somewhat challenging. The data of our study however found rather opposite results, as feelings of interest and pleasantness were highly correlated in our community and statistical psychology class. Furthermore, participants of the community psychology class reported lower levels of perceived difficulty. Again, this is contrary to the theory of FWA, as well as the findings of Løvoll and Vittersø (2014), which would assume that interest would be perceived as a result of a challenging situation, and that high levels of reported pleasantness, as well as low levels of reported difficulty would in fact produce low levels of reported interest.

### **Possible reasons for disaccording results**

As presented above, our results did not find evidence in support for H1 and H2, and only partially confirmed H3 and H4. One explanation to this might be found by examining the conditions under which our data was collected. The assumption I am making, is that the measurement of, and the relationship between the feelings used in our study might not be representable for what we typically feel during a psychology lecture. In Eckblad's (1981) problem-solving study, participants were presented with the specific task of solving eight different problems of varying complexity. Arguably, the required level of activity for solving a problem, such as in Eckblad's study, rely on a fully focused perception on the task at hands, presumably higher than what would be required for tending a psychology lecture. Also, with varying levels of difficulty, it is natural to assume that perceived difficulty would have a direct impact on perceived interest and also pleasantness. Although perceptions of difficulty and interest arguably are relatable to learning environments, the feeling of pleasantness might



not be what we typically associate with college lectures. This raises the question of whether or not the pleasantness the participants reported actually derived from their experience of the lecture, or if it might have been influenced by other factors. Reported feelings of interest could also in theory have been affected as it is possible that it is the individual differences in the participants subjective interest for the subject that determines the participants' reported interest. As such, Teigen (1985) made the assumption that differences in student populations' interest might be influenced by individual motives for undertaking the given subject. Some students' interest might be influenced by a wish to acquire knowledge within their chosen field, while others might be influenced by other external goals, such as the desire to achieve good grades, or career ambitions. Worth noting is that the results of our ICC however indicated that interest was a result of the lecture being interesting, and not the individual differences in participants' interest.

### **Research in support of our findings**

Although we did not find supporting evidence for our hypothesis, some psychological theories of emotions could be used to explain our findings. The zero-order correlation between interesting and pleasantness in the statistical and community psychology classes, as well as lower levels of reported difficulty in the community psychology class could be reasonable findings according to Fredrickson's (1998) Broaden-and-Build theory. Both feelings of interest and pleasantness would indeed share the function of broadening people's momentary thought-action repertoires, which in turn would contribute to building physical, intellectual, social, and psychological resources. Fredrickson (2016) express how hedonia (defined as pleasant experiences), are positively correlated with eudaimonia, and found to predict and even cause increases in eudaimonia. This idea fits well into the positive correlation we found between feelings of pleasantness and interest. The results yielded from

the community psychology class of this study further fits in to Fredrickson's (1998; 2001) theory of emotion, considering that the participants generally reported a low level of perceived difficulty. According to Fredrickson, feelings of interest, as with other positive emotions, are mostly prominent during non-threatening situations. Higher levels of difficulty would according to Fredrickson have the opposite effect on a person's TAR, and would instead constrict and narrow the process needed in order to feel positive emotions such as interest. Tugade and Fredrickson (2004) found evidence for this in their study of positive emotions and their effect on psychological resilience. Participants presented with higher levels of negative emotions (e.g. threat) reported feeling less interested, than participants with lower levels of negative emotions. Again, this is consistent with the findings of our study, as participants of our statistical psychology class reported higher levels of difficulty than in the community psychology class, but also lower levels of pleasantness and interest. As it seems, Fredrickson's Broaden-and-Build theory, makes a fitting theoretical framework for the results of our study, with emphasis on the positive correlations found between pleasure and interest.

### **Limitations and future research**

The sample used for this study consisted of psychology students participating in two separate psychology classes - statistical and community psychology, respectively. The variation of our sample, therefore, is limited towards psychology students, and so, should be taken into account when considering generalization and transferability. Although the students were given instructions on how to fill out the feelometers used in this study, the participants were not given a description of the feelings being measured. This could prove to have alterations, as feelings such as pleasantness could be misinterpreted. Participation were voluntary, and every participant gave their informed consent to partake in the study, the students were not made aware that there would be a study performed until the beginning of

the lectures. The true motivation for participating in the study could therefore be biased towards students feeling obligated, or considering the study as part of the course, both of which could have an impact on the final results of the study. The feelometers used in this study were filled out by each participant during both psychology lectures, in classrooms where the students naturally would be seated next to each other. The possibility that participants responded in a way they would believe to be more desirable, so-called social desirability bias, is therefore more likely to have occurred than if the participants were to fill out their forms in less transparent environments (Zerbe & Paulhus, 1987).

Research and literature within the field of positive psychology have given us insight in the function of hedonic and eudaimonic feelings, but questions such as whether or not well-being is dependent on both remains debated. Future research would therefore be highly valuable.

### **Conclusion**

What is it about complexity, challenge and difficulty that is so appealing to humans? Research it seems, have deducted that when we are presented with something difficult and complex, we experience positive feelings such as interest, engagement, and immersion. Based on previous research, we wanted to expand on existing literature considering the relationship between difficulty and hedonic and eudaimonic feelings. We theorized that interest would be perceived at higher levels of difficulty, and pleasantness at lower levels of difficult. In short, our results did not give us any support for our hypothesis. In fact, much of our data seemed to suggest opposite of our predictions. This is however, only an analogy to the complexity of the field of positive psychology, but as it seems, people rather like complexity..

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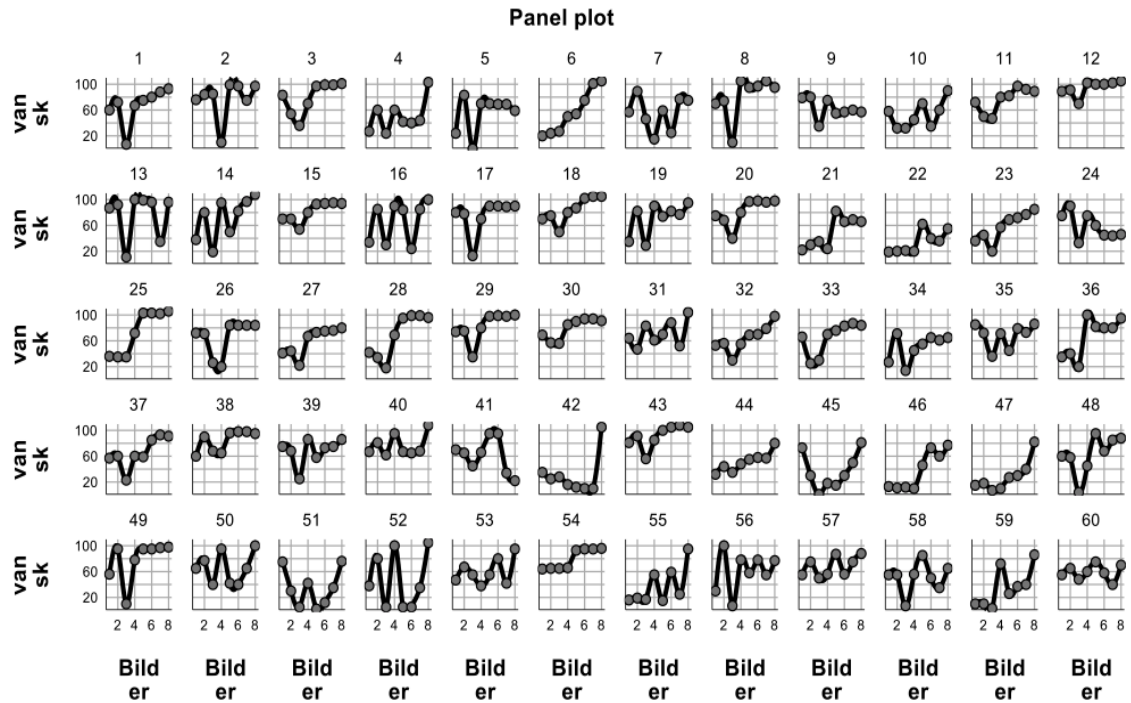
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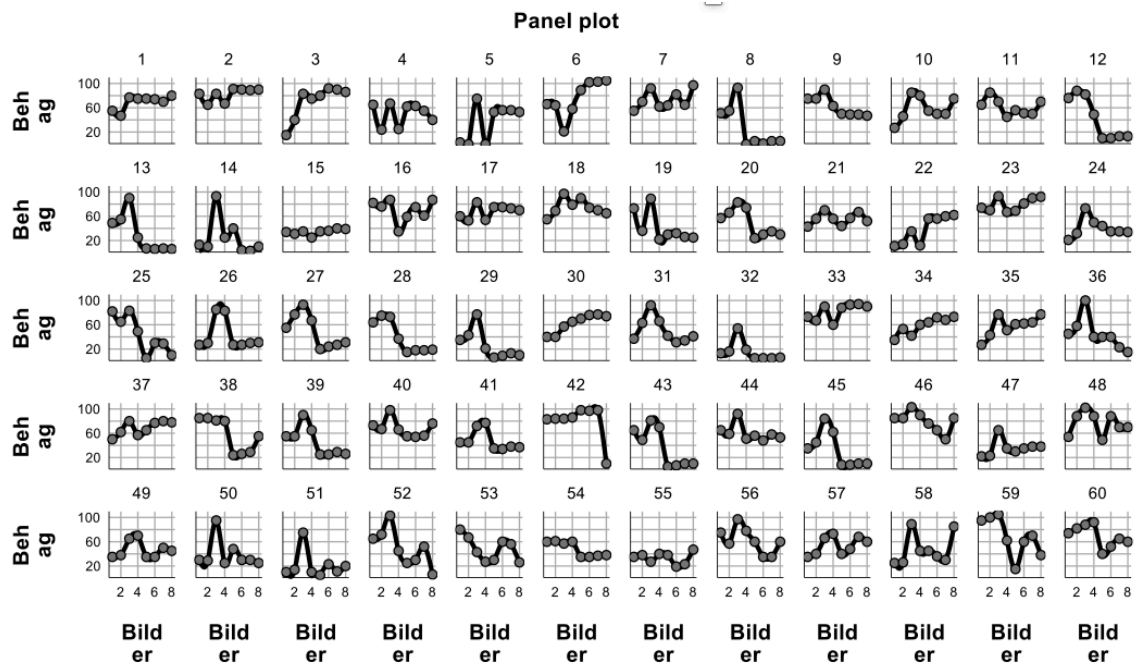
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Appendix A

Panel plot for reported difficulty for all participants in statistical class

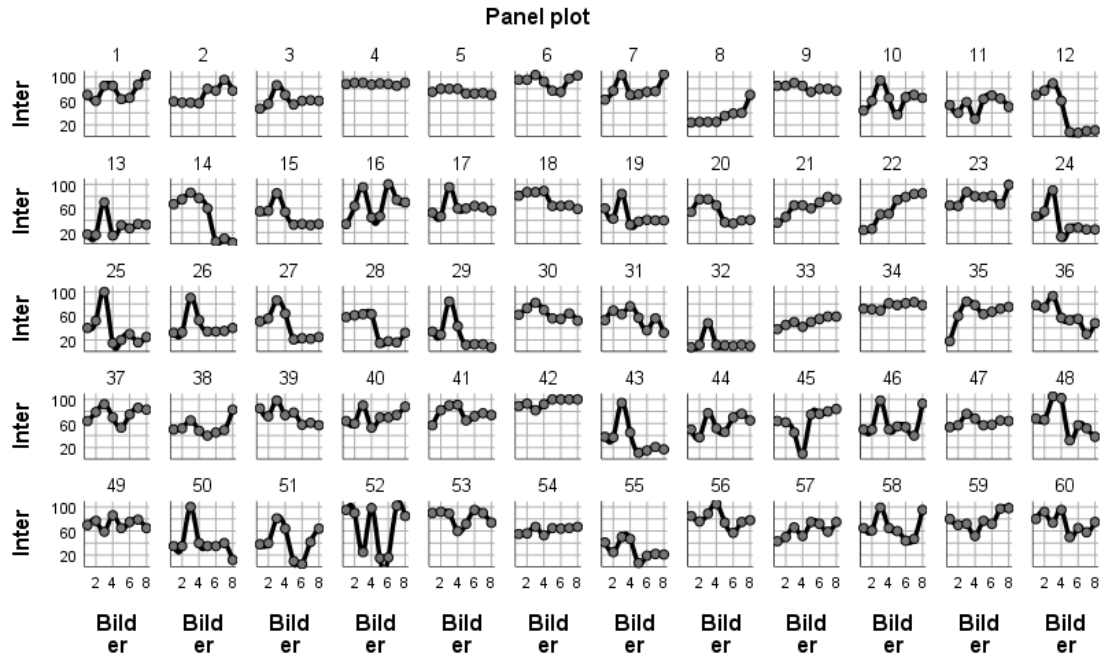


Panel plot for reported pleasantness for all participants in statistical class

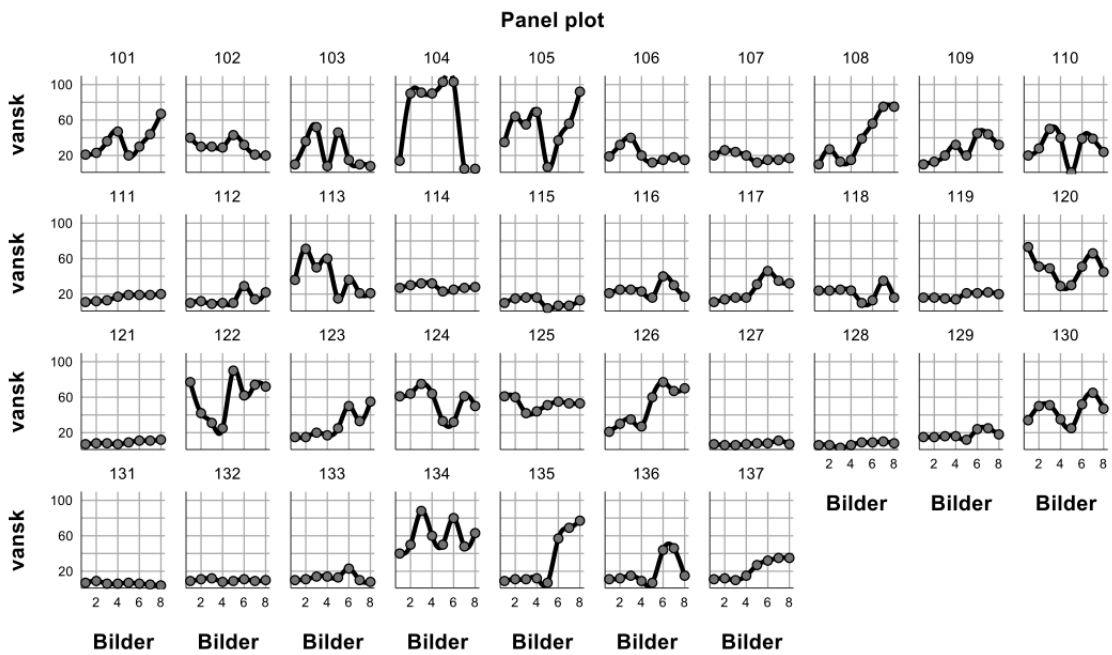


Appendix B

Panel plot for reported interest of all participants in statistical class



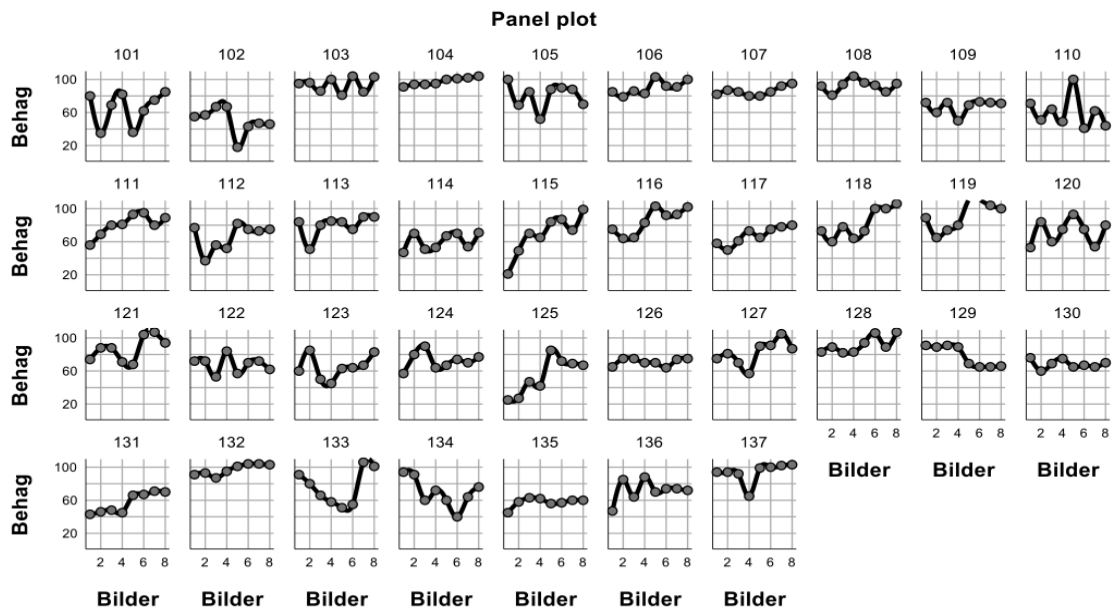
Panel plot for reported difficulty of all participants in community class





Appendix C

Panel plot for reported pleasantness of all participants in community class



Panel plot for reported interest of all participants in community class

