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**Fit Forecasts of Interests, Skills and Expectations in Online-Self-Assessments for
Decision-Making, Well-Being and Achievement in Educational Pathways**

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Don't go into the steppe as a penguin. Take small steps and find your water. And then:

jump! And swim

~inspired by Dr. Eckhart von Hirschhausen

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Contributions Based on This Dissertation

The dissertation contains a research program that has been published or prepared for publication as follows.

- Merkle, B., Schiltenswolf, M., Kiesel, A. & Dickhäuser, O. (2021). Entwicklung und Validierung eines Erwartungs- und Interessenstests ($E \times I$ – Test) zur Erkundung studienfachspezifischer Passung in einem Online-Self-Assessment. [Development and validation of an Expectation-Interest Test ($E \times I$ - Test) to explore fit for a specific major in an online self-assessment]. *Zeitschrift für empirische Hochschulforschung: ZeHf*, 5(2), 162–183. <https://doi.org/10.3224/zehf.5i2.05>
- Merkle, B., Messerer, L. A. S. & Dickhäuser, O. (2024). Will I be happy in this major? Predicting intrinsic motivation and subjective well-being with prospective students' well-being forecast and interest-major fit forecast. *Social Psychology of Education*, 27(1), 237–259. <https://doi.org/10.1007/s11218-023-09835-6>.
- Merkle, B. & Dickhäuser, O. (2024). *Objective major-specific fit forecasts regarding interests, skills, and expectations predict motivation, choice and success in a major* [Manuscript submitted for publication]. School of Social Sciences, University of Mannheim.

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Summary

Choosing an educational path is a difficult life decision that can lead to unfavorable outcomes when it goes wrong. In the context of choosing a field of study (*study major*), an increasing number of students enter higher education with an undeclared major (Eagan et al., 2016), more than 20% of students are not satisfied with their studies (Wong & Chapman, 2023), about 30% change their major (NCES, 2017), and about one-third even drop out of their studies (OECD, 2018). Drop-outs cite the study major not meeting their needs or interests, or being too difficult as one of the top reasons (Eurostat, 2018). Therefore, it seems important to better understand study major choice processes which potentially lead to success within the respective major (*major-specific success* in short also referred to as *success*), potential biases in these processes and how these biases could be reduced to foster major-specific success.

Combining theories on *Person-Environment Fit* (e.g., Le et al., 2014) and the *Expectancy-Value Model of Achievement-Related Choices* (Eccles et al., 1983; Guo et al., 2015), I argue that prospective students' expectations in general, and specifically prospective students' subjective estimations of their fit and success within a specific future study major (*subjective major-specific fit and success forecasts* in short also referred to as *subjective forecasts*) should play a role for their motivation to choose a major, their actual choice and consequently their success. Drawing from theories of *Affective Forecasting* (e.g., Wilson & Gilbert, 2003), I argue that prospective students' expectations of the future major can be wrong and subjective forecasts can be assumed to be biased in the prediction of success (e.g., by prospective students' wrong expectations of the study major) which could lead to biased study major choice processes and consequently less success. Assessments of prospective students' interests or skills in specific content that represents a valid construal of the respective study major (*objective major-specific fit forecasts* in short

also referred to as *objective forecasts*¹) can be assumed to be less biased in predicting success because they are by definition based on an empirically supported predictor for later success (e.g., interest-major fit, skill-major fit; Etzel & Nagy, 2016) and they assess this factor objectively based on a valid construal of the respective major (e.g., content and demands of the major based on expert estimates). Therefore, one central asset of objective forecasts is that they can be assumed to be less biased than subjective forecasts in predicting success. Additionally, objective expectation-major fit, defined as the discrepancy between students' expectations and the actual content of the respective major (based on expert estimates), was linked to study satisfaction (Hasenberg & Schmidt-Atzert, 2013). I argue that in addition to these discrepancies (higher/lower amount of specific content than expected), the valence (e.g., extent to which a prospective student likes or dislikes a specific content) of these discrepancies needs to be considered because it should determine whether discrepancies predict later positive surprises or disappointment, which should play a role for later success. Furthermore, drawing from Merkle, Bürkle et al. (2024) and *Cognitive Dissonance Theory* (Festinger, 1957; McGrath, 2017), I argue that objective forecasts, when displayed in feedback to prospective students, beyond their subjective forecasts can be assumed to lead to a less biased study major choice process and more success.

While many studies show the predictive validity of objective skill-major fit forecasts for later study success (major-specific admission tests, e.g., Julian, 2005), only a few studies have shown that objective forecasts can relate to motivation (expectation-major fit: e.g., Karst et al., 2017) and choice of a study major (skill-major fit: Niessen et al., 2016). However, none of these studies investigated the predictive value of objective

¹ Since prospective students' "fit" in the context of study and career choices already implies a prospective assessment for future situations, the term "forecast" in this specific context is redundant. Therefore, in the attached manuscripts the terms "fit" and "fit forecast" were used as synonyms.

forecasts beyond subjective forecasts. And none investigated the role of objective forecasts, when displayed in feedback to prospective students, for motivation and choice beyond subjective forecasts. Additionally, while methods for assessing objective skill-major fit forecasts are well-established (e.g., Watrin et al., 2022), research on tests for objective interest-major fit forecasts and objective expectation-major fit forecasts is scarce (with notable exceptions, like Messerer et al., 2020) and this research does not consider the objective *valence* of expectation-major fit forecast.

Hence, the goals of my dissertation program are (1) to develop an assessment for objective forecasts regarding interest-major fit and the valence of expectation-major fit (2) to establish the predictive value of subjective forecasts for success (3) to establish the predictive value of objective forecasts regarding interest-major fit, skill-major fit and the valence of expectation-major fit for success beyond subjective forecasts (4) to establish the role of objective forecasts, when displayed in feedback to prospective students, for study major choice processes beyond subjective forecasts and the role of feedback on objective forecasts for success.

Concerning the first goal, my co-authors and I developed an assessment for objective major-specific fit forecasts to be able to test the following hypotheses. Concerning the second goal, we tested whether higher subjective major-specific fit and success forecasts predict higher major-specific success. Concerning the third goal, we tested whether higher objective major-specific fit forecasts predict higher major-specific success beyond subjective forecasts. Concerning the fourth goal, we tested whether higher objective major-specific fit forecasts, when displayed to prospective students before enrollment in a feedback, beyond subjective forecasts predict higher motivation to choose the respective major, higher likelihood of choosing the respective major and whether assessment and feedback of objective forecasts is associated with higher major-specific success compared to no such assessment and feedback.

As important methodological preparatory work to be able to test these hypotheses, we developed an online-self-assessment to assess and feedback objective forecast, using the example of the bachelor's degree in psychology (Manuscript 1). Afterwards, we conducted an ecologically valid longitudinal field study, in which we observed over 4000 prospective students using the online-self-assessment in their study decision process. Of these prospective students, over 500 students subsequently entered the psychology major and took part in at least one of the three annual accompanying student survey waves we conducted including students from the first up to the fifth semester. Additionally, we surveyed over 200 students who did not receive feedback.

Overall, as hypothesized, higher subjective major-specific fit and success forecasts predicted higher major-specific success. These results support the assumption that subjective forecasts to some extent are valid predictors for success (Manuscript 2). Additionally, higher objective major-specific fit forecasts predicted higher major-specific success beyond subjective forecasts. These results support the assumption that objective forecasts are possibly less biased than subjective forecasts in predicting success (Manuscript 2, Manuscript 3). Furthermore, as hypothesized we found that higher objective major-specific fit forecasts when displayed to prospective students in feedback related to higher motivation to choose the respective major and a higher likelihood of actual enrollment beyond subjective forecasts. Additionally, students who received feedback regarding their objective major-specific fit forecasts before enrollment experienced higher success compared to students who received no feedback. These results support the assumption that objective forecasts displayed in feedback to prospective students could possibly relate to less biased motivation, less biased choices and more success (Manuscript 3). In sum, this dissertation underlines the potential of objective major-specific fit forecasts in online-self-assessment beyond subjective major-specific fit and success forecasts for fostering successful study major choice processes.

Dissertation Outline and Overview

The present research program consists of three manuscripts including empirical data from an ecologically valid field design accompanying over the period of three years multiple cohorts of more than 4000 prospective students in their transition to university with three annual student surveys at five different universities. Two of the manuscripts are already published in peer-reviewed journals. The third paper is currently submitted for publication. My overarching goal in this dissertation is to explain and support fit-oriented forecasting processes in the study major choice context to foster major-specific success. Therefore, this dissertation integrates existing theories on major-specific success, study major choice and affective forecasting (biases) to address the research goals of my dissertation program (1) to develop an assessment for objective forecasts regarding interest-major fit and the valence of expectation-major fit (2) to establish the predictive value of subjective forecasts for success (3) to establish the predictive value of objective forecasts regarding interest-major fit, skill-major fit and the valence of expectation-major fit for success beyond subjective forecasts (4) to establish the role of objective forecasts, when displayed in feedback to prospective students, for study major choice processes beyond subjective forecasts, and the role of feedback on objective forecasts for success.

In this synopsis, I will first introduce in more detail the general research goals and hypotheses of this research program as well as underlying theoretical considerations, in chapter 1, which consists of several sub-chapters. In the first sub-chapter, grounded in the *Person-Environment Fit Theory*, I elaborate on the determinants of major-specific success. In the second sub-chapter, based on theories of *Affective Forecasting*, I discuss subjective forecasts' potential value and potential biases in the prediction of major-specific success, namely intrinsic motivation and well-being (Goal 2). In the third sub-chapter, I start by introducing the concept of objective major-specific fit forecasts to argue how biases in the

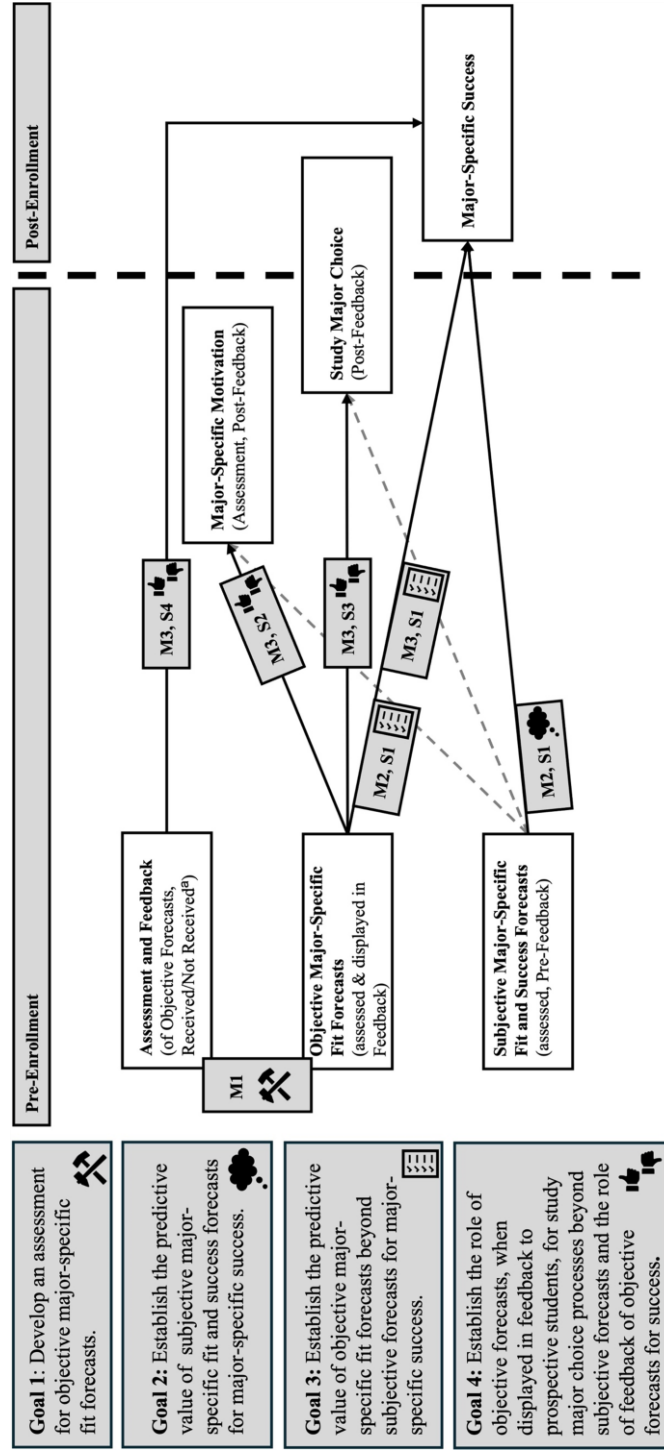
forecasting process of intrinsic motivation and well-being can potentially be reduced, followed by an extension of this argumentation on further predictors and indicators of major-specific success (Goal 3), and I end with a clarification on how objective major-specific fit forecasts can be assessed (Goal 1). After addressing the predictive value of objective forecasts beyond subjective forecasts for success and their potential assessment, in the next chapters I elaborate on the role that objective forecasts might play in the study major choice process when they are assessed and displayed in feedback to prospective students. Therefore, in sub-chapter 4, grounded in the *Expectancy-Value Model of Achievement-Related Choices*, I explain determinants of academic choices. Combining the *Expectancy-Value Model* with *Person-Environment Fit Theory* and *Forecasting Theory* in the fifth sub-chapter, I discuss fit-oriented study major choice processes which potentially lead to success and additionally potential biases in these study major choice processes which might hinder success. In the sixth sub-chapter, based on the *Cognitive Dissonance Theory*, I elaborate on the role of objective forecasts in study major choice processes. Integrating all aforementioned theories, I discuss how objective forecasts can be assumed to support fit-oriented processes by potentially reducing the aforementioned biases and thereby can be assumed to foster success (Goal 4). Based on the theoretical reasoning of the previous six sub-chapters in the seventh sub-chapter, I summarize the research goals and hypotheses of my research program in this dissertation.

In Chapter 2, I present the manuscripts including the empirical studies which represent the core of my dissertation. An overview of the studies in the manuscripts mapped to the associated goals is provided in Figure 1.

Figure 1

Graphical Overview of the Research Program on the Role of Objective Major-Specific Fit Forecasts Beyond

Subjective Forecasts for Study Major Choices and Success



Note. Studies in the Manuscripts Mapped to the Associated Goals. M = Manuscript; S = Study. Black lines represent hypotheses in the studies while dashed grey lines represent controls in the studies.

^a Receiving Assessment and Feedback was coded as 1, while not receiving assessment and feedback was coded as 0.

The first sub-chapter addresses Manuscript 1 and details the development of the assessment and feedback of objective major-specific fit forecasts as important conceptual preparatory work for testing my hypotheses (Goal 1). Sub-chapter 2 presents Manuscript 2 in which we tested whether prospective students' subjective major-specific fit and success forecasts assessed before enrollment predicted their major-specific intrinsic motivation and well-being in the first semester (Goal 2). Additionally, we examined whether prospective students' objective interest-major fit forecast assessed before enrollment predicted their major-specific intrinsic motivation and well-being in the first semester beyond prospective students' subjective forecasts (Goal 3). In sub-chapter 3 dedicated to Manuscript 3 we replicated the findings from Manuscript 2 and extended them in three ways: additional objective forecasts regarding skill-major fit and the valence of expectation-major fit, additional major-specific success outcomes, namely dropout intention and achievement, additional sample, namely third semester students (Goal 3). Further, we tested whether objective major-specific fit forecasts when assessed and displayed in feedback can predict motivation to choose and choice of a study major beyond subjective forecasts. And we examined whether students who received feedback regarding their objective forecasts before enrollment are more successful compared to students who did not receive such feedback (Goal 4).

Chapter 3 includes the overarching discussion of this dissertation. First, I provide an overall summary of the findings of the dissertation studies and elaborate on the associated theoretical implications (sub-chapter 1). I then discuss boundary conditions together with limitations and strengths of my research program (sub-chapter 2) and related future research directions (sub-chapter 3). Finally, I elaborate on practical implications (sub-chapter 4) before I end with an overall preliminary conclusion (sub-chapter 5). The following sections will focus on the parts of the manuscripts relevant for the central research questions of the dissertation. Therefore, the following sections can partly overlap

with the manuscripts. Further specifics of the conducted studies, such as sub-questions and methodological details, can be found in the individual manuscripts. The individual manuscripts with supplemental materials can be found in the attachment.

General Introduction

Choosing an educational path is a crucial life decision that poses a significant challenge for many students. For instance, in the context of choosing a field of study (study major), more than a quarter of prospective students report difficulties because they are unsure about their interests, more than 30% are unsure about their skills (Heine et al., 2010) and an increasing number of students enter higher education with an undeclared major (1966: 1.7%; 2015: 8.9%; Eagan et al., 2016). Further studies indicate that this is not just a matter of uncertainty; prospective students' doubts may sometimes be valid, as decision processes can also lead to failure² rather than success. Over 20% of students report not being satisfied with their studies (Wong & Chapman, 2023). Around 30% change their major (NCES, 2017), and about one-third drop out entirely (OECD, 2018). Further studies found that some of the top reasons students reported for dropping out are false expectations regarding the study major, unmet needs or the fact that the major was too difficult (Eurostat, 2018; Heublein et al., 2010).

This issue presents challenges at multiple levels. For example, on a societal level, providing study spots at universities costs taxpayer money. While students study and have not entered the workforce yet, there are additional opportunity costs due to foregone tax revenues. For higher education institutions, student dropout rates can directly impact their financial stability, as they often rely on funding tied to student retention (Grunschel & Dresel, 2021). Finally, at the individual level, a lack of study success is associated with

² Success/Failure is here used as a term for the presence/absence of study success in terms of intrinsic motivation, well-being, achievement or staying in the major. The term *failure* may seem to imply a normative evaluation that this is generally undesirable. To be clear, I use the term failure simply to denote the failure to choose a study major in which one will be motivated, satisfied, perform well and stay committed. Whether the choice of this very major is considered a personal failure from the subjective perspective of the students or as an important life experience (e.g., because it made them grow on a personal level independent of receiving a degree) shall remain in their personal subjective evaluation of their life.

more mental health problems and a worse economic situation for students later on (Davies & Elias, 2003; Faas et al., 2018). This highlights the importance of improving the study major selection process³.

The study major selection process can be approached from two perspectives. Often, there is an external selection step conducted by higher education institutions, typically based on prior academic performance, specific skill tests, and/or relevant practical experience (Dickhäuser et al., 2022; Janke & Dickhäuser, 2018). However, this selection step occurs at a stage when the decision-making process of prospective students is already well advanced, and substantial effort and costs for both individuals and institutions have already occurred or might occur later (e.g., participation in admission tests with costs, processing of not suitable applications, lack of study success). Therefore, it would be an important gain if prospective students successfully self-select before the external selection during their study major choice process. For instance, it would increase the base rate of suitable candidates applying for the study major and allow prospective students to reorient themselves earlier, to directly apply to a (more) suitable major and thereby to save time and money for themselves, institutions and society (Gleeson et al., 2014). Because individuals can consider a wider range of factors in their self-selection process (e.g., their interests) than institutions do, additional self-selection should make a successful selection of a major more likely. However, while this freedom in the study major choice process provides opportunities, it also presents a challenge: how can prospective students in their study major choice process be supported, so that they focus on factors relevant for their

³ Higher education systems differ across countries. In some systems, students must choose their major before enrollment, with the state covering much of the cost of a study spot (e.g., Germany). In others, an orientation phase allows students to explore fields before deciding, and the individual bears most of the cost (e.g. US federal states). While the timing of study major selection and the amount and distribution of costs associated with a lack of study success vary between systems, a decision is ultimately required in all systems, and incorrect or delayed choices come with costs. Therefore, supporting students in selecting their major is important in every system, though especially in those where decisions are made earlier.

later success within the specific major (*major-specific success* in short also referred to as *success*)? And what are these relevant factors that can predict major-specific success even before enrollment, and predict major-specific success better than prospective students might do on their own? To answer these questions, it seems important to better understand study major choice processes which potentially lead to major-specific success, potential biases in these processes and how these biases could be reduced to foster major-specific success.

Combining theories on Person-Environment Fit (e.g., Le et al., 2014) and the Expectancy-Value Model of Achievement-Related Choices (Eccles et al., 1983; Guo et al., 2015), I argue that prospective students' expectations in general, and specifically prospective students' subjective estimations of their fit and success within a specific future study major (*subjective major-specific fit and success forecasts* in short also referred to as *subjective forecasts*) should play a role for their motivation to choose a major, their study major choice and consequently their success. Drawing from theories of Affective Forecasting (Wilson & Gilbert, 2003), I argue that these subjective forecasts can be assumed to be biased in predicting success (e.g., by prospective students' wrong expectations of the study major) which could lead to biased study major choice processes and consequently less success. I further argue that assessments of prospective students' interests or skills in specific content that represents a valid construal of the respective study major (*objective major-specific fit forecasts* in short also referred to as *objective forecasts*) can be assumed to be less biased in predicting success. This is because they are by definition a) based on an empirically supported predictor for later major-specific success (e.g., interest-major fit, skill-major fit) and b) they assess this factor objectively based on a valid construal of the respective major (e.g., content and demands of the major based on expert estimates). Therefore, one central asset of objective forecasts is that they can be assumed to be less biased than subjective forecasts in predicting success. Additionally,

objective expectation-major fit, defined as the discrepancies between students' expectations and the actual content of the respective major (based on expert estimates), was linked to study satisfaction (Hasenberg & Schmidt-Atzert, 2013). I argue that in addition to these discrepancies (higher/lower amount of specific content than expected) the valence (e.g., extent to which a prospective student likes or dislikes a specific content) of these discrepancies needs to be considered. The valence should determine whether discrepancies predict later positive surprises or disappointment, which should play a role for later success. Additionally, drawing from Merkle, Bürkle et al. (2024), I argue that displaying objective forecasts (assumed to be less biased in predicting success than subjective forecasts) in feedback to prospective students should lead to a less biased study major process and consequently more success. Therefore, a second central asset of objective forecasts is that they can be assumed to lead to a less biased study major choice process when they are displayed in feedback to prospective students beyond subjective forecasts and consequently should lead to more success.

Research so far has largely focused on predicting study success *independent of the respective study major* (e.g., Respondek et al., 2017; Steel et al., 2008). Less research has focused on fit factors targeting a *specific study major* and thus having the potential to predict *major-specific success* (e.g., Etzel & Nagy, 2016). However, this focus is essential for guiding students in choosing a specific study major, rather than merely helping them answer the more general question of whether they should pursue higher education at all (in any major). The existing research regarding major-specific fit showed that a fit between students' interests/skills and the content/demands of the study major (Etzel & Nagy, 2016; Messerer, Merkle et al., 2023) as well as realistic expectations (Hasenberg & Schmidt-Atzert, 2013) were related to more study success. However, these findings stem from students who had already chosen their major and started their studies. Thus, it remains unclear whether objective interest-major fit *forecasts* and the objective valence of

expectation-major fit *forecasts* already measured *before entering* a study major predict later major-specific success and thus could be useful to guide prospective students' study major decision-making process. Regarding objective skill-major fit forecast, many studies show its predictive validity for later study success (e.g., major-specific admission tests; Julian, 2005; Niessen et al., 2016). However, none of these studies investigated the predictive value of objective forecasts *beyond subjective forecasts* for success.

Regarding the role of objective major-specific fit forecasts in the *study major choice process* only a few studies have shown that objective major-specific fit forecasts relate to *motivation for a major* (objective expectation-major fit forecast; Karst et al., 2017; Merkle, Bürkle et al., 2024) and *choice of a study major* (objective skill-major fit forecast; Niessen et al., 2016). However, again none of these studies investigated the role of objective forecasts, when displayed in feedback to prospective students, for motivation and choice *beyond subjective forecasts*.

However, while the assessments of objective skill-major fit forecasts is a long-established field (e.g., Watrin et al. 2022), for the development of interest-major fit and expectation-major fit forecast tests there exists little research and the existing one (Messerer et al., 2020) assessed (*absolute*) *expectation discrepancies* (higher/lower amount of specific content than expected) and has not considered its *valence* (e.g., extent to which a prospective student likes or dislikes a specific content). This valence should determine whether a misfit in expectations can be considered a forecast of later positive surprise (e.g., lower amount than expected of disliked content) or whether a misfit in expectations can be considered a forecast of disappointment (e.g., higher amount than expected of disliked content), a differentiation that has been assumed to be highly relevant for later success (Hasenberg, 2012; Karst et al., 2017) but could not be examined in this context so far because no such assessment exists.

Developing such an assessment and conducting this research yields significant contributions. From a theoretical perspective, the predictive power of objective forecasts beyond subjective forecasts could indicate the potential unbiassing function of objective forecasts in the study major choice process. Thereby, it contributes to theories of study major choice processes and shows ways to reduce potential biases and to foster success. Practically, objective-major specific fit forecasts can be assumed to yield the potential to support study major choice processes and therefore developing a valid assessment for these objective forecasts is an important first step. However, objective forecasts are only useful if they are better predictors than subjective forecasts, which prospective students form on their own. If this central precondition is met, in a second step, it is important to examine whether objective forecasts, when displayed in feedback to prospective students, play a role for study major choice processes beyond subjective forecasts and whether assessment and feedback of objective forecasts play a role for success. This will help to establish whether simply displaying these objective forecasts in feedback within online-self-assessments can guide prospective students' study major choice process or whether further measures are needed in the future.

Therefore, in this dissertation I address these research gaps by implementing an ecologically valid field design accompanying over the period of three years multiple cohorts of more than 4000 prospective students in their transition to university who completed an assessment and feedback of objective major-specific fit forecasts before their enrollment. More specifically, I address these research gaps by (1) developing an assessment for objective forecasts regarding interest-major fit and the valence of expectation-major fit, (2) establishing the predictive value of subjective forecasts for success, (3) establishing the predictive value of objective forecasts regarding interest-major fit, skill-major fit and the valence of expectation-major fit for success beyond subjective forecasts, and (4) establishing the role of objective forecasts, when displayed in feedback

to prospective students, for study major choice processes beyond subjective forecasts and the role of feedback on objective forecasts for success. To address these goals, it is first important to gain a better understanding of what determines success.

Major-Specific Fit Relates to Major-Specific Success

Study success in general can be described as a multidimensional construct that includes intrinsic motivation, well-being (satisfaction, positive affect, negative affect), achievement, and (intention to) dropout (e.g., Bean & Metzner, 1985; Heinze 2018). A large number of studies have already identified many factors which are relevant for general study success of students within their studies, *independent of the respective study major*, including personality traits (e.g., Clark & Schroth, 2010; Sood et al., 2012) or study circumstances such as perceived demands like time pressure (e.g., Lesener et al., 2020), perceived resources like social support (e.g., Mokgele & Rothmann, 2014), and perceived academic control (e.g., Respondek et al., 2017). However, for study major choice processes, it is relevant to focus on factors that target a specific study major and therefore determine study success in the respective *specific* study major (*major-specific success*). To derive such factors, we draw from Person-Environment Fit Theory which states that a fit between a person's characteristics and the characteristics of the environment leads to more success (e.g., Bretz & Judge, 1994; Cable & DeRue, 2002; Edwards & Shipp, 2007; Le et al., 2014). Specifically in the study major context, students' subjective estimation of their interest-major fit and skill-major fit emerged as important factors determining major-specific success (Etzel & Nagy, 2016). However, these research findings on major-specific fit stem from students who had already chosen their major and were in the middle of their studies. Thus, it remains unclear whether variables already measured before entering a study major can predict later major-specific success and thus could be useful to guide prospective students' decision-making processes.

Potential and Biases of Subjective Forecasts for Predicting Well-Being

To be able to better understand differences between predicting students' success with variables measured before versus within their studies, we next look into the literature of (affective) forecasting which focuses on peoples' anticipation about how they will feel in a future situation (Conner et al., 2015; Wilson & Gilbert, 2003). Regarding these subjective forecasts of well-being (as one facet of success), there already exists a large amount of literature. The (affective) forecasting literature shows, in a wide variety of contexts, that people can to some extent forecast their own well-being even before they have experienced the respective situation (e.g., Gilbert et al., 1998). I assume that these findings also hold for prospective students predicting their well-being in a study major (*subjective major-specific well-being forecast*) because prospective students had many years of collecting information about themselves in different learning environments. Because of these previous experiences prospective students should be able to forecast their major-specific well-being to some extent before they enter university. However, the affective forecasting literature (e.g., Wilson & Gilbert, 2003) also shows in many different contexts that forecasts deviate from reality and this deviation can be explained by biases (for an overview, see Gilbert et al., 1998; Wilson & Gilbert, 2003). Those biases might help to better understand why prospective students' major-specific wellbeing forecasts could deviate from later reality. This better understanding in turn could help to identify important factors that could improve the prediction of later major-specific well-being.

Formed by culture or personal experiences, individuals may have very different lay theories (i.e. informal and implicit theories of laymen; Furnham, 1988) about the emotional consequences of specific events or actions and some of these are partly wrong, for example the assumption that a lottery win leads to a life-long happiness gain (Brickman et al., 1978; Wilson & Gilbert, 2003). Affective forecasts based on wrong lay theories are also likely to be wrong to some extent (Wilson & Gilbert, 2003), for example, choosing a study major

for materialistic reasons is not related to more study satisfaction (Janke et al., 2021). If one reason for potential biases in prospective students' subjective major-specific well-being forecasts is their use of inaccurate lay theories, then using a lay theory which aligns with a scientifically supported theory should help them make better forecasts. In the context of predicting major-specific well-being such a scientifically supported theory would be the Person-Environment Fit Theory (Cable & DeRue, 2002; Edwards & Shipp, 2007), based on which it can be assumed that higher interest-major fit predicts higher study satisfaction (Etzel & Nagy, 2016). Following this rationale, *subjective interest-major fit forecast* (assessed by simply asking prospective students to forecast their *interest-major fit* for a specific major instead of their *well-being* in a specific major) should improve the prediction of later well-being because it is a forecast which is based on an empirically supported predictor of later well-being.

However, to forecast their fit to a specific study major, prospective students not only need a lot of insight about themselves but also a lot of information about the respective study major in question. In some education systems students have an orientation phase to get to know different study majors (Messerer, Karst & Janke, 2023) or take part in a curriculum-sampling test during the selection procedure which contains simulations close to reality of (parts of) the major in question (Niessen et al., 2018). However, in other education systems, prospective students must decide on a major without having any study experience in that major. In these cases, they likely have misconceptions about the content of the major (Heublein, 2014). For example, they might expect content in the undergraduate psychology major that is not part of the curriculum. Misconstruing an event (in this context, having wrong expectations regarding the content of the undergraduate psychology major) in turn should lead to biased forecasts (Wilson & Gilbert, 2003). Taken together, while subjective interest-major fit forecasts can be assumed to predict major-

specific well-being to some extent they can also be assumed to be biased in the prediction of major-specific well-being to some extent.

Objective Forecasts Predict Success Beyond Subjective Forecasts

In the next paragraph, I argue that objective interest-major fit forecasts should be less biased in the prediction of well-being than subjective forecasts. I then extend this argumentation on further indicators (objective forecasts of skill-major fit and the valence of expectation-major fit) and facets (achievement and dropout intention) of major-specific success before I discuss tests to assess objective forecasts.

Objective Interest-Major Fit Forecasts Predict Well-Being Beyond Subjective Forecasts

Objective interest-major fit forecasts describe prospective students' interest in specific content that represents a valid construal of the respective study major (in this context, a valid construal of the undergraduate psychology major based on expert estimates of the psychology major). One central asset of objective interest-major fit forecasts is that they can be assumed to be less biased than subjective forecasts in predicting well-being (e.g., reducing inaccurate lay theories and misconstrual). This is because a) they are based on an empirically supported factor for predicting well-being (interest-major fit, Etzel & Nagy, 2016) and b) they are objectively assessed based on a valid construal of the respective major. Therefore, objective interest-major fit forecasts (by reducing biases) should improve the prediction of well-being beyond subjective forecasts. While for subjective interest-major fit many studies show its relationship to success when assessed during the course of their bachelor studies (e.g., Etzel & Nagy, 2016), and few studies showing the predictive validity of objective interest-major fit measured in the first semester for later study satisfaction (Messerer, Merkle et al., 2023; Stoll & Spinath, 2015) to the best of my knowledge there is no research that explores objective interest-major fit *forecast* that is assessed *before enrollment* for predicting later success. Additionally, no

studies have explored the predictive value of objective interest-major fit forecast *beyond subjective forecasts*.

Objective Major-Specific Fit Forecasts Regarding Interests, Skills and Expectations Predict Success Beyond Subjective Forecasts

I extend the previous assumptions on the prediction of *success* with *objective skill-major fit forecasts*. Objective skill-major fit forecasts describe prospective students' skills in specific demands that represent a valid construal of the respective study major.

Objective skill-major fit forecasts a) are based on an empirically supported factor for predicting later success, namely skill-major fit (Etzel & Nagy, 2016), and b) are assessed objectively based on a valid construal of the respective major. Therefore, objective skill-major fit forecasts (by reducing biases) should improve the prediction of success beyond subjective forecasts. However, even though past studies have shown the correlation of objective skill-major fit assessed during studying with well-being and dropout intention (Thiele & Kauffeld, 2019), and the predictive validity of major-specific admission tests (objective skill-major fit forecast) for later success (e.g., Julian, 2005; Niessen et al., 2016), further evidence is needed to show the robustness of these tests *beyond prospective students' subjective forecasts*.

Additionally, *objective expectation-major fit forecasts*, which describe the discrepancies between prospective students' expectations regarding the potential content of a specific major compared to the actual content of the respective major (based on expert estimates), were linked to study satisfaction (Hasenberg & Schmidt-Atzert, 2013). It could be argued that objective expectation-major misfit measured before enrollment can be considered as forecasts of later disappointments during studying which should negatively impact study satisfaction. However, so far research has only examined the predictive value of expectation-major fit assessed at the beginning of the studies (*versus forecasts before enrollment*) for study satisfaction (Hasenberg & Schmidt-Atzert, 2013). Additionally, this

research has only examined (*absolute*) *expectation discrepancies* (higher/lower amount of specific content than expected) and has not considered its *valence* (e.g., extent to which a prospective student likes or dislikes a specific content). This valence should determine whether a misfit in expectations can be considered a forecast of later positive surprise, expectations exceeded (positive valence of expectation discrepancy, e.g., lower amount than expected of disliked content) or whether a misfit in expectations can be considered a forecast of disappointment (negative valence of expectation discrepancy, e.g., higher amount than expected of disliked content). Findings from the Person-Environment Fit literature regarding vocational interests show that a lack of interesting content in the environment is associated with less satisfaction, while an abundance of interesting content in the environment can also be associated with greater satisfaction (Wiegand et al., 2021). This differentiation between excess and deficiency of interests in study content has also been assumed to be relevant for later major-specific success (Hasenberg, 2012; Karst et al., 2017) but has not been examined in this context so far. Therefore, the objective valence of expectation-major fit forecast should also contribute to the prediction of success, specifically a larger negative valence of expectation-major fit forecast should predict lower success because it should be an indicator of more disappointment throughout studying.

Assessment and Feedback of Objective Major-Specific Fit Forecasts

While the development and validation of assessments of objective skill-major fit is a well-established field in the context of major-specific admission tests (e.g., Julian, 2005; Watrin et al., 2022), less research exists for the development and validation of tests to assess objective interest-major fit and the objective valence of expectation-major. Several interest assessments for study choices (e.g., Stoll & Spinath, 2015) are based on the RIASEC Model, which distinguished six categories of *vocational* interests (Holland, 1997). However, first evidence suggests that *study major-specific interests* may be more

effective predictors of success compared to broader vocational interests (Messerer, Merkle et al., 2023).

Procedures for developing major-specific interest and expectation assessments are less standardized and existing efforts often focus on university-specific tests, with item validation methods tailored to individual institutions. For example, items are typically developed and validated by small groups of representatives for each major at a particular university (e.g., Messerer et al., 2020). While this approach is feasible for prospective students who are locally bound or who have already decided on a specific university and only afterwards choose their major, it is less feasible for prospective students who first want to decide for a specific major before selecting a university. Those students need university-independent procedures which ensure that the items validly represent common content of the major, which is independent of specific universities. Additionally, existing expectation tests assess (absolute) expectation discrepancies only and neglect the valence of expectation discrepancies. Therefore, a new development of tests to assess objective interest-major fit and the objective valence of expectation-major fit seems necessary.

Motivation for a Major Influences Choices

Having argued that objective forecasts can be assumed to be less biased in predicting success than subjective forecasts and that new measures to assess these objective forecasts are needed, I now look at the role that those forecasts might play in the study major choice process when they are assessed and displayed in feedback to prospective students. Therefore, in the next paragraph, I first explain what can determine academic choices before I specifically discuss the role that subjective and objective forecasts might play in these choice processes.

Based on the Expectancy-Value Model of Achievement-Related Choices (Eccles et al., 1983; Guo et al., 2015) academic choices are influenced by expectancies of success and the values that individuals attach to different academic options (e.g., intrinsic value which

describes an individual's interest in the respective behavioral option). The higher the subjectively perceived expectancies of success and the higher the attached values for the respective academic option (relative to others), the more likely it is that an individual will choose that academic option (Eccles & Wigfield, 2002), e.g., choose a specific study major (Guo et al., 2015; Merkle, Bürkle et al., 2024). Applied to the study major choice context, intrinsic value for example indicates how much a prospective student is interested in the respective major while expectancies of success indicate how good a prospective student believes to be in the respective study major. Empirical evidence shows first support for this model in the context of higher education. For instance, research into STEM majors (Science, Technology, Engineering and Mathematics) pathways revealed that a higher intrinsic value for math predicted a higher likelihood of choosing a STEM major (Guo et al., 2015). In addition, students whose expectancy and values declined more slowly tended to earn higher grades and were more likely to stay in an engineering major, compared to those whose expectancy and values decreased more rapidly (Robinson et al., 2019). Therefore, drawing from the Expectancy-Value Model, higher values and higher expectancies of success constitute higher motivation for a major and thus should lead to a higher likelihood of choosing the respective major (Eccles, 2011; Guo et al., 2015).

Integration of Theories on Fit, Forecasts and Study Major Choices

In contrast to other educational choices, where individuals can draw upon their previous experiences to form their expectancies of success and subjective values (Eccles et al., 1983), for the choice of a study major, prospective students often lack prior experience and therefore need to rely more on their expectations and forecasts about the assumed content and demands of the respective study major (Karst et al., 2017; Merkle, Bürkle et al., 2024). Combining theories on the *Expectancy-Value Model of Achievement-Related Choices* (Eccles et al., 1983; Guo et al., 2015) and *Person-Environment Fit* (e.g., Le et al., 2014) in the study major choice context, the *intrinsic value* that prospective students place

on their future major should depend on the joy that prospective students expect to experience in the future major (*subjective major-specific well-being forecast*) and the fit that prospective students perceive between their interests and the content of the future major (*subjective interest-major fit forecast*). Similarly, prospective students' *expectancies of success* should be influenced by prospective students' estimation about how good they expect to be in a future major (*subjective major-specific performance forecast*) and the fit that prospective students perceive between their skills and the demands of the future major (*subjective skill-major fit forecast*).

Fit-Oriented Processes. To the extent that prospective students' subjective forecasts are valid predictors of later success, higher subjective forecasts can be assumed to lead to higher motivation to choose a specific major and therefore based on *Expectancy-Value Model* (e.g., Guo et al., 2015) to a higher likelihood of choice and at the same time to better fit in the respective study major choice and therefore based on *Person-Environment Fit Theory* (e.g., Le et al., 2014) to higher later success.

However, based on the forecasting literature (e.g., Wilson & Gilbert, 2003), I have argued that while subjective forecasts can be valid predictors of later success, they can also be assumed to be somewhat biased (e.g., by prospective students' wrong expectations of the study major). Therefore, in addition to these fit-oriented processes, there might also be biased processes.

Biased Processes. To the extent that prospective students' subjective forecasts are biased in predicting later success, higher subjective forecasts can still be assumed to lead to higher motivation to choose a specific major and therefore based on the *Expectancy-Value Model* (e.g., Guo et al., 2015) a higher likelihood of choice. However, in this case the motivation to choose a specific major can be assumed to be biased and therefore should

generally lead to a higher likelihood of *biased/misfitting* study major choices⁴, resulting in a lower likelihood of fit and consequently a lower likelihood of success. Additionally, potential biases in subjective forecasts should not just be a hindrance to success because they could lead to biased self-selection processes but also because they could lead to later disappointment because expectations are not met.

Objective Forecasts Displayed in Feedback and Successful Study Major Choices

Next, it is important to understand how objective forecasts might change these study major choice processes to support fit-oriented processes and foster success. Following the argumentation of Merkle, Bürkle et al. (2024), which is based on the Cognitive Dissonance Theory (Festinger, 1957), objective expectation-major fit forecast, when displayed in feedback to prospective students, could lead to dissonances with the initial expectations and motivation for a major. One way to alleviate these dissonances could be to change one's expectations and motivations for a major. This could be done for example by adjusting the expectations of success for a major (e. g., 'I think I will learn the content of the major very fast' to 'I think I will learn the content of the major very slowly'). I extend this argumentation from the display of objective expectation-major fit forecasts to the display of objective interest- and skill-major fit forecasts in feedback. Their display can also provide new information about what factors to consider for the study major choice and can offer an objective assessment of these factors compared to subjective forecasts.

⁴ The terms "biased/misfitting" are used to characterize the type of choices. Each term implies certain assumptions about the underlying mechanisms (though the mechanisms themselves are not tested directly). The term unbiased/biased choices relates to how choices are made (affective forecasting perspective), while the term fitting/misfitting relates to the consequences of types of choices (person-environment fit perspective). Therefore, depending on the perspective, both terms are adequate, and are used as synonyms.

Therefore, in addition to the display of objective expectation-major fit forecast, the display of objective interest- and skill-major fit forecasts in feedback to prospective students could also trigger dissonances, hence potentially play a role for the motivation to choose a major. The question that remains open is what role the display of these objective forecasts plays for later success. Based on the forecasting literature (e.g., Wilson & Gilbert, 2003), I have argued that objective major-specific fit forecasts can be assumed to be less biased in predicting success than subjective forecasts. Therefore, they can be assumed to support fit-oriented study major choice processes fostering success.

Supporting Fit-Oriented Processes. To the extent that objective forecasts are less biased in predicting later success than subjective forecasts, drawing from my previous argumentations based on the Cognitive Dissonance Theory, I argue that higher objective forecasts, when displayed in feedback to prospective students (beyond subjective forecasts), could still lead to higher motivation to choose a specific major and therefore based on *Expectancy-Value Model* (e.g., Guo et al., 2015) a higher likelihood of choice. However, the motivation to choose a specific major can be assumed to be less biased (compared to motivation based on subjective forecasts only) and therefore should generally lead to a higher likelihood of *less biased/more fitting* choices.

Consequently, students who received feedback regarding their objective forecasts in the study major choice process should generally experience higher fit compared to students who did not receive such feedback. Based on the Person-Environment Fit Theory (e.g., Le et al., 2014), a better fit should translate to higher success. In line with Cognitive Dissonance Theory (Festinger, 1957) regarding objective expectation-major fit forecast, displaying feedback before enrollment could additionally lead to an adjustment of expectations before enrollment (Merkle, Bürkle et al., 2024) and therefore should prevent later disappointment. Therefore, the display of objective forecasts in feedback to

prospective students before enrollment should be related to more success compared to no such feedback.

Regarding the role of objective forecasts in the *study major choice process* only a few studies have shown that objective expectation-major fit forecasts displayed in feedback is related to prospective students' motivation for a major (absolute value of expectation-reality discrepancies; Karst et al., 2017) and can predict changes in such motivation (absolute value of expectation-reality discrepancies; Merkle, Bürkle et al., 2024). Additionally, first evidence showed that objective skill-major fit forecasts predicted the likelihood of enrollment in a psychology major (results in an objective trial studying test; Niessen et al., 2016). However, none of these studies investigated the role of objective forecasts, when displayed in feedback to prospective students, for their motivation and choice *beyond subjective forecasts*.

Goals of the Research Program

Taken together, this research program aims to explain and support forecasting processes in the study major choice context to foster success. Hence, the first goal of this dissertation is to develop an assessment for objective forecasts regarding interest-major fit and the valence of expectation-major fit. Furthermore this dissertation integrates theories on major-specific success, on (changing) study major choices and on affective forecasting (biases) to (2) to establish the predictive value of subjective forecasts for success (3) to establish the predictive value of objective forecasts regarding interest-major fit, skill-major fit and the valence of expectation-major fit for success beyond subjective forecasts (4) to establish the role of objective forecasts, when displayed in feedback to prospective students, for study major choice processes beyond subjective forecasts, and the role of feedback on objective forecasts for success.

To test these goals, I combine theories on Person-Environment Fit with Affective Forecasting to argue that *subjective major-specific fit and success forecasts* can predict

success to some extent while at the same time they can be assumed to be biased (e.g., by inaccurate lay theories or misconstrual) in predicting success. *Objective major-specific fit forecasts* can be assumed to be less biased in predicting study success than subjective forecasts because objective forecasts are a) based on an empirically supported factor for predicting later major-specific success (e.g., interest-major fit, skill-major fit) and they assess this factor objectively based on a valid construal of the respective major (e.g., content and demands of the major based on expert estimates). Therefore, one central asset of objective forecasts is that they can be assumed to be less biased than subjective forecasts in predicting success. Therefore, I examine the predictive value of objective forecasts for success beyond subjective forecasts. Additionally, to the best of my knowledge I am the first to integrate the aforementioned theories with the Expectancy-Value Model and Cognitive Dissonance Theory. This integration allows to argue that motivation for and choice of a study major can be assumed to be biased as they should be influenced by subjective forecasts that themselves may be biased. Information on objective forecasts, when displayed in feedback to prospective students, can be assumed to trigger cognitive dissonances with the initial motivation for a major which is based on subjective forecasts. The alleviation of these dissonances can be assumed to lead to less biased motivation, less biased/more fitting choice, better adjustment of expectations and consequently more success. Consequently, a second central asset of objective forecasts is that they can be assumed to lead to a less biased study major choice process when they are displayed in feedback to prospective students beyond subjective forecasts and consequently should lead to more success.

Therefore, I examine the role of objective forecast, when displayed in feedback to prospective students before their enrollment, beyond prospective students' subjective forecasts for key variables throughout the complete transition from study orientation through to studying. As predictors, I examine prospective students' subjective forecasts

(pre-feedback: *subjective forecasts regarding well-being, performance, interest-major fit, skill-major fit*) and their *objective forecasts regarding interest-major fit, skill-major fit and valence of expectation-major fit* (disappointed/exceeded expectations) measured objectively with a scientifically developed and validated skill-, interest- and expectation-test in an online-self-assessment. As dependent variables I examine prospective students' *motivation to choose a major* (post-feedback: *intrinsic value, expectancies of success, intention*) prospective students' enrollment in a study major and later success (*intrinsic motivation, study satisfaction, dropout intention, achievement*). As control variables I examine major-unspecific factors (*trait well-being, high-school grade point average*).

Concerning Goal 1, my co-authors and I developed an assessment for objective major-specific fit forecasts (Manuscript 1) to be able to address Goal 2 to Goal 4 and associated hypotheses. An overview of the studies in the manuscripts mapped to the associated goals is provided in Figure 1 on page 10 of this dissertation.

Regarding the predictive value of subjective forecasts for intrinsic motivation and well-being (Goal 2), I argue that prospective students' subjective forecasts regarding their major-specific well-being and interest-major fit should predict their later major-specific intrinsic motivation and well-being because prospective students have many years of experience in different learning settings which are to some extent transferrable to future study majors. Based on this argumentation, we tested in Manuscript 2 whether higher subjective major-specific well-being forecasts and higher subjective interest-major fit forecasts predict higher major-specific intrinsic motivation and higher well-being (Study 1).

I additionally focus on the predictive value of objective forecasts regarding interest-major fit, skill-major fit and the valence of expectation-major fit for success beyond subjective forecasts (Goal 3). I argue that objective major-specific fit forecasts should be based on relevant factors for predicting major-specific success and on a valid construal of

the respective major in question. Objective forecasts therefore can be assumed to be less biased than subjective forecasts in predicting success. Hence, we tested in Manuscript 2 and 3 whether higher objective major-specific fit forecasts predict higher major-specific success beyond subjective forecasts (each in Study 1).

Further I concentrate on the potential role of objective forecasts, when displayed in feedback to prospective students, for study major choice processes beyond subjective forecasts and the role of feedback on objective forecasts for success (Goal 4). I argue that information on objective forecast, when displayed in feedback to prospective students, can trigger cognitive dissonances with the initial motivation for a major which was based on subjective forecasts. The alleviation of these dissonances can be assumed to relate to less biased motivation, less biased/more fitting choices, better adjustment of expectations and consequently more success. Therefore, we tested in Manuscript 3 whether higher objective major-specific fit forecasts, when displayed in feedback to prospective students before enrollment predict higher motivation to choose the respective major beyond subjective forecasts (Study 2), higher likelihood of choosing the respective major beyond subjective forecasts (Study 3) and whether assessment and feedback of objective forecasts is associated with higher major-specific success compared to no such assessment and feedback (Study 4).

The reason behind the orchestrating of the studies in this order lies in the fact that, for the interpretation of the following studies, it is first of central importance to know whether objective factors can predict success beyond subjective forecasts (Study 1). In Studies 2 and 3, I then specifically examine whether objective forecasts, when displayed in feedback to prospective students, predict changes in motivation for the study major and later enrollment, beyond subjective forecasts. Without establishing the validity of objective forecasts as predictors for success beyond subjective forecasts in Study 1, it remains unclear whether the role of objective forecasts for motivation and choice beyond subjective

forecasts, can possibly indicate an unbiased and beneficial value for prospective students' study major choice or whether it risks misleading prospective students.

Summary of the Empirical Studies

Next, I first present a summary of the development of an assessment for objective forecasts regarding interest-major fit and the valence of expectation-major fit in Manuscript 1 (sub-chapter 1). Afterwards, I present a summary of the empirical results of Manuscript 2 regarding the predictive value of subjective forecasts and beyond that objective interest-major fit forecast for intrinsic motivation and well-being (sub-chapter 2). Building on this, I present a summary of the empirical results in Manuscript 3 regarding the predictive value of objective forecasts beyond subjective forecasts for overall success, regarding the role of objective forecasts, when displayed in feedback to prospective students, for study major choice processes beyond subjective forecasts and regarding the role of feedback on objective forecasts for success (sub-chapter 3).

Manuscript 1: Development and Validation of an Expectation-Interest Test ($E \times I$ - Test) to Explore Fit for a Specific Major in an Online Self-Assessment

Associated Manuscript 1: Merkle, B., Schiltenswolf, M., Kiesel, A. & Dickhäuser, O. (2021). Entwicklung und Validierung eines Erwartungs- und Interessenstests ($E \times I$ - Test) zur Erkundung studienfachspezifischer Passung in einem Online-Self-Assessment. [Development and validation of an Expectation-Interest Test ($E \times I$ - Test) to explore fit for a specific major in an online self-assessment]. *Zeitschrift für empirische Hochschulforschung: ZeHf*, 5(2), 162–183. <https://doi.org/10.3224/zehf.5i2.05>

As an important methodological preliminary step for addressing the goals in my research program and testing the aligned hypotheses, the first manuscript describes how a tool for measuring and providing feedback on objective interest-major fit forecasts and the objective valence of expectation-major fit forecasts can be developed. It also outlines the

final design of such an online-self-assessment (OSA) including feedback, using the example of the bachelor's degree in psychology (OSA-Psych)⁵.

The basis of the development process for items to measure objective interest-major fit forecast and the objective valence of expectation-major fit forecast was a systematic literature review on the content of the bachelor's degree in psychology. Based on this review, multiple items were created for each subfield (e.g., educational psychology). These items were revised through several expert surveys to ensure that they cover all central subfields of the respective study major (exhaustiveness), that they can be unambiguously assigned to the corresponding subfields of the respective study major (structure) and that these subfields are evenly covered so that no subfield is over- or underrepresented (prototypicality). These development processes aimed to ensure that the final content of the items represents an objective valid construal of the study major and thus can be assumed to reduce potential misconceptions about the study major, which is assumed to be a central function of objective forecasts.

The newly developed item catalog was integrated into an assessment and feedback concept, which was also newly developed to allow for the combined assessment and feedback of expectations and interests. Due to linking expectations with interests, the newly developed test is referred to as the Expectation \times Interest Test. The assessment in the Expectation \times Interest Test consists of two components: a scale for assessing expectations and a scale for assessing interests. The item stem for measuring interests is: "How interested are you in..." [items from the item catalog, e.g., "how attitudes toward others are formed and can change."]. The degree of personal interest can be indicated on a

⁵ The final design also includes items for the assessment and feedback of objective skill-major fit forecast. These items were adapted from a validated objective skill-major fit test (Watrín et al., 2022) and, therefore, the development and description of these items are not part of Manuscript 1 (for the adapted sample of items used for this dissertation see Supplemental Table 1 in Manuscript 3)

seven-point Likert scale from -3 (no interest at all) to +3 (very strong interest). The objective interest-major fit forecast for a prospective student is determined by the average of the interest items. The item stem for assessing expectations is: "To what extent do you expect to engage with this in your [degree program]..." [items from the item catalog, e.g., "how attitudes toward others are formed and can change."], which can be answered on a seven-point Likert scale from 1 (not at all/to a very small extent) to 7 (to a very large extent). The two scales, items and scale points were chosen in such a way that in combination they allowed for the calculation of the objective valence of expectation-major fit forecast. It is calculated as the difference between expert assessment (of the study reality, the factual realization of the temporal extent of a specific study major content) and the prospective students' personal expectations (regarding the temporal extent of a specific study major content) multiplied by their interest (in the respective content), summed across all contents. To determine the study reality, 149 experts answered questions about the extent to which students engage with specific content in the major. The mean of these responses was considered the study reality. Therefore, if a prospective student rates a specific content as interesting (positive value) and there is a higher amount of that content than expected (positive expectation discrepancy), this results in a positive valence of the expectation-major fit through multiplication. At the same time, if a prospective student rates a specific content as interesting (positive value) and there is a lower amount than expected (negative expectation discrepancy), this results in a negative valence of the expectation-major fit through multiplication.

Method & Results. We conducted an ecologically valid field study in which we observed prospective students using the newly developed online-self-assessment (OSA) for the bachelor psychology in their study decision process (t_{OSA}). Within the first month, a total of 2023 prospective students used the newly developed online-self-assessment. In a subsequent survey specifically about the Expectation \times Interest Test, over 80% of

prospective students ticked an answer option above the middle category when asked about the usefulness of the test, indicating that they perceived the Expectation \times Interest Test to be beneficial. Likewise, over 90% of the prospective students reported that they liked the test and that they did not find it difficult. Specifically, the feedback was rated as understandable, clear and helpful by over 90% of the prospective students. Prospective students' self-assessed level of information about the content of the bachelor's degree in psychology significantly increased from before (t_{preOSA}) to after ($t_{postOSA}$) completing the entire online-self-assessment for psychology (additionally including the items regarding objective skill-major fit forecast, adapted from Watrin et al., 2022). The recommendation rate for the entire online-self-assessment for psychology was over 90%, and therefore significantly higher than the rates for other common online-self-assessments (e.g., Sonnleitner et al., 2009).

Discussion. Taken together, Manuscript 1 shows conceptual preparatory work necessary to be able to test our hypotheses. We developed a process for constructing a tool for measuring and providing feedback on objective interest-major fit forecast and the objective valence of expectation-major fit forecast and outlined the final design of such an assessment and feedback, using the example of the bachelor's degree in psychology (OSA-Psych). First evaluation results showed that prospective students accepted the tool and that it enhanced their level of information. Acceptance and information gained from online-self-assessments, which assess and display objective forecasts to prospective students, can be considered important factors for the potential usefulness of objective forecasts in the study major choice process (Hasenberg & Schmidt-Atzert, 2014). However, while these results suggest that students perceive objective forecasts as helpful, we do not know whether objective forecasts are actually helpful in predicting success and can play a role in study major choice processes to foster success.

Manuscript 2: Objective Interest-Major Fit Forecast Predicts Major-Specific Motivation and Well-being Beyond Subjective Forecasts

Associated Manuscript 2: Merkle, B., Messerer, L. A. S. & Dickhäuser, O. (2024). Will I be happy in this major? Predicting intrinsic motivation and subjective well-being with prospective students' well-being forecast and interest-major fit forecast. *Social Psychology of Education, 27*(1), 237–259. <https://doi.org/10.1007/s11218-023-09835-6>.

In the second manuscript, we examined the predictive value of subjective and objective forecasts for later major-specific motivation and well-being. Prospective students already have many years of personal experience in learning environments before entering university and therefore to some extent should be able to forecast their well-being in another learning environment, their future study major. Therefore, we hypothesize that a higher prospective student *subjective major-specific well-being forecast* predicts higher later major-specific intrinsic motivation and well-being (positive affect, negative affect, satisfaction). Furthermore, prospective students' *subjective interest-major fit forecast* (assessed by simply asking prospective students to forecast their interest-major fit for a specific major instead of their well-being in a specific major) should improve the prediction of later well-being. This is because this forecast can be assumed to be based on an empirically supported predictor for later well-being, namely interest-major fit (potentially reducing inaccurate lay theories in study major choice processes, like choosing a study major for materialistic reasons which is not related to more study satisfaction, Janke et al., 2021). Thus, we hypothesize that a higher prospective student *subjective interest-major fit forecast* predicts higher later major-specific intrinsic motivation and well-being (positive affect, negative affect, satisfaction) beyond subjective major-specific well-being forecast. *Objective interest-major fit forecast* should further improve the prediction of intrinsic motivation and well-being because in addition to being based on an

empirically supported predictor of later well-being (e.g., potentially reducing inaccurate lay theories), objective forecasts can be assumed to be based on a valid construal of the respective major (e.g., reducing potential misconceptions about the content of the study major). Therefore, we hypothesize that a higher prospective student objective interest-major fit forecast predicts higher later major-specific intrinsic motivation and well-being (more positive affect, less negative affect, higher satisfaction), beyond prospective students' subjective forecasts.

Method. To test these hypotheses, we continued the ecologically valid field study mentioned in the last sub-chapter by observing more prospective students whose objective interest-major fit forecast was assessed and provided as feedback in the online-self-assessment (t_{OSA}). Additionally, we conducted two annual student surveys ($t_{stud2020-2021}$) which took place at the beginning of the respective autumn/winter semester in five different German universities who advised taking the OSA on their university webpages for study orientation. The matching of the prospective student sample (t_{OSA}) with the student samples ($t_{stud2020-2021}$) in which their study success was assessed resulted in an intersection of 234 prospective students who transferred to the first semester.

Results. In line with our hypotheses, hierarchical multiple regression analyses revealed that higher subjective major-specific well-being forecasts predicted higher intrinsic motivation, more positive affect, and higher satisfaction in the respective major but, against our hypotheses, did not predict negative affect. Higher subjective interest-major fit forecast incrementally predicted higher intrinsic motivation, less negative affect, and higher satisfaction but, against our hypotheses, did not predict positive affect beyond subjective major-specific well-being forecasts. In line with our hypotheses, the results showed that objective interest-major fit forecasts incrementally predicted higher intrinsic motivation, more positive affect, and higher satisfaction beyond subjective forecasts but against our hypotheses did not predict negative affect.

Discussion. Taken together our research showed that prospective students can predict their intrinsic motivation and well-being in a specific major to some extent with subjective forecasts. One standard deviation increase in subjective major-specific well-being forecast predicted a .23 standard deviation increase in intrinsic motivation, a .09 in positive affect and a .23 in satisfaction. These findings align with our theoretical argumentation that prospective students' subjective major-specific well-being forecast can to some extent predict major-specific intrinsic motivation and well-being because of their previous experiences in other learning environments.

Furthermore, our results showed that this prediction can to some extent further be improved by prospective students' subjective interest-major fit forecast. One standard deviation increase in subjective interest-major fit forecast incrementally predicted a .12 standard deviation increase in intrinsic motivation, a .13 in satisfaction and a .10 decrease in negative affect beyond subjective major-specific well-being forecast. These results align with our theoretical argumentation that prospective students subjective forecast, if based on an empirically supported factor for their later well-being - namely their interest-major fit - can be assumed to reduce biases in the prediction of well-being due to inaccurate lay theories and therefore improve the prediction of well-being.

Finally, the results showed that objective interest-major fit forecast can predict some major-specific well-being indicators beyond subjective forecasts. One standard deviation increase in objective interest-major fit forecast incrementally predicted a .27 standard deviation increase in intrinsic motivation, a .11 in positive affect and a .24 in satisfaction beyond subjective forecasts. These findings align with our theoretical argumentation that objective interest-major fit forecasts can be assumed to be less biased than subjective forecasts in predicting major-specific intrinsic motivation and well-being because objective interest-major fit forecasts are based on an empirically supported predictor for later well-being as well as on a valid construal of the future situation (in our

example, the future undergraduate psychology major). More discussions regarding further theoretical implications and unexpected findings can be found in the overarching discussion section. Building on these findings, the question remains as to whether these results are robust in such a way that they can be applied to other objective forecasts of predictors of major-specific success before enrollment, such as skill-major fit and expectation-major fit. Additionally, we do not know if the findings can be extended to the prediction of other indicators of success, such as achievement and dropout intention, or if they remain consistent throughout the course of study for higher-semester students. Furthermore, it is unclear whether objective forecasts, when displayed in feedback to prospective students, play a role for their study major choice process in a way that fosters success which is essential for the efficacy of tests including such feedback.

Manuscript 3: Objective Major-Specific Fit Forecasts Regarding Interests, Skills, and Expectations Predict Motivation, Choice and Success in a Major

Merkle, B. & Dickhäuser, O. (2024). *Objective major-specific fit forecasts regarding interests, skills, and expectations predict motivation, choice and success in a major*
[Manuscript submitted for publication at the Journal of Educational Psychology].

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In the third manuscript, we examined the role of objective forecasts regarding interest-major fit, skill-major fit and the valence of expectation-major fit for study major choice and success by building on the theoretical argumentation and empirical findings from Manuscript 2. In Manuscript 2 we assumed and showed that objective *interest-major fit* forecasts predicted *intrinsic motivation* and *well-being* beyond subjective forecasts. Building on this we extend this argumentation on the prediction of further success indicators, namely dropout *intention and achievement* and on further predictors that are

based on a valid construal of the respective major in question and on relevant factors for major-specific success, namely objective *skill-major fit* forecasts and objective *valence of expectation-major fit* forecasts. Therefore, we hypothesize that higher objective interest-major fit forecast, objective skill-major fit forecast and objective valence of expectation-major fit forecast predict success (intrinsic motivation, satisfaction, dropout intention, achievement) beyond subjective forecasts (Study 1). Additionally, we argue that information on objective forecasts, when displayed in feedback to prospective students, can trigger cognitive dissonances with the initial motivation for a major which should originally be based on subjective forecasts. Provided that the findings from Manuscript 2 and our explanation of these results prove to be robust and valid, suggesting that objective forecasts might be less biased than subjective forecasts, then we further argue that the alleviation of the above-mentioned dissonances can be assumed to relate to less biased motivation, less biased/more fitting choice, better adjustment of expectations and consequently more success. Therefore, we hypothesize that higher objective forecasts, when displayed in feedback to prospective students, predict higher motivation to choose a major (Study 2) as well as higher likelihood of enrolling in the respective major (Study 3) beyond initial motivation to choose major and beyond subjective forecasts. Additionally, we hypothesize that students who took part in the OSA before enrollment and therefore received feedback regarding their objective forecasts prior to their enrollment should be more successful compared to students who did not participate in the OSA (Study 4).

Method & Results. To test these hypotheses, we continued the ecologically valid longitudinal field study mentioned in the last two sub-chapters by observing more prospective students whose objective forecasts were assessed and provided as feedback in the online-self-assessment (t_{OSA}) and by adding a third annual student survey ($t_{stud2022}$) in which students reported success in their study major. For testing whether prospective students' objective forecasts assessed before enrollment predicted their success beyond

subjective forecasts, we used the match of the prospective student sample (t_{OSA}) with the student samples ($t_{stud2020-2022}$). This resulted in an intersection of 396⁶ prospective students who transferred to the first semester and 136 prospective students who transferred to the third semester. In line with our hypotheses, multivariate analyses for *first semesters'* success outcomes conducted in Study 1 showed that objective interest-major fit forecast proved to be an overall significant predictor beyond subjective forecasts while objective expectation-major fit forecast and objective skill-major fit forecast were not significant predictors. The multivariate analyses for *third semesters'* outcomes showed that objective interest-major fit forecast, objective valence of expectation-major fit forecast and objective skill-major fit forecast proved to be overall significant predictors for success beyond subjective forecasts. In line with our hypotheses, higher *objective interest-major fit forecast* assessed before enrollment predicted higher intrinsic motivation and study satisfaction beyond subjective forecasts for first semester students. Contrary to our hypotheses, study dropout intention for first semester students was not significantly incrementally predicted. Regarding third semester students, higher objective interest-major fit forecast unexpectedly predicted higher dropout intention while intrinsic motivation, study satisfaction and achievement were not incrementally predicted beyond subjective forecasts. Unexpectedly, a more *positive objective valence of expectation-major fit forecast* was not a significant predictor for first semester students' success beyond subjective forecasts. Regarding third semester students and in line with our hypotheses, a more positive objective valence of expectation-major fit predicted higher study satisfaction and better achievement beyond subjective forecasts. However, intrinsic motivation and dropout

⁶ The first semester data for Study I in Manuscript 3 partly overlaps with the first semester data from Study 1 in Manuscript 2. However, the sample in Manuscript 3 is larger and more variables are considered in the analyses (additional predictors: Objective forecasts regarding skill-major fit and the valence of expectation-major fit; additional outcomes: Dropout intention and achievement) which justifies the partly reanalysis.

intention were not significantly incrementally predicted. Higher *objective skill-major fit forecast* was not a significant predictor for the first semester's outcomes beyond subjective forecasts. Regarding third semester students, higher objective skill-major fit forecast predicted better achievement beyond subjective forecasts. However, intrinsic motivation, study satisfaction, and dropout intention were not significantly incrementally predicted.

For testing whether objective forecasts when assessed and displayed in feedback can predict prospective students' motivation to choose a major, we used the full sample of prospective students (tOSA) who completed the online-self-assessment for psychology and took part in two prospective students' surveys in which their motivation to choose the study major was assessed one survey before and one survey after the participation in the OSA ($n = 4482$). In line with our hypotheses, Study 2⁷ showed that higher *objective interest-major fit forecast* predicted higher intrinsic value and higher expectations of success after participating in the online-self-assessment, beyond the respective motivation and beyond subjective forecasts assessed before participating in the online-self-assessment. However, intention to choose the major was not significantly incrementally predicted. A more *positive objective valence of expectation-major fit forecast* predicted higher intrinsic value, and against our hypothesis lower expectations of success after participating in the online-self-assessment beyond the respective motivation and beyond subjective forecasts assessed before participating in the online-self-assessment. However, intention to choose the major was not significantly incrementally predicted. In line with our hypothesis, higher *objective skill-major fit forecast* predicted higher intrinsic value, higher expectancies of success and higher intention to choose the major after participating in the online-self-

⁷ Because our research hypotheses build logically upon one another, in our studies we utilize both overlapping and independent samples to answer them. However, for clarity, we will refer to them as Study 1 to Study 4 due to their clear differentiation with regard to research content.

assessment beyond the respective motivation and beyond subjective forecasts assessed before participating in the online-self-assessment.

For testing whether objective forecasts when assessed and displayed in feedback can predict choice of a study major we used the prospective student sample (t_{OSA}) as a basis for whose objective forecasts were assessed and provided as feedback before their enrollment and matched it with the full student sample ($t_{stud2020-2022}$) to receive the indicator which prospective students later enrolled in the psychology study major ($n_{enrolled} = 538$) and which did not (definitely) enroll in the study major ($n_{not\ enrolled} = 4132$). Against our hypotheses, Study 3 showed that higher *objective interest-major fit forecast* did not significantly incrementally predict the likelihood of enrollment beyond subjective forecasts. In line with our hypotheses, a more positive *objective valence of expectation-major fit forecast* and higher *objective skill-major fit forecast* were significant predictors of enrollment beyond subjective forecasts.

For testing whether students who took part in the OSA before enrollment and therefore received feedback regarding their objective major-specific fit forecasts prior to their enrollment are more successful compared to students who did not, we used the full sample of higher semester students who participated in at least one of the annual student surveys ($t_{stud2020-2022}$) and reported their success in their study major. Within these samples we compared the assessed success indicators of those students who had participated in the OSA before enrollment (match with prospective students sample, t_{OSA}), with those who did not participate in the OSA (no match prospective students, t_{OSA}). we did so for students in the first semester (OSA before enrollment: $n = 433$; no OSA: $n = 154$), for students in the third semester (OSA before enrollment: $n = 151$; no OSA: $n = 108$) and fifth semester (OSA before enrollment: $n = 52$ no OSA: $n = 103$). Against our hypotheses, multivariate analyses for *first semesters'* success outcomes conducted in Study 4 revealed that there was no overall significant difference in success between the group that participated in the

OSA and the group that did not participate in the OSA. Subsequent univariate analyses revealed that the group that took part in the OSA before enrollment reported significantly more intrinsic motivation, more satisfaction and lower dropout intention than the group that did not participate. For *third semester students* the multivariate analysis revealed that there was an overall significant difference in success between the two groups. Subsequent univariate analyses revealed that the group that took part in the OSA before enrollment had significant better grades than the group that did not participate. However, no differences for intrinsic motivation, study satisfaction and dropout intention were found. For *fifth semester students* the multivariate analysis revealed that there was an overall significant difference in success between the two groups. Subsequent univariate analyses showed that the group that took part in the OSA before enrollment hold significant better grades than the group that did not participate. However, no differences for intrinsic motivation, study satisfaction and dropout intention were found.

Discussion. In sum, Study 1 showed that objective forecasts could predict some indicators of success beyond subjective forecasts. A one standard deviation increase in objective interest-major fit forecast predicted a .27 standard deviation increase in intrinsic motivation and a .19 standard deviation increase in satisfaction of first semester students. A one standard deviation increase in objective expectation-major fit forecast predicted a .17 standard deviation increase in third semester satisfaction and a .21 increase in achievement. A one standard deviation increase in objective skill-major fit forecast predicted a .43 standard deviation increase in third semesters' achievement. These findings align with our theoretical argumentation that objective forecasts can be assumed to be less biased than subjective forecasts in predicting success because objective forecasts can be assumed to be based on an empirically supported predictor for later success as well as on a valid construal of the future situation (in our example, the future undergraduate psychology major). Building on the findings from Study 1, the question remains as to whether

objective forecasts, when displayed in feedback to prospective students, play a role in study major choice processes beyond subjective forecasts to foster success. Our results showed that objective forecast, when displayed in feedback to prospective students, predicted some indicators of *motivation to choose a major* (Study 2) and likelihood of *enrollment* in the respective study major (Study 3) beyond subjective forecasts. Additionally, students who participated in an OSA and therefore received feedback regarding their objective forecasts before enrollment showed more success regarding certain success indicators than students who did not participate in the OSA and did therefore not receive such feedback (Study 4). A one standard deviation increase in objective interest-major fit forecast predicted a .14 standard deviation increase in intrinsic value and a .02 standard deviation increase in expectations of success beyond subjective forecasts and initial motivation. A one standard deviation increase in objective valence of expectation-major fit forecast predicted a .03 standard deviation increase in intrinsic value as well as a 9% increase in the odds of enrollment beyond subjective forecasts and initial motivation. A one standard deviation increase in objective skill-major fit forecast predicted a .06 standard deviation increase in intrinsic value, a .11 increase in expectations of success, a .06 increase in intention to choose the major, as well as a 57% increase in the odds of enrollment beyond subjective forecasts and initial motivation. Additionally, participation in the OSA before enrollment compared to no such participation showed small associations with higher first semester students' intrinsic motivation, satisfaction and lower dropout intention and medium associations with higher advanced students' achievement.

These findings align with the theoretical argumentation that objective forecasts, when displayed in feedback to prospective students, can be assumed to reduce biases in motivation, choices and that feedback on objective forecasts can be assumed to be a good measure to foster success by potentially reducing biases in the study (choice) process.

More discussions regarding further theoretical implications and unexpected findings can be found in the following overarching discussion section.

Overarching Discussion

Choosing an educational path is a difficult life decision that can lead to unfavorable outcomes when it goes wrong. Therefore, the research program of this dissertation aims to explain and support forecasting processes in the study major choice context to foster success. Hence, the goals of my dissertation program are (1) to develop an assessment for objective forecasts regarding interest-major fit and the valence of expectation-major fit (2) to establish the predictive value of subjective forecasts for success (3) to establish the predictive value of objective forecasts regarding interest-major fit, skill-major fit and the valence of expectation-major fit for success beyond subjective forecasts (4) to establish the role of objective forecasts, when displayed in feedback to prospective students, for study major choice processes beyond subjective forecasts and the role of feedback on objective forecasts for success.

The present research explored these goals based on data from an ecologically valid field design accompanying over the period of three years more than 4000 prospective students in their transition to university with three annual student surveys covering first to fifth semester students at five different universities. In general, (1) together with my co-authors I developed an assessment and feedback of objective major-specific fit forecasts that was well accepted and the empirical studies of my dissertation program showed that (2) subjective forecasts could predict success, (3) objective forecasts could predict success beyond subjective forecasts, (4) objective forecasts, when displayed in feedback, could predict motivation to choose and study major choice beyond subjective forecasts, and receiving feedback regarding objective forecasts before enrollment was associated with more success compared to not receiving such feedback. However, not all objective forecasts significantly improved the predictions of all indicators of motivation, enrollment and success at all times during their bachelor studies. An overview of the specific findings can be found in Table 1.

Table 1

Summary of the Results of the Field Study Regarding the Role of Objective Major-Specific Fit Beyond Subjective Forecasts for

Study Major Choices and Success

Predictors	Subj. WBF		Subj. Interest-MFF		Obj. Interest-MFF		Obj. Skill-MFF		Obj. Valence of Expectation-MFF		Assessment and Feedback of Obj. Forecasts		
	1 st	3 rd	1 st	3 rd	1 st	3 rd	1 st	3 rd	1 st	3 rd	1 st	3 rd	5 th
Success	1 st	3 rd	1 st	3 rd	1 st	3 rd	1 st	3 rd	1 st	3 rd	1 st	3 rd	5 th
Intrinsic Motivation	✓		✓	✓	x	x	x	x	✓	x	✓	x	x
Satisfaction	✓		✓	x	x	x	x	✓	✓	x	✓	x	x
Positive Affect	✓		x	x	x	x	x	x	✓	x	✓	x	✓
Negative Affect	x		✓	x	x	x	x	✓	x	x	x	x	x
Dropout Intention	-		-	x	x	x	x	x	✓	x	✓	x	x
Achievement	-		-	-	-	✓	-	✓	-	-	-	✓	✓
Motivation to choose	Prospective Students												
Intrinsic Value	-		-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Exp. of Success	-		-	✓	✓	✓	✓	✓	x	x	✓	✓	-
Intention to choose	-		-	x	x	✓	✓	✓	✓	✓	✓	✓	-
Choice	Prospective Students → Students												
Enrollment	-		-	x	✓	✓	✓	✓	✓	✓	✓	✓	-

Note. Subj. = Subjective; Obj. = Objective; WBF = Major-Specific Well-Being Forecast; MFF= Major Fit Forecast; Exp.=Expectations;

1st/3rd/5th represents students in the first/third/fifth semester; ✓ = supports our hypothesis; cells marked in grey highlight results that

support our hypotheses. x = does not support our hypothesis. - = relationship was not tested.

This could be a first summary of an answer to the goals of this dissertation to examine the potential predictive value of subjective and objective forecasts for the prediction of success and to examine the potential role of objective forecasts in the study major choice process to foster success. In the following, I will discuss these results stemming from the three manuscripts described in the previous chapters in more detail to provide more elaborate answers to the research goals and questions raised in this dissertation.

Overall Summary of the Findings and Theoretical Implications

I will start with providing an overall summary of the findings in line with stipulated hypotheses of the dissertation and elaborating on the associated theoretical implications with regards to the goals of this dissertation. After that, I discuss the boundary conditions, limitations and strengths of this dissertation and further future research directions. Finally, I elaborate on practical implications before I end with an overall preliminary conclusion.

Assessment and Feedback of Objective Forecasts. My co-authors and I developed an assessment for objective major-specific fit forecasts in Manuscript 1 (Goal 1). This conceptual preparatory work is necessary to test the research hypotheses of this dissertation and address the associated further research goal. Specifically, we developed a process for constructing a tool for measuring and providing feedback on objective interest-major fit forecast and the objective valence of expectation-major fit forecast and outlined the final design of such an assessment and feedback, using the example of the bachelor's degree in psychology (OSA-Psych). While several assessments already exist for objective skill-major fit forecasts (admission tests, e.g., Watrin et al., 2022), we presented a structured approach to developing assessments for *objective interest-major fit forecasts* and the *objective valence of expectation-major fit forecasts*. In line with past research (Messerer et al., 2020), we conducted expert surveys to develop the items. However, going beyond this research, we used validation techniques that are university-independent and

specifically demonstrated that expectation discrepancies can be combined with interest in the respective content to differentiate between expectation discrepancies that are forecasts of later positive surprises, expectations exceeded (positive valence of expectation discrepancy, e.g., lower amount than expected of disliked content) or whether a misfit in expectations can be considered a forecast of disappointment (negative valence of expectation discrepancy, e.g., higher amount than expected of disliked content). First evaluation results showed that prospective students accepted the tool and that it enhanced their level of information. Acceptance and information gained from online-self-assessments, which assess and display objective forecasts to prospective students, can be considered important factors for the potential usefulness of objective forecasts in the study major choice process (Hasenberg & Schmidt-Atzert, 2014). However, while these results suggest that students perceive objective forecasts as helpful, in this dissertation I aim to investigate whether objective forecasts actually are helpful in predicting success and can play a role in study major choice processes to foster success beyond subjective forecasts. Therefore, as a next step I first establish the predictive value of subjective forecasts for motivation and well-being (Goal 2) before I look at the boundaries of subjective forecasts and the potential value of objective forecasts beyond subjective forecasts.

Subjective Forecasts' Potential for Predicting Major-Specific Well-Being.

Regarding the goal to establish the predictive value of subjective forecasts for intrinsic motivation and well-being (i.e. Goal 2), manuscript 2 provides an elaborate answer. The results of Manuscript 2 showed that subjective major-specific well-being forecast predicted intrinsic motivation, positive affect and satisfaction. These results are in line with past findings in the affective forecasting literature indicating that people can predict their well-being in a certain future situation to some extent even before they have experienced the respective situation (e.g., Gilbert et al., 1998; Wilson & Gilbert, 2003) and show that this also applies to the study major context, possibly because prospective students had a many

years of collecting information about themselves in different learning environments. I obtained these results while controlling for trait well-being, suggesting that prospective students do not only project their trait average well-being into the future but that they probably have some more insight about the specific future situation. However, prospective students' wellbeing forecast left more than 95% of variance in intrinsic motivation and well-being in their study major unexplained. This finding is not surprising as the affective forecasting literature additionally states that many biases (such as inaccurate lay theories or misconstrual) prevent people from making accurate predictions (for an overview, see Wilson & Gilbert, 2003). Thus, it is likely that those biases also are at work in the context of choosing a study major and might prevent prospective students from accurately forecasting their well-being in a specific major. Further evidence for this assumption provides our finding that prospective students' subjective interest-major fit forecast improved the prediction of intrinsic motivation, negative affect, and study satisfaction by up to two percent. This finding shows that using a predictor based on an empirically supported cause of later well-being (person-environment fit in the context of choosing a study major; e.g., Cable & DeRue, 2002; Etzel & Nagy, 2016), improved the predictions of intrinsic motivation and well-being. A potential explanation for this finding could be that inaccurate lay theories are at work when prospective students decide on a study major (e.g., choosing a study major for materialistic reasons; Janke et al., 2021) and that reducing those biases by focusing on an empirically supported cause for later well-being therefore improves the prediction of major-specific well-being.

Objective Forecasts' Potential for Predicting Success. Regarding the question whether objective forecasts can predict success beyond subjective forecasts (i.e. Goal 3), the results of Manuscript 2 provide a first answer. The results showed that objective interest-major fit forecast could incrementally explain up to six percent of variance of intrinsic motivation, positive affect, and study satisfaction in a study major beyond

subjective forecasts. These results indicate that using a predictor that can be assumed to reduce a potential misconstrual of the future situation (in this context, a misconstrual of the undergraduate psychology major) can improve the prediction of students' intrinsic motivation and well-being. This finding is in line with past findings and theoretical argumentations suggesting in different contexts that misconstrual of the future situation in question biases affective forecasts of the respective situation (Wilson & Gilbert, 2003) indicating that this is also a problem in prospective students' process of deciding on a study major. Additionally, it adds to the existing literature a possible way to reduce such misconceptions in the study major decision context to improve forecasts. Therefore, in sum, these findings align with the theoretical argumentations and empirical evidence suggesting in various contexts that subjective forecasts are biased (e.g., Hasenberg & Schmidt-Atzert, 2013; Wilson & Gilbert, 2003) and that objective interest-major fit forecasts can be assumed to be less biased than subjective forecasts in predicting success because they are a) based on an empirically supported factor for predicting later success, namely interest-major fit (Etzel & Nagy, 2016), and b) are assessed objectively based on a valid construal of the respective major.

The results of Manuscript 3 can extend the answer on the question whether objective forecasts can predict success beyond subjective forecasts (i.e. Goal 3). Study 1 indicates that the previous theoretical argumentations regarding objective interest-major fit forecast as a predictor of intrinsic motivation and well-being in the first semester can be extended to objective *skill*-major fit forecast and the objective *valence of expectation*-major fit forecast as predictors of *overall success* in later semesters. Specifically, objective skill-major fit forecast and the objective valence of expectation-major fit forecast predicted achievement for third semester students and the valence of expectation-major fit forecast additionally predicted study satisfaction. These results are in line with past findings showing that objective skill-major fit forecast and the objective valence of expectation-

major fit predict success (e.g., Hasenberg & Schmidt-Atzert, 2013; Julian, 2005). Especially regarding the objective valence of expectation-major fit forecast this finding is also in line with theoretical argumentations from the Person-Environment Fit literature in the work context that a lack of interesting content in the environment is associated with less satisfaction, while an abundance of interesting content in the environment can also be associated with greater satisfaction (Wiegand et al., 2021). This differentiation between excess and deficiency of interests in study content has also been assumed to be highly relevant for later success (Hasenberg, 2012; Karst et al., 2017) and has to the best of my knowledge for the first time been empirically shown in the study major choice context in Study 1 of my dissertation program. Further extending past findings, the results of Study 1 showed that these two objective forecasts predict success beyond subjective forecasts, providing further evidence that objective forecasts can be assumed to be less biased than subjective forecasts in predicting success. Building on the findings from Study 1, the question remains as to whether objective forecasts, when displayed in feedback to prospective students, play a role in study major choice processes beyond subjective forecasts and as to what role feedback on objective forecasts plays for success.

Objective Forecasts' Potential for Predicting Successful Major Choices.

Regarding the goal to establish the role of objective forecasts, when displayed in feedback to prospective students, for study major choice processes beyond subjective forecasts and the role of feedback on objective forecasts for success, the results of Manuscript 3 provide an elaborate answer. The results of Study 2 and Study 3 showed that higher objective interest-major fit forecast, when displayed in feedback to prospective students, predicted higher intrinsic value and higher expectations of success beyond initial motivation and subjective forecast. A more positive objective valence of expectation-major fit predicted higher intrinsic value and higher likelihood for enrollment. Meanwhile, higher objective skill-major fit forecast predicted higher intrinsic value, expectations of success, intention to

choose the major and likelihood of enrollment beyond initial motivation and subjective forecast. These findings align with theoretical argumentations based on Cognitive Dissonance Theory (Festinger, 1957; Karst et al., 2017; Merkle, Bürkle et al., 2024) that objective expectation-major fit forecast, when displayed in feedback, might relate to cognitive dissonances with the initial expectations and motivation for a major which can be alleviated by changing the motivation for a major (Festinger, 1957; Karst et al., 2017; Merkle, Bürkle et al., 2024). Additionally, these results indicate that these theoretical argumentations can be applied to objective *interest*-major fit forecast, objective *skill*-major fit forecast, as well as the objective *valence* of expectation-major fit forecast. Displaying these objective forecasts in feedback can potentially also provide new information about what factors to consider for the study major choice process, therefore could also relate to dissonances and trigger additional change processes in motivation for a major.

Additionally, these findings align with past empirical findings that objective forecast, when displayed in feedback to prospective students, relates to prospective students' motivation for a major (Karst et al., 2017), predict changes in such motivation (Merkle, Bürkle et al., 2024) and in accordance with the Expectancy-Value Model of Achievement-Related Choices (Eccles et al., 1983; Eccles & Wigfield, 2002) predict enrollment (Niessen et al., 2016). Additionally, our results extend past findings by showing the predictive value of *objective* forecasts beyond *subjective* forecasts for motivation to choose a major and for enrollment. These findings harmonize with my extended theoretical argumentations that objective forecasts (because they can be assumed to be less biased in predicting success than subjective forecasts), when displayed in feedback to prospective students, can be assumed to relate to less biased motivation and less biased choices. Thus, the results of Studies 2 and 3 indicate that objective forecasts, when displayed in feedback to prospective students, can potentially reduce biases in motivation to choose a major and choices because objective forecasts could predict motivation and enrollment beyond subjective forecasts.

Study 4 showed that students who participated in an OSA and therefore received feedback regarding their objective forecasts experienced more intrinsic motivation, satisfaction and less dropout intention in their first semester and more achievement in their later semesters than students who did not participate in the OSA and did therefore not receive such feedback. Building on the previous findings, these findings are in line with my argumentation that prospective students who receive such feedback before enrollment - potentially relating to less biased/more fitting motivation to choose a major and less biased/more fitting choices - should experience a better total fit compared to prospective students who did not. Based on Person-Environment Fit Theory (e.g., Le et al., 2014) this better fit in turn should be related to more success (Etzel & Nagy, 2016). Additionally, these findings are in line with the idea that such feedback supports expectation management processes (Festinger, 1957; Merkle, Bürkle et al., 2024) which should prevent disappointment and therefore foster success. Further, these results harmonize with first empirical evidence relating self-reported usage of an online-self-assessment (displaying objective skill-major fit and objective expectation-major fit in feedback) to more study success (Thiele & Kauffeld, 2019) but extend these findings by using an objective indicator of tool usage compared to self-report and further indicators of objective forecasts.

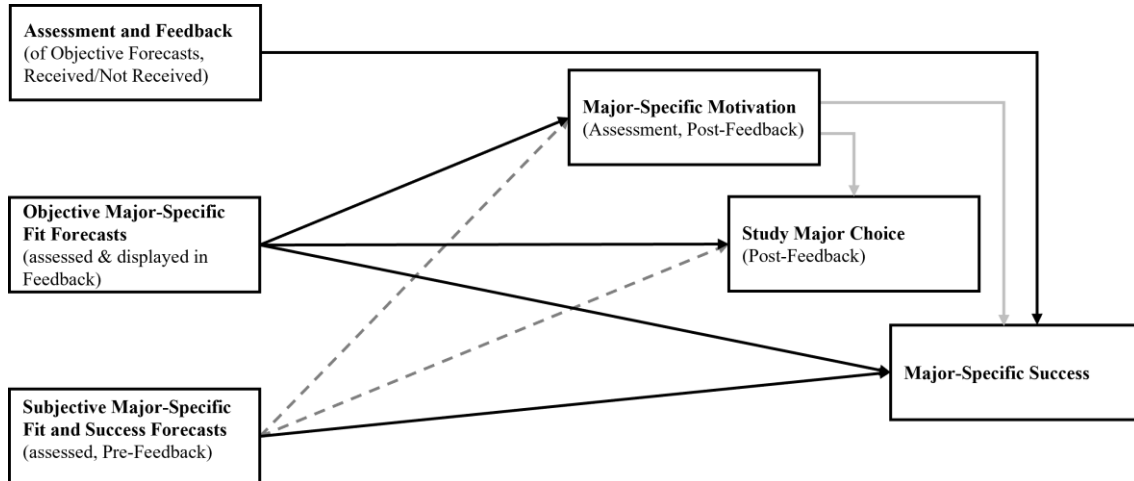
Thus, the results indicate that feedback on objective forecasts might support fit-oriented processes in the study major choice context and therefore might potentially be a good measure to reduce biases in the study (choice) process to foster success.

A Conceptual Model of Objective Major-Specific Fit Forecasts

The findings of my research program underline my general theoretical assumptions. Consequently, I propose a *Conceptual Model for the Role of Objective Major-Specific Fit Forecasts Beyond Subjective Forecasts for Study Major Choices and Success*, visualized in Figure 2.

Figure 2

Conceptual Model for the Role of Objective Major-Specific Fit Forecasts Beyond Subjective Forecasts for Study Major Choices and Success.



Note. Grey solid lines represent paths already established in the Expectancy-Value Model of Achievement-Related Choices (e.g., Eccles & Wigfield, 2002). Black solid lines represent new path added to the model to explain the role of forecasts. Grey dashed lines represent controls. This model represents a simplified visualization as no differentiations for specific objective major-specific fit forecasts (interests-, skill-, valence of expectation-major fit), specific indicators of major-specific motivation (intrinsic value, expectations of success), of major-specific success (intrinsic motivation, study satisfaction, positive affect, negative affect, dropout intention, achievement) and no temporal perspective (1st, 3rd, 5th semester) are incorporated.

As can be seen, I assume that subjective forecasts can predict success, and that objective forecasts can predict success beyond subjective forecasts. Additionally, I assume that objective forecasts, when displayed in feedback, predict motivation to choose a major and study major choice beyond subjective forecasts, and that receiving feedback regarding objective forecasts before enrollment is associated with more success compared to not receiving such feedback. While the empirical evidence is not yet robust enough to make definitive conclusions about this model, the findings offer a promising foundation for future research in this area.

Boundary Conditions, Limitations and Strengths

The present research indicated some important boundary conditions for my proposed conceptual model. Regarding the predictive value of objective forecasts for success (Goal 3), not all objective forecasts significantly improved the predictions of all indicators of success beyond subjective forecasts. The results of Study 1 showed that objective interest-major fit forecast predicted motivation, positive affect and satisfaction in the first semester only, while objective skill-major fit forecast predicted achievement only, and the valence of expectation-major fit forecast additionally predicted satisfaction in the third semester. These findings are in line with past findings on the specificity of interests and skills for specific success outcomes (interests are more strongly related to motivation and well-being, while skills are more strongly related to achievement; Etzel & Nagy, 2016), which speaks for the relevance of both constructs for different success facets. Additionally, the results potentially indicate a different timing of the relevance of the constructs. It seems like objective skill-major fit forecast, and the objective valence of expectation-major fit forecast might be more relevant in later semesters, because it might take some time until disappointed expectations unfold and until students get their first grades. However, objective interest-major fit forecast might be relevant from the very beginning of the studies, starting with the first work on course content. The lack of

predictive value of objective interest-major fit forecast for success in later semesters could be explained with the fact that interests can change over time (Stoll et al., 2021) and therefore the relevance of initial interests might diminish throughout the course of the studies. This could also explain the findings of Study 4 regarding my fourth goal showing differences between the groups with or without feedback in intrinsic motivation, satisfaction and dropout intention only in the first semester and not in the later semesters anymore while differences in achievement are found in the later semesters. In sum, this calls for further research with measurement points taken at shorter intervals to examine the potential change of objective interest-major fit forecast throughout the first two semesters in a more fine-grained way. Additionally, future research should test more specific hypotheses considering the special relationships between objective interest-major fit forecast and intrinsic motivation/well-being as well as between objective skill-major fit forecast and achievement. If future research contributes further evidence for my preceding arguments the conceptual model could be refined by including also a temporal perspective, and by considering the specificity of interests and skills.

Additionally negative indicators of success could barely be predicted with objective major-specific fit forecasts, neither negative affect in Manuscript 2 nor dropout intention in Manuscript 3. One possible explanation for this finding might be that the undergraduate psychology major in Germany is very popular, leading to many applications and harsh selection criteria by universities. Therefore, means of interests and skills are generally very high and variance in interests and skills is rather restricted in psychology⁸. Therefore, their predictive value is – as a statistical consequence - necessarily lower, especially for negative

⁸ The means and ranges of the scores in this sample are as follows: interest-major fit forecast (mean = 1.62, range = -0.33 to 2.92 on a scale ranging from -3 to +3), skill-major fit forecast (mean = 0.74, range = 0.29 to 1.00, on a scale ranging from 0 to 100% correctly solved), and High School-Grade Point Average (mean = 1.46, range = 1.0 to 2.60, on a scale ranging from 1 to 6).

outcomes because according to the control-value theory of achievement emotions (Pekrun, 2006) negative emotions only occur for negative values and as the range of values for this sample is mainly in a positive range, negative outcomes might not be predicted equally good.

However, unexpectedly the results of Study 1 showed that higher objective interest-major fit forecast significantly predicted more dropout intention and more negative affect in the third semester. This finding could indicate that it might be possible to have even too much objective interest-major fit forecast, probably relating to over-engagement with the content and subsequent negative impacts on success. This is in line with theories and research in the organizational context arguing and showing in terms of need-supply fit and value-fit that sometimes excess might also lead to less success (Edwards et al., 1998; Karakurum, 2005). Further indicators for this interpretation are that additional analysis showed that higher objective interest-major fit forecast predicted higher negative affect for third semesters (see additional analysis for Study 1 in attached Manuscript 3) and predicted higher perceived costs in the orientation phase (i.e. they expect to invest a lot of time and effort for the studying in the respective major, see additional analysis for Study 2 in attached Manuscript 3). Therefore, future studies should test these hypotheses in other possible less restrictive majors or majors which are commonly used while waiting on an enrollment spot in another major in order to retrieve a sample with a lower mean and larger variance for objective forecast scores. If future studies with lower mean values show positive relationships between objective interest-major fit forecast and dropout intention, alongside the negative relationships observed at higher mean values in the present study, the model would need to be revised from assuming linear associations to considering potential curvilinear relationships.

Regarding the potential role of objective forecasts' for predicting successful major choices (Goal 4), objective interest-major fit forecast did not predict intention to choose a

study major (Study 2) or study major choice (Study 3) beyond subjective forecasts. This finding warrants further attention, particularly when considered alongside the results from Manuscript 2 which demonstrated that objective interest-major fit forecast can predict motivation, positive affect, and study satisfaction in the first semester beyond subjective forecasts. Despite being presented with objective interest-major fit forecasts—shown to improve the prediction of prospective students' well-being beyond their own subjective forecasts—prospective students seem to resist changing their study major choice.

This resistance can be further understood through the lens of Cognitive Dissonance Theory. According to this theory, changing one's beliefs and behaviors (in this context, motivation and choice of a study major) is just one way to reduce dissonance. Alternative strategies include rejecting dissonant information (Harmon-Jones & Mills, 2019) or trivializing its importance (Simon et al., 1995). For instance, prospective students might alleviate their dissonance by dismissing the validity of the assessment of their objective forecasts or downplaying the significance of objective interest-major fit forecast for success, rather than changing their motivation or study major choice. This perspective would suggest the need for developing and evaluating interventions that make the rejection or trivialization of information less convenient. For example, enhancing the explanation of the value of online-self-assessments and the importance of an interest-based study choice could encourage prospective students to incorporate this feedback into their decision-making process. However, the positive evaluation of the interest test reported in Manuscript 1 challenges this explanation.

Alternatively, students may not change their intentions because they perceive the cost of switching their choice of major as too high or other values are so high undermining the lower objective interest-major fit forecast. In the context of the psychology major, the utility value, referring to the perceived usefulness of the study major for future benefits (Merkle, Bürkle et al., 2024) might be especially relevant. This is because, in Germany,

studying psychology is the sole path to becoming a licensed psychotherapist for adults. Consequently, many prospective students aspiring to pursue this profession are likely to choose this major regardless of the feedback they receive from an online-self-assessment. Furthermore, in some universities, prospective students had to complete this assessment and feedback as a requirement for their application. Consequently, they completed the assessment not to inform their study choice, but as a required part of their late-stage decision-making process (the application phase). As a result, they may not or no longer be willing to change their decision. This suggests that the current samples were potentially more resistant to changing their mind and their study major decision than other prospective students' might be. These arguments suggest that the predictive value of objective forecasts could be even stronger for other study majors and at the same time can serve as another explanation for the lack of an association between objective interest-major fit forecast and motivation to choose a major and enrollment. This calls for further research into other majors and earlier intervention points, such as for example targeting the last two years before the completion of secondary education

Another explanation for this finding could be that due to the design of the present research, I look at the data from an interindividual perspective while an intraindividual perspective would be more suitable. Therefore, small differences in interest and skills between prospective students (especially if in a positive range) even though relevant for later success on a between perspective might not translate to actual differences in major choice because from an individual perspective the respective major could still be the relatively best fitting major choice compared to other majors. Therefore, in future studies objective interest-major fit forecast should be assessed regarding multiple majors to be able to determine a relative objective interest-major fit forecast of one major compared to other majors.

Until now, such an undertaking seemed quite complex because, on one hand, the development of objective assessments requires a significant amount of time for researchers. Simultaneously, completing these tests can be time-consuming for prospective students, making such tests less appealing. However, researchers suggested that recent advancements in artificial intelligence could help to develop these tests more efficiently (Merkle & Janke, 2024). For example, artificial intelligence procedures could be used to generate test items by analyzing the module handbooks of different study majors automatically, thereby saving a crucial step in the creation of such an assessment. Furthermore, as already common practice in skill tests (for a review see Vie et al., 2017), interest tests could also be designed adaptively so that prospective students do not need to answer all items; instead, based on their responses to previous items, the most appropriate next interest items would be selected to expedite the process. These innovative approaches could streamline both research and practice in this field in the future, suggesting that research should focus on further developing these methods (Merkle & Janke, 2024).

Additionally, the study design yielded some methodological limitations across all studies: First, the predictors in the longitudinal field study were not experimentally manipulated but were only observed and group assignment regarding receiving feedback versus not receiving feedback was not at random because before 2020 no participation in the OSA was possible, and after 2020 participation was mandatory for some universities but not for others. Therefore, I cannot exclude that our results are driven by potential third variables. However, while some of the features of the ecological valid field study limit the causal interpretation of the data, the field study also serves as a strength at the same time by demonstrating relationships and predictions in an ecologically valid setting accompanying real prospective students in their study choice decision process. This approach is rarely found in the context of study major choices where variables are often assessed retrospectively at the beginning of the first semesters and therefore can introduce

even more biases. Additionally, I made extensive efforts to control for potential confounding variables (e.g., High School-Grade Point Average, trait-well-being, motivation for a major assessed before OSA participation) and found robust results beyond those variables, further underscoring the relevance of my findings.

Another limitation of my research program is measurement accuracy. The assessment of the *objective valence of expectation-major fit forecast* is based on an estimation of the environment by experts (see Manuscript 1). However, those experts do not always agree and therefore, the objective valence of expectation-major fit forecast is not completely objective. However, it should still be more objective than prospective students' subjective forecasts only. Additionally, in my research, I conceptualized the relationship between the valence of expectation discrepancies and success as linear. However, according to Prospect Theory (Kahneman & Tversky, 1979), losses tend to have a greater psychological impact than gains. This suggests that disappointment in study major content (negative objective valence of expectation-major fit) may have a stronger influence on choices and success than positive surprises (positive valence of objective expectation-major fit). Taking this concept a step further, following Idson et al. (2000) who combine Regulatory Focus Theory (Higgins, 1997, 1998) with Prospect Theory (Kahneman & Tversky, 1979), one could even distinguish between different value functions: one for interesting study major content (more/less interesting content than expected) and one for uninteresting content (more/less of uninteresting content than expected). This assumption merits further investigation in future research, a line of research made possible by our new conceptualization of the objective *valence of expectation-major fit*.

Additionally, the items to measure *objective skill-major fit forecast* in Manuscript 3 are a small selection of example items from a large comprehensive enrollment test battery. Although this battery is presented as assessing major-specific aptitude, it includes

measures of general intelligence in addition to major-specific knowledge and skills. Hence, it is unclear to which extent the skills that were measured are major-specific. Future studies should examine whether such items truly measure objective skill-major fit forecast, for instance by assessing their discriminant validity for a specific major compared to other majors. While from the university perspective this is not relevant as long as the items predict success, it is crucial from students' perspective to determine whether prospective students should rely on these tests to inform their choice *between* different study majors. Additionally, from a theoretical perspective, it is important to possibly refine measurements models of general versus specific skills and knowledge.

Additionally, the *enrollment* indicator in Study 3 was measured by matching prospective students to the following survey waves during their studies. Therefore, prospective students declared as "not enrolled" may have entered the psychology major at another university or may have entered the study major but did not take part in any of the subsequent survey waves. The same applies for the indicator of measuring *OSA participation* in Study 4 which was derived by matching the students' sample to the prospective student's sample that participated in the OSA. Therefore, students in the "no OSA participation and no feedback" group could have taken part in the OSA but did not give permission to use their data for research or could have taken part in another OSA. However, if anything, this should make it difficult to detect effects and speaks to the robustness of the results I nonetheless found. Additionally, it represents a strength of my research program that I was able to assess these indicators of OSA participation and enrollment objectively (versus relying on retrospective self-reports) - an approach that is rarely undertaken (Hasenberg & Schmidt-Atzert, 2014). Nonetheless, in future studies, additional variables related to study choice and academic success could be considered. Specifically, data on applications and acceptances would be valuable, alongside the enrollment data I collected from the student survey waves, to help distinguish between

voluntary and involuntary non-enrollment. Moreover, objective data on dropout rates would be beneficial. Especially to determine the value of objective forecasts not only for the individual but also for institutions and society. While many indicators could be valuable for expanding my research, I want to emphasize that, to the best of my knowledge, this research program is the first to measure objective forecasts regarding interest-major fit, skill-major fit and the objective valence of expectation-major fit before enrollment and relate these to both subjective and objective indicators of the study major choice process and later success. Therefore, although the indicators used in the present research are not perfect, my comprehensive approach remains a notable strength of my research program.

Furthermore, the assessment of objective forecasts was designed specifically for the psychology major and therefore the sample was restricted to a sample of (prospective) psychology students. To generalize my findings, further studies across other majors are necessary. Replicating the results in other samples could lead to smaller effect sizes for enrollment because in this specific sample some prospective students had to participate in major-specific aptitude tests, whose results were a selection criterion for admission. Therefore, the relation of objective skill-major fit forecast to enrollment must be interpreted cautiously. It is also possible that the objective skill-major fit forecast I assessed was merely predictive of performance in the admission test of the respective universities. Therefore, it is also possible that prospective students did not alter their decisions based on feedback, but rather were forced to change their enrollment decision because they were not admitted into their desired study major. Therefore, effect sizes for objective skill-major fit forecast on enrollment in majors without major-specific aptitude tests could be smaller. However, the effect sizes could also be more pronounced in other majors due to the likely restriction of variance in objective forecasts in this specific major.

Therefore, my assumptions should be tested in further samples that include (prospective) students pursuing different majors.

Additional Directions for Future Research

In addition to the future research topics mentioned above, my program can be expanded in several ways.

Generalizability. Beyond examining a broader range of study majors, objective fit forecasts can also be used to examine how to support educational choices on other levels, such as choosing a vocational training program, pursuing a PhD, or selecting a profession. These future studies are important to show whether my conceptual model can be generalized on other career choices. Furthermore, additional studies should cover the complete career choice process, extending from the choice and success in the bachelor studies to include the choice and success in master's programs and even future career choices, as choosing a major is often associated with specific opportunities for future career paths. Therefore, success in these subsequent career paths should also be considered an important outcome in future research.

Methodology. While a specific test might show predictive validity for explaining variance in external constructs within the population, it might still not be advisable to base decisions solely on that test score from an individual perspective due to larger standard errors at the individual level and stronger demands regarding reliability (Moosbrugger & Kelava, 2012). Showing the test's sensitivity and specificity (e.g., for predicting later dropout) could support decisions regarding individuals (Ziegler & Lämmle, 2020). Additionally, as mentioned beforehand, to make the best choice from an individual's perspective, an intraindividual perspective is necessary (e.g., the best study major for an individual is the one in which they have the greatest relative interest among all possible majors). This is an important perspective to add to the interindividual approach I used in my research program (e.g., the less interested a prospective student is in a study major

compared to other prospective students, the less this prospective student should choose that major; neglecting whether it might still be the most interesting major for the prospective student relative to other majors). Additionally, it would be interesting to also use machine learning techniques in these studies to be able to build more fine-grained prediction models (e.g., weighing different content of the major to a different extent instead of building a sum score). However, for such analyses larger sample sizes are necessary to be able to use cross-validating techniques to validate obtained results and of course in a second step these methods need to be accompanied by explanatory studies again to understand the underlying processes beyond the results retrieved via machine learning techniques (De Vries et al. 2024; Yarkoni & Westfall, 2017).

Stability versus Changeability. Furthermore, it is important to examine the stability versus changeability of interests and skills. In my research program I focused on stability to make predictions for the future. However, the perspective of change, such as that missing skills can potentially be learned, or interests potentially evolve with increasing skills is important too, especially if interests and skills do not align in the study orientation phase. In the study orientation, focusing solely on stability and thus discouraging prospective students from pursuing a major they are interested in but lack skills for, or from choosing a major where they are highly skilled but lack interest, seems risky given past research indicating that interests and abilities can change (Stoll et al., 2021). Furthermore, focusing on stability is risky because it might oppose a growth mindset—believing in the potential for abilities to change (Claro et al., 2016)—which is crucial for change processes. Therefore, future research on study major choices should consider not only the stability of interests and skills but also interventions aimed at sparking and developing interest, as well as fostering a mindset that views lacking abilities as learnable (for a review and meta-analysis on growth mindset interventions see Burnette et al., 2023).

Assessment versus Feedback. Finally, in the longitudinal field study of my dissertation program the assessment and the feedback of objective forecasts were always conducted consecutively. Therefore, I cannot draw conclusions for my conceptual model on whether the assessment and/or the feedback produces the found associations with study major choice and success and therefore they are treated as a joint intervention in the conceptual model. A first study which distinguishes assessment and feedback of objective expectation-major fit forecast in the context of choosing a study major showed that both assessment and feedback play an important role in study major choice processes (Merkle, Bürkle et al., 2024). Further studies are needed to disentangle these specific effects regarding the assessment of objective interest-major fit forecast, objective skill-major fit forecast and the objective valence of expectation-major fit forecast. However, the results of my dissertation program indicate promising initial findings regarding the potential usefulness of assessment and feedback of objective forecast, therefore withholding feedback might pose ethical challenges. One way to address these issues in such studies would be to provide delayed feedback to the group that initially does not receive any feedback, as demonstrated by Merkle, Bürkle et al. (2024).

Bias Investigation. Additionally, it would be valuable to investigate biases in the forecasting process related to choosing a study major more deeply. While there is some direct evidence of biases concerning misconceptions about future study majors—evidenced by discrepancies between prospective students' expectation and the study major reality (e.g., Merkle, Bürkle et al., 2024), I tested my understanding of inaccurate lay theories regarding successful study major choices only indirectly in my research program by testing the predictive value of objective beyond subjective forecasts for success. Initial studies have indicated that various study choice motivations exist, not all of which are linked to later study satisfaction (Janke et al. 2021). To determine whether these different study motivations can be classified as inaccurate lay theories, an individual perspective is

necessary. It is possible that while a specific motivation may generally be associated with lower success, it could still be crucial for certain prospective students for whom this motive is particularly significant (Merkle, Schnettler et al., 2024). Therefore, future research could explore interindividual differences in the subjective importance of different study choice motivations and their influence on the relationship between the fulfillment of the respective motivation and later success to examine whether these differences in importance should guide study major choices or merely reflect inaccurate lay theories.

Practical Implications

In recent years, a variety of online-self-assessments has been developed to support prospective students in their study orientation process, allowing them to reflect on their expectations, interests, and skills (Hell, 2009). These tools are popular due to their accessibility and low cost, potentially having a relevant impact on prospective students' study major choices. Therefore, it is crucial to determine whether objective major-specific fit forecasts, as displayed in online-self-assessments, can effectively guide prospective students or potentially mislead them. My research program shows that objective interest-major fit forecast, the objective valence of expectation-major fit forecast, and objective skill-major fit forecast provide relatively good incremental predictive validity for success beyond prospective students' subjective forecasts and other established constructs in the field like High-School Grade Point Average (Manuscript 2 and 3). Additionally, feedback regarding objective forecasts is well-received (Manuscript 1) by students, predicts study major choices and assessment and feedback of objective forecasts relate to success (Manuscript 3). Assuming these results are generalizable, promoting the use of online-self-assessments to display objective forecasts in feedback could be a cost-effective way to support prospective students in their decision-making process.

Therefore, as a first step, new tests should be developed, or current tests should be improved. Existing measures of interest, skills, or expectations often have limitations in

assessing objective major-specific fit forecasts. Many focus on vocational interests (e.g., Allen & Robbins, 2010) rather than study major-specific interests even though study major specific interests have been shown to be a better predictor of success (Messerer, Merkle et al., 2023). They often require payment or in-person presence (e.g., Scholastic Assessment Test versus free online options), or lack rigorous validation. This is particularly concerning if prospective students rely on these measures – as my research program indicated they do.

Therefore, I recommend investing in the scientific development and continuous evaluation of both new and existing tools. This process could be guided by the structured scientific development process which I outlined in Manuscript 1, along with the accompanying research on prospective students' acceptance of the tool, as well as on the validity in predicting motivation change, enrollment and success as presented in Manuscripts 1, 2, and 3. Recent advancements in artificial intelligence may offer promising opportunities for the cost-efficient development of these tools on a large scale for multiple study majors.

Additionally, it is important to further encourage prospective students to use validated tools with assessments and feedback of objective major-specific fit forecasts. This could be facilitated by restructuring the current landscape of online-self-assessments, highlighting validated assessments, and potentially making their use a requirement for enrollment as is already practiced in some universities. More work should also be done in designing assessments and feedback mechanisms that better encourage prospective students to incorporate valid feedback into their study major decision-making.

From a long-term perspective, if these steps are successfully implemented and prospective students participate in online-self-assessments containing feedback on objective major-specific fit forecasts, they may more effectively self-select into study majors that align with their interests, skills, and expectations. This could increase their chances of successfully completing their chosen study major, which may ultimately help

prevent mental health problems (Davies & Elias, 2003; Faas et al., 2018) and save time and resources for students, institutions, and society as a whole (Gleeson et al., 2014).

A Preliminary Conclusion on Objective Forecasts in Educational Pathways

The purpose of the research program in my dissertation was to examine factors that can improve the prediction of major-specific success beyond subjective forecasts and therefore potentially support prospective students in choosing an educational pathway, namely their study major. I have argued that objective forecasts regarding interest-major fit, skill-major fit and the valence of expectation-major fit might be such factors. Hence, together with my co-authors, I developed an assessment (procedure) for objective major-specific fit forecasts which was well accepted among prospective students. Using this assessment, I found that objective forecasts regarding interest-major fit, skill-major fit and the valence of expectation-major fit predicted success and, when displayed in feedback to prospective students, predicted actual study choice beyond subjective forecasts, potentially fostering success. As the first research program to examine the predictive value of objective major-specific fit forecasts beyond subjective forecasts for major-specific success and to examine the role of these objective forecasts in the study major choice process, my research program underscores the advantages of these objective forecasts beyond subjective forecasts and identifies potential for future research into forecasting processes to support fit-oriented study major choices as well as online-self-assessment practices in the study orientation process.

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Appendix

Appendix A - Manuscript 1:

Merkle, B., Schiltenswolf, M., Kiesel, A. & Dickhäuser, O. (2021). Entwicklung und Validierung eines Erwartungs- und Interessenstests ($E \times I$ – Test) zur Erkundung studienfachspezifischer Passung in einem Online-Self-Assessment. [Development and validation of an Expectation-Interest Test ($E \times I$ - Test) to explore fit for a specific major in an online self-assessment]. *Zeitschrift für empirische Hochschulforschung: ZeHf*, 5(2), 162–183. <https://doi.org/10.3224/zehf.5i2.05>

Entwicklung und Validierung eines Erwartungs- und Interessenstests

($E \times I$ - Tests) zur Erkundung studienfachspezifischer Passung in einem Online-Self-Assessment

Development and Validation of an Expectation-Interest Test ($E \times I$ - Test) to Explore Fit for a Specific Major in an Online Self-Assessment

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Zusammenfassung

Realistische Erwartungen und Passung zwischen Interessen und Studieninhalten sind zentrale Ansatzpunkte bei der Steuerung von Studienwahlentscheidungen. In einem neu entwickelten fachspezifischen Erwartungs- und Interessenstest ($E \times I$ - Test) für Psychologie werden erstmals Erwartungsdiskrepanzen und Interessen kombiniert betrachtet und dementsprechend auch übertroffene oder enttäuschte Erwartungen erfasst und rückgemeldet. Die zu den Studieninhalten des neuen Verfahrens entwickelten Items konnten annähernd perfekt den Studienfachbereichen zugeordnet werden und deckten diese weitgehend vollständig und gleichmäßig ab. 2033 Studieninteressierte bearbeiteten den $E \times I$ - Test im Rahmen eines Online-Self-Assessments und fühlten sich danach informierter als vorher. Insgesamt bewerteten die Studieninteressierten das neue Verfahren positiv und 94% würden es weiterempfehlen. Auf Basis des vorgestellten Verfahrens für das Bachelor-Psychologiestudium könnten weitere $E \times I$ - Tests für die Orientierung in andere Studienfächer oder Berufe entwickelt und validiert werden, für welche sowohl spezifische Interessen als auch enttäuschte Erwartungen eine Rolle spielen.

Schlüsselwörter: Erwartungs-Interessenstest, Erwartungsdiskrepanzen, Interessen, Valenz der Erwartungsdiskrepanzen, Studierende-Studienfach Passung, Online-Self-Assessment

Abstract

Both, realistic expectations and fit between interests and study content are crucial to guide study choice decisions. A newly developed subject-specific Expectation-Interest Test ($E \times I$ - Test) for psychology considers expectation discrepancies and interests in combination for the first time. Thus, exceeded or disappointed expectations are assessed and reported back. It was shown that the newly developed items which represent study contents can be assigned almost perfectly to the study subject areas and cover them to a large extent completely and evenly. 2033 prospective students completed the $E \times I$ - Test as part of an online self-assessment and felt more informed afterwards than before. Overall, prospective students rated the new procedure positively and 94% would recommend it to others. Based on the presented procedures for the bachelor psychology studies, further $E \times I$ - Tests could be developed and validated for orientation to other fields of study or professions, for which both specific interests and disappointed expectations play a role.

Keywords: expectations-interest test, expectation discrepancies, interests, valence of expectation discrepancies, student-study subject fit, online self-assessment

1 Einleitung

Die Hochschullandschaft in Deutschland hat sich in den letzten Jahren stark weiterentwickelt. Es gibt eine immer größere Vielfalt an Studiengängen (Frankenberg, 2008) und eine steigende Zahl an Studienanfänger*innen (Statistisches Bundesamt, 2020). Allerdings entsteht bei Studieninteressierten zunehmend Unsicherheit hinsichtlich der Frage, welches Studienfach das richtige für sie ist (Hasenberg, 2012; Wolter, 2008). Die Unsicherheit bei der Studienwahl ist nicht überraschend, wenn man bedenkt, dass die Entscheidung für einen bestimmten Studiengang einen komplexen Informations- und Reflexionsprozess erfordert.

Gemäß der Person-Environment Fit-Theorie drückt sich Passung zwischen Studierenden und Studienfach unter anderem in der Passung zwischen Interessen und Studieninhalten aus, was wiederum die spätere Studienzufriedenheit beeinflusst (Cable & DeRue, 2002; Westermann & Heise, 2018). Zusätzlich spielt die Realitätsnähe der Erwartungen an das Studienfach eine wichtige Rolle für Studienerfolg (Hasenberg & Schmidt-Atzert, 2013). Somit müssen Studieninteressierte über ihre eigenen Interessen reflektieren und sich über die Angebote ihres angestrebten Studiengangs informieren, um ein akkurates Bild von sich selbst und von ihrem Studiengang zu gewinnen sowie etwaige falsche Erwartungen zu korrigieren (Hasenberg & Schmidt-Atzert, 2013). Und schließlich müssen sie diese beiden Bilder miteinander vergleichen und abwägen, ob der Studiengang der passende für sie ist. Dass dies häufig misslingt, zeigen die zahlreichen Studienfachwechsel und Studienabbrüche von Studierenden, die zu Beginn des Studiums nicht ausreichend informiert waren, mit den falschen Erwartungen ins Studium gestartet sind oder zu geringes Interesse am Studienfach hatten (Heublein, Hutzsch, Schreiber, Sommer & Besuch, 2010; Schiefele, Streblov & Brinkmann, 2007; Schmidt-Atzert, 2005).

Da Studienabbruch mit persönlichen und gesellschaftlichen Kosten verbunden ist, ist es sinnvoll, Studieninteressierte bei diesem Informations- und Reflexionsprozess zu

unterstützen (Frebort & Kubinger, 2008; Hasenberg, 2012). Dabei können Erwartungs- und Interessenstests in Online-Self-Assessments (OSAs) einen großen Beitrag leisten, da diese meist kostenlos, eigenständig und barrierearm bearbeitet werden können und somit für Studieninteressierte leicht zugänglich sind (Hasenberg & Schmidt-Atzert, 2014). Je nach der Phase im Entscheidungsprozess können Studieninteressierte dabei auf allgemeine oder fachspezifische Verfahren zurückgreifen (Heukamp, Putz, Milbradt & Hornke, 2009). Allgemeinere Verfahren liefern eine erste Orientierung, was generell in einem Studium erwartet wird und welche der vielen Studienfächer für einen Studieninteressierten in Frage kommen (z.B. *Orientierungstest*, Ministerium für Wissenschaft; vgl. Hell, 2009). Diese Verfahren basieren häufig auf dem RIASEC-Modell (Holland, 1997), welches Interessen in sechs grundlegenden Bereichen umfasst und damit zur Orientierung in einem breiten Range von Studiengängen genutzt werden kann. Zu diesem Zweck erhalten Studieninteressierte eine Empfehlung, welche der vielen Studiengänge zu ihren Interessen passen. Somit sind diese Verfahren besonders zu Beginn des Entscheidungsprozesses relevant (Hasenberg, 2012; Heukamp et al., 2009). Je konkreter der Studienwunsch ist, desto wichtiger sind fachspezifisch-konfirmierende Verfahren, in denen die Passung für ein konkretes Studienfach überprüft werden kann (z.B. *Online-Self-Assessment des Bachelorstudiengangs Psychologie*, Universität Marburg; vgl. Hasenberg & Schmidt-Atzert, 2014). Ziel dieser Gruppe von Verfahren sollte es sein, Interessen und Erwartungsdiskrepanzen (Abweichung der Erwartung der Teilnehmenden von der Einschätzung der Expert*innen) hinsichtlich studienfachspezifischer Themen und Inhalte adäquat zu messen, darauf basierend den Studieninteressierten ein realistisches Bild von sich selbst und von ihrem Studiengang rückzumelden, um letztlich Studienwahlentscheidungen zu optimieren und Studienerfolg zu fördern.

Bisherige Forschung konnte zeigen, dass ein größeres Ausmaß an intrinsischer Studienwahlmotivation (z.B. Wahl eines Studienfachs aus Interesse) mit höherer

Studienmotivation, höherer Studienzufriedenheit und geringeren Studienabbruchintentionen in Verbindung steht (Janke, Messerer, Merkle & Krille, 2021; Kegel et al., 2020). Somit sollte das Interesse einen wichtigen Faktor bei der Studienwahlentscheidung darstellen, um ein erfolgreiches Studium zu ermöglichen. Die Optimierung von Studienwahlentscheidungen hinsichtlich der Interessenkongruenz sollte dem Studienerfolg zuträglich sein. Forschung im Bereich der Erwartungstests zeigte, dass die Bearbeitung eines fachspezifischen Erwartungstests mit anschließender Rückmeldung mit einem höheren Informationsstand und realistischeren Erwartungen korrespondierte (Vent & Erdfelder, 2009), womit schließlich auch größerer Studienerfolg in Verbindung stehen sollte (Burkhardt & Hagemeister, 2018; Hasenberg & Schmidt-Atzert, 2013). Dennoch gibt es, wie sich nachfolgend zeigen wird, Defizite bestehender Verfahren. Basierend auf wissenschaftlichen Grundlagen adressieren wir diese Mängel und liefern vier neuartige Beiträge zur Erwartungs- und Interessensforschung sowie zur praktischen Anwendung von Erwartungs- und Interessenstests bei der Studienorientierung.

Der *erste Beitrag* unserer Arbeit liegt in der Konzeption eines Erwartungs- und Interessenstests, welcher Erwartungsdiskrepanzen und Interessen in Kombination misst und rückmeldet. Bisher wurden Erwartungsdiskrepanzen in der Forschung und Praxis von Erwartungstests isoliert betrachtet und somit lediglich falsche Erwartungen korrigiert oder rückgemeldet, zu welchem Ausmaß die Erwartungen der Studieninteressierten mit den Einschätzungen der Expert*innen übereinstimmen (Hasenberg, 2012; Karst, Ertelt, Frey & Dickhäuser, 2017). Mithilfe des hier vorgestellten Verfahrens kann zum ersten Mal gemessen und rückgemeldet werden, ob ein bestimmtes Studienfach die Erwartungen von Studieninteressierten übertrifft oder enttäuscht (Valenz der Erwartungsdiskrepanz). Dies ist relevant, da die Valenz der Erwartungsdiskrepanz sowohl die Studienwahlentscheidung als auch die spätere Studienzufriedenheit beeinflussen sollte (Hasenberg, 2012; Karst et al., 2017).

Der *zweite Beitrag* bezieht sich auf neue Validierungsmethoden für die Items von Erwartungs- und Interessenstests hinsichtlich ihrer Struktur, Vollständigkeit und Prototypizität. Mit Hilfe dieser Methoden wird in ersten empirischen Studien überprüft, ob die Items zu Studieninhalten eindeutig den zugehörigen Studienfachbereichen zugeordnet werden können und ob sie diese Studienfachbereiche ausreichend und gleichmäßig vollständig sowie gleichmäßig prototypisch abbilden.

Der *dritte Beitrag* ist konzeptioneller Natur und ergibt sich aus der Hochschulunabhängigkeit dieses fachspezifischen Verfahrens. Bisher sind fachspezifische Verfahren meist hochschulspezifisch angelegt (Hasenberg, 2012). Das bietet die Möglichkeit, auch hochschuleigene Marketinginteressen zu verfolgen, was teilweise auch explizit als Funktion von OSAs begriffen wird (Störk & Mocigemba, 2013). Da das neue Verfahren hochschulunabhängig ist, besteht diese Möglichkeit erst gar nicht. Außerdem ist das neue Verfahren durch seine Hochschulunabhängigkeit besonders geeignet für den großen Anteil an Studieninteressierten, die zunächst ihre allgemeine Passung für ein Fach erkunden wollen, bevor sie sich über standortspezifische Besonderheiten informieren (Hovestadt & Stegelmann, 2011).

Der *vierte Beitrag* dieses Manuskripts liegt schließlich darin, erste empirische Befunde zur Evaluation der Güte des gesamten neuen Verfahrens hinsichtlich der Akzeptanz, der Informiertheit und der Weiterempfehlung durch Studieninteressierte zu liefern. Jeder dieser vier Beiträge wird nachfolgend in je einem Kapitel erläutert.

1.1 Messung und Rückmeldung von Erwartungsdiskrepanzen und Interessen

Es gibt bisher keine einheitliche Struktur zur Verbindung von Erwartungs- und Interessenstests. An einigen Hochschulen werden auf fachspezifischer Ebene nur Erwartungstests durchgeführt und keine Interessenstests (z.B. *Fit4TU*, Technische Universität Braunschweig; vgl. Thiele & Kauffeld, 2019), wobei die Interessenstests manchmal auf fachunspezifischer Ebene vorgeschaltet sind, um die Auswahl an

Studienfächern auf einige passende zu begrenzen (z.B. *Study Finder Interessenstest und Erwartungscheck*, Universität des Saarlandes; vgl. Stoll & Spinath, 2015). An anderen Hochschulen werden auf fachspezifischer Ebene sowohl Erwartungen als auch Interessen abgefragt (z.B. *Online Studienwahl Assistent*, Universität Freiburg; vgl. Störk & Mocigemba, 2013), wobei nur beim *Bonner testMaker* (vgl. Sindern & Pietrangeli, 2009) Erwartungen und Interessen auch für dieselben Inhalte abgefragt werden, was jedoch von enormer Wichtigkeit für die Rückmeldung ist und in diesem Zusammenhang später detaillierter erläutert wird. Auch die konkrete Messung der Erwartungen und Interessen unterscheidet sich hinsichtlich der Skaleninstruktionen und Antwortoptionen stark über verschiedene OSAs hinweg. Interesse wird in fachspezifischen OSAs als Interesse an fachspezifischen Themen erfragt (z.B. *Bonner testMaker*) oder es wird nach einer Einschätzung der Wichtigkeit verschiedener Interessensbereiche für ein erfolgreiches Psychologiestudium gefragt (z.B. *Online Studienwahl Assistent*).

Die Verfahren zur Erfassung von Erwartungen sind ebenfalls heterogen. Bei manchen Erwartungschecks werden Aussagen über den jeweiligen Studiengang präsentiert, welche von den Studieninteressierten in einem dichotomen Antwortformat als richtige oder falsche Erwartungen klassifiziert werden sollen (z.B. *Bonner testMaker*). Bei anderen Erwartungstests kann man auf mehrstufigen Antwortformaten angeben, für wie treffend man verschiedene Aussagen über das Studium hält oder inwieweit man diesen zustimmt (z.B. *stimmt gar nicht bis stimmt völlig*, *Mannheimer Informationssystem für Studieninteressierte der Sozialwissenschaften* (MISS), Universität Mannheim; vgl. Vent & Erdfelder, 2009).

Allerdings ist dabei nicht eindeutig, was durch das Maß der Zustimmung zu einer Aussage über Studieninhalte erfasst wird. Es könnte ausdrücken, in welchem zeitlichen Ausmaß man einen bestimmten Inhalt im Studium erwartet, für wie wichtig man einen bestimmten Inhalt im Studienfach hält oder auch wie sicher man sich in dieser Erwartung

ist. Studieninteressierte könnten demnach bei einem Inhalt, den sie in einem großen zeitlichen Ausmaß im Studium erwarten, sich aber dessen unsicher sind, eine mittlere Zustimmung angeben und würden damit denselben Wert erhalten wie Expert*innen, die sich sicher sind, dass dieser Inhalt einen durchschnittlichen Anteil am Studium einnimmt. Solche fehlende Eindeutigkeit in der Itemformulierung ist problematisch, da es zu einem unterschiedlichen Verständnis bei verschiedenen Personen führen kann, wodurch die Messungen nicht mehr vergleichbar sind (Jonkisz, Moosbrugger & Brandt, 2012). Eine weitere Schwierigkeit bei der Beantwortung und Interpretation bestehender Erwartungssitems ist, dass die Zustimmungswahrscheinlichkeit zu einer Aussage über einen Inhalt nicht nur durch das zeitliche Ausmaß dieses Inhalts beeinflusst wird, sondern auch durch die Einbettung des Inhalts. Beispielsweise bekommt die Einbettung „ein bestimmter Inhalt steht im Mittelpunkt eines Studiums“ eine geringere Zustimmungswahrscheinlichkeit als „ein bestimmter Inhalt wird im Studium behandelt“ trotz gleichen zeitlichen Ausmaßes im Studium. Um nicht nur falsche Erwartungen aufzuzeigen, sondern gleichzeitig ein möglichst akkurates Bild vom Studium aufzubauen, schlagen wir vor, über Zustimmungsabfragen zu bestehenden Aussagen hinauszugehen und stattdessen explizit die Erwartungen über das zeitliche Ausmaß verschiedener Inhalte in einem Studienfach zu erfassen.

Ähnlich divers wie die Messung von Erwartungen und Interessen gestalten sich auch die Rückmeldungen der Ergebnisse der fachspezifischen Tests. Gemeinsame Grundlage der meisten Rückmeldungen ist der Vergleich der Erwartungen von Studieninteressierten mit den Einschätzungen von Expert*innen (Studierenden und/oder Dozierenden). Bei „Korrekt-/Falsch-Aussagen“ wird rückgemeldet, welche Aussagen richtig eingeschätzt wurden und welche nicht; und gegebenenfalls werden noch weitere Informationen angeboten (z.B. *Study Finder Erwartungscheck*). Zusätzlich dazu geben einige Erwartungstests an, wieviel % der Erwartungen insgesamt zutreffend waren (z.B.

Online Studienwahl Assistent). Dies sagt zwar etwas über die Informiertheit eines Studieninteressierten aus, bietet den Studieninteressierten per se aber noch keine Information darüber, wie sie ihre Einstellung zum Studium und damit ihre Studienwahlentscheidung ändern sollten. Karst et al. (2017) diskutieren, dass eine Fehleinschätzung des Ausmaßes spezifischer Inhalte, in Abhängigkeit von der Wichtigkeit des betreffenden Inhalts für die Studieninteressierten, differentielle Effekte auf die Einstellung zum Studium haben sollte. Auch Hasenberg (2012) nimmt an, dass übertroffene Erwartungen zu mehr Studienzufriedenheit führen könnten.

Diese theoretischen Überlegungen im Rahmen der Studienwahl lassen sich durch Befunde im Bereich der Person-Environment Fit-Theorie im Bereich beruflicher Interessen stützen, die zeigen konnten, dass ein Mangel an interessanten Inhalten in der Umwelt zwar mit weniger Zufriedenheit einhergeht, ein Überfluss an interessanten Inhalten in der Umwelt aber auch mit mehr Zufriedenheit in Verbindung stehen kann (Wiegand et al., 2021). Dies verdeutlicht, wie wichtig es in einem ersten Schritt ist, bei der Konzeptualisierung von Erwartungstests zwischen diesen beiden Formen von Misfit zu unterscheiden und dadurch Studieninteressierten mit Erwartungsdiskrepanzen zusätzlich rückmelden zu können, ob ihre Erwartungen enttäuscht oder übertroffen werden.

Gegenwärtig sind uns keine Erwartungs- und Interessenstests bekannt, welche dies leisten. Einige Tests, bei denen man graduell Zustimmung oder Erwartung ausdrücken kann, melden Studieninteressierten zumindest zurück, ob laut Expert*inneneinschätzung mehr oder weniger von einem Inhalt im Studium vorkommt, als von den Studieninteressierten erwartet. Diese Information über die Erwartungsdiskrepanz allein sagt allerdings nichts darüber aus, ob die Erwartungen der Studieninteressierten dadurch enttäuscht oder übertroffen wurden. Um diese Information zu vermitteln, muss man zusätzlich zur Erwartungsdiskrepanz hinsichtlich bestimmter Inhalte und zu den Interessen an bestimmten Inhalten auch eine Kombination von Erwartungsdiskrepanzen und

Interessen rückmelden. Dadurch wird berücksichtigt, dass Erwartungsdiskrepanzen hinsichtlich eines Inhalts, je nach Interesse am jeweiligen Inhalt, von unterschiedlicher Wertigkeit sein können. Diese neue Kombination wird nachfolgend als *Valenz der Erwartungsdiskrepanz* bezeichnet.

Dementsprechend werden im neuen Erwartungs- und Interessenstest drei Kennwerte voneinander abgegrenzt und separat erfasst: Das *Interesse der Studieninteressierten* (an bestimmten Studieninhalten); die *Erwartung der Studieninteressierten* (an das zeitliche Ausmaß bestimmter Studieninhalte); die *Expert*inneneinschätzung* (die faktische Realisation des zeitlichen Ausmaßes bestimmter Studieninhalte). Für die Rückmeldung lässt sich dann aus diesen Kennwerten im ersten Schritt die Erwartungsdiskrepanz berechnen, als Differenz der Expert*inneneinschätzung und der persönlichen Erwartung der Studieninteressierten. Die Valenz der Erwartungsdiskrepanz ergibt sich dann im zweiten Schritt aus der Erwartungsdiskrepanz multipliziert mit dem Interesse am jeweiligen Inhalt.

In Tabelle 1 sind Beispiele verschiedener Werte für Interessen, Erwartungsdiskrepanzen und die daraus resultierenden Valenzen der Erwartungsdiskrepanzen dargestellt, mit deren Hilfe wir im Folgenden die Bedeutung der Valenz der Erwartungsdiskrepanz erläutern. Eine negative Valenz der Erwartungsdiskrepanz ergibt sich für enttäuschte Erwartungen, die entstehen, wenn im Studium von einem bestimmten Inhalt, an dem man interessiert ist, weniger als erwartet vorkommt (Mangel, Wiegand et al., 2021; -18, siehe Tabelle 1 C) oder von einem Inhalt, an dem man überhaupt nicht interessiert ist, mehr vorkommt als erwartet (-18, siehe Tabelle 1 G). Dementsprechend sollte eine negative Valenz der Erwartungsdiskrepanz zu einer negativeren Einstellung zum Studienfach führen (geringeres Passungserleben, geringere Studienwahrscheinlichkeit) und letztlich auch zu geringerer Studienzufriedenheit. Eine neutrale Valenz der Erwartungsdiskrepanz entsteht, wenn die Erwartung der

Teilnehmenden über das zeitliche Ausmaß eines Inhalts mit dem realen Ausmaß des Inhalts laut Expert*inneneinschätzung übereinstimmt (0, siehe Tabelle 1 B, E, H). Da in diesem Fall keine Erwartungsdiskrepanz hinsichtlich des jeweiligen Inhalts vorliegt, können Erwartungen weder enttäuscht noch übertroffen werden und die Einstellung zum Studium sollte sich dementsprechend nicht ändern, unabhängig vom Interesse am jeweiligen Inhalt. Außerdem kann eine neutrale Valenz der Erwartungsdiskrepanz entstehen, wenn man einem Inhalt neutral beziehungsweise mit mittelmäßigem Interesse gegenübersteht (0, siehe Tabelle 1 D, E, F). In diesem Fall ist weder ein größeres zeitliches Ausmaß noch ein kleineres zeitliches Ausmaß dieses Inhalts relevant für die Einstellung zum Studium beziehungsweise die Studienzufriedenheit. Eine positive Erwartungsdiskrepanz beschreibt übertroffene Erwartungen, welche entweder dadurch entstehen, dass im Studium von einem bestimmten Inhalt, an dem man interessiert ist, mehr als erwartet vorkommt (Überfluss, Wiegand et al., 2021; 18, siehe Tabelle 1 A) oder von einem Inhalt, an dem man überhaupt nicht interessiert ist, weniger vorkommt als erwartet (18, siehe Tabelle 1 I). Dies sollte dazu führen, dass man seine Einstellung gegenüber dem Studienfach positiv ändert (höheres Passungserleben, stärkere Studienwahlsicherheit) sowie zufriedener mit dem Studienfach ist.

Tabelle 1

Beispielwerte für die Valenz der Erwartungsdiskrepanz als Kombination von Interesse und Erwartungsdiskrepanz

Interesse	Erwartungsdiskrepanz		
	mehr als erwartet ($\Delta > 0$ max. 6)	wie erwartet ($\Delta = 0$)	weniger als erwartet $\Delta < 0$ (min. -6)
hoch (max. +3)	18 (A)	0 (B)	-18 (C)
mittel (0)	0 (D)	0 (E)	0 (F)
niedrig (min. -3)	-18 (G)	0 (H)	18 (I)

Anmerkung. Δ bezeichnet die Differenz zwischen der Expert*innen-

einschätzung und der persönlichen Erwartung der Studieninteressierten. Unter

Zugrundelegung eines 7-stufigen Antwortformats bei der Erfassung dieser

Kennwerte beträgt die maximale Differenz 6 beziehungsweise -6.

Der erste Beitrag der vorliegenden Arbeit besteht demnach darin, einen fachspezifischen Interessens- und Erwartungstest vorzustellen, welcher die Valenz der Erwartungsdiskrepanz erfassen und rückmelden kann, indem er Interesse an Studieninhalten und Erwartungsdiskrepanzen hinsichtlich des zeitlichen Ausmaßes dieser Inhalte in Kombination betrachtet. Aufgrund der Verknüpfung von Erwartungen mit Interessen wird der neu entwickelte Test als Erwartungs- \times Interessenstest bezeichnet (E \times I - Test).

1.2 Entwicklung und Validierung von Items

Zusätzlich zur Festlegung auf ein übergeordnetes Konzept zur Erfassung und Rückmeldung von Erwartungen und Interessen stellen die Entwicklung und Validierung der konkreten Items sowie die Erhebung und Validierung der Expert*inneneinschätzung weitere kritische Faktoren bei der Entwicklung von fachspezifischen Erwartungs- und Interessenstests dar. So wie es keine Standardstruktur für Erwartungstests gibt, so gibt es auch kein allgemein anerkanntes Standardvorgehen bei deren Entwicklung und Validierung. Ein möglicher Prozess besteht in der Durchführung von hochschulinternen

Workshops mit Studierenden, Dozierenden und Beratenden für das jeweilige Fach, bei welchen verschiedene Items generiert werden, von denen dann die relevantesten in den Erwartungstest aufgenommen werden (z.B. Stoll & Spinath, 2015). Vent und Erdfelder (2009) wendeten ein alternatives Verfahren zur Auswahl der Iteminhalte an, bei welchem zunächst basierend auf ausgiebigen Recherchen von Lehrbüchern, Vorlesungsverzeichnissen, Studieneinführungsliteratur und Prüfungsordnungen zentrale Studieninhalte herausgearbeitet und durch benötigte Vorkenntnisse sowie spätere berufliche Möglichkeiten ergänzt wurden. Um auch häufige falsche Erwartungen der Studieninteressierten an den Studiengang zu inkludieren, wurden zusätzlich Studieninteressierte nach ihren Erwartungen gefragt. Schließlich wurden alle gesammelten Inhalte von Lehrenden und Studierenden auf Vollständigkeit überprüft (Vent & Erdfelder, 2009). Zusätzlich dazu wurde die zugrundeliegende Struktur der Erwartungsisems überprüft, weil auf Basis dieser Struktur Erwartungsisems beim Feedback in Oberkategorien zusammengefasst werden (z.B. Wirtschafts- und Werbepsychologie, Anwendungsfelder, etc. im *Mannheimer Informationssystem für Studieninteressierte der Sozialwissenschaften* (MISS)). Bisher wurde für die Überprüfung dieser Struktur getestet, ob die Antworten der Studieninteressierten sich faktorenanalytisch in die erwarteten Kategorien einteilen (Kossner, 2015). Als letzter wichtiger Schritt wurden Expert*inneneinschätzungen für das Ausmaß der Studieninhalte eingeholt, welche in der Rückmeldung mit der Erwartung der Studieninteressierten kontrastiert werden (vgl. Stoll & Spinath, 2015; Vent & Erdfelder, 2009). All dies zeigt, dass es bereits erste Bestrebungen gibt, eine fundierte Itementwicklung und -validierung zu betreiben. Gleichzeitig weisen die bisherigen Vorgehensweisen noch einige Lücken auf.

Die faktoranalytische Betrachtung von Items (Vent & Erdfelder, 2009) ist kritisch zu bewerten, da sich dadurch Faktoren von Inhalten bilden sollten, die in einem ähnlichen Ausmaß von Studieninteressierten im Studium erwartet werden. Dies ist unter anderem

problematisch, weil die so gebildeten Faktoren die systematischen, gegebenenfalls falschen Vorstellungen der Studieninteressierten widerspiegeln und nicht die Studienrealität. Daher schlagen wir vor, die Struktur der Items mithilfe von Expert*innen zu überprüfen, welche die zu verschiedenen Studieninhalten entwickelten Items den vorher definierten Oberkategorien (Fachbereiche eines Studienfachs, z.B. Klinische Psychologie, Pädagogische Psychologie, etc.) zuordnen sollen. Eine eindeutige Zuordenbarkeit der Items zu jeweils einer Oberkategorie spricht dafür, dass eine Zusammenfassung der betreffenden Items in die jeweilige Oberkategorie angemessen ist und demnach Studieninteressierte dabei unterstützen sollte, ein realistisches Bild vom Studium (gemäß dem Bild von Expert*innen) aufzubauen.

Zusätzlich zur Frage nach der Struktur der Items sollte auch sichergestellt werden, dass die Items das interessierende Merkmal – die Inhalte der Fachbereiche eines Studienfachs – möglichst vollständig abdecken und dass die Items in einem angemessenen Verhältnis zueinander stehen (Hartig, Frey & Jude, 2012). Dies ist nicht nur für die inhaltliche Validität wichtig, sondern auch dafür, dass die Studieninteressierten ein realistisches Bild vom Studienfach erhalten, was besonders bei (ungleich) unvollständiger Repräsentation verschiedener Studienfachbereiche nicht möglich wäre. Demnach sollte auch die Vollständigkeit und Prototypizität der Items überprüft werden.

Nachdem die Items zu den Studieninhalten finalisiert sind, werden die Einschätzungen der Expert*innen zu den betreffenden Inhalten eingeholt und gemittelt. Hier wurde oft mit kleineren Gruppen von Expert*innen gearbeitet, die im Rahmen von Workshops um ihre Einschätzungen gebeten wurden (Stoll & Spinath, 2015). Wir halten es für problematisch, hier mit sehr kleinen Stichproben zu arbeiten, und empfehlen, für präzisere Schätzungen auf möglichst groß angelegte Studierenden- und Dozierendenbefragungen zurückzugreifen (Leonhart, 2017). Allerdings sollte vor einer Zusammenfassung der Studierenden- und Dozierendenratings überprüft werden, ob diese

eine homogene Expert*inneneinschätzung bilden oder systematische Abweichungen vorliegen. Dozierende unterscheiden sich von Studierenden beispielsweise dahingehend, dass das eigene Studium schon länger zurückliegt als bei den Studierenden, wobei sie dafür längere Erfahrung an der Hochschule in einem konkreten Studienfachbereich vorweisen können.

Angesicht dieser aufgezeigten Schwierigkeiten in der Forschung und Praxis der Entwicklung von OSAs besteht der zweite Beitrag dieser Publikation darin, zusätzliche Methoden zur Entwicklung und Validierung von Items sowie die Erhebung und Validierung der Expert*inneneinschätzung vorzustellen, die bei der Entwicklung neuer Erwartungs- und Interessenstests wichtig sind.

1.3 Hochschulunabhängigkeit

Sowohl das Vorgehen bei der Messung und Rückmeldung von Erwartungsdiskrepanzen und Interessen als auch das Vorgehen bei der Entwicklung und Validierung von Items können von den bisher existierenden fachspezifischen Verfahren genutzt werden, die von einzelnen Hochschulen speziell für die eigenen Studienfächer erstellt wurden und damit zu den *fach- und hochschulspezifischen* Verfahren zählen (z.B. *MISS*). Diese Verfahren sind gut geeignet für alle Studieninteressierten, die bereits entschieden haben, an welcher Hochschule sie konkret studieren möchten und überprüfen möchten, welches Fach an der jeweiligen Hochschule am besten zu ihnen passt. Viele Studierende entscheiden sich allerdings zuerst für ein Studienfach, bevor sie sich auf eine bestimmte Hochschule festlegen (Hovestadt & Stegelmann, 2011). Demnach sind in einem ersten Schritt Verfahren relevant, die dabei helfen, die Frage zu beantworten, ob ein bestimmtes Studienfach unabhängig von einer bestimmten Hochschule zu einer bestimmten Person passt, die sich für ein Studium interessiert (fortan als

studienfachspezifisch, hochschulunabhängig bezeichnet)¹. Leider mangelt es an solchen Verfahren, obwohl diese zusätzlich den Vorteil haben, dass etwaige Marketinginteressen von spezifischen Hochschulen, welche in OSAs auch verfolgt werden können, in den Hintergrund treten (Störk & Mocigemba, 2013). Dadurch kann ohne Interessenskonflikt adäquat sowohl auf beliebte als auch unbeliebte Studieninhalte eingegangen werden, was wichtig ist, um die Erwartungen von Studieninteressierten möglichst gut an die Realität anzupassen, selbst wenn dies – entgegen des Marketinginteresses - Studieninteressierte von einer Bewerbung abhalten könnte.

Der dritte Beitrag dieser Arbeit ist es, einen fachspezifischen Erwartungs- und Interessenstest vorzustellen, der es Studieninteressierten erlaubt, ihre Passung zu einem spezifischen Studienfach unabhängig von etwaigen hochschulspezifischen Besonderheiten zu überprüfen.

2 Entwicklung des Erwartungs- und Interessenstests (E × I - Test)

Der hier vorgestellte E × I - Test wurde im Rahmen eines Projekts zur Entwicklung eines neuen Studierendenauswahlverfahrens für Psychologie in Baden-Württemberg (*STAV-Psych BaWü*) für ein OSA speziell für das Bachelor-Psychologiestudium entwickelt (*OSA-Psych*). Das Vorgehen zur Entwicklung und Validierung der Items, der Fokus auf Hochschulunabhängigkeit sowie das Konzept zur Kombination von Erwartungen und Interessen im Assessment und in der Rückmeldung sind allerdings allgemein für die Entwicklung von fachspezifischen Erwartungs- und Interessenstests relevant und können auf andere Studienfächer übertragen werden.

¹ Hasenberg (2012) stellte zudem bereits fest, dass bisher keine studienfachspezifischen und hochschulübergreifenden Verfahren existieren. Solche Verfahren wären in einem zweiten Schritt hilfreich, um die Frage zu beantworten, *an welcher Hochschule* ein ausgewähltes Studienfach studiert werden sollte (nach Konfirmierung des Studienfachs, zur Orientierung hin zu einem Hochschulstandort).

2.1 Literaturrecherche zur Auswahl der Inhalte

Den ersten Schritt im Prozess der Entwicklung der Items stellte eine systematische Recherche zu den Inhalten des jeweiligen Studienfachs dar, in diesem Fall den Inhalten des Bachelor-Psychologiestudiums unabhängig von der spezifischen Hochschule. Um zu gewährleisten, dass alle zentralen Inhaltsbereiche des Bachelor-Psychologiestudiums abgedeckt werden, legten wir als Basis für die Auswahl unserer Items das Rahmencurriculum zugrunde, das für dieses Studienfach von der entsprechenden Fachgesellschaft (Deutsche Gesellschaft für Psychologie, DGPs) empfohlen wird. Daraus extrahierten wir die Studienfachbereiche, die allen Hochschulen mit DGPs Gütesiegel gemeinsam sind, und fassten die zugehörigen Studieninhalte zusammen. Dabei nutzten wir hochschulunabhängige Quellen (z.B. Lehrbücher) sowie hochschulspezifische Quellen (z.B. Modulkataloge und Items bestehender Erwartungs- und Interessenstests). Zusätzlich sammelten wir bei der Recherche Informationen zu sonstigen Studieninhalten, wie Arbeitsweisen, die übergeordnet für mehrere Studienfachbereiche der Psychologie wichtig sind, und zu Inhalten, die Studieninteressierte fälschlicherweise im Psychologiestudium erwarten. Basierend darauf erstellten wir für alle Studienfachbereiche jeweils vier Items, um systematisch und gleichmäßig alle zentralen Inhaltsbereiche des Studiums abzudecken.

Diese systematisch erstellten Items ergänzten wir durch eine flexible Anzahl an Items zu den übergeordneten Arbeitsweisen und falschen Erwartungen, welche später in der Rückmeldung unter der Kategorie „Sonstige Studieninhalte“ und „Häufige Irrtümer“ zusammengefasst wurden.

2.2 Zuordenbarkeit der Items zu Oberkategorien

Zur Testung der Zuordenbarkeit der Items zu den erwarteten Studienfachbereichen wurden Bewertungen von zwei Expert*innen (Personen mit abgeschlossenem Bachelor-Psychologiestudium aus zwei verschiedenen deutschen Hochschulen) eingeholt. Die Expert*innen sollten alle in randomisierter Reihenfolge präsentierten Items jeweils genau

einer Oberkategorie (einem Studienfachbereich) zuordnen. Im Anschluss daran wurde die Beurteilerübereinstimmung zwischen ihren Zuordnungen untereinander sowie im Vergleich zu unserer erwarteten Zuordnung mittels Cohens Kappa bestimmt. Die Beurteilerübereinstimmung zwischen den beiden Ratern lag bei $Kappa = .762$ ($p < .0001$), 95% KI [.639, .885], was für eine substanzielle Übereinstimmung spricht (Landis & Koch, 1977). Die Beurteilerübereinstimmung zwischen den jeweiligen Ratern und der erwarteten Zuordnung lag für beide Rater bei $Kappa = .848$ ($p < .0001$), 95% KI [.744, .952], was gemäß den Konventionen von Landis und Koch (1977) einer fast perfekten Übereinstimmung entspricht. Im Anschluss wurden mit beiden Ratern etwaige Differenzen bei der Zuordnung besprochen und darauf basierend zwei Kategorien zusammengeführt, die sich nicht klar trennen ließen, sowie bestehende Items trennschärfer formuliert. Nach diesen Schritten können alle Items genau einem Studienfachbereich zugeordnet werden. Dies ist zum einen wichtig, damit Studieninteressierte durch das gruppierte Feedback der Items in Studienfachbereiche ein adäquates Bild von der Struktur des Studiums aufbauen können. Zum anderen ist es eine wichtige Grundlage, um im nächsten Schritt testen zu können, ob die Inhalte verschiedener Fachbereiche eines Studienfachs ausreichend und gleichmäßig vollständig sowie gleichmäßig prototypisch abgedeckt werden.

2.3 Vollständigkeit und Prototypizität der Items

Um die Vollständigkeit und Prototypizität der Items zu überprüfen, wurden im Rahmen eines Vortests 19 Personen² mit einem abgeschlossenen Bachelor-Psychologiestudium von sieben verschiedenen Hochschulen befragt.

² Davon mussten zwei Personen ausgeschlossen werden, weil sie die Instruktionen missverstanden hatten und dadurch Antworten gegeben hatten, die logisch inkonsistent waren. Zwei weitere Personen wiesen jeweils auf zwei Variablen offensichtliche Tippfehler auf. Da die restlichen Daten dieser Personen logisch konsistent waren, wurden nur die Einzelangaben in Missings umcodiert, was bei einzelnen Analysen zu einer reduzierten Stichprobe führte.

Vollständigkeit. Um die Gesamtabdeckung der Items für einen bestimmten Studienfachbereich X zu erfassen, konnten die Absolvent*innen im Bereich von 0% bis 100% angeben, wieviel % der Zeit, die man im Studium für Studienfachbereich X (z.B. Sozialpsychologie) hat, durch alle vier dargebotenen Studieninhalte gemeinsam abgedeckt werden.

Prototypizität. Die Prototypizität der Items für den jeweiligen Studienfachbereich wurde erfasst, indem gefragt wurde, wieviel % der Zeit, die man im Studium für Studienfachbereich X hat, man sich mit den jeweiligen Studieninhalten beschäftigt (z.B. wie sich Einstellungen gegenüber anderen bilden und verändern können). Dabei wurde angemerkt, dass die Prozentzahlen der vier Items pro Studienfachbereich sich nicht zu 100% aufsummieren müssen. Sie können sowohl weniger als 100% ergeben – wenn einzelne Studieninhalte fehlen – oder auch mehr als 100% - wenn einzelne Studieninhalte sich überlappen und dadurch doppelt vorkommen.

Fehlende Inhalte. Zusätzlich dazu wurde bei Personen, die weniger als 100% bei der Gesamtabdeckung angaben, erfragt, welcher zentrale Studieninhalt des Studienfachbereichs X nicht durch die vier obenstehenden Studieninhalte erfasst wurde.

Ergebnis Vollständigkeit. Um zu testen, ob die verschiedenen Studienfachbereiche hinreichend vollständig abgedeckt wurden und ob sie sich in der Vollständigkeit ihrer Abdeckung voneinander unterscheiden, wurde eine ANOVA mit Messwiederholung mit Greenhouse-Geisser-Korrektur durchgeführt, in welcher die Vollständigkeitsangaben in % zwischen den verschiedenen Studienfachbereichen verglichen wurden. Es zeigte sich, dass sich die Vollständigkeitsangaben nicht statistisch signifikant zwischen den einzelnen Studienfachbereichen unterscheiden, $F(4.47, 62.62) = 1.60, n.s.$ Zusätzlich zeigte sich deskriptiv in den *Vollständigkeitsratings über alle Studienfachbereiche hinweg*, dass alle Studienfachbereiche durchschnittlich zu mehr als 90% abgedeckt wurden ($M = 93.33\%$, $SD = 3.83\%$, Range: 87.94%-99.12%). Das deutet

darauf hin, dass die Inhalte aller Studienfachbereiche in ausreichendem Maße und ungefähr gleichmäßig vollständig abgedeckt wurden.

Ergebnis Prototypizität. Um zu testen, ob die Items für verschiedene Studienfachbereiche sich in der Prototypizität ihrer Formulierung unterscheiden, betrachteten wir den Mittelwert der jeweils zu einem Studienfachbereich gehörenden Itemprototypizitätsangaben. Eine ANOVA mit Messwiederholung mit Greenhouse-Geisser-Korrektur zeigte, dass sich die Mittelwerte der Itemprototypizitätsangaben pro Studienfachbereich statistisch signifikant voneinander unterschieden, $F(3.47, 52.06) = 2.82, p < .05$, partielles $\eta^2 = .158$. Deskriptive Statistiken zeigten zusätzlich, dass der Mittelwert der Itemprototypizitätsangaben (über alle Items hinweg) 27.04% betrug ($SD = 2.20\%$, Range: 24.07% (Biopsychologie) bis 31.62% (Statistik)). Das bedeutet, dass die Items insgesamt etwas zu allgemein formuliert wurden (Optimum bei vier Items pro Kategorie wären 25%) und konkret zum Beispiel die Items für den Studienfachbereich Biopsychologie tendenziell weniger prototypisch formuliert wurden als die Items für Statistik. Basierend auf diesen Ergebnissen wurde überprüft, ob Formulierungen bei den über-/unterrepräsentierten Fächern schwächer/stärker prototypisch formuliert werden konnten. Ziel war es, Überlappungen zwischen Iteminhalten zu verringern, eine gleichmäßigere Prototypizität der Items verschiedener Studienfächer zu erreichen und damit eine verzerrende Darstellung zu vermeiden.

Schließlich wurde die Verständlichkeit der Items für die Zielgruppe des $E \times I$ -Tests anhand von zwei Schüler*innen getestet. Dafür wurden den Schüler*innen die angepassten Items zur Beantwortung vorgelegt. Anschließend wurden sie im Interview zu Verständnisschwierigkeiten befragt und betreffende Fachbegriffe abgeändert. Der finale hochschulunabhängige Itemkatalog für das Bachelor-Psychologiestudium bestehend aus 61 Items (je 4 Items für 12 Studienfachbereiche, 7 Items zu Sonstigen Studieninhalten und 6

Items zu Häufigen Irrtümern) kann im elektronischen Supplementmaterial A eingesehen werden.

2.4 Erhebung und Validierung der Expert*inneneinschätzung

Für die Gewinnung der Expert*inneneinschätzung hinsichtlich der finalen Items wurde eine Mail an alle Professor*innen für Psychologie deutschlandweit über den DGPs-Hauptverteiler gesendet. Außerdem wurden Masterstudierende der Universität Mannheim und Freiburg befragt, welche zuvor das Bachelor-Psychologiestudium an verschiedenen Hochschulen erfolgreich abgeschlossen hatten. Insgesamt nahmen 149 Personen an der Befragung teil, davon 76 Studierende und 73 Dozierende (Akademische Mitarbeitende, Doktoranden, Postdoktoranden und Professor*innen), von insgesamt 8 verschiedenen Hochschulen.

Expert*inneneinschätzung. Zur Erfassung des realen Ausmaßes der Inhalte wurden die Expert*innen gefragt, in welchem zeitlichen Ausmaß sich Studierende im Bachelor-Psychologiestudium mit den folgenden Studieninhalten und Arbeitsweisen beschäftigen, und im Anschluss die ausgewählten Items präsentiert. Die Expert*innen konnten dazu auf einer Skala von 1 (*gar nicht/ in einem sehr geringen zeitlichen Ausmaß*) bis hin zu 7 (*in einem sehr großen zeitlichen Ausmaß*) ihre Einschätzung abgeben.

Ergebnisse Expert*inneneinschätzung. Deskriptive Statistiken zu den Ratings der Expert*innen sowie Übereinstimmungsmaße sind im elektronischen Supplementmaterial B zu finden. Die t-Tests zeigten einen statistisch signifikanten Unterschied zwischen den Studierenden- und Dozierendenangaben bei fünf der 15 untersuchten Dimensionen der Studienfachbereiche, übergeordneten Arbeitsweisen und falschen Erwartungen. Der Betrag der Effektstärken zeigte im Median kleine Effekte ($|d_{Md}| = 0.15$, $|d_R| = 0.00-0.63$). Die größten Unterschiede zeigten sich bei der Einschätzung des Ausmaßes, in dem das Bearbeiten von wissenschaftlichen Texten eine zentrale Arbeitsweise im Studium darstellt, während die kleinste Effektstärke bei der Einschätzung

des zeitlichen Ausmaßes der Forschungsmethoden vorlag. Auf Basis dieser Ergebnisse wurden die Expert*inneneinschätzung dieser beiden Gruppen für die Rückmeldung zusammengefasst.

3 Beschreibung Assessment und Rückmeldung im E × I - Test

Der neu entwickelte Itemkatalog sowie die Expert*inneneinschätzungen können nun in ein Assessment- und Rückmeldungskonzept eingefügt werden, das ebenfalls neu erarbeitet wurde, um Interessen und Erwartungen kombiniert erfassen und rückmelden zu können. Das Assessment im E × I - Test besteht aus zwei Bestandteilen: einer Skala zur Erfassung der Erwartungen und einer Skala zur Erfassung der Interessen. Der Itemstamm für die Erfassung der Interessen lautet: „Wie sehr interessierst du dich dafür...“ [Items aus dem Itemkatalog, z.B. ... wie sich Einstellungen gegenüber anderen bilden und verändern können.]. Dazu passend kann auf einer siebenstufigen Likert-Skala von -3 (*überhaupt kein Interesse*) bis hin zu $+3$ (*sehr starkes Interesse*) graduell das persönliche Interesse angegeben werden³. Der Itemstamm für die Erfassung der Erwartungen lautet: „In welchem zeitlichen Ausmaß erwartest du, dich in deinem [Studiengang] damit zu beschäftigen, ...“ [Items aus dem Itemkatalog, z.B. ... wie sich Einstellungen gegenüber anderen bilden und verändern können.] und kann mit einer siebenstufigen Likert-Skala von 1 (*gar nicht/ in einem sehr geringen zeitlichen Ausmaß*) über 4 (*in einem durchschnittlichen zeitlichen Ausmaß*) bis hin zu 7 (*in einem sehr großen zeitlichen Ausmaß*) beantwortet werden. Die beiden Skalen und die Items wurden so formuliert, dass sie es erlauben, Interessen und Erwartungen hinsichtlich derselben Items kombiniert

³ Die Entscheidung zwischen uni- und bipolaren Skalen kann nicht pauschal getroffen werden, sondern muss unter Berücksichtigung der zu erfassenden Konstrukte getroffen werden (Jonkisz, Moosbrugger & Brandt, 2012). Wir nehmen an, dass es Inhalte gibt, denen aufgrund eines starken Interesses ein positiver Wert beigemessen wird, sowie Inhalte, an denen überhaupt kein Interesse besteht, weswegen diese negativ bewertet werden. Um dieser Annahme methodisch gerecht zu werden, haben wir uns für ein bipolares Vorgehen bei Erfassung und Rückmeldung des Interesses entschieden.

abzufragen. Die Formulierung zur Erfassung der Erwartungen zielt außerdem klar auf das zeitliche Ausmaß eines spezifischen Inhalts im Studium ab und kann so weder von den Studieninteressierten noch von den Expert*innen mit einer Sicherheit bei der Beantwortung verwechselt werden.

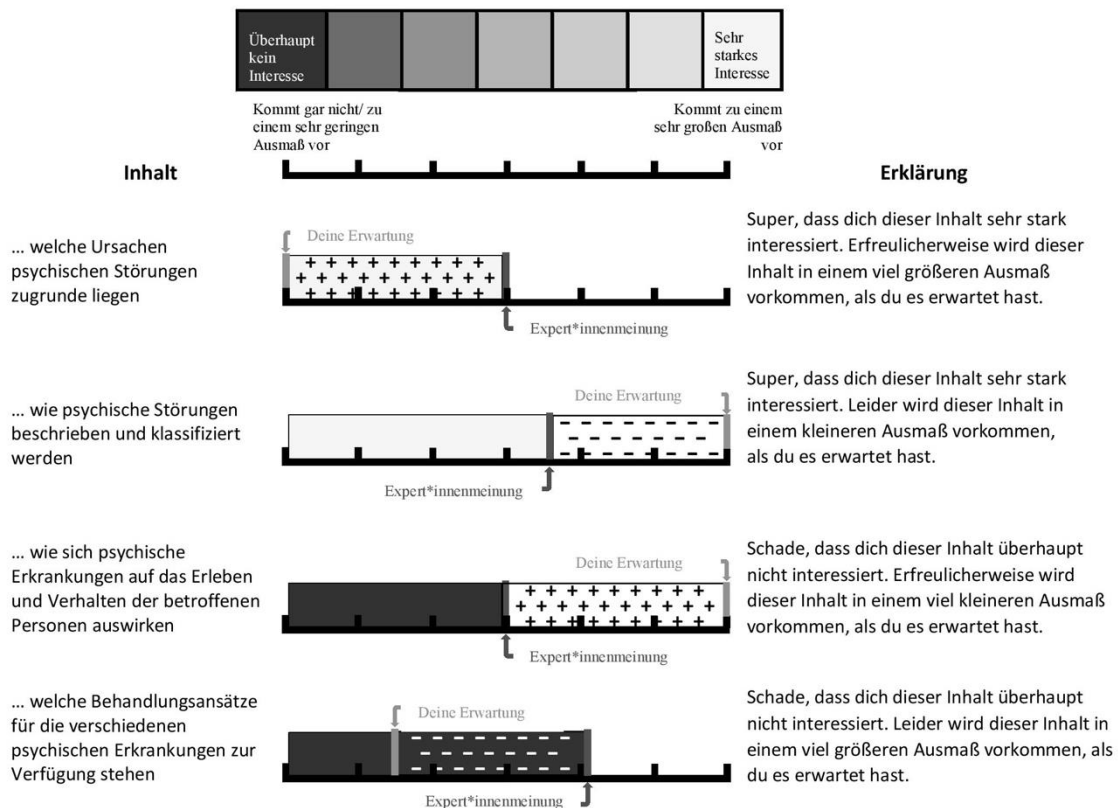
Das Feedback im $E \times I$ - Test gibt Studieninteressierten Rückmeldung zu drei relevanten Indikatoren für deren Studienentscheidung: Interesse, Erwartungsdiskrepanz und Valenz der Erwartungsdiskrepanz. Die Rückmeldung zum Interesse verdeutlicht Studieninteressierten, wie gut die Inhalte des Studienfachs zu ihren Bedürfnissen passen, Interesse an Studieninhalten ist zunächst per se positiv zu bewerten („Super, dass dich dieser Inhalt interessiert“), während überhaupt kein Interesse negativ ist („Schade, dass dich dieser Inhalt nicht interessiert“). Die Erwartungsdiskrepanzen geben an, wie akkurat ihr Bild vom jeweiligen Studienfach ist und ob weiterer Informationsbedarf herrscht oder nicht. Die Valenz der Erwartungsdiskrepanz unterstützt Studieninteressierte dabei einzuschätzen, inwiefern sie ihre bisherige Einstellung zum Studium in positiver oder negativer Weise ändern sollten. Beispielsweise könnten Studieninteressierte, die sich für die Ursachen psychischer Störungen sehr stark interessieren, allerdings ein größeres zeitliches Ausmaß davon erwartet hätten, als von Expert*innen eingeschätzt wurde, folgende Rückmeldung erhalten: „Super, dass dich dieser Inhalt sehr stark interessiert. Leider wird dieser Inhalt in einem kleineren Ausmaß vorkommen, als du es erwartet hast.“. Diese negative Erwartungsdiskrepanz – die Erwartungen werden enttäuscht – sollte somit zu einer negativeren Einstellung zum Studium führen (z.B. geringere erlebte Passung, geringere Studienwahlsicherheit). Wenn Studieninteressierte sich aber dafür interessieren, wie psychische Störungen beschrieben und klassifiziert werden können, und sie davon nur ein geringeres zeitliches Ausmaß erwartet hätten, verglichen mit der höheren Einschätzung der Expert*innen, erhalten sie folgende Rückmeldung: „Super, dass dich dieser Inhalt sehr stark interessiert. Erfreulicherweise wird dieser Inhalt in einem größeren

Ausmaß vorkommen, als du es erwartet hast.“. Diese positive Erwartungsdiskrepanz – die Erwartungen werden übertroffen – sollte somit zu einer positiveren Einstellung zum Studium führen (z.B. höhere erlebte Passung, stärkere Studienwahlsicherheit).

Diese drei Indikatoren werden zunächst sowohl graphisch als auch verbal auf Studienfachbereichsebene gemittelt rückgemeldet, um Studieninteressierten einen Überblick zu geben und die Struktur des Studiums zu verdeutlichen. Mit Klicken auf die Studienfachbereiche wird jeweils auch spezifisch auf Ebene einzelner Items eine Rückmeldung gegeben, um falsche Erwartungen an spezifische Inhalte konkret zu korrigieren. Ein beispielhafter Ausschnitt aus einem Feedback ist in Abbildung 1 dargestellt (für die originale farbige Darstellung siehe das elektronische Supplementmaterial C). Die Farbe des Balkens zeigt an, wie sehr sich die Nutzer*innen für einen bestimmten Inhalt interessieren: Von Rot (*überhaupt kein Interesse*) über Gelb (*mittelmäßiges Interesse*) bis Grün (*sehr starkes Interesse*). Diese Farbcodierung wurde gewählt, da mehr Interesse an Studieninhalten unabhängig von den Erwartungen per se besser ist als weniger Interesse und „Grün“ als Farbe eher positive Assoziationen mit sich zieht, während „Rot“ eher eine Warn- und Signalfarbe darstellt. Die Erwartung der Studieninteressierten hinsichtlich des zeitlichen Ausmaßes beziehungsweise die Expert*inneneinschätzung werden auf der x-Achse abgetragen, von links (*kommt gar nicht/ zu einem sehr geringen Ausmaß vor*) bis rechts (*kommt zu einem sehr großen Ausmaß vor*). Dadurch wird die Differenz zwischen der Erwartung der Studieninteressierten und der Expert*inneneinschätzung veranschaulicht. Die Füllung des Balkenbereichs dieser Differenz zeigt zusätzlich an, inwiefern Erwartungen übertroffen (positive Valenz der Erwartungsdiskrepanz symbolisiert durch „+“) beziehungsweise enttäuscht (negative Valenz der Erwartungsdiskrepanz symbolisiert durch „-“) wurden, oder ob die Erwartungsdiskrepanz aufgrund eines mittelmäßigen Interesses neutral zu bewerten ist („°“).

Abbildung 1: Ausschnitt eines Feedbacks zum Interesse, zur Erwartungsdiskrepanz und zur Valenz der Erwartungsdiskrepanz aus dem Erwartungs- und Interessenstest (E × I - Test).

Anmerkung. Farbe des Balkens: Interesse der Nutzer*innen für einen bestimmten Inhalt.



Füllung des Balkenbereichs „+“: positive Valenz der Erwartungsdiskrepanz (Erwartungen übertroffen); „-“ negative Valenz der Erwartungsdiskrepanz (Erwartungen enttäuscht); „o“ Neutrale Valenz der Erwartungsdiskrepanz.

Zum Schluss folgt eine verbale Rückmeldung auf gesamter Studienfachebene (über die einzelnen Items und Studienfachbereiche hinweg) bestehend aus dem Gesamtinteresse an allen realen Inhalten (durchschnittliches Interesse der Person, die den E × I - Test bearbeitet hat, an allen Studieninhalten und Arbeitsweisen exklusive Häufige Irrtümer), dem Gesamtbetrag der Erwartungsdiskrepanz (durchschnittlicher Betrag der

Erwartungsdiskrepanzwerte der Person, die den $E \times I$ - Test bearbeitet hat) sowie der Gesamtvalenz der Erwartungsdiskrepanz (durchschnittliche Valenz der Erwartungsdiskrepanzwerte der Person, die den $E \times I$ - Test bearbeitet hat), um den Studieninteressierten für ihre Studienwahlentscheidung eine Zusammenfassung der drei genannten Indikatoren zu liefern. Für die exakten Berechnungsformeln und zugehörigen verbalen Feedbacktexte siehe das elektronische Supplementmaterial D. Der gesamte $E \times I$ - Test für Psychologie kann selbstgesteuert, ohne zusätzliche Beratung, kostenlos und online an einem Computer bearbeitet werden, da die Erfassung, Auswertung und Rückmeldung automatisch erfolgen. Die Bearbeitungszeit des $E \times I$ - Tests für Psychologie ist für ungefähr 20 Minuten angesetzt.

4 Erste Befunde zur Evaluation des Erwartungs- und Interessenstests ($E \times I$ - Tests)

Der $E \times I$ - Test wurde sowohl spezifisch als auch allgemein im Rahmen der Bearbeitung des gesamten OSA-Psychs evaluiert, welches neben dem $E \times I$ - Test noch einen Fähigkeitstest sowie Informationen zum Bachelor-Psychologiestudium zur Verfügung stellt.

Innerhalb des ersten halben Jahres nach Freischaltung im Februar 2020 bearbeiteten 2023⁴ Studieninteressierte das OSA-Psych, nahmen an der freiwilligen Evaluation teil und stimmten dabei der Speicherung ihrer Daten zu (81.96% weiblich, 17.48% männlich, 0.56% divers, $M_{\text{age}} = 20.0$ Jahre, Range: 16-61). 93.29% der Teilnehmenden wollten noch im selben Jahr mit einem Studium beginnen, 5.88% im darauffolgenden Jahr und die restlichen 0.83% in den darauffolgenden Jahren. 79.61% der Studieninteressierten waren sehr sicher, dass sie sich auf das Bachelor-Psychologiestudium bewerben möchten, 18.22% tendierten dazu, sich für ein Bachelor-Psychologiestudium zu bewerben, waren sich aber

⁴ Da es in der freiwilligen Befragung für einzelne Items keinen Antwortzwang gab, variierte die Stichprobengröße pro Item zwischen $n = 1876$ und $n = 1985$.

weniger sicher, 1.60% waren unsicher und 0.57% tendierten sogar eher dazu, sich nicht für ein Bachelor-Psychologiestudium zu bewerben. Somit waren Studieninteressierte aus verschiedenen Phasen im Entscheidungsprozess für ein Bachelor-Psychologiestudium vertreten.

Akzeptanz. In Anlehnung an die Items von Schueller (2011) konnten die Studieninteressierten direkt im Anschluss an die Bearbeitung des $E \times I$ - Tests bewerten, ob sie vom $E \times I$ - Test profitiert haben, ob ihnen der $E \times I$ - Test gefallen hat und wie schwierig sie ihn fanden. Hinsichtlich der Rückmeldung wurden die Studieninteressierten zunächst allgemein gefragt, wie verständlich und übersichtlich sie die Rückmeldung im $E \times I$ - Test empfanden. Im Anschluss konnten sie konkret hinsichtlich der neuen Features bewerten, ob sie das Gesamtfeedback als sinnvolle Ergänzung zum inhaltsspezifischen Feedback empfanden und ob sie die Rückmeldung der positiven und negativen Erwartungsdiskrepanz als sinnvolle Ergänzung zur separaten Rückmeldung von Interessen und Erwartungen empfanden. Alle Aussagen wurden auf einer Skala von 1 (*trifft überhaupt nicht zu*) bis 7 (*trifft vollkommen zu*) bewertet.

Informiertheit. Sowohl vor als auch nach der Bearbeitung des OSA-Psych wurden die Studieninteressierten gefragt, wie gut sie sich hinsichtlich der Inhalte und Arbeitsweisen im Bachelor-Psychologiestudium informiert fühlen, was sie auf einer Skala von 1 (*trifft überhaupt nicht zu*) bis 7 (*trifft vollkommen zu*) beantworten konnten.

Weiterempfehlung. Außerdem wurden die Studieninteressierten nach der Bearbeitung des gesamten OSA-Psychs gefragt, ob sie dieses weiterempfehlen würden, was sie bejahen oder verneinen konnten.

Wir testeten alle Akzeptanzratings gegen den Mittelpunkt der Skala als Maß für ein durchschnittliches Rating. Alle folgenden Aspekte des Akzeptanzratings lagen signifikant über dem Skalenmittelwert ($p < .001$, $d_{Md} = 1.86$). Konkret zeigt sich in den deskriptiven Daten, dass insgesamt 83.64% der Nutzer*innen bei der Frage nach dem Profitieren eine

Antwortoption über der Mittelkategorie ankreuzten und somit angaben, vom $E \times I$ - Test profitiert zu haben, 90.39% hat der $E \times I$ - Test gefallen und 92.29% der Nutzer*innen empfanden ihn als nicht schwierig. Das neu entwickelte Feedback empfanden 96.73% der Nutzer*innen als verständlich und 93.47% als übersichtlich. Das Gesamtfeedback empfanden 90.60% der Nutzer*innen als sinnvolle Ergänzung zum inhaltspezifischen Feedback. 92.86% der Nutzer*innen empfanden die neu ergänzte Rückmeldung der Valenz der Erwartungsdiskrepanz als hilfreiche Ergänzung zur separaten Rückmeldung von Interessen und Erwartungen.

Hinsichtlich der Wissensänderung zeigte sich, dass die selbst eingeschätzte Informiertheit der Studieninteressierten über die Inhalte und Arbeitsweisen im Bachelor-Psychologiestudium von vor der Bearbeitung des OSA-Psych ($M = 5.26$, $SD = 1.24$) im Vergleich zu nach der Bearbeitung des OSA-Psych ($M = 5.81$, $SD = .95$) signifikant zunahm, $t(1911) = -18.46$, $p < .001$, $d = .42$.

Bei bisherigen OSAs lag die Weiterempfehlungsrate bei 76% (Sonnleitner, Kubinger & Frebort, 2009) bis hin zu 90% (was-studiere ich.de). Die Weiterempfehlungsrate für das gesamte OSA-Psych lag signifikant über der 90% Rate, $t(1984) = 7.52$, $p < .001$, $d = .17$, da insgesamt 94.01% der Teilnehmenden angaben, dass sie die Teilnahme am OSA-Psych weiterempfehlen würden. Ein Ausblick für eine Erweiterung der Evaluation auf Studienerfolgsindikatoren (Wohlbefinden, Leistung, Studienabbruch) wird in der Diskussion gegeben.

5 Diskussion

Mit dem $E \times I$ - Test stellen wir einen neuen Erwartungs- und Interessenstest zur Verfügung, welcher in dreierlei Hinsicht innovativ ist. Der $E \times I$ - Test ermöglicht erstmals eine Erfassung und Rückmeldung von Erwartungsdiskrepanzen und Interessen in Kombination und kann dementsprechend auch messen und rückmelden, ob die

Erwartungen an ein Studienfach übertroffen oder enttäuscht wurden, was für die Studienwahlentscheidung relevant sein sollte (Hasenberg, 2012; Karst et al., 2017). Außerdem wurde bei der Entwicklung und Validierung der Items für den $E \times I$ - Test mithilfe neuer Verfahren sichergestellt, dass die neuen Items die Struktur des Studienfachs angemessen widerspiegeln, und ausreichend vollständig und annähernd gleichmäßig abdecken, wodurch ein möglichst akkurates Bild vom Studium aufgebaut werden sollte. Schließlich wurde der fachspezifische $E \times I$ - Test für das Bachelor-Psychologiestudium hochschulunabhängig konzipiert und ist damit im Gegensatz zu hochschulspezifischen Tests besser geeignet für den großen Anteil an Studieninteressierten, die sich zuerst für ein Fach und im Anschluss für eine spezifische Hochschule entscheiden (Hovestadt & Stegelmann, 2011). Erste Evaluationsergebnisse zeigen, dass Studieninteressierte das neue Verfahren akzeptieren. Durch die Bearbeitung steigt die Informiertheit der Studieninteressierten und die Weiterempfehlungsrate liegt über den Weiterempfehlungsraten bekannter Verfahren. Da fehlende Informiertheit, zu geringes Interesse und falsche Erwartungen an das Studienfach zentrale Gründe für Studienabbruch darstellen (Heublein et al., 2010; Schiefele et al., 2007; Schmidt-Atzert, 2005), birgt der $E \times I$ - Test somit großes Potential, Studienerfolg langfristig zu fördern.

5.1 Limitationen und zukünftige Forschung

Unsere Ergebnisse sind dergestalt limitiert, dass beim Itementwicklungs- und Itemvalidierungsprozess hinsichtlich der Zuordenbarkeit, Vollständigkeit und Prototypizität der Items jeweils kleine Expert*innenstichproben eingeholt wurden und die auf Basis dieser Ergebnisse angepassten Items nicht mithilfe einer zweiten Expert*innenstichprobe überprüft wurden. Trotz dieser Einschränkungen ist darauf hinzuweisen, dass die begangenen Schritte zur Validierung der Items bereits innovative neue Wege darstellen, die über bisherige Validierungsprozesse hinausgehen. In Zukunft

wäre allerdings eine zweite Validierungsrunde mit einer größeren Expert*innenstichprobe anzustreben.

Zusätzlich dazu bleibt auch bei den Expert*inneneinschätzungen hinsichtlich des zeitlichen Ausmaßes der Studieninhalte offen, ob trotz der kleinen Unterschiede eine der beiden Expert*innengruppen (Studierende vs. Dozierende) eine relevantere Einschätzung für die Studieninteressierten liefert. Man könnte argumentieren, dass es die Einschätzung der Dozierenden ist, da diese mit ihrer langjährigen Erfahrung die Prozesse an der Hochschule besser kennen als die Studierenden. Dem steht entgegen, dass Studierende noch einen besseren Überblick über das Gesamtstudium haben, da bei ihnen das Studium noch nicht so lange zurückliegt wie bei den Dozierenden. Dafür sollte in zukünftigen Studien geprüft werden, ob es Unterschiede in der Vorhersagekraft der berechneten Erwartungsdiskrepanz für späteren Studienerfolg gibt, in Abhängigkeit davon, welche Referenzgruppe (Studierende vs. Dozierende) für die Berechnung verwendet wird. Zusätzlich dazu schwanken die Einschätzungen auch zwischen verschiedenen Hochschulen aufgrund von unterschiedlichen Schwerpunktsetzungen. Dadurch, dass die Expert*innenmeinung aus dem Mittel der Einschätzung von Expert*innen verschiedener Hochschulen bestehen, sollten allerdings standortspezifische Besonderheiten nicht stark ins Gewicht fallen und eine Hochschulunabhängigkeit gewährleistet sein. Eine alternative Möglichkeit wäre es, gemäß der laut DGPs vorgeschlagenen ECTS zu gewichten. Eine solche Gewichtung nach ECTS zeigte allerdings in unserer Stichprobe deutliche Abweichungen von einer Gewichtung basierend auf den Expert*inneneinschätzungen hinsichtlich des zeitlichen Ausmaßes der Inhalte. Demnach gilt es zunächst in zukünftiger Forschung zu klären, woher diese Unterschiede kommen und welcher Indikator Studienerfolg besser vorhersagen kann. Außerdem könnte zukünftige Forschung noch berücksichtigen, ob ein Inhaltsbereich fakultativ oder obligatorisch ist, Gegenstand einer Prüfung ist oder wie die Inhalte in der Abschlussnote gewichtet sind. Bis dahin bleiben wir

bei den Expert*inneneinschätzungen, da wir davon ausgehen, dass diese näher an der späteren subjektiven Wahrnehmung der Nutzer*innen sein werden und damit prädiktiver für Studienzufriedenheit als das vollkommen objektive Maß der ECTS-Punkte oder andere Kriterien.

Der Fokus auf den zeitlichen Umfang verschiedener Studieninhalte bei der Erfassung von Erwartungen bedingt allerdings, dass keine Erwartungen hinsichtlich etwaigen Anforderungen im Studium oder späteren Berufsmöglichkeiten erfasst werden, wie in anderen Erwartungschecks möglich (z.B. *Study Finder Erwartungscheck*). Um auch diese wichtigen Informationen zu geben, empfehlen wir zusätzlich zum $E \times I$ - Test Fähigkeitstests einzusetzen, damit Studieninteressierte abgleichen können, ob sie den Anforderungen des Studiums gewachsen sind, sowie Informationen zu den beruflichen Perspektiven nach dem Studium anzubieten, wie es auch im OSA-Psych gehandhabt wird. Schließlich sei darauf hingewiesen, dass die Evaluation des $E \times I$ - Tests hinsichtlich der Informiertheit und Weiterempfehlungsrate im Rahmen der Bearbeitung des gesamten OSA-Psych stattfand. Da im OSA-Psych weitere Informationen zur optimalen Nutzung zur Verfügung gestellt werden (Fähigkeitstest und Informationen zum Studium), können die Ergebnisse zur Informiertheit und Weiterempfehlungsrate nicht ausschließlich auf den $E \times I$ - Test allein zurückgeführt werden. Es gibt aber gute Gründe, den $E \times I$ - Test als den maßgeblichen Treiber dieser Effekte zu interpretieren. Zum einen schnitt der $E \times I$ - Test bei den Akzeptanzratings, die spezifisch sowohl für den $E \times I$ - Test als auch für den Fähigkeitstest erfasst wurden, besser ab als der Fähigkeitstest. Zum anderen musste der $E \times I$ - Test bearbeitet werden, bevor die Studieninteressierten ihr Teilnahmezertifikat erhielten und an der Nachbefragung teilnehmen konnten. Das Anschauen der Informationsseiten hingegen war freiwillig und stand damit weniger im Fokus der Studieninteressierten, wie sich an den offenen Kommentaren der Studieninteressierten ablesen ließ, welche sich überwiegend auf die beiden Testverfahren bezogen. Dementsprechend ist es plausibel, die

positiven Ergebnisse hinsichtlich der Steigerung der Informiertheit sowie der sehr hohen Weiterempfehlungsrate maßgeblich auf den $E \times I$ - Test zurückzuführen.

Zukünftige Studien sollten dennoch für eine weiterführende Evaluation die Ergebnisse zur Informiertheit und Weiterempfehlungsrate spezifisch für den $E \times I$ - Test replizieren. Außerdem sollte getestet werden, inwiefern die Rückmeldung des Interesses und der Valenz der Erwartungsdiskrepanz die Einstellung der Studieninteressierten gegenüber dem Studium ändert (z.B. Passung, Studienwahlsicherheit), sowie die letztliche Studienwahlentscheidung. Schließlich sollte überprüft werden, ob die Indikatoren des $E \times I$ - Tests (Interessen sowie enttäuschte beziehungsweise übertroffene Erwartungen) in erwarteter Weise mit Studienerfolg in Form von Wohlbefinden und Leistung im Studium in Zusammenhang stehen. Dabei wäre es lohnend, den neuen Indikator der Valenz der Erwartungsdiskrepanz hinsichtlich seiner prädiktiven Validität mit anderen möglichen Indikatoren zu vergleichen (z.B. der Diskrepanz zwischen den Interessen und Erwartungen der Studieninteressierten oder der Diskrepanz zwischen den Interessen und der Expert*inneneinschätzung der faktischen Realisation der Studieninhalte). Die Untersuchung dieser zentralen theoretischen wie praktischen Fragestellungen wird durch den neuen $E \times I$ - Test erst möglich gemacht.

5.2 Praktische Implikationen

Der $E \times I$ - Test wird bereits von zahlreichen Studieninteressierten für das Bachelor-Psychologiestudium im Rahmen des OSA-Psych bearbeitet (siehe <https://www.osa-psych.de/>).

Basierend auf den ersten Evaluationsbefunden werden wir den $E \times I$ - Test für das Bachelor-Psychologiestudium bundesweit weiter bekannt machen. Dafür wird unter anderem Search Engine Optimization eingesetzt, in bundesweiten Studienorientierungsmaterialien (u.a. auch auf der Website der Deutschen Gesellschaft für

Psychologie) über das Verfahren informiert sowie eine sinnvolle Verzahnung mit anderen OSAs (z.B. was-studiere-ich.de) angestrebt.

Zum anderen können auf Basis des hier vorgestellten $E \times I$ - Tests für das Bachelor-Psychologiestudium sowie der hier vorgestellten Validierungsprozesse in Zukunft auch weitere $E \times I$ - Tests entwickelt werden. Darunter könnten zunächst $E \times I$ - Tests für die Orientierung in andere Studienfächer fallen oder in einem breiteren Kontext auch $E \times I$ - Tests für weitere Karriereentscheidungen. Allerdings gibt es erste Hinweise, dass sich Prädiktoren für Studienabbruch in verschiedenen Studienfächern (z.B. Sozialwissenschaften vs. MINT Fächern) unterschiedlich auswirken können (Fischer et al., 2020). Demnach sollte durch zukünftige Forschung geklärt werden, welche Mechanismen diese Unterschiede zwischen den Studienfächern erklären können, um das Verfahren noch zielgerichteter einsetzen zu können.

Die Entwicklung von hochschulunabhängigen Verfahren ist dabei für alle Inhalte erstrebenswert, die einem Studienfach über verschiedene Hochschulen hinweg gemein sind. Im Anschluss an hochschulunabhängige Verfahren kann je nach Bedarf zusätzlich noch auf hochschulspezifische OSAs verwiesen werden, um bei der Entscheidung für einen konkreten Studienort auch standortspezifische Unterschiede in den Blick zu nehmen.

5.3 Schlussfolgerung

Insgesamt steht mit dem $E \times I$ - Test ein neues Verfahren zur Verfügung, das Erwartungen und Interessen zum ersten Mal in Kombination betrachtet und damit auch enttäuschte und übertroffene Erwartungen erfassen und rückmelden kann. Items für die Inhalte des Bachelor-Psychologiestudiums wurden unabhängig von hochschulspezifischen Besonderheiten entwickelt und validiert. Items für andere Studienfächer oder Berufe könnten in Zukunft auf Basis des vorgestellten Verfahrens systematisch entwickelt und validiert werden.

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7 Elektronisches Supplementmaterial

Link zum elektronischen Supplementmaterial:

https://osf.io/6pk9b/?view_only=ed95334e5a28403381fcbf619753a2e6

Elektronisches Supplementmaterial A - Tabelle 1

Der Erwartungs- x Interessenstest ($E \times I$ - Test) - Skalen zu Erwartungen und Interessen inklusive des Itemkatalogs für das Bachelor-Psychologiestudium

Skaleninstruktion Erwartungen
In welchem zeitlichen Ausmaß erwartest du, dich in deinem Bachelor-Psychologiestudium damit zu beschäftigen, ...
Skaleninstruktion Interessen
Wie sehr interessierst du dich dafür...

Allgemeine Psychologie
... was Menschen motiviert und was sie empfinden?
... wie menschliches Lernen und das Gedächtnis funktionieren?
... wie Denk-, Sprach-, und Bewegungsprozesse ablaufen?
...worauf Menschen ihre Aufmerksamkeit lenken und wie sie ihre Umgebung wahrnehmen?

Biologische Psychologie
...wie das Nervensystem und das Gehirn aufgebaut sind und welche Funktionen sie erfüllen?
...welche Funktionen Gene, Hormone und Neurotransmitter im menschlichen Körper erfüllen?
...welche biologischen Prozesse der Wahrnehmung, der Bewegung, dem Schlaf, sowie den Emotionen und dem Denken zugrunde liegen?
... welche biologischen Prozesse dem Schmerz und Stress, sowie der Wirkung von Psychopharmaka und Drogen zugrunde liegen?

Differentielle Psychologie/ Persönlichkeitspsychologie
...warum sich Menschen in bestimmten Bereichen, beispielsweise ihren Fähigkeiten, ihrem Temperament oder ihren Bedürfnissen unterscheiden?
... wie Unterschiede zwischen Menschen durch das Zusammenspiel von Genen und dem sozialen Umfeld erklärt werden können?
...wie Persönlichkeit und Intelligenz in verschiedenen Situationen das Erleben und Verhalten von Menschen beeinflussen?
...welche Persönlichkeitstypen und Intelligenzmodelle es gibt?

Einführung in die Psychologie / Geschichte der Psychologie
... wie sich das Fach Psychologie – historisch und methodisch – im Laufe der Zeit entwickelt hat?
... welche grundlegenden theoretischen und methodischen Ansätze zum heutigen Verständnis der Psychologie als Wissenschaft geführt haben?
... welche Strömungen und Personen die Entwicklung der Psychologie maßgeblich beeinflusst haben?
...welche grundlegenden Vorgehensweisen die Psychologie in der Wissenschaft und der beruflichen Praxis auszeichnen?

Tabelle geht auf der nächsten Seite weiter.

Entwicklungspsychologie

- ...wie man Entwicklungsphasen über die gesamte Lebensspanne beschreiben kann?
- ... wie sich ein Mensch im Laufe seines Lebens hinsichtlich seiner Sinnessysteme, Körperbewegungen, Denkprozesse und Sprache entwickelt mit einem besonderen Fokus auf der Entwicklung im Kindesalter?
- ...wie sich ein Mensch im Laufe seines Lebens hinsichtlich seiner Emotionen, Identität und Bindungen verändert?
- ... wie man Schwierigkeiten in der menschlichen Entwicklung messen und damit umgehen kann?

Sozialpsychologie

- ...wie Menschen sich selbst und andere in sozialen Situationen wahrnehmen und sich verhalten?
- ...wie sich Einstellungen gegenüber anderen bilden und verändern können?
- ...wie Gruppenprozesse ablaufen und Gruppen das Verhalten von Einzelpersonen beeinflussen?
- ...wie sozial schädliches und sozial förderliches Verhalten erklärt werden kann?

Statistik

- ...welche mathematischen Methoden die Psychologie als Wissenschaft nutzt und welche theoretischen Überlegungen diesen zugrunde liegen?
- ...wie man psychologische Daten (z. B. Ergebnisse aus Tests und Fragebögen) mithilfe von Grafiken und statistischen Werten beschreiben kann und wie man diese Werte berechnet?
- ...wie man Wahrscheinlichkeiten berechnet?
- ... wie man mithilfe von statistischen Methoden psychologische Annahmen und Theorien rechnerisch überprüfen kann?

Empirisch-wissenschaftliches Arbeiten /Forschungsmethoden

- ... wie man die Qualität des wissenschaftlichen Vorgehens bei einer psychologischen Forschungsstudie kritisch hinterfragen und beurteilen kann?
- ... wie statistische Softwareprogramme zur Auswertung von psychologischen Daten zu bedienen sind?
- ...wie man eigenständig psychologische Forschungsstudien plant, vorbereitet und durchführt?
- ... wie man wissenschaftliche Erkenntnisse für andere verständlich aufbereitet und präsentiert?

Psychologische Diagnostik

- ...wie man psychologische Entscheidungen (z.B. nach der Eignung von Personen) mithilfe von psychologischen Methoden zielgerichtet treffen und kommunizieren kann?
- ... welche Verfahren es gibt, um psychologische Merkmale (z. B. Intelligenz oder Motivation) zu messen, wie man neue Verfahren entwickelt und wie man deren Qualität beurteilen kann?
- ...wie man Verfahren zur Messung psychologischer Merkmale anwendet und deren Ergebnisse interpretiert?
- ...welche Theorien man bei der Erstellung von Verfahren zur Messung psychologischer Merkmale zugrunde legt?

Arbeits-, Organisations- und Wirtschaftspsychologie

- ...wie Arbeitsleistung entsteht und wie sie gefördert werden kann?
- ...wie man Arbeits- und Organisationsprozesse analysieren, gestalten und verbessern kann?
- ... welche Faktoren das Wohlbefinden und Stresserleben auf der Arbeit beeinflussen können?
- ...wie Personalauswahl und Personalentwicklung gestaltet werden kann?

Tabelle geht auf der nächsten Seite weiter.

Klinische Psychologie

- ... welche Ursachen psychischen Störungen zugrunde liegen?
- ... wie psychische Störungen beschrieben und klassifiziert werden können?
- ... wie sich psychische Erkrankungen auf das Erleben und Verhalten der betroffenen Personen auswirken?
- ... welche Behandlungsansätze für die verschiedenen psychischen Erkrankungen zur Verfügung stehen?

Pädagogische Psychologie

- ... welche Prozesse beim Lernen ablaufen und wie dieses gefördert werden kann?
- ... wie Lehrprozesse beschrieben und gestaltet werden können?
- ... wie man Leistungen, Kompetenzen und Überzeugungen mit Präventionsprogrammen oder Trainings günstig beeinflussen kann?
- ... wie man mit Hilfe von Forschungsstudien Bildungssysteme, Erziehungs- und Unterrichtsformen vergleichen und bewerten kann?

Sonstige Studieninhalte

- ...die im Studium erlangten Erkenntnisse auf ein eigenes Thema in Form einer wissenschaftlichen Abschlussarbeit anzuwenden?
- ...wissenschaftliche Fachliteratur auf Englisch zu lesen?
- ...theoretisch Gelerntes bei einem Praktikum anzuwenden?
- ...Berufsfelder von Psychologinnen und Psychologen in Form eines Praktikums kennenzulernen?
- ...theoretisch Gelerntes bei einem Praktikum anzuwenden?
- ...Berufsfelder von Psychologinnen und Psychologen in Form eines Praktikums kennenzulernen?
- ...theoretisch Gelerntes bei einem Praktikum anzuwenden?

Häufige Irrtümer

- ...wie man Psychoanalyse nach Freud praktisch anwenden kann?
- ... dich selbst zu therapieren?
- ... wie man andere Menschen manipulieren kann?
- ... im Kontakt mit Klient/innen das im Psychologiestudium praktisch Gelernte (z. B. Gesprächstechniken) anzuwenden?
- ... wie man Menschen in einen Hypnose-Zustand versetzt?
- ... wie Träume interpretiert werden können?

Anmerkung. Die Skalenrange für die Erfassung von Interessen reicht von -3 (*überhaupt kein Interesse*) bis hin zu $+3$ (*sehr starkes Interesse*). Die Skalenrange für die Erfassung von Erwartungen reicht von 1 (*gar nicht/ in einem sehr geringen zeitlichen Ausmaß*) über 4 (*in einem durchschnittlichen zeitlichen Ausmaß*) bis hin zu 7 (*in einem sehr großen zeitlichen Ausmaß*).

Elektronisches Supplementmaterial B - Tabelle 1*Mittelwerte, Standardabweichungen und Übereinstimmungsmaße für die Expert*innen Ratings*

In welchem zeitlichen Ausmaß erwartest du, dich in deinem Bachelor-Psychologiestudium damit zu beschäftigen, ...	Gesamt Expert*innen Rating		Getrennt Dozierende/Studierende Rating	
	$N_{Ges} = 149$		$n_{Doz} = 73 / n_{Stud} = 76$	
Studienfachbereich (ICC=.98)	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
... Einzelitems (ICC=.99)				
Allgemeine Psychologie	4.65	0.95	4.67/4.63	1.06/0.85
... was Menschen motiviert und was sie empfinden?	4.62	1.30	4.63/4.61	1.39/1.22
... wie menschliches Lernen und das Gedächtnis funktionieren?	5.12	1.07	5.16/5.08	1.14/0.99
... wie Denk-, Sprach-, und Bewegungsprozesse ablaufen?	4.32	1.30	4.37/4.28	1.31/1.29
... worauf Menschen ihre Aufmerksamkeit lenken und wie sie ihre Umgebung wahrnehmen?	4.54	1.26	4.51/4.58	1.32/1.19
Differentielle Psychologie/ Persönlichkeitspsychologie	4.49	0.96	4.49/4.53	1.03/0.89
... warum sich Menschen in bestimmten Bereichen, beispielsweise ihren Fähigkeiten, ihrem Temperament oder ihren Bedürfnissen unterscheiden?	4.40	1.35	4.52/4.28	1.39/1.32
... wie Unterschiede zwischen Menschen durch das Zusammenspiel von Genen und dem sozialen Umfeld erklärt werden können?	4.56	1.12	4.23/4.88	1.22/1.09
... wie Persönlichkeit und Intelligenz in verschiedenen Situationen das Erleben und Verhalten von Menschen beeinflussen?	4.22	1.34	4.37/4.08	1.35/1.32
... welche Persönlichkeitstypen und Intelligenzmodelle es gibt?	4.79	1.32	4.71/4.87	1.23/1.40
Entwicklungspsychologie	4.05	1.01	4.05/4.06	1.08/0.95
... wie man Entwicklungsphasen über die gesamte Lebensspanne beschreiben kann?	4.59	1.25	4.58/4.61	1.26/1.25
... wie sich ein Mensch im Laufe seines Lebens hinsichtlich seiner Sinnessysteme, Körperbewegungen, Denkprozesse und Sprache entwickelt mit einem besonderen Fokus auf der Entwicklung im Kindesalter?	4.30	1.28	4.23/4.36	1.26/1.29
... wie sich ein Mensch im Laufe seines Lebens hinsichtlich seiner Emotionen, Identität und Bindungen verändert?	3.66	1.15	3.81/3.51	1.19/1.10
... wie man Schwierigkeiten in der menschlichen Entwicklung messen und damit umgehen kann?	3.67	1.27	3.59/3.75	1.34/1.20
Sozialpsychologie	4.43	1.01	4.63/4.24	1.02/0.96
... wie Menschen sich selbst und andere in sozialen Situationen wahrnehmen und sich verhalten?	4.97	1.17	5.12/4.82	1.13/1.20
... wie sich Einstellungen gegenüber anderen bilden und verändern können?	4.40	1.28	4.67/4.13	1.26/1.28
... wie Gruppenprozesse ablaufen und Gruppen das Verhalten von Einzelpersonen beeinflussen?	4.44	1.32	4.62/4.26	1.27/1.36
... wie sozial schädliches und sozial förderliches Verhalten erklärt werden kann?	3.93	1.23	4.11/3.76	1.30/1.15

Tabelle geht auf der nächsten Seite weiter.

Biologische Psychologie	4.38	1.01	4.14/4.62	1.03/0.94
...wie das Nervensystem und das Gehirn aufgebaut sind und welche Funktionen sie erfüllen?	4.74	1.21	4.47/5.00	1.20/1.17
...welche Funktionen Gene, Hormone und Neurotransmitter im menschlichen Körper erfüllen?	4.34	1.21	4.00/4.67	1.20/1.12
...welche biologischen Prozesse der Wahrnehmung, der Bewegung, dem Schlaf, sowie den Emotionen und dem Denken zugrunde liegen?	4.47	1.12	4.26/4.67	1.24/1.06
... welche biologischen Prozesse dem Schmerz und Stress, sowie der Wirkung von Psychopharmaka und Drogen zugrunde liegen?	3.98	1.33	3.82/4.13	1.27/1.37
Einführung in die Psychologie / Geschichte der Psychologie	4.01	1.00	3.97/4.04	1.07/0.94
... wie sich das Fach Psychologie – historisch und methodisch – im Laufe der Zeit entwickelt hat?	3.45	1.32	3.56/3.34	1.35/1.28
... welche grundlegenden theoretischen und methodischen Ansätze zum heutigen Verständnis der Psychologie als Wissenschaft geführt haben?	4.32	1.40	4.27/4.36	1.39/1.42
... welche Strömungen und Personen die Entwicklung der Psychologie maßgeblich beeinflusst haben?	3.66	1.38	3.48/3.84	1.37/1.38
...welche grundlegenden Vorgehensweisen die Psychologie in der Wissenschaft und der beruflichen Praxis auszeichnen?	4.59	1.50	4.55/4.63	1.50/1.51
Statistik	5.64	0.83	5.52/5.75	0.91/0.75
...welche mathematischen Methoden die Psychologie als Wissenschaft nutzt und welche theoretischen Überlegungen diesen zugrunde liegen?	5.93	1.07	5.79/6.05	1.19/0.92
...wie man psychologische Daten (z. B. Ergebnisse aus Tests und Fragebögen) mithilfe von Grafiken und statistischen Werten beschreiben kann und wie man diese Werte berechnet?	5.77	1.12	5.77/5.76	1.09/1.17
...wie man Wahrscheinlichkeiten berechnet?	4.83	1.45	4.62/5.04	1.45/1.52
... wie man mithilfe von statistischen Methoden psychologische Annahmen und Theorien rechnerisch überprüfen kann?	6.03	0.94	5.90/6.14	1.03/0.84
Empirisch-wissenschaftliches Arbeiten /Forschungsmethoden	5.36	0.89	5.36/5.36	0.98/0.80
... wie man die Qualität des wissenschaftlichen Vorgehens bei einer psychologischen Forschungsstudie kritisch hinterfragen und beurteilen kann?	6.07	1.12	5.95/6.20	1.18/1.05
... wie statistische Softwareprogramme zur Auswertung von psychologischen Daten zu bedienen sind?	5.10	1.31	5.38/4.83	1.24/1.33
...wie man eigenständig psychologische Forschungsstudien plant, vorbereitet und durchführt?	5.36	1.32	5.36/5.36	1.37/1.27
... wie man wissenschaftliche Erkenntnisse für andere verständlich aufbereitet und präsentiert?	4.91	1.52	4.75/5.05	1.59/1.45
Psychologische Diagnostik	5.15	0.92	5.16/5.13	0.99/0.86
...wie man psychologische Entscheidungen (z.B. nach der Eignung von Personen) mithilfe von psychologischen Methoden zielgerichtet treffen und kommunizieren kann?	4.72	1.41	4.99/4.47	1.31/1.47
... welche Verfahren es gibt, um psychologische Merkmale (z. B. Intelligenz oder Motivation) zu messen, wie man neue Verfahren entwickelt und wie man deren Qualität beurteilen kann?	5.40	1.13	5.33/5.46	1.16/1.10
...wie man Verfahren zur Messung psychologischer Merkmale anwendet und deren Ergebnisse interpretiert?	5.52	1.15	5.59/5.46	1.18/1.13
...welche Theorien man bei der Erstellung von Verfahren zur Messung psychologischer Merkmale zugrunde legt?	4.94	1.26	4.73/5.14	1.29/1.20

Tabelle geht auf der nächsten Seite weiter.

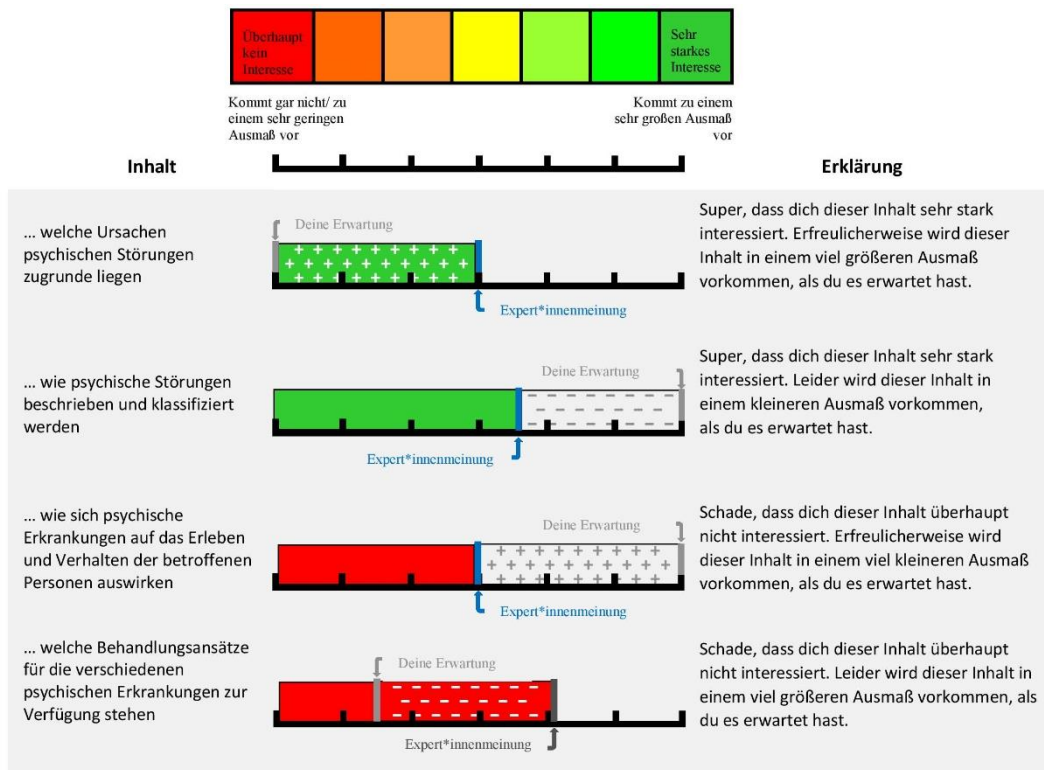
Pädagogische Psychologie	3.94	1.02	4.18/3.70	1.02/0.98
... welche Prozesse beim Lernen ablaufen und wie dieses gefördert werden kann?	4.89	1.21	5.01/4.76	1.24/1.18
... wie Lehrprozesse beschrieben und gestaltet werden können?	3.88	1.30	4.16/3.61	1.19/1.36
... wie man Leistungen, Kompetenzen und Überzeugungen mit Präventionsprogrammen oder Trainings günstig beeinflussen kann?	3.59	1.38	3.78/3.41	1.39/1.36
... wie man mit Hilfe von Forschungsstudien Bildungssysteme, Erziehungs- und Unterrichtsformen vergleichen und bewerten kann?	3.40	1.56	3.78/3.03	1.40/1.63
Klinische Psychologie	4.61	1.11	4.52/4.69	1.13/1.10
... welche Ursachen psychischen Störungen zugrunde liegen?	4.72	1.33	4.74/4.70	1.29/1.38
... wie psychische Störungen beschrieben und klassifiziert werden können?	5.03	1.17	4.88/5.18	1.19/1.14
... wie sich psychische Erkrankungen auf das Erleben und Verhalten der betroffenen Personen auswirken?	4.56	1.22	4.49/4.62	1.26/1.19
... welche Behandlungsansätze für die verschiedenen psychischen Erkrankungen zur Verfügung stehen?	4.12	1.47	3.97/4.26	1.35/1.57
Arbeits-, Organisations- und Wirtschaftspsychologie	3.92	1.09	4.11/3.74	1.05/1.10
...wie Arbeitsleistung entsteht und wie sie gefördert werden kann?	4.00	1.24	4.19/3.82	1.27/1.19
...wie man Arbeits- und Organisationsprozesse analysieren, gestalten und verbessern kann?	3.97	1.32	4.18/3.78	1.24/1.37
... welche Faktoren das Wohlbefinden und Stresserleben auf der Arbeit beeinflussen können?	4.11	1.29	4.29/3.95	1.22/1.34
...wie Personalauswahl und Personalentwicklung gestaltet werden kann?	3.60	1.39	3.78/3.43	1.34/1.43
Sonstige Studieninhalte	5.28	0.78	5.09/5.46	0.78/0.76
...theoretisch Gelerntes bei einem Praktikum anzuwenden?	3.56	1.57	3.36/3.76	1.42/1.69
...Berufsfelder von Psychologinnen und Psychologen in Form eines Praktikums kennenzulernen?	4.01	1.49	3.82/4.20	1.45/1.52
... wie wissenschaftliche Artikel in der Psychologie aufgebaut sind?	5.80	1.25	5.37/6.21	1.37/0.96
... komplexe Fachliteratur effizient zu lesen und zu verstehen?	5.68	1.33	5.44/5.92	1.41/1.21
... aus psychologischer Fachliteratur Erkenntnisse zu gewinnen?	6.07	1.15	5.89/6.24	1.16/1.12
... die im Studium erlangten Erkenntnisse auf ein eigenes Thema in Form einer wissenschaftlichen Abschlussarbeit anzuwenden?	5.28	1.364	5.37/5.18	1.24/1.48
... wissenschaftliche Fachliteratur auf Englisch zu lesen?	6.54	0.86	6.38/6.68	0.78/0.91

Tabelle geht auf der nächsten Seite weiter.

Häufige Irrtümer	1.67	0.63	1.65/1.70	0.56/0.70
... wie man Psychoanalyse nach Freud praktisch anwenden kann?	1.32	0.67	1.19/1.43	0.52/0.77
... dich selbst zu therapieren?	1.30	0.62	1.21/1.38	0.44/0.75
... wie man andere Menschen manipulieren kann?	1.90	1.11	1.93/1.87	1.13/1.10
... im Kontakt mit Klient/innen das im Psychologiestudium praktisch Gelernte (z. B. Gesprächstechniken) anzuwenden?	2.19	1.25	2.26/2.12	1.19/1.31
... wie man Menschen in einen Hypnose-Zustand versetzt?	1.19	0.66	1.16/1.22	0.44/0.83
... wie Träume interpretiert werden können?	1.17	0.49	1.21/1.14	0.58/0.39

Anmerkung: Die Skalenrange für die Erfassung von Erwartungen reicht von 1 (*gar nicht/ in einem sehr geringen zeitlichen Ausmaß*) über 4 (*in einem durchschnittlichen zeitlichen Ausmaß*) bis hin zu 7 (*in einem sehr großen zeitlichen Ausmaß*). *M* = Mittelwert; *SD* = Standardabweichung; *ICC* = Intraklassen Korrelation basierend auf dem *mean-rating* ($k = 149$), *absolute-agreement, two-way randomized-effects model*

Elektronisches Supplementmaterial C - Abbildung 1: Ausschnitt eines Feedbacks zum Interesse, zur Erwartungsdiskrepanz und zur Valenz der Erwartungsdiskrepanz aus dem Erwartungs- und Interessenstest (E × I - Test).



Anmerkung: Die Farbe des Balkens zeigt an, wie sehr sich die Nutzer*innen für einen bestimmten Inhalt interessieren: Von Rot (*überhaupt kein Interesse*) über Gelb (*mittelmäßiges Interesse*) bis Grün (*sehr starkes Interesse*). Diese Farbcodierung wurde gewählt, da mehr Interesse an Studieninhalten unabhängig von den Erwartungen per se besser ist als weniger Interesse und „Grün“ als Farbe eher positive Assoziationen mit sich zieht, während „Rot“ eher eine Warn- und Signalfarbe darstellt. Die Erwartung der Studieninteressierten hinsichtlich des zeitlichen Ausmaßes (graue Markierung) beziehungsweise die Expert*inneneinschätzung (blaue Markierung) werden auf der x-Achse abgetragen, von links (*sehr geringes Ausmaß*) bis rechts (*sehr großes Ausmaß*). Dadurch wird die Differenz zwischen der Erwartung der Studieninteressierten und der Expert*inneneinschätzung veranschaulicht. Die Füllung des Balkenbereichs dieser Differenz zeigt zusätzlich an, inwiefern Erwartungen übertroffen (positive Valenz der Erwartungsdiskrepanz symbolisiert durch „+“) beziehungsweise enttäuscht (negative Valenz der Erwartungsdiskrepanz symbolisiert durch „-“) wurden, oder ob die Erwartungsdiskrepanz aufgrund eines mittelmäßigen Interesses neutral zu bewerten ist („^o“).

Elektronisches Supplementmaterial D - Tabelle 1

Bedeutung und Berechnung der Scores im Erwartungs- und Interessenstests ($E \times I$ - Test)

Score	Bedeutung und Berechnung
i	Item von 1...i...n (alle Items, 61) bzw. n*(alle Items des Studiums bis auf die Items zu den häufigen Irrtümern, 55)
j	Nutzer*in 1...j...m
$\$I_{ij}$	Nutzer*inneninteresse am Inhalt des Items von -3 (<i>überhaupt kein Interesse</i>) bis hin zu +3 (<i>sehr starkes Interesse</i>)
$\$E_{ij}$	Nutzer*innenerwartung hinsichtlich des zeitlichen Ausmaßes des Inhalts des Items von 1 (<i>gar nicht/ in einem sehr geringen zeitlichen Ausmaß</i>) bis hin zu 7 (<i>in einem sehr großen zeitlichen Ausmaß</i>)
$\$Exp_i$	Expert*inneneinschätzung hinsichtlich des zeitlichen Ausmaßes des Inhalts des Items 1 (<i>gar nicht/ in einem sehr geringen zeitlichen Ausmaß</i>) bis hin zu 7 (<i>in einem sehr großen zeitlichen Ausmaß</i>)
$\$ED_{ij}$	Erwartungsdiskrepanz = $\$Exp_i - \E_{ij}
$\$BED_{ij}$	Betrag der Erwartungsdiskrepanz = $Abs(\$ED_{ij})$
$\$VED_{ij}$	Valenz der Erwartungsdiskrepanz = $\$I_{ij} * \ED_{ij}
$\$IG_j$	Durchschnittliches Interesse (Gesamt) = $\sum_{i=1}^n \$I_{ij} / n^*$
$\$EDG_j$	Durchschnittliche Erwartungsdiskrepanz (Gesamt) = $\sum_{i=1}^n \$ED_{ij} / n$
$\$BEDG_j$	Durchschnittlicher Betrag der Erwartungsdiskrepanzen (Gesamt) = $\sum_{i=1}^n \$BED_{ij} / n$
$\$VEDG_j$	Durchschnittliche Valenz der Erwartungsdiskrepanzen (Gesamt) = $\sum_{i=1}^n \$VED_{ij} / n$

Anmerkung. Bei der Bildung des Gesamtscores hinsichtlich des durchschnittlichen Interesses werden die Items zu den häufigen Irrtümern, also Inhalten, die fälschlicherweise im Studium erwartet werden, nicht miteinbezogen, da Interesse an diesen Items nicht das Interesse an den wahren Studieninhalten widerspiegelt.

Elektronisches Supplementmaterial D - Tabelle 2

Gesamtfedback zur Erwartungsdiskrepanz im Erwartungs- und Interessentest ($E \times I - Test$)¹

Score	Gesamtfedback zur Erwartungsdiskrepanz
(-0.5 >= \$EDG _j) && (\$EDG _j > -1.5)	Achtung, du hast über alle Inhalte hinweg im Durchschnitt das zeitliche Ausmaß etwas größer als die Experten eingeschätzt. Das wäre so als ob du etwas mehr Schulstunden erwarten würdest als im Lehrplan vorgesehen. Dadurch kommt es beim folgenden Feedback dazu, dass du häufiger die Rückmeldung bekommst, dass Inhalte in einem kleineren Ausmaß vorkommen, als du es erwartest hast. Das bedeutet nicht automatisch, dass du nicht für das Bachelor-Psychologiestudium geeignet bist. Schau dir lieber genau an, an welchen Stellen es größere Abweichungen gibt, als deine tendenzielle Abweichung und ob diese besonders relevant sind, weil es ein Thema ist, dass dich möglicherweise besonders stark/wenig stark interessiert.
(0.5 <= \$EDG _j) && (\$EDG _j < 1.5)	Achtung, du hast über alle Inhalte hinweg im Durchschnitt das zeitliche Ausmaß etwas kleiner als die Experten eingeschätzt. Das wäre so als ob du etwas weniger Schulstunden erwarten würdest als im Lehrplan vorgesehen. Dadurch kommt es beim folgenden Feedback dazu, dass du häufiger die Rückmeldung bekommst, dass Inhalte in einem größeren Ausmaß vorkommen, als du es erwartest hast. Das bedeutet nicht automatisch, dass du nicht für das Bachelor-Psychologiestudium geeignet bist. Schau dir lieber genau an, an welchen Stellen es größere Abweichungen gibt, als deine tendenzielle Abweichung und ob diese besonders relevant sind, weil es ein Thema ist, dass dich möglicherweise besonders stark/wenig stark interessiert.
(-1.5 >= \$EDG _j) && (\$EDG _j > -2.5)	Achtung, du hast über alle Inhalte hinweg im Durchschnitt das zeitliche Ausmaß größer als die Experten eingeschätzt. Das wäre so als ob du mehr Schulstunden erwarten würdest als im Lehrplan vorgesehen. Dadurch kommt es beim folgenden Feedback dazu, dass du häufiger die Rückmeldung bekommst, dass Inhalte in einem kleineren Ausmaß vorkommen, als du es erwartest hast. Das bedeutet nicht automatisch, dass du nicht für das Bachelor-Psychologiestudium geeignet bist. Schau dir lieber genau an, an welchen Stellen es größere Abweichungen gibt, als deine tendenzielle Abweichung und ob diese besonders relevant sind, weil es ein Thema ist, dass dich möglicherweise besonders stark/wenig stark interessiert.
(1.5 <= \$EDG _j) && (\$EDG _j < 2.5)	Achtung, du hast über alle Inhalte hinweg im Durchschnitt das zeitliche Ausmaß geringer als die Experten eingeschätzt. Das wäre so als ob du weniger Schulstunden erwarten würdest als im Lehrplan vorgesehen. Dadurch kommt es beim folgenden Feedback dazu, dass du häufiger die Rückmeldung bekommst, dass Inhalte in einem größeren Ausmaß vorkommen, als du es erwartest hast. Das bedeutet nicht automatisch, dass du nicht für das Bachelor-Psychologiestudium geeignet bist. Schau dir lieber genau an, an welchen Stellen es größere Abweichungen gibt, als deine tendenzielle Abweichung und ob diese besonders relevant sind, weil es ein Thema ist, dass dich möglicherweise besonders stark/wenig stark interessiert.
-2.5 >= \$EDG _j	Achtung, du hast über alle Inhalte hinweg im Durchschnitt das zeitliche Ausmaß sehr viel größer als die Experten eingeschätzt. Das wäre so als ob du sehr viel mehr Schulstunden erwarten würdest als im Lehrplan vorgesehen. Dadurch kommt es beim folgenden Feedback dazu, dass du häufiger die Rückmeldung bekommst, dass Inhalte in einem kleineren Ausmaß vorkommen, als du es erwartest hast. Das bedeutet nicht automatisch, dass du nicht für das Bachelor-Psychologiestudium geeignet bist. Schau dir lieber genau an, an welchen Stellen es größere Abweichungen gibt, als deine tendenzielle Abweichung und ob diese besonders relevant sind, weil es ein Thema ist, dass dich möglicherweise besonders stark/wenig stark interessiert.
2.5 <= \$EDG _j	Achtung, du hast über alle Inhalte hinweg im Durchschnitt das zeitliche Ausmaß sehr viel kleiner als die Experten eingeschätzt. Das wäre so als ob du sehr viel weniger Schulstunden erwarten würdest als im Lehrplan vorgesehen. Dadurch kommt es beim folgenden Feedback dazu, dass du häufiger die Rückmeldung bekommst, dass Inhalte in einem größeren Ausmaß vorkommen, als du es erwartest hast. Das bedeutet nicht automatisch, dass du nicht für das Bachelor-Psychologiestudium geeignet bist. Schau dir lieber genau an, an welchen Stellen es größere Abweichungen gibt, als deine tendenzielle Abweichung und ob diese besonders relevant sind, weil es ein Thema ist, dass dich möglicherweise besonders stark/wenig stark interessiert.

Anmerkung. Zeichenverwendung gemäß JavaScript Code. Bedeutung und Berechnung der Scores siehe Tabelle 1.

¹ Bei diesem Feedback geht es darum, den Studieninteressierten mitzuteilen, dass nicht jeder Inhalt in einem unter- beziehungsweise überdurchschnittlichen Ausmaß vorkommen kann.

Elektronisches Supplementmaterial D - Tabelle 3

Feedback zum Interesse, zur Erwartungsdiskrepanz und zur Valenz der Erwartungsdiskrepanz für einzelne Items im Erwartungs- und Interessenstest ($E \times I$ - Test)

Interesse		Valenz der Erwartungsdiskrepanz		Erwartungsdiskrepanz	
Score	Feedback ^a	Score	Feedback	Score	Feedback
$\$I_{ij} \leq -2.5$	Schade, dass dich dieser Inhalt überhaupt nicht interessiert.	$\text{abs}(\$BED_{ij}) < 0.5$	Exakt, dieser Inhalt wird	$\text{abs}(\$BED_{ij}) < 0.5$	ungefähr in dem Ausmaß vorkommen, in dem du es erwartest hast.
$(-2.5 < \$I_{ij}) \&\& (\$I_{ij} \leq -1.5)$	Schade, dass dich dieser Inhalt wenig interessiert.	$(0.5 \leq \text{abs}(\$BED_{ij})) \&\& (\text{abs}(\$BED_{ij}) < 1.5) \&\& (-0.5 < \$I_{ij}) \&\& (\$I_{ij} < 0.5)$	Dieser Inhalt wird	$(0.5 \leq \$BED_{ij}) \&\& (\$BED_{ij} < 1.5)$	in einem etwas größeren Ausmaß vorkommen, als du es erwartest hast.
$(-1.5 < \$I_{ij}) \&\& (\$I_{ij} \leq -0.5)$	Schade, dass dich dieser Inhalt eher wenig interessiert.	$(\text{abs}(\$BED_{ij}) > 1.5) \&\& (-0.5 < \$I_{ij}) \&\& (\$I_{ij} < 0.5)$	Achtung, dieser Inhalt wird	$(-0.5 > \$BED_{ij}) \&\& (\$BED_{ij} > -1.5)$	in einem etwas kleineren Ausmaß vorkommen, als du es erwartest hast.
$(-0.5 < \$I_{ij}) \&\& (\$I_{ij} < 0.5)$	Dieser Inhalt interessiert dich mittelmäßig.	$((\$BED_{ij}) \leq -0.5) \&\& (\$I_{ij} \leq -0.5) \parallel ((0.5 \leq \$BED_{ij}) \&\& (\$I_{ij} > 0.5))$	Erfreulicherweise wird dieser Inhalt	$(1.5 \leq \$BED_{ij}) \&\& (\$BED_{ij} < 2.5)$	in einem größeren Ausmaß vorkommen, als du es erwartest hast.
$(0.5 \leq \$I_{ij}) \&\& (\$I_{ij} < 1.5)$	Super, dass dich dieser Inhalt eher stark interessiert.	$((\$BED_{ij}) \leq -0.5) \&\& (\$I_{ij} > 0.5) \parallel ((0.5 \leq \$BED_{ij}) \&\& (\$I_{ij} \leq -0.5))$	Leider wird dieser Inhalt	$(-1.5 > \$BED_{ij}) \&\& (\$BED_{ij} > -2.5)$	in einem kleineren Ausmaß vorkommen, als du es erwartest hast.
$(1.5 \leq \$I_{ij}) \&\& (\$I_{ij} < 2.5)$	Super, dass dich dieser Inhalt stark interessiert.			$2.5 \leq \$BED_{ij}$	in einem viel größeren Ausmaß vorkommen, als du es erwartest hast.
$2.5 \leq \$I_{ij}$	Super, dass dich dieser Inhalt sehr stark interessiert.			$-2.5 \geq \$BED_{ij}$	in einem viel kleineren Ausmaß vorkommen, als du es erwartest hast.

Anmerkung. Zeichenverwendung gemäß JavaScript Code. Bedeutung und Berechnung der Scores siehe Tabelle 1. ^aIn der Kategorie der Häufigen Irrtümer entfällt dieser Kommentar, da Interesse an Inhalten, die nur fälschlicherweise im Bachelor Psychologiestudium erwartet werden ohne Verrechnung mit etwaigen Erwartungsdiskrepanzen hinsichtlich derselben Inhalte, nicht von Relevanz für die Studienwahlentscheidung sein sollte.

Elektronisches Supplementmaterial D - Tabelle 4

Gesamtfeedback zum Interesse, zum Betrag der Erwartungsdiskrepanz und zur Valenz der Erwartungsdiskrepanz im Erwartungs- und Interessentest (E × I - Test)

Interesse		Betrag der Erwartungsdiskrepanz		Valenz der Erwartungsdiskrepanz	
Score	Feedback	Score	Feedback	Score 1	Feedback 1
		Score	Feedback	Score 2	Feedback 2
$\$IG_j < -2.5$	Insgesamt hast du überhaupt kein Interesse am Bachelor-Psychologiestudium.	$\$BEDG_j < 0.5$	Insgesamt werden Inhalte im Bachelor-Psychologiestudium ungefähr in dem zeitlichen Ausmaß vorkommen, in dem du es erwartest hast.	$abs(\$VEDG_j) < 0.5$	Es zeigt sich nicht oder nur in sehr geringem Maße, dass insgesamt im Bachelor-Psychologiestudium.
$(-2.5 < \$IG_j) \&\& (\$IG_j < -1.5)$	Insgesamt hast du wenig Interesse am Bachelor-Psychologiestudium.				a) Inhalte, die dich nicht interessieren, in einem größeren Ausmaß vorkommen, als du es erwartest hast b) Inhalte, die dich nicht interessieren, in einem kleineren Ausmaß vorkommen, als du es erwartest hast c) oder es kann auch beides zutreffen.
$(-1.5 < \$IG_j) \&\& (\$IG_j < -0.5)$	Insgesamt hast du eher wenig Interesse am Bachelor-Psychologiestudium.	$(0.5 <= \$BEDG_j) \&\& (\$BEDG_j < 1.5)$	Insgesamt weichen deine Erwartungen hinsichtlich des zeitlichen Ausmaßes der Inhalte im Bachelor-Psychologiestudium in eher kleinem Ausmaß von der Einschätzung der Experten ab.	$(0.5 <= abs(\$VEDG_j) \&\& (abs(\$VEDG_j) < 3.5)$	a) Inhalte, die dich interessieren, in einem kleineren Ausmaß vorkommen, als du es erwartest hast b) Inhalte, die dich nicht interessieren in einem größeren Ausmaß vorkommen, als du es erwartest hast c) oder es kann auch beides zutreffen.
$(-0.5 < \$IG_j) \&\& (\$IG_j < 0.5)$	Insgesamt hast du mittelmäßiges Interesse am Bachelor-Psychologiestudium.				
$(0.5 <= \$IG_j) \&\& (\$IG_j < 1.5)$	Insgesamt hast du eher starkes Interesse am Bachelor-Psychologiestudium.	$(1.5 <= \$BEDG_j) \&\& (\$BEDG_j < 2.5)$	Insgesamt weichen deine Erwartungen hinsichtlich des zeitlichen Ausmaßes der Inhalte im Bachelor-Psychologiestudium in eher großem Ausmaß von der Einschätzung der Experten ab.	$(3.5 <= abs(\$VEDG_j) \&\& (abs(\$VEDG_j) < 6.5)$	Inhalte, die dich interessieren/nicht interessieren, in einem größeren/kleineren Ausmaß vorkommen, als du es erwartest hast.
$(1.5 <= \$IG_j) \&\& (\$IG_j < 2.5)$	Insgesamt hast du starkes Interesse am Bachelor-Psychologiestudium.				
$2.5 <= \$IG_j$	Insgesamt hast du sehr starkes Interesse am Bachelor-Psychologiestudium.	$2.5 <= \$BEDG_j$	Insgesamt weichen deine Erwartungen hinsichtlich des zeitlichen Ausmaßes der Inhalte im Bachelor-Psychologiestudium in sehr großem Ausmaß von der Einschätzung der Experten ab.	$(6.5 <= abs(\$VEDG_j))$	Es zeigt sich in sehr großem Maße, dass insgesamt im Bachelor-Psychologiestudium.

Anmerkung: Zeichenverwendung gemäß JavaScript Code. Bedeutung und Berechnung der Scores siehe Tabelle 1.

Appendix B - Manuscript 2:

Merkle, B., Messerer, L. A. S. & Dickhäuser, O. (2024). Will I be happy in this major?

Predicting intrinsic motivation and subjective well-being with prospective students' well-being forecast and interest-major fit forecast. *Social Psychology of Education*, 27(1), 237–259. <https://doi.org/10.1007/s11218-023-09835-6>.

Will I Be Happy in This Major?**Predicting Intrinsic Motivation and Subjective Well-Being With Prospective Students' Well-Being Forecast and Interest-Major Fit Forecast****Biographical Details:**

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Abstract

Choosing a field of study (study major) is challenging for prospective students. However, little research has examined factors measured prior to enrollment to predict motivation and well-being in a specific study major. Based on literature on affective forecasting and person-environment fit, prospective students' well-being forecast could be such a factor. However, affective forecasts are often biased by individuals' inaccurate theories about what makes them happy and their misconstrual of future situations. Thus, we hypothesize that subjective and objective interest-major fit forecasts improve predictions as these factors are based on a well-founded theory (person-environment fit theory) and objective interest-major fit forecasts are additionally based on a more accurate construal of the future situation (expert estimates of a study major). We tested these hypotheses in a longitudinal field study. Over two years, more than 4000 prospective students were asked for their well-being forecast and subjective interest-major fit forecast before using an online-self-assessment to assess their objective interest-major fit forecast. Of these prospective students, 234 subsequently entered the psychology major and took part in a survey about their motivation and well-being in their study major. As hypothesized, higher well-being forecasts predicted higher motivation, more positive affect, and higher satisfaction in the respective major. Beyond that, higher subjective interest-major fit forecasts predicted higher motivation, less negative affect, and higher satisfaction, while objective interest-major fit forecasts incrementally predicted higher motivation, more positive affect, and higher satisfaction. We discuss theoretical implications for affective forecasting and person-environment fit theory and practical implications for study orientation and guidance.

Keywords: affective forecasting, interest-major fit, motivation, subjective well-being, online-self-assessment for study choices, higher education

1. Introduction

The choice of a field of study (study major) is the first step for students along the path of higher education and represents an important life choice (Schindler et al., 2014). To make a good choice, prospective students need to know not only how well they will do in a particular major, but also how motivated and satisfied they will be. The difficulty of this task is shown by about 30% of students changing their major (NCES, 2018), and more than 20% of students ending up not being satisfied with their studies (Wong & Chapman, 2022). While some higher education systems offer orientation phases for students to explore various majors and find out how much they like different majors, other education systems (e.g., the German system) do not have such a phase (Messerer, Karst & Janke, 2023). Instead, they usually expect prospective students to choose a study major before entering university and stay with it as dropping out or changing the study major comes with costs for the individual and the organization and therefore is often seen as an event that should be avoided (Behr et al., 2020; Soppe et al., 2019). Thus, especially in education systems without an orientation phase it is important to predict how successful prospective students will be in a specific study major even before they enter university.

There is a broad body of literature focusing on the prediction of objective study success outcomes, for example predicting academic performance or dropout using high school grade point average (e.g., Geiser & Santelices, 2007), or tests in the selection procedure (e.g., trial-studying tests, Niessen et al., 2016). However, several models of study success (e.g., Bean & Metzner, 1985; Heinze, 2018) not only include objective outcomes such as grades and dropout as indicators of students' success but also subjective outcomes such as their motivation and satisfaction. Regarding the prediction of subjective outcomes there is less research, and the existing research focuses mainly on factors predicting the intrinsic motivation and subjective well-being of students *independent of the respective study major* (e.g., Respondek, et al., 2017; Steel et al., 2008). Little research has

focused on factors that target a *specific study major* and thus have the potential to predict students' intrinsic motivation and subjective well-being within a specific study major (e.g., Etzel & Nagy, 2016) and to the best of our knowledge there is no research that explores major-specific predictors for intrinsic motivation and subjective well-being (e.g., positive affect, negative affect and satisfaction) in a study major measured even *before entering university*.

We aim to fill this gap by implementing an ecologically valid field design accompanying prospective students in their transition to university. Drawing from theories of affective forecasting (e.g., Wilson & Gilbert, 2003) our first goal is to examine to which extent prospective students' forecast of their subjective well-being within a specific study major (*well-being forecast*) can predict their later intrinsic motivation and subjective well-being in the respective study major. Combining theories of biases in affective forecasting (e.g., Wilson & Gilbert, 2003) with the person-environment fit theory (e.g., Le et al., 2014), our second goal is to test whether prospective students' forecast of their interest-major fit (*subjective interest-major fit forecast*) improves the prediction of their later intrinsic motivation and subjective well-being in the respective study major. Building on this, our third goal is to examine whether prospective students' forecast of their interest in specific contents which represent a valid construal of the respective study major (*objective interest-major fit forecast*) can further improve the prediction. Our research will shed light on whether prospective students need more support in predicting their major-specific intrinsic motivation and subjective well-being before entering university and how this support could look like to ensure successful decisions to pursue a particular study major.

1.1 Interest-Major Fit– Explaining Students' Major-Specific Subjective Well-Being

A large number of studies has already identified many factors predicting the intrinsic motivation and subjective well-being of students within their studies, including personality traits (e.g., Clark & Schroth, 2010; Sood et al., 2012) or study circumstances

such as perceived demands like time pressure (e.g., Lesener et al., 2020), perceived resources like social support (e.g., Mokgele & Rothman, 2014) and perceived academic control (e.g., Respondek et al., 2017). However, when it comes to choosing one study major among many, it is most relevant to know which factors that target a specific study major determine intrinsic motivation and subjective well-being in a *specific* study major. Based on person-environment fit theory a fit between a person's characteristics and the characteristics of the environment leads to more success (e.g., Bretz & Judge, 1994; Cable & DeRue, 2002; Edwards & Shipp, 2007; Le et al., 2014). In the university context the fit between students' interests (person) and study contents (environment) is referred to as interest-major fit (person-environment fit) and has proven to be a predictor for study satisfaction and dropout intention (Etzel & Nagy, 2016). However, these research findings on interest-major fit stem from students who had already chosen their major and were in the middle of their studies. Thus, it remains unclear whether variables already measured before entering a study major can predict later intrinsic motivation and subjective well-being within this specific major and thus could be useful to guide prospective students' decision-making process.

1.2 Well-Being Forecast – Influenced by Biases

When making decisions people are guided by their affective forecasting, their anticipation about how they will feel in a future situation (Conner et al., 2015; Wilson & Gilbert, 2003). The affective forecasting literature shows, in a wide variety of contexts, that this approach is reasonable as people can to some extent forecast their own subjective well-being before they have experienced the respective situation (e.g., Gilbert et al., 1998). We assume that these findings also hold in the context of choosing a study major because prospective students had a lifetime of collecting information about themselves in different learning environments. Because of these previous experiences prospective students should be able to forecast their intrinsic motivation and subjective well-being in a study major to

some extent before they enter university. However, more importantly, the affective forecasting literature also shows that these forecasts are far from perfectly accurate and identifies several biases that could explain forecasts' deviations from reality, including inaccurate theories and misconstrual (for an overview, see Gilbert et al., 1998; Wilson & Gilbert, 2003). Those biases can help to better understand why prospective students' well-being forecast could deviate from later reality. This better understanding in turn can help to identify important factors that could improve the prediction of later intrinsic motivation and subjective well-being in a study major.

1.3 Subjective Interest-Major Fit Forecast – Reducing Inaccurate Theories

Formed by culture or personal experiences, individuals may have very different theories about the emotional consequences of specific events or actions and some of these are partly wrong, for example the assumption that money is the key to happiness (Aknin et al., 2009; Wilson & Gilbert, 2003). Affective forecasts based on those theories are also likely to be wrong to some extent (Wilson & Gilbert, 2003), for example, choosing a study major for materialistic reasons is not related to more study satisfaction (Janke et al., 2021). If one reason for prospective students' biased well-being forecasts is their use of inaccurate theories, then using a scientifically proven theory should help them make better forecasts. In the context of predicting study satisfaction such a theory would be the person-environment fit theory (Cable & DeRue, 2002; Edwards & Shipp, 2007), based on which it can be assumed that higher interest-major fit predicts higher study satisfaction (Etzel & Nagy, 2016). Following this rationale, subjective interest-major fit forecast (assessed by simply asking prospective students to forecast their interest-major fit) should improve the prediction of later subjective well-being because it directs prospective students' forecast to an empirically proven cause of later subjective well-being.

1.4 Objective Interest-Major Fit Forecast – Reducing Inaccurate Theories and Misconstrual

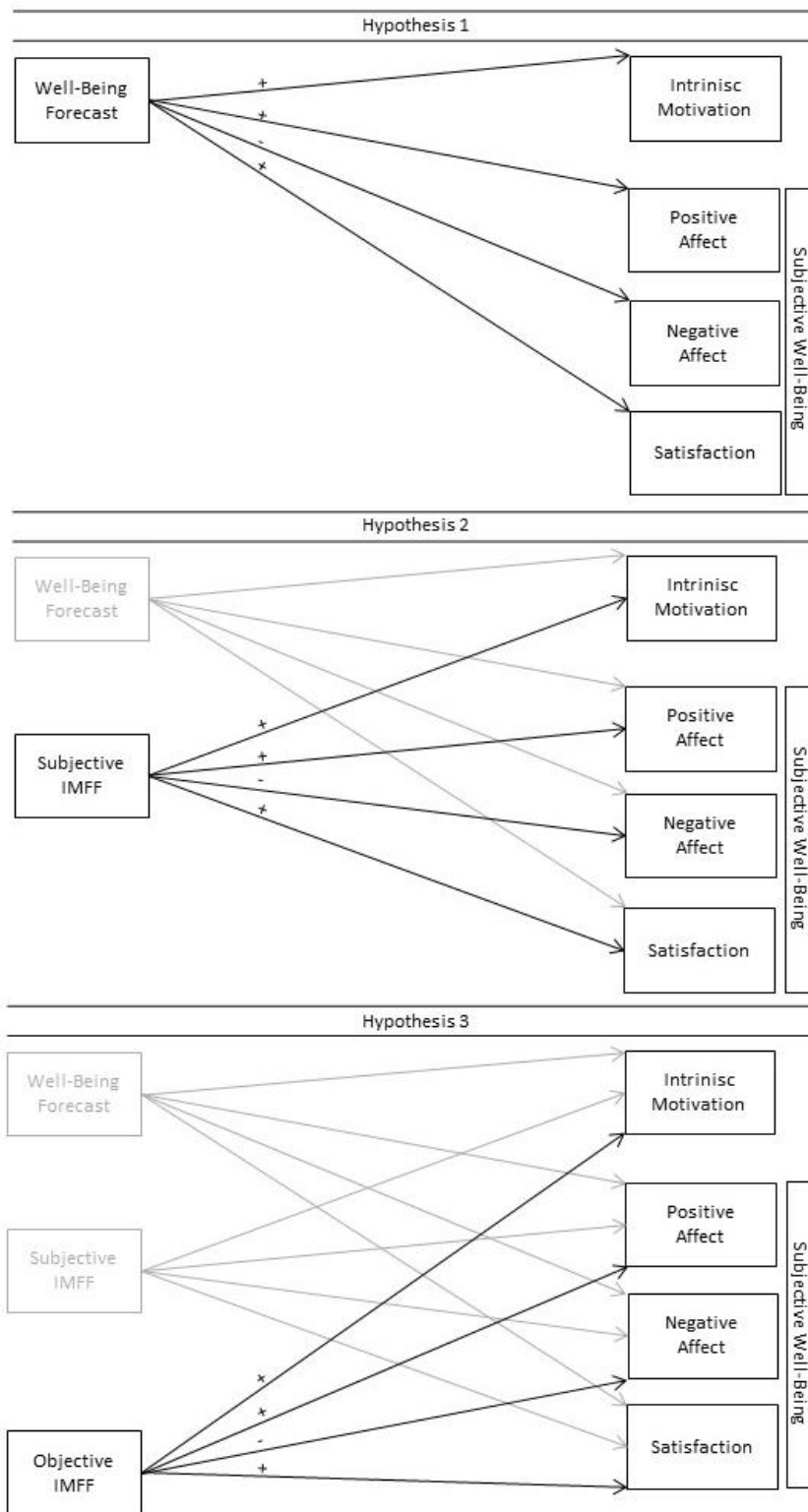
To forecast their fit to a specific study major, prospective students not only need a lot of insight about themselves but also a lot of information about the respective study major in question. In some education systems students have an orientation phase to get to know different study majors (Messerer, Karst & Janke, 2023) or take part in a curriculum-sampling test during the selection procedure which contains fidelity simulations of (parts of) the major in question (Niessen et al., 2018). However, in other education systems, prospective students must decide on a major without having any study experience in that major. In these cases, they likely have misconceptions about the contents of the study major (Heublein, 2014). For example, they might expect content in the undergraduate psychology major that is not part of the curriculum. Misconstruing an event (in our example having wrong expectations regarding the content of the undergraduate psychology major) in turn can lead to biased forecasts (Wilson & Gilbert, 2003). Following this rationale, assessing prospective students' interest-major fit forecast based on a valid theory (person-environment fit theory) and based on a valid construal of the future situation (in our example a valid construal of the undergraduate psychology major based on expert estimates of the psychology major) should improve the prediction of intrinsic motivation and subjective well-being. Thus, we propose assessing prospective students' interest (person) in specific contents which represent a valid construal of the respective study major (environment). Important criteria for ensuring that specific contents represent a valid construal of a study major are the following (Merkle et al., 2021): The specific contents should cover all central subfields of the respective study major (exhaustiveness), should be unambiguously assignable to the corresponding subfields of the respective study major (structure) and these subfields should be evenly covered so that no subfield is over- or underrepresented (prototypicality).

Following this procedure for the construction of the assessment of interest-major fit should lead to a more *objective* forecast of interest-major fit which is why we refer to it as *objective interest-major fit forecast*. Objective interest-major fit forecast should reduce the bias in prospective students' forecast which is due to prospective students' misconceptions about the contents of the study major. Thus, objective interest-major fit forecast should improve the prediction of intrinsic motivation and subjective well-being.

1.5 Research Question and Hypotheses

Thus, to the best of our knowledge, we are the first to examine factors that fulfill two necessary conditions to support students in their decision-making process for a study major: First, the factors target a specific study major and thus have the potential to predict students' intrinsic motivation and subjective well-being in a specific study major (versus targeting studying in general and predicting subjective well-being during studying independent of a specific major). Second, these factors are assessed even before students start studying. As predictors we will specifically examine prospective students' direct forecast of their subjective well-being (*well-being forecast*), students' subjective forecast of their interest-major fit (*subjective interest-major fit forecast*) as well as interest-major fit measured objectively with a scientifically developed and validated interest test in an online-self-assessment (*objective interest-major fit forecast*). The theoretical arguments presented above can be transposed into a theoretical framework (figure 1) that includes the following hypotheses.

Figure 1 Hypothesized theoretical framework for the prediction of intrinsic motivation and subjective well-being within a study major by well-being forecast, subjective interest-major fit forecast (subjective IMFF) and objective interest-major fit forecast (objective IMFF).



Note. Black lines represent hypotheses while grey lines represent controls

Prospective students already have many years of personal experience in different learning environments before entering university. Therefore, we hypothesize that a higher prospective student well-being forecast predicts higher later intrinsic motivation and subjective well-being (positive affect, negative affect, satisfaction) within their major (hypothesis 1). Directing prospective students' forecast away from possible inaccurate theories to an empirically proven cause of later subjective well-being, such as interest-major fit, should improve this prediction of subjective well-being. Thus, we hypothesize that a higher prospective student subjective interest-major fit forecast predicts higher later intrinsic motivation and subjective well-being within their major (positive affect, negative affect, satisfaction) beyond prospective students' well-being forecast (hypothesis 2). Additionally, assuring a valid construal of the respective major in the process of assessing interest-major fit forecasts (objective interest-major fit forecast) should reduce the bias in prospective students' forecast which is due to prospective students' misconceptions about the contents of the study major. Therefore, we hypothesize that a higher prospective student objective interest-major fit forecast predicts higher later intrinsic motivation and subjective well-being within their major (more positive affect, less negative affect, higher satisfaction), beyond prospective students' well-being forecast and subjective interest-major fit forecast (hypothesis 3).

2. Method

2.1 Sample and Procedure

In a first step (t_1), we collected data of 4262 prospective students who completed an online-self-assessment for psychology (*OSA-Psych*) prior to their enrollment in the period between February 2020 and September 2021 to self-reflect on whether psychology is the major which they want to decide on. Before they completed the online-self-assessment they agreed that their data can be used for scientific purposes and voluntarily took part in

an accompanying survey. In the survey they answered questions about their demographics, their trait subjective well-being, their well-being forecast within the psychology major and their subjective interest-major fit forecast. In the online-self-assessment, prospective students' objective interest-major fit was assessed and reported back in a feedback.

Of these 4262 prospective students, 234 started studying psychology in the 2020 or 2021 cohort, took part in a second survey within their first two months of study at one of five surveyed universities (t_2) and thus form the sample for our analyses ($M_{\text{age}} = 20.07$, $SD = 2.67$, range = 17-42 years, 87.2% women). In the second survey they were asked about their intrinsic motivation, satisfaction as well as positive and negative affect within their study major and received either credit points or an online-shopping voucher in exchange for their participation. All instructions and measures were provided in German.

2.2 Measures

2.2.1 Well-Being Forecast

To obtain a reliable measure and valid score of well-being forecast, we combined different approaches to measure affective forecasting. First, we used a single item which is often used in the affective forecasting literature to measure affective forecasts, asking how happy one would be in a specific situation (Gilbert et al., 1998). We adapted this item to the study context, asking "I would be happy in the undergraduate psychology major". However, to be able to estimate the reliability and validity of this measure, we added four more items. Two items were based on the study satisfaction scale from Westermann et al. (1996) and adapted to the future tense "I would really enjoy studying in an undergraduate psychology major" and "Overall, I would be satisfied with an undergraduate psychology major". One more item was adapted from Diener et al.'s (1985) life satisfaction scale and adapted to the future tense and the study context "In most areas, studying in an undergraduate psychology major would meet my ideal expectations" and one more item was self-constructed to reflect the affective component of subjective well-being "It would

feel really good to study in an undergraduate psychology major”. Participants used a seven-point scale, ranging from 1 (*does not apply at all*) to 7 (*applies completely*) to indicate how they envision the future undergraduate psychology major. As the scale was self-constructed, we conducted a pretest which showed first empirical evidence for its reliability, as well as its factorial and construct validity¹. The internal consistency in the present study was good with Cronbach’s $\alpha = .86$.

2.2.2 Subjective Interest-Major Fit Forecast

We adapted three items from Etzel and Nagy’s (2016) need-supply fit in the academic context scale to measure subjective interest-major fit forecast in the academic context by replacing the word expectations with the word interests (e.g., “The offerings of the undergraduate psychology major fit my expectations of the major” was adapted to “The offerings of the undergraduate psychology major fit my interests”). Participants used a 7-point Likert scale to indicate the extent to which each statement applied to them ranging from 1 (*not at all*) to 7 (*completely*). The internal consistency for the scale was good, Cronbach’s $\alpha = .81$.

2.2.3 Objective Interest-Major Fit Forecast

Objective interest-major fit forecast was assessed using the interest subscale of the expectation-interest test (Merkle et al., 2021) which consists of 61 items: 55 items addressing all central contents of the undergraduate psychology major (environment); six

¹ In the pretest the reliability of the scale was excellent ($\alpha = .92$) and did not improve if any item was omitted, thus all items were kept. The fit statistics retrieved through a confirmatory factor analysis for a one-dimensional model indicated a good model fit, $\chi^2(10) = 379.66, p < .001$; CFI = .995; RMSEA = .039; SRMR = .023 (based on the guidelines by Schermelleh-Engel et al., 2003). As expected, based on previous research (Wilson & Gilbert, 2003), the scale showed medium to strong correlations to current subjective well-being in their major: more positive affect ($r = .70, p < .001$), less negative affect ($r = .57, p < .001$), more study satisfaction ($r = .81, p < .001$). Additionally, students did forecast more subjective well-being in their major when they reported more intrinsic value ($r = .75, p < .001$), higher attainment value ($r = .61, p < .001$), higher utility value ($r = .48, p < .001$) and higher subjective interest-major fit.

items addressing content that is often mistaken for content of the undergraduate psychology major. Prospective students (person) could rate on a 7-point Likert scale how interested they were in the specific contents (e.g., “which causes underlie mental disorders”) on a scale ranging from -3 (*not interested at all*) to 3 (*very much interested*). The objective interest-major fit forecast (person-environment fit) was calculated by building the mean of the 55 interest items regarding central contents, the higher the value the higher the interest-major fit forecast. The internal consistency for the interest subscale was excellent, Cronbach’s $\alpha = .91$.

2.2.4 Intrinsic Motivation

Intrinsic study motivation was assessed using an adapted German translation (Messerer, Karst & Janke, 2023) of the interest subscale of the Intrinsic Motivation Inventory (Deci & Ryan, 2013). It consisted of 6 items; sample item: “I find it exciting to study”. The scale was anchored at 1 (*not true at all*) and 7 (*completely true*). The internal consistency for this scale was excellent, Cronbach’s $\alpha = .92$.

2.2.5 Subjective Well-Being

To measure subjective well-being within a specific major we assessed *study satisfaction* with a subscale of Westermann et al.’s (1996) study satisfaction scale which explicitly addresses satisfaction with the content of the studies. The subscale consists of three items (e.g., “Overall, I am satisfied with the undergraduate psychology major.”). Participants had to rate to what degree each statement applied to them on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*completely*). The scale showed a good internal consistency, Cronbach’s $\alpha = .86$.

Additionally, we assessed *positive and negative affect* with a slightly modified version of the German Version (Rahm et al., 2017) of the Scale of Positive and Negative Experience (SPANE, Diener et al., 2010). Participants were instructed to indicate on six items how frequently they felt this way in the first weeks of their semester “positive”,

“good”, “happy”, “pleasant”, “content” “joyful” and on six items how frequently they felt “negative”, “bad”, “sad” “unpleasant, “afraid”, “angry”). The scale was anchored at 1 (*very rarely or never*) and 7 (*very often or always*). Following Rahm et al.’s (2017) conceptualization of this measure and in congruence with confirmatory factor analyses results, positive and negative affect scores were computed separately, instead of together as a common difference score². Internal consistency for the positive affect subscale was excellent, Cronbach’s $\alpha_{\text{Pos}} = .89$, internal consistency for the negative affect subscale was good, $\alpha_{\text{Neg}} = .80$.

2.2.6 Control Variables

To control for trait subjective well-being, we used two single items. We asked participants to report satisfaction (item taken from Beierlein et al., 2014) and happiness (item taken from Breyer & Voss, 2016) with their own life on scales from 1 to 7. Given the correlation of $r = .81$, we use the mean score of these two items.

2.3 Data Analysis

We tested our hypotheses using hierarchical multivariate multiple regression analyses conducted in R (Version 4.1.2, R Core Team, 2021). In step one, we included trait subjective well-being as a control variable, in step two we added prospective students’ well-being forecast as a predictor, in step three prospective students’ subjective interest-major fit forecast and in step four we included objective interest-major fit forecast as a predictor. As outcomes we included intrinsic motivation, positive affect, negative affect, and satisfaction in the study major. A multivariate analysis was conducted to show for each

² Confirmatory factor analyses were computed separately for a one-factor-solution, a bi-factor-solution, and a tri-factor solution (positive vs. negative affect vs. study satisfaction) using R (Version 4.1.2; R Core Team, 2021). The models were compared regarding their information criteria (AIC, BIC), which revealed that the three-factor-solution, AIC = 24012.74, BIC = 24059,57 should be preferred to the two-factor-solution, AIC = 24410.74; BIC = 24454.734, should be preferred to the one-factor solution, AIC = 24744.47; BIC = 24882.30.

predictor whether it uniquely and significantly contributes to explaining intrinsic motivation, positive affect, negative affect, and satisfaction in the study major (all outcomes considered together). Univariate analyses were conducted to provide more insights about each predictor's contribution to predicting each specific outcome (all outcomes considered separately). Effect sizes were measured by Cohen's f^2 . The recommended interpretation of Cohen's f^2 is .01 = small effect, .06 = medium effect, .14 = large effect (cf. Khalilzadeh & Tasci, 2007).

3. Results

The descriptives and zero-order correlations between all continuous variables in the following analyses are depicted in table 1. All associations between the predictors and outcomes were significant and pointed in the expected direction.

Table 1
Mean Scores, Standard Deviations, and Intercorrelations for All Continuous Variables of the

Hierarchical Multiple Regression Analyses

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Trait Well-Being <i>t</i> ₁	5.34	1.12	-						
2. WBF <i>t</i> ₁	6.20	0.64	.39***	-					
3. Subjective IMFF <i>t</i> ₁	5.95	0.72	.19**	.52***	-				
4. Objective IMFF <i>t</i> ₁	1.69	0.57	.16*	.42***	.40***	-			
5. Motivation <i>t</i> ₂	5.47	0.99	.23***	.29***	.24***	.35***	-		
6. Positive Affect <i>t</i> ₂	3.80	0.65	.32***	.25***	.17**	.24***	.63***	-	
7. Negative Affect <i>t</i> ₂	2.21	0.69	-.30***	-.17**	-.20**	-.14*	-.48***	-.63***	-
8. Satisfaction <i>t</i> ₂	5.88	0.99	.22***	.28***	.24***	.34***	.78***	.66***	-.49***

Note. *N* = 234. *t*₁ = Measured Pre-Enrollment; *t*₂ = Measured Post-Enrollment; WBF = Well-Being Forecast;

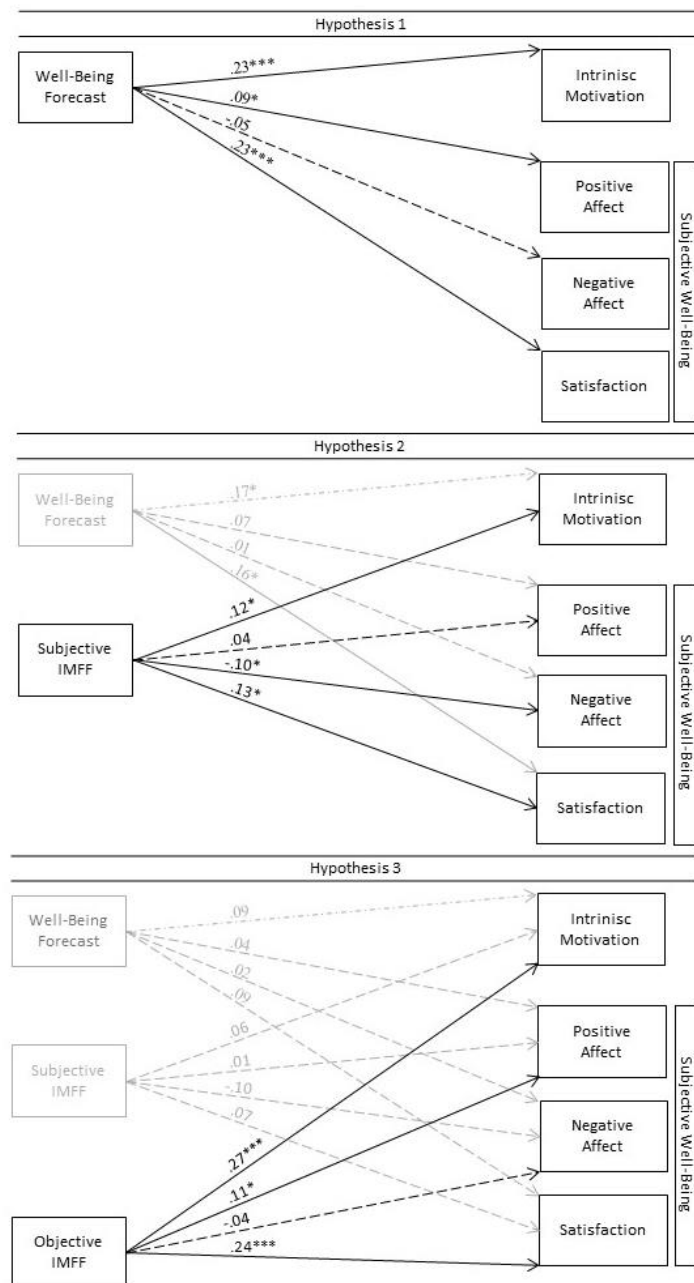
IMFF = Interest-Major Fit Forecast; Adj. = Adjusted.

p* < .05. ** *p* < .01. **p* < .001.

Our goal was to predict first semester students' intrinsic motivation and subjective well-being (positive affect, negative affect, satisfaction) in a specific major with prospective students' well-being forecast (hypothesis 1), subjective interest-major fit forecast (hypothesis 2) and objective interest-major fit forecast (hypothesis 3).

The multivariate analysis showed that trait subjective well-being (Pillai's trace = .12, $p < .001$), well-being forecast (Pillai's trace = .06, $p = .003$) and interest-major fit forecast (Pillai's trace = .07, $p < .001$) proved to be overall significant predictors, while subjective interest-major fit forecast was not significant overall (Pillai's trace = .03, $p = .155$). The results of the hierarchical univariate analyses are depicted in figure 2 (for further details, see table 2). To be able to describe all results belonging to a particular hypothesis in a common section, the results of the univariate analyses (which were calculated with all predictors for each outcome separately) are summarized below across all outcomes and reported per predictor.

Figure 2 Results of the hierarchical univariate multiple regression analyses for the prediction of intrinsic motivation and subjective well-being within a study major by well-being forecast, subjective interest-major fit forecast (subjective IMFF) and objective interest-major fit forecast (objective IMFF).



Note. All regression coefficients are standardized (for further details, see table 2). Black lines represent hypotheses while grey lines represent controls. Solid lines represent significant relations while dotted lines represent nonsignificant relations

* $p < .05$. ** $p < .01$. *** $p < .001$

Table 2
Hierarchical Univariate Multiple Regression Analyses Predicting Intrinsic Motivation and Subjective Well-Being in a Specific Major

Outcome t_2	Motivation				Positive Affect				Negative Affect				Satisfaction			
	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4
Predictor t_1	β	β	β	β	β	β	β	β	β	β	β	β	β	β	β	β
Trait SWB	.22***	.14*	.14*	.14*	.21***	.18***	.18***	.18***	.18***	-.19***	-.19***	-.19***	-.19***	.22***	.13	.13
WBF	.23***	.17*	.09	.09	.09*	.07	.04	.04	-.05	.01	.02	.02	.23***	.16*	.09	.09
Subj. IMFF	.12*	.06	.06	.06	.04	.04	.01	.01	-.10*	-.10*	-.10	-.10	.13*	.13*	.07	.07
Obj. IMFF	.27***	.27***	.27***	.27***	.11*	.11*	.11*	.11*	.11*	.11*	.11*	.11*	.11*	.11*	.11*	.24***
Adj. R^2	.05***	.09***	.10*	.15***	.10***	.12***	.11***	.13***	.08***	.08***	.10***	.10***	.04***	.09***	.10***	.14***
Adj. ΔR^2	.04***	.01*	.05***	.05***	.02*	-.01	.02*	.02*	.00	.02*	.00	.00	.05***	.01*	.04***	.04***
Cohen's f	.05	.05	.01	.06	.11	.01	.00	.02	.09	.00	.01	.00	.05	.04	.01	.05

Note. $N = 234$. S = Step; t_1 = Measured Pre-Enrollment; t_2 = Measured Post-Enrollment; SWB = Subjective Well-Being; WBF = Well-Being Forecast; Subj. =

Subjective; Obj. = Objective; IMFF = Interest-Major Fit Forecast; Adj. = Adjusted.

* $p < .05$. *** $p < .001$.

3.1 Trait Subjective Well-Being Predicts Motivation and Well-Being in a Major

Higher trait subjective well-being was a significant predictor of higher intrinsic motivation, more positive affect, less negative affect, and higher study satisfaction. The effect sizes indicated small to medium effects (for further details, see table 2, step 1 of each model).

3.2 Well-Being Forecast Predicts Motivation and Well-Being in a Major

Hypothesis 1 stated that a higher prospective student well-being forecast predicts higher later intrinsic motivation and subjective well-being within their major (positive affect, negative affect, satisfaction). In line with our hypothesis, our analyses showed that a higher well-being forecast incrementally predicted higher intrinsic motivation, more positive affect, and higher satisfaction. However, unexpectedly, the relationship with negative affect was not significant but pointed in the expected direction. Thus, hypothesis 1 was partly supported. The effect sizes indicated no effect to small effects (for further details, see table 2, step 2 of each model).

3.3 Subjective Interest-Major Fit Forecast Predicts Motivation and Well-Being in a Major

Hypothesis 2 stated that a higher prospective student subjective interest-major fit forecast predicts higher later intrinsic motivation and subjective well-being within their major (positive affect, negative affect, satisfaction) beyond prospective students' well-being forecast and trait subjective well-being. Our results partially supported this hypothesis as higher subjective interest-major fit forecast predicted more intrinsic motivation, less negative affect and higher study satisfaction beyond prospective students' well-being forecast and trait subjective well-being. Contrary to our hypothesis, no incremental variance was explained for positive affect even though the beta pointed in the expected direction. Thus, hypothesis 2 was partially supported. The effect sizes indicated no effect to small effects (for further details, see table 2, step 3 of each model).

3.4 Objective Interest-Major Fit Forecast Predicts Motivation and Well-Being in a Major

Hypothesis 3 stated that a higher prospective student objective interest-major fit forecast predicts higher later intrinsic motivation and subjective well-being within their major (positive affect, negative affect, satisfaction), beyond prospective students' subjective interest-major fit forecast, students' well-being forecast and trait subjective well-being. As expected, our analyses showed that higher objective interest-major fit forecast predicted higher intrinsic motivation, more positive affect, and higher study satisfaction. However, it did not predict negative affect, but the beta pointed in the expected direction. Thus, hypothesis 3 was supported for intrinsic motivation, positive affect, and study satisfaction but not for negative affect. The effect sizes indicated no effect to medium effects (for further details, see table 2, step 4 of each model).

4. Discussion

Predicting intrinsic motivation and subjective well-being *within a specific study major before enrolling* is crucial to support prospective students in their study decision process when choosing a major. There exist many studies that identified several factors *assessed during studying* predicting the intrinsic motivation and subjective well-being of students for *studying in general* (e.g., Lesener et al., 2020, Sood et al., 2012). However, there is almost no research dedicated to identifying factors measurable *before enrolling* to predict motivation and well-being *in a specific major*. Thus, combining theories about affective forecasting (e.g., Wilson & Gilbert, 2003) and person-environment fit theory (e.g., Le et al., 2014), we examined in a longitudinal field design to which extent prospective students' well-being forecast and beyond that subjective interest-major fit forecast and objective interest-major fit forecast can predict intrinsic motivation and subjective well-being in their major.

4.1 Summary of Findings and Theoretical Implications

We showed that a higher prospective student well-being forecast predicted higher intrinsic motivation, positive affect, and satisfaction in their study major beyond prospective students' trait subjective well-being. These results are in accordance with past findings in the affective forecasting literature indicating that people can predict their subjective well-being in specific situations to some extent (e.g., Gilbert et al., 1998, Wilson & Gilbert, 2003). We obtained these results while controlling for trait subjective well-being, suggesting that prospective students do not only project their trait average subjective well-being into the future but that they probably have some more insight about the specific future situation. However, prospective students' well-being forecast explained no more than five percent of variance in intrinsic motivation and subjective well-being in their study major. This finding is not surprising as affective forecasting theory additionally states that many biases (such as *inaccurate theories* or *misconstrual*) prevent people from making accurate predictions (for an overview, see Wilson & Gilbert, 2003). Thus, it is likely that those biases also are at work in the context of choosing a study major and might prevent prospective students from accurately forecasting their subjective well-being in a specific major.

Further evidence for this assumption provides our finding that prospective students' subjective interest-major fit forecast improved the prediction of intrinsic motivation, negative affect, and study satisfaction by up to two percent. This finding shows that using a predictor based on an empirically proven cause of later subjective well-being (the person-environment fit in the context of choosing a study major, e.g., Cable & DeRue, 2002; Etzel & Nagy, 2016), improved the predictions of motivation and well-being. Thus, our results indicate not only that inaccurate theories are at work when prospective students decide on a study major but also show a first way of reducing this bias.

Finally, we found that objective interest-major fit could incrementally explain up to six percent of variance of intrinsic motivation, positive affect, and study satisfaction in a study major. These results demonstrate that using a predictor that reduces a potential misconstrual of the future situation (in our example a misconstrual of the undergraduate psychology major) further improves the prediction of students' intrinsic motivation and subjective well-being. This finding is in line with past findings suggesting in different contexts that misconstrual of the future situation in question biases affective forecasts of the respective situation (Wilson & Gilbert, 2003) indicating that this is also a problem in prospective students' process of deciding on a study major. Additionally, it explains why prospective students' false expectations might be related to less study satisfaction (Hasenberg & Schmidt-Atzert, 2013) and adds to the existing literature a possible way to reduce such misconceptions in the study decision context to improve forecasts.

Taken together our research shows that prospective students can predict their intrinsic motivation and subjective well-being in a specific major and that this prediction can further be improved by reducing affective forecasting biases. Thus, our research contributes to the affective forecasting literature by providing specific evidence for two affective forecasting biases in a new context – the context of deciding on a study major. Additionally, our research provides important theoretical implications for the process of deciding on a study major by deepening the understanding of prospective students' underlying challenges in the decision-making process.

4.2 Unexpected Findings, Limitations, and Future Research Questions

First, subjective interest-major fit was not a significant multivariate predictor and explained a relatively small amount of variance in the univariate analyses, and no variance in positive affect. A likely explanation for this finding is that the predictive power of subjective interest-major fit is not very strong, especially beyond trait subjective well-being and well-being forecast. One possible explanation for this small predictive power is

that subjective interest-major fit only improves inaccurate theories. Thus, the condition for an improvement is prospective students' use of inaccurate theories when making their well-being forecast. However, past research indicates that students already pay attention to their interest-major fit (an empirically proven cause of well-being, Etzel & Nagy, 2016) when choosing a study major (Janke et al., 2021; Watt et al., 2012) and thus it is likely that they also pay attention to this factor when making their well-being forecast. In addition, asking prospective students for their subjective interest-major fit forecast may have already acted as an intervention that led prospective students to take this factor into account when forecasting their well-being. If prospective students already accounted for their subjective interest-major fit forecast in their well-being forecast, this would explain why subjective interest-major fit forecast failed to predict intrinsic motivation and subjective well-being beyond well-being forecast (or only did so to a small extent). At the same time, it leaves open the possibility that the predictive power of subjective interest-major fit might be more robust and stronger at an even earlier stage (before attention is drawn to subjective interest-major fit). This interpretation is further supported by the fact that the zero-order correlations between subjective interest-major fit and all outcomes were significant while the hierarchical multiple regression analyses showed no or only small effects sizes for the incremental predictive value of subjective interest-major fit on the prediction of all outcomes after controlling for well-being forecast. Therefore, future studies should examine well-being forecast before attention is drawn to empirically proven causes for well-being to provide a better baseline measure of irrational theories. Moreover, in our study we focused on one single (subjective) theory in the study choice process. Future studies could examine in more depth which other factors prospective students consider important when choosing their future study major by building on existing research on different motivations for enrollment (Janke et al., 2021; Watt et al., 2012) to better

understand the underlying processes of prospective students' subjective theories in the study choice process.

Second, objective interest-major fit forecast did not significantly predict negative affect. Thus, one could conclude that objective interest-major fit forecast does not play a role in the perception of negative affect during studying. However, descriptively, the prediction pointed in the expected direction and even proved significant in the zero-order correlations. These results suggest that the predictive power of objective interest-major fit forecast for negative affect is probably not strong enough to persist beyond trait subjective well-being, well-being forecast, and subjective interest-major fit forecast. One possible reason for the small effect size is that the objective interest-major fit forecast scores of the respective samples are in a very high range (scores ranged from -0.33 to 2.93, based on a -3 to 3 Likert-like-scale). This is not surprising since we are dealing with a very special sample, namely those prospective students who, after using an online-self-assessment and the accompanying reflection on their interest-major fit forecast, made an informed decision to apply for a place in the respective major, received and accepted it, and finally even voluntarily participated in the survey. The resulting almost only positive level of objective interest-major fit forecast leaves enough variance to allow students with a higher positive objective interest-major fit forecast (compared to a lower positive objective interest-major fit forecast) to feel more positive emotions but leaves no room for negative emotions caused by a poor objective interest-major fit. Accordingly, this finding is aligned with the control-value theory of achievement emotions (Pekrun, 2006) stating that negative emotions only occur for negative values. This reasoning underscores the importance of the size of predictive power found for objective interest-major fit forecast, which significantly predicted intrinsic motivation, positive affect, and study satisfaction not only beyond trait subjective well-being, well-being forecast and subjective interest-major fit forecast but also despite massive restrictions in its variance.

Third, the results in the present study were obtained within the first academic year. Although motivation in the first year has been shown to predict motivation in later years (Messerer, Scherer, et al., 2023), following the argumentation of Niessen et al. (2016), data from later years are needed to gain insight into the long-term predictive power of the predictors, which may decrease with increasing time interval. Additionally, the outcomes in the present study show medium to strong correlations which raise the question of whether univariate analyses are appropriate or whether their results are partly redundant. To avoid inflated results we conducted multivariate analyses to examine our predictor effects' controlling for the correlations between our outcomes. However, as our outcomes are not only theoretically distinguishable but also empirically distinct (as shown by the results of the confirmatory factor analysis reported in the measures section), conducting univariate analyses for each outcome gives us valuable insights in the psychological mechanisms underlying each of these variables.

Additionally for all indicators it should be considered that the present study was an ecologically valid field study, conducted in a setting with limited control of the situation (prospective students took part in the online-self-assessment as they were in their study major decision process, not in the context of taking part in a research study). Therefore, it is plausible that effect sizes do not reach the same size as in controlled experimental labor settings. Compared to the variance explained by well-established constructs such as trait subjective well-being, the reported effect sizes can even be considered comparatively good, as the well-being forecast, and the objective interest-major fit forecast can each *incrementally* explain (almost) as much variance in intrinsic motivation and satisfaction in the respective major as trait subjective well-being does.

Furthermore, it should be mentioned that all participants were (prospective) psychology students and consequently the interest test was specifically designed for the psychology major. Therefore, further studies should be conducted in other majors to check

whether the findings can be generalized. However, as it is very hard to get a place to study psychology in Germany it is assumed that effect sizes of interest tests could be even stronger in other study majors as psychology students are probably more restricted in their variance of interest as well as intrinsic motivation and subjective well-being in their major.

Finally, our results suggest that an objective interest-major fit forecast can predict intrinsic motivation and subjective well-being and therefore should be considered in study decision processes. However, we do not know yet whether prospective students automatically incorporate these scores in their decisions which is essential for the efficacy of such interest tests in the study choice decision process. Thus, future research should examine whether prospective students who receive feedback regarding their interest-major fit forecast take this score into account in their study choice process or whether more support is needed for prospective students to use such feedback in an adequate way.

4.3 Practical Implications

Assuming some generalizability of the present results, important practical implications can be derived from our studies. The first implication is that to some extent prospective students should trust their “gut” feeling as it has proven to be a significant predictor that goes beyond prospective students’ potential projection based on their trait subjective well-being. However, many prospective students still feel overwhelmed with their study choice process.

To support students in this process, a wide variety of online-self-assessments has been developed over the last years which has been used by a high number of prospective students to self-reflect upon their expectations, interests, and skills (Hell, 2009). They are attractive for prospective students as they are easily accessible and free of charge and attractive for universities as they come with very low maintenance costs once they are developed, especially when weighed against the high potential costs of study dropout for both the individual as well as society due to poor study choices (Behr et al., 2020). Thus,

they could have a big impact on prospective students' study decisions which makes it even more important to find out whether online-self-assessments can be valuable guides or whether they lead prospective students astray. Our research demonstrates that an interest-major fit forecast measured objectively via an online-self assessment shows a relatively good incremental predictive validity compared with other established constructs in the field study (given the premise that it is developed using scientific methods to ensure structure, exhaustiveness and prototypicality of items regarding the study content, Merkle et al., 2021). Therefore, our results suggest that the use of online-self-assessments to assess interest-major fit should be promoted as they yield the potential to be cost-efficient tools to support prospective students in the decision-making process. The potential of using the results of online-self-assessment should be particularly high in admission procedures where there is a focus on the fit between students and the study major with an aim for high content validity. According to Niessen et al. (2016), one example for such a procedure would be the open admission program in the Netherlands where applicants take part in a mandatory matching procedure with nonbinding advice before they can self-select their study major. To better integrate online-self-assessments, we recommend as a first step, to invest time and money in a scientific development and continuous evaluation of online-self-assessments that assess interest-major fit in the study decision process. It could be argued that the development of new objective interest-major fit assessments is superfluous because the RIASEC model (Eder & Bergmann, 2015; Holland, 1959, 1997) has sometimes been used to operationalize interest-major fit (Allen & Robbins, 2010; Tracey & Robbins, 2006; Usslepp et al., 2020). However, the RIASEC operationalization of interest-major fit is based on vocational interests (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) whereas our operationalization is based on interests in contents of the respective study major. An operationalization of interest-major fit based on contents of the respective study major should be more accurate than an operationalization

based on vocational content and showed a stronger association to study satisfaction in a recent study (Messerer, Merkle, et al., 2023). For these reasons we used an objective interest-major fit assessment based on interest in the contents of the study major in our paper and believe it makes sense to invest in the development of this type of interest-major fit assessments. Second, it seems promising to further motivate prospective students to use these tools. This could be done by restructuring the current online-self-assessment landscape in the study decision process to improve students experience by better guiding them in their study decision process. Additionally, the use of a validated online-self-assessment could be made a mandatory requirement for enrollment as it is already common practice in some universities.

4.4. Conclusion

The purpose of the current work was to examine factors that can predict students' intrinsic motivation and subjective well-being in a specific study major even before the start of studies. We found that a higher prospective student well-being forecast and beyond that a higher subjective interest-major fit forecast and a higher objective interest-major fit forecast predicted higher intrinsic motivation and subjective well-being in their study major. As one of the first studies to examine predictors of intrinsic motivation and subjective well-being *prior to university enrollment in a specific major*, this work underlines the importance of prospective students' subjective forecasts in the study choice process. At the same time, it highlights the benefits of more objective predictors, such as objective interest-major fit forecast and identifies several important starting points for future interest-major fit research as well as online-self-assessment practice.

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Appendix C – Manuscript 3

Merkle, B. & Dickhäuser, O. (2024). *Objective major-specific fit forecasts regarding interests, skills, and expectations predict motivation, choice and success in a major* [Manuscript submitted for publication]. School of Social Sciences, University of Mannheim.

**Objective Major-Specific Fit Forecasts Regarding Interests, Skills, and Expectations
Predict Motivation, Choice and Success in a Major**

THIS PAPER IS UNDER REVIEW.

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Abstract

Choosing an educational path is a difficult life decision that can lead to unfavorable outcomes when it goes wrong. However, little research has examined how to support successful study major choice processes. To address this gap, we draw on person-environment fit and (affective) forecasting bias theories, assuming that higher objective major-specific fit forecasts (interests, skills, expectations) predict success (motivation, satisfaction, dropout intention, achievement) beyond subjective forecasts. Additionally relying on expectancy-value theory and cognitive dissonance theory, we assume that higher objective major-specific fit forecasts, when displayed in feedback, predict higher motivation to choose a major and higher likelihood of enrollment beyond subjective forecasts. Finally, we propose that prospective students receiving feedback before enrollment experience more success than those receiving no feedback. We tested these hypotheses in a longitudinal field study. Over three years, more than 4000 prospective students received feedback on their objective major-specific fit forecasts in an online-self-assessment and reported their motivation for the major before and after feedback. Subsequently, over 500 of these prospective students entered their respective major and reported their success. Additionally, we surveyed over 200 students who did not receive feedback. As hypothesized, objective major-specific fit forecasts predicted success beyond subjective forecasts. Higher objective forecasts related to higher motivation to choose the major and higher likelihood of enrollment beyond subjective forecasts. Finally, prospective students who received feedback on their objective forecasts before enrollment experienced more success compared to no feedback. We discuss theoretical implications for study choice and success theories and practical implications for study guidance.

Keywords: major-specific fit (interest, skills, expectations), change in motivation, study major choice, study success (satisfaction, achievement), online-self-assessment for study major choices

Educational Impact and Implications

Our research focuses on objective assessments of how well prospective students' interests, skills, and expectations align with a specific study major. Our studies showed that such objective major-specific fit forecasts can predict students' later well-being and academic achievement within the study major beyond prospective students' own subjective estimations of their fit to a study major. Additionally, providing prospective students with feedback on their objective major-specific fit is associated with changes in their motivation to choose a study major and their actual study major choice. Students who received such feedback during their study major choice process also experienced more academic success compared to those who did not. These findings suggest that online tools offering this type of feedback could help prospective students make more successful study major choices than they would on their own, ultimately enhancing both their well-being and academic achievement.

1. Introduction

Choosing an educational path is a crucial life decision that poses a significant challenge for many students and when it goes wrong can lead to unfavorable outcomes. For instance, in the context of choosing a field of study (study major), an increasing number of students enter higher education with an undeclared major (1966: 1.7%; 2015: 8.9%, Eagan et al., 2016), more than 20% of students end up not being satisfied with their studies (Wong & Chapman, 2023), and about one-third even drop out of their studies (OECD 2018). Drop-outs cite the study major not meeting their needs or interests, or being too difficult as one of the top reasons (Eurostat, 2018). Therefore, it seems important to better understand study choice processes with their potential biases and how these biases could potentially be reduced to foster success within the respective major (*major-specific success*).

Combining theories on *Person-Environment Fit* (e.g., Le et al., 2014) and the *Expectancy-Value Model of Achievement-Related Choices* (Eccles et al., 1983; Guo et al., 2015), we argue that prospective students' subjective estimations of their fit and success within a specific future study major (*subjective forecasts*) should play a role for their study major choice and consequently their major-specific success. Based on the *Forecasting* literature (e.g., Merkle, Messerer, & Dickhäuser, 2024; Wilson & Gilbert, 2003), we argue that these subjective forecasts can be assumed to be biased in predicting success (e.g., by prospective students' wrong expectations of the study major) which could lead to biased study major choice processes and consequently less success. Drawing from Merkle, Messerer, and Dickhäuser (2024), we argue that an objective assessment of prospective students' interests or skills in specific content that represents a valid construal of the respective study major (*objective major-specific fit forecasts*) can be assumed to be less biased in the prediction of success because they are by definition based on an empirically supported factor for later major-specific success (e.g., interest-major fit, skill-major fit) and

they assess this factor objectively based on a valid construal of the respective major (e.g., content and demands of the major based on expert estimates). Therefore, one central asset of objective major-specific fit is that it can be assumed to be less biased in predicting major-specific success than subjective forecasts. Additionally, drawing from Merkle, Bürkle et al. (2024), we argue that displaying objective forecasts in feedback to prospective students should lead to a less biased study major process and consequently more major-specific success. Therefore, a second central asset of objective major-specific fit is that it can be assumed to lead to a less biased study major process and consequently more success when it is displayed in feedback to prospective students beyond subjective forecasts.

However, while many studies show the predictive validity of major-specific admission tests (objective skill-major fit) for later study success (e.g., Julian, 2005; Niessen et al., 2016), only a few studies have shown that objective major-specific fit can relate to motivation (expectation-major fit; Karst et al., 2017; Merkle, Bürkle et al., 2024) and choice of a study major (skill-major fit: Niessen et al., 2016). With one exception (interest-major fit; Merkle, Messerer, & Dickhäuser, 2024), none of these studies investigated the predictive value of objective major-specific fit *beyond subjective forecasts*. And none investigated the role of objective major-specific fit when displayed in feedback to prospective students for motivation and choice *beyond subjective forecasts*.

Conducting this research yields significant contributions. From a theoretical perspective, the predictive power of objective beyond subjective forecasts indicates the potential unbiassing function of objective forecasts in the study choice process. Thereby, this research contributes to theories of study major choice processes and shows possible ways to reduce potential biases and to foster major-specific success. Practically, objective forecasts are only useful if they are better predictors than subjective forecasts, which prospective students form on their own. If this central precondition is met, in a second step,

it is important to know whether displaying objective forecasts in feedback in the study major choice process to prospective students can play a role for their study major choice processes beyond subjective forecasts. This will help to find out whether simply *displaying* these objective factors can guide prospective students' study major choice process or whether stronger measures are needed in the future.

Therefore, we aim to address this research gap by implementing an ecologically valid field design accompanying prospective students in their transition to university. Our first goal is to test whether objective major-specific fit regarding interests, skills and expectations assessed before enrollment predicts major-specific success beyond subjective forecasts (Study 1). Next, we examine the role of objective major-specific fit when revealed to prospective students in feedback before enrollment for motivation to choose the respective major (Study 2) and actual choice (Study 3) beyond subjective forecasts. Building on this, our fourth goal is to examine whether students who received feedback regarding their objective major-specific fit before enrollment are more successful than students who did not receive such feedback (Study 4). The reason behind the orchestrating of the studies in this order lies in the fact that, for the interpretation of the following studies, it is first of central importance to know whether objective factors can predict success beyond subjective forecasts (Study 1). In Studies 2 and 3, I specifically examine whether objective forecasts, when displayed in feedback to prospective students, predict changes in motivation for the study major and later enrollment, beyond subjective forecasts. Without establishing the validity of objective forecasts as predictors for success beyond subjective forecasts, it remains unclear whether their role for motivation and choice, beyond subjective forecasts can possibly indicate an unbiased and beneficial value for prospective students' study major choice or whether it risks misleading prospective students.

1.1 Fit-Oriented Study Major Choice Processes Foster Major-Specific Success

To better understand successful study major choice processes, it is first important to understand what determines major-specific success. Based on the *Person-Environment Fit Theory* (e.g., Le et al., 2014), a fit between an environment and a person determines their success. Specifically in the study major context, interest-major fit and demands-abilities fit (henceforth referred to as skill-major fit) emerged as important predictors of study success (Etzel & Nagy, 2016). Therefore, drawing from Person-Environment Fit Theory, students' success in a specific major should depend on prospective students' interest-major fit and skill-major fit.

Second, it is important to understand what determines academic choices. Based on the *Expectancy-Value Model of Achievement-Related Choices* (Eccles et al., 1983; Guo et al., 2015) task choices are influenced by expectancies of success and the values that individuals attach to different behavioral options. The higher the subjectively perceived expectancies of success and the higher the attached values for the respective option (relative to others), the more likely it is that an individual will choose that academic option (Eccles & Wigfield, 2002), e.g., choose a specific study major (Guo et al., 2015; Merkle, Bürkle et al., 2024). Applied to the study major choice context, intrinsic value for example indicates how much a prospective student is interested in the respective major while expectancies of success indicate how good a prospective student believes to be in the respective study major. Therefore, drawing from the Expectancy-Value Model, higher values and higher expectancies of success constitute higher motivation for a major and thus should lead to a higher likelihood of choosing the respective major (Eccles, 2011; Guo et al., 2015). In contrast to other educational choices, where individuals can draw upon their previous experiences to form their expectancies of success and subjective values (Eccles et al., 1983), for the choice of a study major, prospective students often lack prior experience

and therefore need to rely on their expectations and forecasts about the assumed content and demands of the respective study major (Karst et al., 2017; Merkle, Bürkle et al., 2024).

Combining both theoretical perspectives, we argue that in the study major choice context, the *value* that prospective students place on their future major should depend on prospective students' subjective forecasts of *interest-major fit*. Similarly, prospective students' *expectancies of success* should be influenced by subjective forecasts of *skill-major fit*. Following the *Expectancy-Value Model of Achievement-Related Choices* (Eccles et al., 1983; Guo et al., 2015), we further argue that higher interest-major fit/values and higher skill-major fit/expectations of success should lead to a higher likelihood of (fitting) choices. Finally, closing the circle to the *Person-Environment Fit Theory* (e.g., Le et al., 2014) again, higher prospective student fit should lead to higher later major-specific success. In the next paragraph, we argue that in addition to these fit-oriented processes, there might also be biased processes that could make fitting study major choices less likely.

1.2 Subjective Forecasts Bias Study Major Choice Processes and Success

Based on the affective forecasting literature (e.g., Wilson & Gilbert, 2003) and following the argumentation of Merkle, Messerer, and Dickhäuser (2024) we argue that prospective students' subjective forecasts can deviate from reality and a potential explanation for this deviation can be biases (e.g., inaccurate theories and misconstrual, for an overview, see Gilbert et al., 1998; Wilson & Gilbert, 2003). For example, in addition to relying on their subjective forecasts of fit, prospective students might also rely on factors that will not make them successful in a major ("*inaccurate theories*"). Additionally, even if prospective students rely on subjective forecasts of their fit, these forecasts can be based on "*misconstruals*" of the future situation because students' expectations can differ from the realities of a study major (Hasenberg & Schmidt-Atzert, 2013; Karst et al., 2017; Merkle, Bürkle et al., 2024). These processes should result in biased subjective forecasts. Again,

following the Expectancy-Value Model of Achievement-Related Choices, subjective forecasts of interest- and skill-major fit can be assumed to be biased in the prediction of major-specific success. Therefore, this should constitute *biased* motivation to choose a major and thus should lead to *biased/misfitting* choices¹⁵, resulting in less major-specific fit. Following the *Person-Environment Fit Theory* (e.g., Le et al., 2014), less fit in turn should lead to less study success. Additionally, biases are not just a problem because they can lead to biased self-selection processes but also because they can potentially lead to later disappointment because expectations are not met. Having argued that subjective forecasts can be assumed to be biased in predicting major-specific success and therefore can be assumed to bias the study major choice process, in the next paragraph, we argue that objective major-specific fit can be assumed to be less biased in predicting major-specific success than subjective forecasts.

1.3 Objective Major-Specific Fit Regarding Interests, Skills and Expectations Is Less Biased Than Subjective Forecasts in Predicting Success

Objective interest-major fit describes students' interest in specific content that represents a valid construal of the respective study major (in our example, a valid construal of the undergraduate psychology major based on expert estimates of the psychology major). Following the argumentation of Merkle, Messerer, and Dickhäuser (2024), one central asset of these objective forecasts is that they can be assumed to be less biased than subjective forecasts in predicting major-specific success. This is because they are based on an empirically supported factor for later well-being, namely interest-major fit (e.g.

¹⁵ The terms “biased/misfitting” are used to characterize the type of choices. Each term implies certain assumptions about the underlying mechanisms (though the mechanisms themselves are not tested directly). The term unbiased/biased choices relates to how choices are made (affective forecasting perspective), while the term fitting/misfitting relates to the consequences of types of choices (person-environment fit perspective). Therefore, depending on the perspective, both terms are adequate, and we use them as synonyms.

reducing inaccurate theories) and additionally, this factor is objectively assessed based on a valid construal of the respective major (e.g., reducing misconstrual). Therefore, objective interest-major fit (by reducing biases) should improve the prediction of major-specific success beyond subjective forecasts, an assumption that was supported in prior research (Merkle, Messerer, & Dickhäuser, 2024).

We extend this assumption on *objective skill-major fit*, which we define as prospective students' skills in specific demands that represent a valid construal of the respective study major. Objective skill-major fit is based on an empirically supported factor for later study success, namely skill-major fit (Etzel & Nagy, 2016) and it is assessed objectively based on a valid construal of the respective major. Therefore, objective skill-major fit (by reducing biases) should improve the prediction of major-specific success beyond subjective forecasts. However, even though many studies show the predictive validity of major-specific admission tests (objective skill-major fit) for later study success (e.g., Julian, 2005; Niessen et al., 2016), further evidence is needed to show the robustness of these tests beyond prospective students' subjective forecasts.

Additionally, objective expectation-major fit, which we define as the discrepancies between prospective students' expectations regarding the potential content of a specific major compared to the actual content of the respective major (based on expert estimates), were linked to study satisfaction (Hasenberg & Schmidt-Atzert, 2013). However, research has yet to assess objective expectation-major fit *before enrollment* and has not considered the *valence* (e.g., a prospective student's like/dislike of specific content) of the expectation-major fit (e.g., higher/lower amount of specific content than expected). This valence determines whether expectations will be exceeded (positive valence of expectation discrepancy, e.g., higher amount than expected of a liked content) or disappointed (negative valence of expectation discrepancy, e.g., higher amount than expected of a disliked content; Merkle et al., 2021). The *objective valence of expectation-major fit*

should also contribute to the prediction of study success because a larger negative valence of expectation-major fit should lead to a higher likelihood of biased/misfit choices and more disappointment throughout studying. Therefore, we additionally examine to which extent the valence of expectation-major fit can improve the prediction of major-specific success.

Having argued that objective forecasts can be assumed to be less biased than subjective forecasts in predicting major-specific success, in the next paragraph we argue that objective forecasts when displayed in feedback to prospective students are likely to reduce biases in the study major choice process and consequently foster success.

1.4 Objective Major-Specific Fit Revealed in Feedback Reduces Biases in The Study Major Choice Processes and Fosters Success

Following the argumentation of Merkle, Bürkle et al. (2024), which is based on the cognitive dissonance theory (Festinger, 1957), *objective expectation-major fit* when displayed in feedback to prospective students can be assumed to lead to dissonances. These dissonances can be alleviated by changing one's expectations and motivations for a major. We apply this argumentation to the display of *objective interest- and skill-major fit* in feedback. Their display can provide new information about what factors to consider for the study major choice and can offer an objective assessment of these factors compared to subjective forecasts. Therefore, the display of objective interest- and skill-major fit in feedback to prospective students could also trigger dissonances, hence potentially influence the *motivation to choose a major* and according to the Expectancy-Value Model of Achievement-Related Choices (Eccles et al., 1983; Eccles & Wigfield, 2002), should consequently influence the *choice of a major*.

We extend this argumentation building on our previous arguments. We have argued before that motivation and choosing to study a major can be assumed to be biased because they should be influenced by subjective forecasts that can be assumed to be biased in

predicting major-specific success. Further, objective major-specific fit can be assumed to be less biased than subjective forecasts in predicting major-specific success. Combining these arguments, a second central asset of objective major-specific fit is that it can be assumed to lead to a less biased study major process and consequently more major-specific success when it is displayed in feedback to prospective students beyond subjective forecasts. Therefore, objective major-specific fit when displayed in feedback to prospective students should predict less biased *motivation to choose a major* and *higher likelihood of less biased/more fitting choices* beyond subjective forecasts. Consequently, prospective students who received feedback regarding their objective major-specific fit in the study choice process should experience a higher major-specific fit compared to prospective students not receiving such feedback. Based on the Person-Environment Fit Theory (e.g., Le et al., 2014), a higher fit should translate to higher *major-specific success*. In line with cognitive dissonance theory (Festinger, 1957) regarding objective expectation-major fit, displaying feedback before enrollment could additionally lead to an adjustment of expectations before enrollment (Merkle, Bürkle et al., 2024) and therefore should prevent later disappointment.

For *objective expectation-major fit*, first evidence supports this theoretical argumentation showing that the absolute value of expectation-reality discrepancies is related to prospective students' motivation for a major (Karst et al., 2017) and can predict changes in such motivation (Merkle, Bürkle et al., 2024). However, so far research regarding objective expectation-major fit has not examined its predictive value for *actual choice*. Additionally, for neither motivation nor choice has the predictive value of the objective *valence* of expectation-major fit *beyond subjective forecasts* been tested, which is an important indicator for the unbiasing value of objective forecasts beyond subjective forecasts.

Regarding *objective skill-major fit*, first evidence showed that results in an objective trial studying test predicted the likelihood of enrollment in a psychology major (Niessen et al., 2016). However, to our knowledge, no study has examined the predictive value of *objective interest-major fit* and objective skill-major fit *beyond subjective forecasts* for motivation to choose a major and choice. And no study has compared *major-specific success* between students who received feedback as prospective students regarding their objective major-specific fit compared to students who did not receive such feedback.

1.5 Research Question and Hypotheses

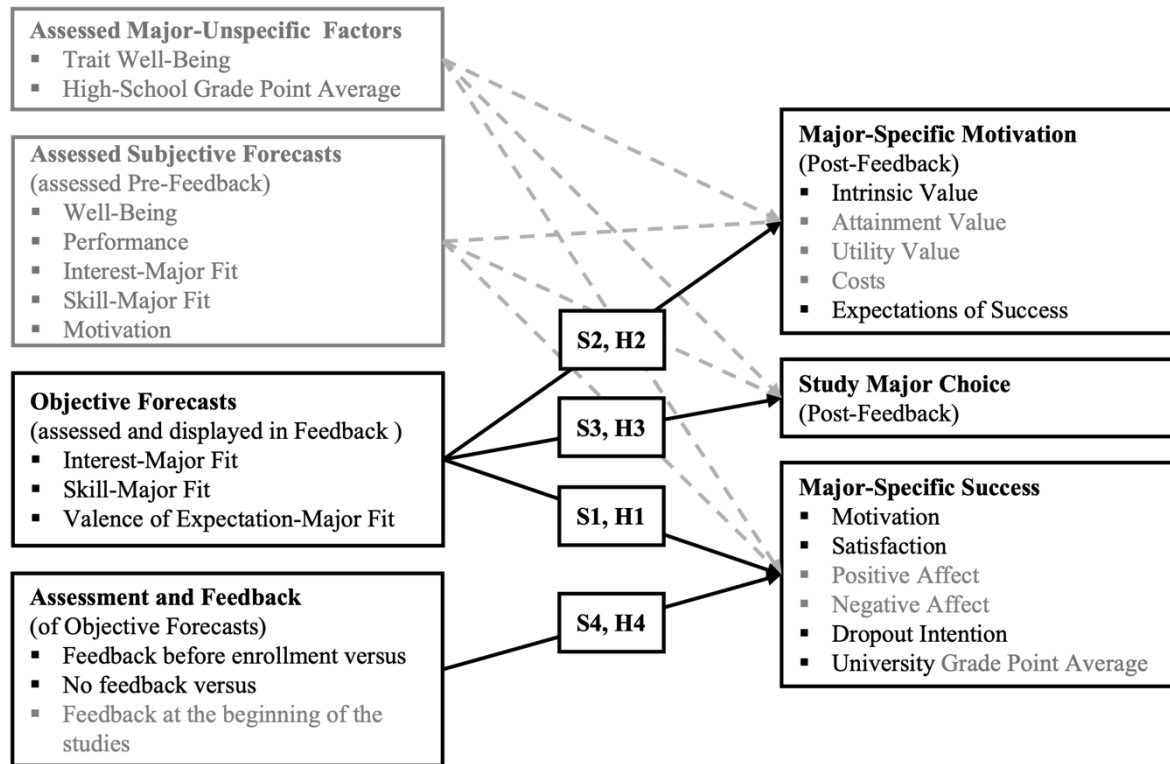
We argue that one central asset of objective major-specific fit is that it can be assumed to be less biased than subjective forecasts in predicting major-specific success. Therefore, we examine the predictive value of objective major-specific fit for success beyond subjective forecasts. Additionally, to the best of our knowledge we are the first to argue that motivation and choice to study a major can be assumed to be biased because they should be influenced by subjective forecasts which can be assumed to be biased. Therefore, a second central asset of objective major-specific fit is that it can be assumed to lead to a less biased study major process when it is displayed in feedback beyond subjective forecasts and consequently should lead to more study success. Therefore, we examined the role of objective major-specific fit, when displayed in feedback to prospective students, before their enrollment beyond prospective students' subjective forecasts for key variables throughout the complete transition from study orientation through to studying. As predictors, we specifically examined prospective students' *objective interest-major fit*, *objective skill-major fit* and disappointed/exceeded expectations (*objective valence of expectation-major fit*) measured objectively with a scientifically developed and validated skill-, interest- and expectation-test in an online-self-assessment. As dependent variables we examined prospective students' *motivation to choose a major* (post-feedback: *intrinsic value*, *expectancies of success*, *intention*)

prospective students' enrollment in a study major and later major-specific success (*intrinsic motivation, study satisfaction, dropout intention, achievement*). As control variables we examined subjective forecasts (pre-feedback: *subjective forecasts on well-being, performance, interest-major fit, skill-major fit*) and major-unspecific factors (*trait well-being, high-school grade point average*).

Our theoretical argumentations can be transferred to an empirical model which is displayed in Figure 1.

Figure 1

Hypothesized Theoretical Framework for the Role of Objective Major-Specific Fit Forecasts for Study Major Choice (Motivation) and Major-Specific Success Beyond Subjective Forecasts



Note. S = Study; H= Hypothesis. Black lines represent hypotheses while dashed lines represent controls. Black text represents constructs in the focus of hypothesis testing, grey text represents controls or additional constructs.

The model includes different hypotheses which were tested in a series of four studies. Objective major-specific fit is assumed to be based on relevant factors for major-specific success and on a valid construal of the respective major in question. Objective major-specific fit therefore can be assumed to be less biased in predicting major-specific success than subjective forecast of success. Based on this, we hypothesize that higher objective interest-major fit, objective skill-major fit and the objective valence of expectation-major fit predict major-specific success beyond subjective forecasts (Hypothesis 1, Study 1). Information on objective major-specific fit when displayed in feedback to prospective students can potentially trigger cognitive dissonances with the initial motivation to choose a major which is based on subjective forecasts. The alleviation of these dissonances can be assumed to lead to less biased motivation, less biased/more fitting choices, better adjustment of expectations and consequently more study success. Therefore, we hypothesize that higher objective major-specific fit when displayed in feedback to prospective students predicts higher motivation to choose a major (Hypothesis 2, Study 2) as well as higher likelihood of enrolling in the respective major (Hypothesis 3, Study 3) beyond initial motivation to choose a major and beyond subjective forecasts. Additionally, we hypothesize that prospective students receiving feedback regarding their objective major-specific fit prior to their enrollment should be more successful compared to prospective students who did not receive such feedback (Hypothesis 4, Study 4).

2. General method

2.1 Participants & Procedure

For the four studies, we used different samples which will be described in detail (including information of the overlap of the samples). In February 2020 an online-self-assessment (OSA) for a bachelor in psychology went live for prospective students to reflect whether psychology was the major they wanted to choose. This instrument assessed

prospective students' objective interest-major fit, skill-major fit ¹⁶ and their valence of expectation-major fit (t_{OSA}). Afterwards, prospective students received feedback regarding these fit indicators. Additionally, participants could voluntarily take part in a survey that assessed their demographics, controls, as well as motivation for the study major before (t_{preOSA}) and after ($t_{postOSA}$) taking part in the OSA. Data collection for this paper ended in April 2023.

The OSA live setting was accompanied by four annual student surveys, which always took place at the beginning of the autumn/winter semester in five different German universities who advised taking the OSA on their university webpages for study orientation. In the first survey that took place before the OSA went live, student participants ($t_{stud2019}$) took part in a test version of the online-self-assessment that also assessed their objective interest-major fit, skill-major fit and the valence of their expectation-major fit and gave participants feedback on their fit scores. Afterwards, students reported their major-specific success (intrinsic motivation, study satisfaction, dropout intention, achievement). In the following surveys ($t_{stud2020-2022}$) students reported their study success (intrinsic motivation, study satisfaction, dropout intention, achievement)¹⁷. Participation was voluntary and students received either credit points or an online-shopping voucher in exchange for their participation.

To answer our research questions, different parts of these samples and their matches were used. Because our research hypotheses (H1-H4) build logically upon one another, we utilize both overlapping and independent samples to answer them. However,

¹⁶ The measure for objective skill-major fit in the online-self-assessment changed by the end of 2020. Therefore, we only use the new objective skill-major fit measures after the change which results in lower sample sizes for this predictor.

¹⁷ Dropout intention was not measured for first semester students in survey 2.

for clarity, we will refer to them as four samples (Sample 1 to Sample 4) in four studies (Study 1 to Study 4) due to their clear differentiation with regard to research content.

In Study 1, we examined the predictive value of objective major-specific fit for major-specific success beyond subjective forecasts (H1). For H1, we used the match of the prospective student sample (t_{OSA}) whose objective major-specific fit was assessed and provided as feedback before their enrollment, with the student samples ($t_{stud2020-2022}$) in which their major-specific success was assessed. This resulted in an intersection of 396¹⁸ prospective students transferred to the first semester ($M_{age} = 19.81$, $SD = 1.66$, 85.4% women, 0 divers) and 136 prospective students transferred to the third semester ($M_{age} = 20.90$, $SD = 2.50$, 88.2% women, 1 divers).¹⁹

In Study 2 we tested the predictive value of objective major-specific fit for motivation to choose a major beyond subjective forecasts (H2). For H2 we used the sample of prospective students (t_{OSA}) who completed an online-self-assessment for psychology prior to their enrollment accompanied by two surveys ($N = 4482$, $M_{age} = 20.08$, $SD = 3.98$, 82.1% women, 23 divers). In the online-self-assessment, prospective students' objective major-specific fit was assessed and provided as feedback. In the surveys, prospective students' motivation for the study major was assessed before and after the feedback.

In Study 3 we tested the predictive value of objective major-specific fit for enrollment beyond subjective forecasts (H3). For H3, we used the prospective student sample (t_{OSA}) as a basis for whose objective major-specific fit was assessed and provided as feedback before their enrollment and matched it with the student sample ($t_{stud2020-2022}$) to receive the indicator which prospective students later enrolled in the psychology study

¹⁸ The first semester data for Study I overlaps with data from Merkle, Messerer, and Dickhäuser (2024). However, the sample in this paper is larger and more variables are considered in the analysis which justifies the partly reanalysis.

¹⁹ Students could participate in the surveys at multiple time points, at the first and/or third semester.

major ($n_{\text{enrolled}} = 538$, $M_{\text{age}} = 19.5$, $SD = 2.41$, 85.5% women, 0 divers) and which did not (definitely enroll in the study major ($n_{\text{not enrolled}} = 4132$, $M_{\text{age}} = 20.20$, $SD = 4.17$, 81.1% women, 22 divers).

In Study 4, we tested whether students who received feedback regarding their objective major-specific fit prior to their enrollment are more successful compared to students who did not receive such feedback (H4). For H4, we used the full sample of higher semester students who participated in at least one of the annual student surveys ($t_{\text{stud2020-2022}}$) and reported their major-specific success indicators in a survey. Within these samples we compared the assessed success indicators of those students who had participated in the OSA before enrollment (match with prospective students' sample, t_{OSA}), with those who did not participate in the OSA (no match to either the sample of prospective students or to the sample of first semesters in survey 1). We did so for students in the first semester ($n = 587$, $M_{\text{age}} = 20.04$, $SD = 2.29$, 82.2% women; OSA before enrollment: $n = 433$; no OSA: $n = 154$), for students in the third semester ($n = 259$, $M_{\text{age}} = 21.33$, $SD = 3.71$, 85.9% women, 1 divers; OSA before enrollment: $n = 151$; no OSA: $n = 108$) and fifth semester ($n = 155$, $M_{\text{age}} = 22.83$, $SD = 4.25$, 83.4% women, 2 divers; OSA before enrollment: $n = 52$; no OSA: $n = 103$).

2.2 General Measures

Example items, response format and reliabilities of all measures can be found in Table 1.

Table 1.*Example Items, Response Format and Reliabilities of all Measures*

Example Items	Response Format	Cronbach's α
Objective Major-Specific Fit Forecasts		
Objective Interest-Major Fit Forecast		.95
I am interested in which causes underlie mental disorders.	From 1 (<i>not interested at all</i>) to 7 (<i>very much interested</i>)	
I am interested in how work performance emerges and how it can be promoted.		
Objective Valence of Expectation-Major Fit Forecast		.95
To what extent do you expect to deal with which causes underlie mental disorders in your undergraduate psychology major?	From 1 (<i>not at all/ very low extent</i>), to 4 (<i>average extent</i>) to 7 (<i>very large extent</i>)	
To what extent do you expect to deal with how work performance emerges and how it can be promoted in your		
Objective Skill-Major Fit Forecast		.62
A set of 24 cards is numbered with positive integers from 1 to 24. The cards are shuffled, and one card is drawn at random. What is the probability that the number on this card is divisible by 4 or 6? (<i>Mathematics Knowledge</i>)	a) $\frac{1}{3}$, b) $\frac{1}{4}$, c) $\frac{7}{24}$, d) $\frac{1}{6}$	
Two students are writing tasks for an intelligence test. Student A writes 8 tasks per hour and Student B writes 2 tasks in 20 minutes. How many tasks do both students complete together in three hours? (<i>Numerical Reasoning</i>)	a) 28, b) 32, c) 42, d) 48	
Motivation for a Study Major		
Subjective Values		
I expect that I will like the undergraduate psychology major. (<i>Intrinsic Value</i>)	From 1 (<i>not at all</i>) to 7 (<i>completely</i>)	$\alpha_{pre} = .76$
I expect that I will do things in the undergraduate psychology major that are important to me. (<i>Attainment Value</i>)		$\alpha_{post} = .83$
I expect that what I learn in the undergraduate psychology major will be useful for my personal future. (<i>Utility Value</i>)		$\alpha_{pre} = .75$
		$\alpha_{post} = .82$
		$\alpha_{pre} = .84$
		$\alpha_{post} = .88$

Table continues on next page.

I expect that I will have to invest a lot of time in the undergraduate psychology major. (Costs)		$\alpha_{pre} = .90$ $\alpha_{post} = .93$
Expectancies of Success		$\alpha_{pre} = .74$ $\alpha_{post} = .78$
I will learn the content of the study major ...	From 1 (...very slowly) to 7 (...very quickly.)	
I will find studying in this study major ...	From 1 (...very difficult) to 7 (...very easy)	
In this study major I will do ...	From 1 (...very bad) to 7 (...very well)	
Intention to Choose a Major		$r = .78$ $r = .76$
Would you like to apply for an undergraduate psychology major?	From -7 (sure no), to 0 (unsure), to 7 (sure yes)	
Would you like to pursue an undergraduate psychology major?		
Subjective Major-Specific Fit and Success Forecasts		
Subjective Interest-Major Fit Forecast		.76
The offerings of the undergraduate psychology major fit my interests.	From 1 (not at all) to 7 (completely)	
The content that interests me in a degree program is well covered by the undergraduate psychology major.		
Subjective Skill-Major Fit Forecast		.76
The match is very good between my personal skills and the demands of the undergraduate psychology major.	From 1 (not at all) to 7 (completely)	
My knowledge matches the requirements of the undergraduate psychology major.		
Subjective Major-Specific Well-Being Forecast		.85
I would be happy in the undergraduate psychology major.	From 1 (does not apply at all) to 7 (applies completely)	
Overall, I would be satisfied with an undergraduate psychology major.		
Subjective Major-Specific Performance Forecast		.74
Cf. Expectancies of success		
Study Success Indicators		
Intrinsic Motivation		$\alpha_{1st} = .90$ $\alpha_{3rd} = .92$ $\alpha_{5th} = .91$
I find it exciting to study.	From 1 (not true at all) to 7 (completely true)	
I find it very interesting to study.		
Study Satisfaction		$\alpha_{1st} = .85$

Table continues on next page.

Overall, I am satisfied with the undergraduate psychology major. I truly enjoy what I am studying.	From 1 (<i>not at all</i>) to 7 (<i>completely</i>)	$\alpha_{3rd} = .82$ $\alpha_{5th} = .88$
Affect		
Happy (<i>positive Affect</i>)	From 1 (<i>rarely or never</i>), 2 (<i>rarely</i>), 3 (<i>occasionally</i>), 4 (<i>often</i>)	$\alpha_{1st} = .88$ $\alpha_{3rd} = .86$ $\alpha_{5th} = .88$
Afraid (<i>negative Affect</i>)	to 5 (<i>very often or always</i>)	$\alpha_{1st} = .80$ $\alpha_{3rd} = .81$ $\alpha_{5th} = .83$
Dropout/Change Intention		
I often think about dropping out of my current course of studies or changing my major. I am confident that I can complete my current studies.	From 1 (<i>not true at all</i>) to 7 (<i>completely true</i>)	$\alpha_{1st} = .84$ $\alpha_{3rd} = .83$ $\alpha_{5th} = .82$
University GPA / Academic Achievement		
What is your current GPA in your undergraduate psychology major?	<i>open text field</i>	
Major-Unspecific Factors		
$\alpha = .67$		
Trait Well-Being		
How satisfied are you with your life at the moment, all things considered?	From 1 (<i>not at all satisfied</i>) to 7 (<i>completely satisfied</i>)	
When you look at your life, how happy or unhappy would you say you are overall?	From 1 (<i>completely unhappy</i>) to 7 (<i>completely happy</i>)	
High School Grade Point Average		
What is your High School GPA?	<i>open text field</i>	

2.2.1 Objective Major-Specific Fit

Objective interest-major fit was assessed with the interest subscale of the expectation-interest test (Merkle et al., 2021) which consists of 61 items: 55 items addressing all central content of the undergraduate psychology major; six items addressing content that is often mistaken for content of the undergraduate psychology major. The objective interest-major fit was calculated by building the mean of the 55 interest items regarding the central content of the undergraduate psychology major, with higher a value meaning higher objective interest-major fit.

Objective valence of expectation-major fit was assessed combining the interest and expectation subscale of the expectation-interest test (Merkle et al., 2021) described above. The two scales and items were formulated in such a way that they allowed combined assessment of interests and expectations regarding the same items. The objective valence of expectation-major fit was calculated by first subtracting each prospective students' expectation ratings from the reality (mean of expert expectation ratings of the reality). Second this difference was multiplied with the interest score for the respective item. Third, the average objective valence of expectation-major fit was computed by calculating the mean value across all 61 single scores. The more negative the value the more disappointed the expectations (e.g., less interesting content than expected; more uninteresting content than expected).

Objective Skill-Major Fit was measured with 21 items adapted from Watrin et al. (2022) regarding reasoning (figural, numerical and verbal content), prior knowledge (Math, Biology, English) and psychology comprehension. The sum score was the number of correctly solved items. The specific items used can be found in Supplemental Table 1.

2.2.2 Motivation for a Study Major

*Intrinsic value*²⁰ was measured with three items from a German questionnaire inspired by items from Karst et al. (2017) based on Steinmayr and Spinath (2010) by replacing the general term study major with undergraduate psychology major.

Expectancies of success/ subjective performance forecast were measured with three items from a German questionnaire inspired by items from Karst et al. (2017) based on Poloczek and Greb (2011) and by replacing the general term study major with undergraduate psychology major.

Intention to study a major was measured with two self-constructed items, one item asking whether prospective students want to apply for the undergraduate psychology major and one item asking whether they want to study in the undergraduate psychology major.

2.2.3 Major-Specific Success Indicators

Intrinsic motivation was assessed using an adapted German translation (Messerer et al., 2023) of the interest subscale of the Intrinsic Motivation Inventory (Deci & Ryan, 2013) which consists of 6 items.

Study satisfaction was measured with a subscale of Westermann et al.'s (1996) study satisfaction scale which explicitly addresses satisfaction with the content of the studies. The subscale consists of three items²¹.

Dropout intention was assessed using the scale to assess the intention to terminate university studies or switch majors from Dresel & Grassinger (2013), which consists of 5 items. Note that higher values represent a lower intention to dropout and therefore higher success.

²⁰ As control variables, attainment value, utility value and costs were measured with the same questionnaire.

²¹ For additional analyses, positive and negative affect were assessed as further indicators of well-being with a slightly modified version of the German Version (Rahm et al., 2017) of the Scale of Positive and Negative Experience (SPANE; Diener et al., 2010).

Actual Achievement in the undergraduate psychology major was assessed with a single item asking participants to report their current average grade in the undergraduate psychology major (University-GPA) with one decimal place. Note that higher values represent better grades and therefore higher success.

2.2.4 Subjective Major-Specific Fit Forecast

Subjective interest-major fit forecast was measured with three items from Merkle, Messerer, and Dickhäuser (2024) to measure subjective-interest major fit forecast. Those three items were originally based on three items from Etzel and Nagy's (2016) need-supply fit in the academic context scale and were adapted by replacing the word expectations with interests.

Subjective skill-major fit forecast was measured with three items adapted from Etzel and Nagy's (2016) demands-abilities in the academic context scale to measure subjective skill-major fit in the academic context by replacing study major with undergraduate psychology major.

Subjective well-being forecast was measured with five items from Merkle, Messerer, and Dickhäuser (2024) to measure subjective well-being forecast. Two items were based on the study satisfaction scale from Westermann et al. (1996) and adapted to the future tense. One item was based on Diener et al.'s (1985) life satisfaction scale and adapted to the future tense and the study context. One item is often used in the affective forecasting literature, asking how happy one would be in a specific situation (Gilbert et al., 1998) and was adapted to the study context, asking whether "I would be happy in the undergraduate psychology major". One more item was self-constructed to reflect the affective component of subjective well-being: "It would feel really good to study in an undergraduate psychology major".

2.2.5 Major-Unspecific Factors

The goal in our study is to explain *major-specific* success, and study major choice processes. Therefore, we controlled for *major-unspecific* factors because they should explain *major-unspecific* variance in study success (e.g., people who are generally more satisfied with their lives are to some extent also generally happier in their study major; and people with a better High School-GPA should also perform better in their studies). Because we control for this *major-unspecific* success variance, more/only *major-specific* success variance should be explained by our predictors, which is exactly the variance we want to examine. Therefore, as major-unspecific factors we assessed trait well-being with two single items from Merkle, Messerer, and Dickhäuser (2024). We asked participants to report satisfaction (item taken from Beierlein et al., 2014) and happiness (item taken from Breyer & Voss, 2016) with their own life. Additionally, we used a single item that asked participants to enter their *High School-GPA* with one decimal place. Again, higher values represent better grades and therefore higher success.

2.3 Transparency and Openness

In the prior section, we reported how we retrieved our sample and we describe all measures in the study. Informed consent was obtained for all participants. The Ethics Review Panel of the Faculty of Behavioural and Cultural Studies of the University of Heidelberg approved the study on 20th of July, 2019. Datasets generated and analyzed as part of the current study are not publicly available because participant consent does not allow data to be shared with researchers other than those on the project. However, interested researchers may email the authors for insights into analysis codes for replication purposes. The matching was conducted with a custom matching algorithm programmed in JavaScript (Blamberg & Merkle, 2024). The analyses were conducted with R (Version 4.1.2, R Core Team, 2021). This study's design and its analysis were not pre-registered.

3. Study 1 - Objective Major-Specific Fit Predicts Major-Specific Success Beyond Subjective Forecasts

In Study 1 we investigated whether higher objective interest-major fit, objective skill-major fit and the objective valence of expectation-major fit predict major-specific success beyond subjective forecasts (Hypothesis 1, see Figure 1).

Data Analysis

We tested our hypotheses using hierarchical multivariate and univariate multiple regression analyses conducted in R (Version 4.1.2, R Core Team, 2021). In step 1 we included major-unspecific factors (trait well-being, High School-GPA) and subjective forecasts (on well-being, performance, interest-major fit, skill-major fit) as controls. In step 2 we added objective interest-major fit and objective valence of expectation-major fit as predictors. As outcomes we included intrinsic motivation, satisfaction²², dropout intention for the first and third semesters and, additionally, achievement for the third semester. In a separate analysis we repeated steps 1 and 2 and, additionally, included objective skill-major fit as a predictor because objective skill-major fit was only available for a smaller sample (Sample B), and we wanted to obtain the results of the other predictors for the full sample (Sample A). Multivariate analyses were conducted to show for each predictor whether it uniquely and significantly contributes to explaining all outcomes considered together as major-specific success. Univariate analyses were conducted to provide more insights about each predictor's contribution to predicting each specific outcome (all outcomes considered separately).

²² We focus here on satisfaction as the most common indicator of well-being used in definitions of students' success (e.g., York et al., 2015). Results for positive and negative affect can be found in Supplemental Table 2.3.

3.1 Results

The descriptives and zero-order correlations between all continuous variables in the following analyses are depicted in Supplemental Tables 2.1-2.2. The multivariate analyses for *first semesters*' major-specific success showed that objective interest-major fit proved to be an overall significant predictor beyond subjective forecasts while objective expectation-major fit and objective skill-major fit were not significant predictors. The multivariate analyses for *third semesters*' outcomes showed that objective interest-major fit, objective valence of expectation-major fit and objective skill-major fit proved to be overall significant predictors for major-specific success beyond subjective forecasts. The results of the hierarchical univariate multiple regression analyses can be found in Table 2.

Table 2*Hierarchical Univariate Multiple Regression Analyses Predicting Major-Specific Success*

Outcomes	Intrinsic Motivation			Satisfaction			Dropout Intention			Achievement		
	Sample A 1 st /3 rd	Sample B 1 st /3 rd	Sample A 1 st /3 rd	Sample A 1 st /3 rd	Sample B 1 st /3 rd	Sample A 1 st /3 rd	Sample B 1 st /3 rd	Sample A 1 st /3 rd	Sample B 1 st /3 rd	Sample A 1 st /3 rd	Sample B 1 st /3 rd	
Predictors	β	β	β	β	β	β	β	β	β	β	β	
Step 1: Controls												
Δ Adj. R ²	.084***/.037	.092***/.029	.112***/.010	.109***/-.047	.144***/.008	.144***/-.058	.144***/-.058	-.003	-.003	-.003	-.006	
Step 2: Controls + Obj. Forecasts												
Trait Well-Being	.18***/.10	.21***/-.07	.16***/.12	.18***/-.02	.26***/.16	.28***/-.15	.28***/-.15	-.10	-.10	-.10	-.17	
Highschool GPA	-.02/.15	-.02/.22	-.05/.12	-.08/.24	-.05/.07	-.03/.16	-.03/.16	-.15	-.15	-.15	-.13	
Subj. Well-Being-F.	.13/.22	.14/.45	.19***/.21	.20***/.41	.12/.15	.13/.33	.13/.33	-.02	-.02	-.02	-.31	
Subj. Performance-F.	-.02/-.03	-.01/-.02	-.02/.01	.01/-.06	.06/.00	.06/.07	.06/.07	-.07	-.07	-.07	-.16	
Subj. Interest-MFF	-.07/.08	-.08/.22	.00/.07	-.01/.22	.09/.27*	.08/.33	.08/.33	-.01	-.01	-.01	-.15	
Subj. Skill-MFF	.01/-.16	-.05/.11	.02/-.10	-.01/.13	.01/-.25*	.00/-.01	.00/-.01	-.02	-.02	-.02	-.04	
Obj. Interest-MFF	.27***/.02	.27***/-.38	.19***/-.08	.14*/-.41*	.00/-.25**	-.01/-.42*	-.01/-.42*	-.02	-.02	-.02	-.10	
Obj. Val. Exp.-MFF	-.04/.08	-.06/.13	.01/.17*	-.01/.22	-.03/.14	-.01/.11	-.01/.11	-.21**	-.21**	-.21**	-.36**	
Obj. Skill-MFF	-/-	.08/-.21	-/-	.06/-.16	-/-	.03/-.16	.03/-.16	-/-	-/-	-/-	-.43**	
Adj. R ²	.143***/.027	.157***/.109	.134***/.032	.119***/.062	.139***/.068*	.135***/.003	.135***/.003	-.034	-.034	-.034	-.255*	
Δ Adj. R ²	.059***/-.01	.065***/.08	.022***/.022*	.01/.109*	-.005/.060**	-.009/.061	-.009/.061	-.031*	-.031*	-.031*	-.26**	

Note. Values left of / belong to 1st semester outcomes. Values right of / belong to 3rd semesters outcome. Sample A does not include skill-major fit as predictor: $N = 396/$

$N = 136$. Sample B does include skill-major fit as predictor: $N = 271/ N = 42$. For all variables higher values represent higher success. GPA = Grade Point Average; F. =

Forecast; MFF = Major Fit Forecast; Subj. = Subjective; Obj. = Objective; Val. Exp = Valence of Expectation; Adj. = Adjusted; grey = control results; black = hypothesis results; bold = hypothesis-conform results; p-values for hypothesis-testing are one-sided.

^a $N = 291/ N = 136$.

* $p < .05$. ** $p < .01$. *** $p < .001$.

In order to describe all results belonging to a particular hypothesis in a common section, the results of the univariate analyses (which were calculated with all predictors for each outcome separately) are summarized below across all outcomes and reported per predictor.

3.1.1 Objective interest-major fit predicts major-specific success

In line with our hypothesis, higher objective interest-major fit assessed before enrollment predicted higher intrinsic motivation and study satisfaction beyond subjective forecasts for the first semester. Contrary to our hypothesis, study dropout intention for the first semester was not significantly incrementally predicted. Regarding the third semester, higher objective interest-major fit unexpectedly predicted higher dropout intention while intrinsic motivation, study satisfaction and achievement were not incrementally predicted beyond subjective forecasts (see step 2 in Table 2, Sample A).

3.1.2 Objective valence of expectation-major fit predicts major-specific success

Unexpectedly, a more positive objective valence of expectation-major fit was not a significant predictor for the first semester's outcomes beyond subjective forecasts. Regarding the third semester and in line with our hypothesis, a more positive objective valence of expectation major-fit predicted higher study satisfaction and better achievement beyond subjective forecasts. However, intrinsic motivation and dropout intention were not significantly incrementally predicted (see step 2 in Table 2, Sample A).

3.1.3 Objective skill-major fit predicts major-specific success

Higher objective skill-major fit was not a significant predictor for the first semester's outcomes beyond subjective forecasts. Regarding third semester students, higher objective skill-major fit predicted better achievement beyond subjective forecasts. However, intrinsic motivation, study satisfaction, and dropout intention were not significantly incrementally predicted (step 2 in Table 2, Sample B).

3.2 Discussion

Study 1 showed that objective major-specific fit predicted some indicators of success beyond subjective forecasts. A one standard deviation increase in objective interest-major fit predicted a .27 standard deviation increase in intrinsic motivation and a .19 standard deviation increase in the satisfaction of first semester students. A one standard deviation increase in objective expectation-major fit predicted a .17 standard deviation increase in third semester satisfaction and a .21 increase in achievement. A one standard deviation increase in objective skill-major fit predicted a .43 standard deviation increase in third semester achievement. These findings align with the theoretical argumentation that objective forecasts can be assumed to be less biased than subjective forecasts in predicting success. More discussions regarding further theoretical implications and unexpected findings can be found in the general discussion section. Building on these findings, the question remains as to whether objective forecasts when displayed in feedback to prospective students play a role in study choice processes beyond subjective forecasts.

4. Study 2 - Objective Major-Specific Fit Revealed in Feedback Predicts

Motivation Beyond Subjective Forecasts

In Study 2 we investigate whether higher objective major-specific fit when displayed in feedback to prospective students predict changes in their motivation to choose a specific major beyond subjective forecasts (Hypothesis 2, see Figure 1).

Data Analyses

We tested our hypotheses using univariate multiple regression analyses conducted in R (Version 4.1.2, R Core Team, 2021). In step 1 we included motivation for a major

(intrinsic value, expectancies of success²³, intention) to account for the stability of motivation for a major and we included controls, namely major-unspecific factors (trait well-being, High School-GPA) and subjective forecasts (on well-being, performance, interest-major fit, skill-major fit) as controls assessed prior to participating in the OSA and receiving feedback (t_{preOSA}). In step 2, we included objective interest-major fit and objective expectation-major fit as predictors to test our hypotheses. As outcomes we included motivation for a major (intrinsic value, expectancies of success, intention) assessed after participating in the OSA and receiving feedback ($t_{postOSA}$). In a separate analysis we repeated steps 1 and 2 and, additionally, included objective skill-major fit as a predictor because objective skill-major fit was only available for a smaller sample (Sample B), and we wanted the results of the other predictors for the full sample (Sample A).

4.1 Results

The descriptives and zero-order correlations between all continuous variables in the following analyses are depicted in Supplemental Tables 3.1-3.2. The results of the hierarchical univariate multiple regression analyses can be found in Table 3.

²³ We focus here on intrinsic value and expectancies of success because they align most closely with interest-major fit and skill-major fit. Results for attainment value, utility value and costs can be found in Supplemental Table 3.3.

Table 3

Hierarchical Univariate Multiple Regression Analyses Predicting Motivation for a Major

Outcomes	Post-Intrinsic Value		Post-Expectations of Success		Post-Intention to choose	
	Sample A β	Sample B β	Sample A β	Sample B β	Sample A β	Sample B β
Step 1: Controls						
ΔR^2	.508***	.497***	.564***	.533***	.598***	.557***
Step 2: Controls + Obj. Forecasts						
Trait Well-Being	.05***	.06***	.04***	.04**	.02	.02
Highschool GPA	.03**	.00	.04***	.02	.04***	.03
Subj. Well-Being Forecast	.21***	.20***	.03*	.04*	.06***	.08***
Subj. Performance Forecast	.04***	.06**	-	-	.01	.02
Subj. Interest-MFF	.04**	.02	-.02	.00	.02	.01
Subj. Skill MFF	-.02	-.02	.08***	.06**	.00	-.02
Motivation	.49***	.48***	.66***	.65***	.74***	.71***
Obj. Interest-MFF	.14***	.14***	.02*	.02	-.01	-.02
Obj. Val. Exp.-MF	.03**	.03*	-.05***	-.06***	.01	.00
Obj. Skill-MFF		.06***		.11***		.06***
Adj. R ²	.523***	.514***	.567***	.546***	.598***	.560***
Δ Adj. R ²	.015***	.017***	.003***	.013***	.000	.003***

Note. Sample A does not include skill-major fit as predictor: $N = 4482$. Sample B does include skill-major fit as predictor: $N = 2565$. For all

variables higher values represent higher success. Post- = Assessed after the feedback; all other motivation aspects were assessed before the

feedback; GPA = Grade Point Average; F. = Forecast; MFF = Major Fit Forecast; Subj. = Subjective; Obj. = Objective; Motivation for a Major =

respective motivation for a major aspect (intrinsic value, expectations of success or intention to choose) assessed before the feedback; Val. Exp =

Valence of Expectation; Adj. = Adjusted; grey = control results; black = hypothesis results; bold = hypothesis-conform results; p-values for

hypothesis are one-sided.

* $p < .05$. ** $p < .01$. *** $p < .001$.

To be able to describe all results belonging to a particular hypothesis in a common section, the results of the univariate analyses (which were calculated with all predictors for each outcome separately) are summarized below across all outcomes and reported per predictor.

4.1.1 Objective interest-major fit

In line with our hypothesis higher objective interest-major fit predicted higher intrinsic value and higher expectations of success at t_{postOSA} beyond the respective motivation assessed at t_{preOSA} and beyond subjective forecasts. However, intention to choose the major was not significantly incrementally predicted (see step 2 in Table 3, Sample A).

4.1.2 Objective valence of expectation-major fit

A more positive objective valence of expectation-major fit predicted higher intrinsic value, and against our hypothesis lower expectations of success at t_{postOSA} beyond the respective motivation assessed at t_{preOSA} and beyond subjective forecasts. However, intention to choose the major was not significantly incrementally predicted (see step 2 in Table 3, Sample A).

4.1.3 Objective skill-major fit

In line with our hypothesis higher skill-major fit predicted higher intrinsic value, higher expectancies of success and higher intention to choose the major at t_{postOSA} beyond the respective motivation assessed at t_{preOSA} and beyond subjective forecasts (see step 2 in Table 3, Sample B).

4.2 Discussion

Study 2 showed that objective major-specific fit when displayed in feedback to prospective students predicted some indicators of motivation to choose a major beyond subjective forecasts. A one standard deviation increase in objective interest-major fit predicted a .14 standard deviation increase in intrinsic value and a .02 standard deviation increase in expectations of success beyond subjective forecasts and initial motivation. A one

standard deviation increase in objective valence of expectation-major fit predicted a .03 standard deviation increase in intrinsic value beyond subjective forecasts and initial motivation. A one standard deviation increase in objective skill-major fit predicted a .06 standard deviation increase in intrinsic value, a .11 increase in expectations of success and a .06 increase in intention to choose the major beyond subjective forecasts and initial motivation. In combination with the findings from Study 1 indicating that objective forecasts can be assumed to be less biased than subjective forecasts, these findings align with the theoretical argumentation that objective forecasts, when displayed in feedback to prospective students, can be assumed to reduce biases in motivation to choose a major because objective forecasts can predict such motivation beyond subjective forecasts. More discussions regarding further theoretical implications and unexpected findings can be found in the general discussion section. Building on these findings, the question remains as to whether objective major-specific fit, when displayed in feedback to prospective students, plays a role for actual study choice beyond subjective forecasts.

5. Study 3 - Objective Major-Specific Fit Revealed in Feedback Predicts Choice Beyond Subjective Forecasts

In Study 3 we investigate whether higher objective major-specific fit when displayed in feedback to prospective students predicts the likelihood of enrolling in the respective major beyond subjective forecasts (Hypothesis 3, see Figure 1).

Data Analyses

We tested our hypotheses using a stepwise multiple logistic regression analysis conducted in R (Version 4.1.2, R Core Team, 2021). In step 1 we included major-unspecific factors (trait well-being, High School-GPA), subjective forecasts (on well-being, performance, interest-major fit, skill-major fit) and motivation to choose the major (values, expectations of success, intention) assessed prior to participating in the OSA and

receiving feedback (t_{preOSA}) as controls. In step 2 we added objective interest-major fit and the objective valence of expectation-major fit as predictors. As an outcome we included enrollment in the undergraduate psychology major. This variable was determined by assigning a 1 to all prospective students who entered the undergraduate psychology major and participated in one of three conducted annual surveys in one of five surveyed universities and assigning a 0 for all prospective students who did not. In a separate analysis we repeated steps 1 and 2 and, additionally, included objective skill-major fit as a predictor because objective skill-major fit was only available for a smaller sample (Sample B), and we wanted the results of the other predictors for the full sample (Sample A).

5.1 Results

The descriptives and zero-order correlations between all continuous variables in the following analyses are depicted in Supplemental Tables 4.1-4.2. The results of the hierarchical univariate multiple logistic regression analyses can be found in Table 4.

Table 4

Hierarchical Univariate Multiple Logistic Regression Analyses Predicting Enrollment

Predictors	Sample A			Sample B		
	β	OR(β)	90 % CI	β	OR(β)	90 % CI
Step 1: Controls						
Adj. R^2	.095***			.071***		
Step 2: Controls + Obj. Forecasts						
Trait Well-Being	.00	1.00	[0.92; 1.08]	.16*	1.17	[1.04; 1.31]
Highschool GPA	1.04***	2.82	[2.50; 3.18]	.73***	2.08	[1.79; 2.42]
Subj. Well-Being F	.10	1.10	[0.98; 1.25]	.11	1.12	[0.95; 1.31]
Subj. Performance F ^a	-.13*	0.88	[0.80; 0.98]	-.18*	0.84	[0.73; 0.96]
Subj. Interest-MFF	-.04	0.96	[0.85; 1.08]	-.04	0.96	[0.82; 1.12]
Subj. Skill-MFF	.12	1.13	[1.01; 1.26]	.05	1.05	[0.91; 1.22]
Intrinsic Value	.03	1.03	[0.93; 1.15]	.07	1.07	[0.92; 1.24]
Attainment Value	.07	1.07	[0.96; 1.20]	.12	1.13	[0.97; 1.31]
Utility Value	-.11	0.89	[0.80; 0.99]	-.09	0.92	[0.79; 1.06]
Costs	.02	1.02	[0.93; 1.11]	-.05	0.95	[0.84; 1.06]
Intention to Choose	.25***	1.28	[1.14; 1.44]	.14	1.15	[1.00; 1.33]
Obj. Interest-MFF	-.03	0.97	[0.89; 1.07]	-.03	0.97	[0.86; 1.09]
Obj. Val. Exp.-MFF	.09*	1.09	[1.00; 1.19]	.04	1.04	[0.92; 1.17]
Obj. Skill-MFF				.45***	1.57	[1.40; 1.76]
Adj. R^2	.096***			.095***		
Δ Adj. R^2	.001			.024***		

Note: Sample A does not include skill-major fit as predictor: $n_{\text{enrolled}} = 538$, $n_{\text{not enrolled}} = 4132$; Sample B does include skill-major fit as predictor:

$n_{\text{enrolled}} = 313$, $n_{\text{not enrolled}} = 2348$; Enrollment: 0 = Not enrolled, 1 = Enrolled; For all other variables higher values represent higher success. OR =

Odds Ratio; CI = Confidence Interval; GPA = Grade Point Average; F. = Forecast; MFF = Major Fit Forecast; Subj. = Subjective; Obj. = Objective;

Adj. = Adjusted; grey = control results; black = hypothesis results; bold = hypothesis-conform results; p-values for hypothesis are one-sided.

^a Performance Forecast = Expectation of Success.

* $p < .05$. *** $p < .001$.

5.1.1 Objective interest-major fit

Higher objective interest-major fit did not significantly incrementally predict the likelihood of enrollment beyond subjective forecasts (see step 2 in Table 4, Sample A).

5.1.2 Objective valence of expectation-major fit

A more positive objective valence of expectation-major fit was a significant predictor of enrollment beyond subjective forecasts. (see step 2 in Table 4, Sample A).

5.1.3 Objective skill-major fit

Higher objective skill-major fit was a significant predictor of enrollment beyond subjective forecasts (see step 2 in Table 4, Sample B).

5.2 Discussion

Study 3 showed that some objective major-specific fit forecasts when displayed in feedback to prospective students predicted the likelihood of enrollment in a study major beyond subjective forecasts. A one standard deviation increase in objective valence of expectation-major fit predicted a 9% increase in the odds of enrollment and a one standard deviation increase in objective skill-major fit predicted a 57% increase in the odds of enrollment beyond subjective forecasts and initial motivation. In combination with the findings from Study 1 indicating that objective forecasts can be assumed to be less biased than subjective forecasts, these findings align with the theoretical argumentation that objective forecasts when displayed in feedback to prospective students can be assumed to reduce biases in choices because objective forecasts can predict enrollment beyond subjective forecasts. More discussions regarding further theoretical implications and unexpected findings can be found in the general discussion section. Building on these findings, the question remains as to whether prospective students who took part in the OSA before enrollment and therefore received feedback regarding their objective major-specific

fit prior to their enrollment are more successful compared to those who do not (Hypothesis 4, Study 4).

6. Study 4 - Feedback on Objective Major-Specific Fit Before Enrollment Relates to Major-Specific Success (Compared to No Feedback)

In Study 4 we investigated whether students who received feedback regarding their objective major-specific fit prior to their enrollment are more successful compared to students who did not receive such feedback (Hypothesis 4, see Figure 1).

Data Analyses

We tested our hypotheses using MANCOVAs and ANCOVAs conducted in R (Version 4.1.2, R Core Team, 2021). We included intrinsic motivation, satisfaction²⁴, dropout intention, and achievement as dependent variables. As a factor we included whether participants received the feedback. This variable was determined by assigning a 1 to all surveyed students who took part in the OSA (and allowed us to save their data) before starting their studies and therefore received feedback regarding their objective major-specific fit. A 0 was assigned to those students who did not participate in the OSA and therefore did not receive such feedback. As a control variable we included the major-unspecific factor High-School-GPA²⁵. Three multivariate analyses (one each for first, third, fifth semester students) were conducted to show whether there was an overall difference in study success between the group that participated in the OSA before

²⁴ We focus here on satisfaction as the most common indicator of well-being used in definitions of students' success (e.g., York et al., 2015). Results for positive and negative affect can be found in Supplemental Table 5.4.

²⁵In the analyses for Studies 1 to 3, we additionally included pre-enrollment trait well-being and subjective forecasts as control variables. It was crucial to measure these variables before enrollment because they may change once students enter their major. However, since the non-feedback group did not participate in the OSA and its accompanying surveys before enrollment, we were unable to assess their trait well-being and subjective forecasts pre-enrollment, so we could not include them as controls in the analysis. In contrast, High-School GPA, which remains stable over time, could be assessed retrospectively without affecting its validity. Therefore, only High-School GPA was included as control variable in this analysis.

enrollment and the group that did not participate in the OSA. Univariate Analyses were conducted to provide more insights about the differences between those groups for each specific outcome (all outcomes considered separately). Analyses were conducted separately in the cohorts of first, third and fifth semesters (see Table 5). Zero-order correlations between all continuous variables in the following analyses are depicted in Supplemental Tables 5.1-5.3

Table 5

Analysis of Covariance of Major-Specific Success as a Function of Two Groups of OSA Participation with High-School GPA as Covariate

Outcomes	No OSA Participation			OSA participation			F-value	p	η^2_p
	EMM	SE	n	EMM	SE	n			
First Semester							df=1,584		
Intrinsic Motivation	5.38	0.08	154	5.54	0.05	433	3.17	.038	.005
Satisfaction	5.79	0.08	154	5.95	0.05	433	3.11	.039	.005
Dropout Intention	6.04	0.10	92	6.23	0.05	314	2.96 (1,403)	.043	.007
Third Semester							df=1,256		
Intrinsic Motivation	5.44	0.10	108	5.33	0.09	151	0.72	.198	.003
Satisfaction	5.52	0.10	108	5.60	0.08	151	0.23	.315	.002
Dropout Intention	6.13	0.09	108	6.11	0.08	151	0.03	.430	.000
Achievement	5.15	0.04	108	5.33	0.03	151	19.27	< .001	.042
Fifth Semester							df=1,152		
Intrinsic Motivation	5.21	0.11	103	5.15	0.16	52	0.23	.316	.000
Satisfaction	5.23	0.12	103	5.69	0.17	52	2.52	.057	.031
Dropout Intention	6.15	0.09	103	6.32	0.13	52	0.39	.266	.006
Achievement	5.20	0.03	103	5.36	0.05	52	13.55	< .001	.046

Note. For all variables higher values represent higher success. OSA = online-self-assessment; GPA = Grade Point Average; EMM = Estimated Marginal Means; SE = Standard

Error; bold = hypothesis-conform results; p-values for hypothesis-testing are one-sided.

6.1 Results

6.1.1 First Semester

For first semester students the multivariate analysis revealed that there was no overall significant difference in study success between the two groups (Pillai's trace = .01, $p = .311$). Univariate analysis revealed that the group that took part in the OSA before enrollment reported significantly more intrinsic motivation, more satisfaction and lower dropout intention compared to the group that did not participate.

6.1.2 Third Semester

For third semester students the multivariate analysis revealed that there was an overall significant difference in study success between the two groups (Pillai's trace = .08, $p < .001$). Univariate analysis revealed that the group that took part in the OSA before enrollment had significantly better grades than the group that did not participate. However, no differences for intrinsic motivation, study satisfaction and dropout intention were found.

6.1.3 Fifth Semester

For fifth semester students the multivariate analysis revealed that there was an overall significant difference in study success between the two groups (Pillai's trace = .12, $p < .001$). Univariate analysis revealed that the group that took part in the OSA before enrollment had significant better grades than the group without OSA participation. However, no differences for intrinsic motivation, study satisfaction and dropout intention were found.

6.1.4 Additional exploratory analyses

Additionally, we tested whether participation in an OSA and receiving feedback *after enrollment* is related to differences in terms of later success compared to participation *before enrollment* or *no participation* (and therefore no feedback), using MANCOVAs, ANCOVAs, and Tukey's post-hoc *t*-tests for significant ANCOVAs. Therefore, we

repeated analysis 4 with an additional group - those students who participated in the OSA after enrollment, at the start of their studies ($t_{stud2019}$). The results show again for third and fifth semester students that the group that completed the OSA before enrollment had significant better grades than the group with no participation. However, there were no significant differences between the group that completed the OSA after enrollment and the no-OSA participation group and there were no significant differences between the group that completed the OSA after enrollment and the group that participated in the OSA before enrollment (see Supplemental Table 5.5 for details).

6.2 Discussion

Study 4 showed that students who participated in an OSA and therefore received feedback regarding their objective major-specific fit before enrollment showed more success regarding certain indicators than students who did not participate in the OSA and did therefore not receive such feedback. Specifically, participation in the OSA before enrollment compared to no such participation showed small associations with first semester students' higher intrinsic motivation, higher satisfaction and lower dropout intention and medium associations with advanced students' achievement. In combination with the findings from Study 1 indicating that objective forecasts can be assumed to be less biased than subjective forecasts in predicting study success, these findings are in line with the theoretical argumentation that feedback on objective forecasts can be assumed to be a good measure to foster study success by reducing biases in the study (choice) process. More discussions regarding further theoretical implications and unexpected findings can be found in the general discussion section.

7. General Discussion

Choosing an educational path is a difficult life decision which can lead to unfavorable outcomes when it goes wrong. Subjective forecasts play an important role in

such decisions but can be assumed to be biased in predicting study success. Initial empirical evidence supports this assumption (Merkle, Messerer, & Dickhäuser, 2024; Wilson & Gilbert, 2003). In the current investigation, we examine for the first time, in a longitudinal field design, whether objective forecasts regarding interests, expectations and skills can improve the prediction of study success and play a role for the study choice process beyond subjective forecasts in a way that fosters study success.

The results of the four studies provide first empirical evidence to support these hypotheses. Objective major-specific fit improved the prediction of major-specific success beyond subjective forecasts (Study 1) indicating that objective forecasts are potentially less biased than subjective forecasts in predicting success. When displayed in feedback to prospective students, objective major-specific fit predicted the motivation to choose a major (Study 2) and the likelihood of enrollment (Study 3) beyond subjective forecasts. These findings suggest that objective forecasts can potentially reduce biases in the study choice decision process. Additionally, students who participated in an online-self-assessment and received feedback regarding objective forecast were more successful than students who did not participate in such an assessment and therefore did not receive such feedback (Study 4). This result indicates that such feedback might possibly be a good measure to foster success probably by reducing biases in the study choice process.

7.1 Summary of findings and theoretical implications

Diving deeper into the findings, Study 1 showed that objective major-specific fit could predict first semester intrinsic motivation and satisfaction beyond subjective forecasts. These findings align with previous theoretical argumentations and empirical evidence suggesting in various contexts that subjective forecasts can be assumed to be biased (e.g., Hasenberg & Schmidt-Atzert, 2013; Wilson & Gilbert, 2003) and that these biases can potentially be reduced by adding objective interest-major fit which is assumed to be less biased (Merkle, Messerer, & Dickhäuser, 2024). Further, Study 1 indicates that

these theoretical argumentations do not only hold for objective interest-major fit as a predictor of intrinsic motivation and well-being in the first semester (Merkle, Messerer, & Dickhäuser, 2024). They can also be extended to objective skill-major fit and the objective valence of expectation-major fit as predictors of success in later semesters. Objective skill-major fit and the objective valence of expectation-major fit both predicted third semester students' achievement, and the objective valence of expectation-major fit additionally predicted study satisfaction. These results are in line with past findings showing that objective expectation-major fit can predict study satisfaction (e.g., Hasenberg & Schmidt-Atzert, 2013) and objective skill-major fit can predict achievement (Julian, 2005). Extending past findings, we showed that these two objective forecasts can do so beyond subjective forecasts, providing further evidence that objective forecasts are possibly less biased than subjective forecasts in predicting success.

Building on the findings from Study 1, the question remains as to whether objective forecasts, when displayed in feedback to prospective students, play a role for the study choice process beyond subjective forecasts. We found in Study 2 and Study 3 that higher objective interest-major fit when displayed in feedback to prospective students predicted higher intrinsic value and higher expectations of success beyond initial motivation and subjective forecasts. A more positive objective valence of expectation-major fit predicted higher intrinsic value, intention to choose the major, and likelihood for enrollment. Meanwhile, higher objective skill-major fit predicted higher intrinsic value, expectations of success, intention to choose the major and likelihood of enrollment beyond initial motivation and subjective forecast. These findings align with theoretical argumentations and empirical evidence that objective expectation-major fit provided in feedback might relate to cognitive dissonances which can be alleviated by changing the motivation to choose a major (Festinger, 1957; Karst et al., 2017; Merkle, Bürkle et al, 2024). Study 2 and Study 3 indicate that these theoretical argumentations can potentially be applied to

objective *interest-major* fit and objective *skill-major* fit as well as the objective *valence* of expectation-major fit and that displaying these indicators in feedback could also relate to dissonances and therefore trigger such change processes in motivation. Additionally, these findings align with past theorizing and findings that objective major-specific fit when displayed in feedback to prospective students relates to motivation for a major (Karst et al., 2017; Merkle, Bürkle et al., 2024) which according to the Expectancy-Value Model of Achievement-Related Choices (Eccles et al., 1983; Eccles & Wigfield, 2002) should influence choices (Niessen et al., 2016). Additionally, our results extend past findings by showing the predictive value of *objective* forecasts beyond *subjective* forecasts for motivation to choose a major and for enrollment. These findings align with our extended theoretical argumentations that objective major-specific fit when displayed in feedback to prospective students can be assumed to relate to less biased motivation and less biased choices. Thus, the results of Study 2 and 3 indicate that objective forecasts when displayed in feedback to prospective students can potentially reduce biases in motivation to choose a major and choices because objective forecasts can predict motivation and choice beyond subjective forecasts.

Study 4 showed that students who participated in an OSA and therefore received feedback regarding their objective major-specific fit experienced more intrinsic motivation and satisfaction in their first semester, and more achievement in their later semesters than students who did not participate in the OSA and did therefore not receive such feedback. These findings are in line with our argumentation that prospective students who receive such feedback before enrollment and therefore make less biased/more fitting choices should experience a better total fit than prospective students who did not. Based on person-environment fit theory (e.g., Le et al., 2014) this better fit should be related to more study success (Etzel & Nagy, 2016). Additionally, these findings are in line with the idea that such feedback supports expectation management processes (Festinger, 1957; Merkle,

Bürkle et al., 2024), which should prevent disappointment and therefore foster success.

Thus, our results indicate that feedback on objective forecasts might potentially be a good measure to reduce biases in the study (choice) process to foster success.

7.2 Unexpected findings and limitations

However, not all objective major-specific fit forecasts significantly improved the predictions of all indicators of study success, motivation and enrollment. The results of Study 1 showed that objective interest-major fit predicted motivation and satisfaction in the first semester only, while skill-major fit predicted achievement only and the valence of expectation-major fit additionally predicted satisfaction in the third semester. These findings are in line with past findings on the specificity of interests and skills for specific success outcomes (interests are more strongly related to motivation and well-being, while skills are more strongly related to achievement; Etzel & Nagy, 2016), which speaks for the relevance of both constructs for different study success facets. Additionally, the results potentially speak for a different timing of the relevance of the constructs. It seems like objective skill-major fit, and the objective valence of expectation-major fit might be more relevant in later semesters, because it might take some time until disappointed expectations unfold and until students get their first grades. However, interest-major fit might be relevant from the beginning of the studies, starting with the first work on course content. In addition, the relevance of prior interests might diminish throughout the course of the studies because interests can change over time (Stoll et al., 2021). This could also explain the unexpected findings from Study 4 showing no difference between the groups with or without feedback in intrinsic motivation and satisfaction in the later semesters. In sum, this calls for further research with measurement points taken at shorter intervals to examine the development of objective interest-, skill- and the valence of expectation-major fit throughout the studies within the first two semesters.

Additionally, objective interest-major fit could not explain students' intention to choose the respective major (Study 2) or their enrollment (Study 3) beyond subjective forecasts. One possible explanation is that prospective students do not change their study choice in alignment with their objective interest-major fit even though it is a valid predictor of their later success because they do not believe in its validity. This would call for the development and evaluation of interventions explaining the value of an interest-based study choice to prospective students to foster incorporation of this feedback into their study major decision-making. However, another explanation for this finding could be that in our sample the mean of interest for the major was fairly high, at 1.6, on a scale from -3 to +3. Therefore, small differences in interest between prospective students (even though relevant for later success) might not translate to actual differences in major choice because from an individual perspective it could still be the relatively best fitting major choice compared to other majors. Future studies should assess objective interest-major fit across various study majors to clarify this point.

Additionally, our data unexpectedly showed that higher objective interest-major fit predicted higher dropout intention for third semester students. A possible explanation could be that there can be too much interest-major fit leading to over-engagement with the content and subsequent negative impacts on study success. The fact that we also found that higher objective interest-major fit predicted higher perceived costs before enrollment and higher negative affect in the third semester provides some first support for this explanation (see Supplemental Tables 2.3 & 3.3). Therefore, future studies could explore curvilinear relationships of objective interest-major fit in a sample with a larger variance in objective interest-major fit.

Our ecologically valid field study design accompanying real prospective students in their study choice decision process yielded some methodological limitations across all studies: First, predictors were not experimentally manipulated but were only observed

(Studies 1-3) and group assignment was not at random (Study 4) because before 2020 no participation in the OSA was possible, and after 2020 participation was mandatory for some universities but not for others. Therefore, it is possible that a third variable drives the discovered relationships. While some of the features of our ecologically valid field study limit the causal interpretation of the data, the field study also serves as a strength at the same time by demonstrating relationships and predictions in an ecologically valid setting. Additionally, we made extensive efforts to control for potential confounding variables (e.g., High School-GPA) and found robust effects, further underscoring the relevance of these findings.

A second limitation is measurement accuracy. The items to measure objective skill-major fit are a small selection of example items from a large comprehensive enrollment test battery. Although this battery is presented as assessing major-specific aptitude, it includes measures of general intelligence in addition to major-specific knowledge and skills. Hence, it is unclear to which extent the skills that we measured were major-specific. Future studies should examine whether such items truly measure objective skill-major fit, for instance, by assessing their discriminant validity for a specific major compared to other majors. While from the university perspective this is not relevant if the items predict success, it is crucial from prospective students' perspective to determine whether prospective students should rely on these tests to inform their choice *between* different study majors. Additionally, from a theoretical perspective, it is important to refine measurement models of general versus specific skills or knowledge. Additionally, enrollment (Study 3) was measured by matching prospective students to the following survey waves during their studies. Therefore, prospective students declared as "not enrolled" may have entered the psychology major at another university or may have entered the major but did not take part in any of the subsequent survey waves. The same applies for measurement of OSA participation in Study 4 which was derived by matching

the students' sample to the prospective students' sample that took part in the OSA.

Therefore, students in the “no OSA participation and no feedback” group could have taken part in the OSA but did not allow us to use their data for research or could have taken part in another OSA. However, if anything, this should make it difficult for us to detect effects and speaks to the robustness of the results we found.

Second, the sample was restricted to (prospective) psychology students.

Consequently, the assessment of interest-, skill-, and expectation-major fit was designed specifically for the psychology major. To generalize our findings, further studies across other majors are necessary. Replicating the results in other samples could lead to smaller effect sizes for enrollment (Study 3) because in this specific sample some prospective students had to participate in major-specific skill tests, whose results were a selection criterion for admission. Therefore, the predictive value of objective skill-major fit for enrollment must be interpreted cautiously. It is also possible that the objective skill-major fit we assessed was merely predictive of performance in the admission test, which universities use to admit students. Therefore, it is also possible that prospective students did not alter their decisions based on feedback, but rather were forced to change their enrollment decision because they were not admitted into their desired study major.

Therefore, effect sizes for skill-major fit on enrollment for majors without a major-specific skill admission test could be smaller in prospective student cohorts.

For a different perspective, effect sizes in other samples could also be expected to be larger than in this sample. As argued by Merkle, Messerer, and Dickhäuser et al. (2024), the undergraduate psychology major in Germany is very popular, leading to many applications and strong selection criteria by universities. Therefore, variance in interests

and skills is rather restricted in psychology²⁶ and therefore their predictive value (studies 1-3) is – as a statistical consequence - necessarily lower. Additionally, the psychology major is the only path in Germany to become a licensed psychotherapist, meaning that many prospective students who wish to pursue this profession will choose this major regardless of the feedback they receive from an online-self-assessment. Furthermore, in some universities, prospective students had to complete this assessment and feedback as a requirement for their application. Consequently, they completed the assessment not to inform their study choice, but as a required part of their late-stage decision-making process (the application phase). As a result, they may no longer be willing to change their decision. This suggests that the current samples were potentially more resistant to changing their mind and their study major decision than other prospective students might be. These arguments suggest that the predictive value of objective major-specific fit could be even stronger for other study majors and at the same time can serve as an explanation for the lack of predictive value of objective interest-major fit for motivation to choose a major and enrollment.

7.3 Additional directions for future research

Our findings should be extended and expanded upon in several ways. First, future research should examine whether these findings also apply to *predicting* outcomes for a specific *individual* versus explaining the variance in *population* outcomes (De Vries et al., 2024). This consideration is important due to larger standard errors at the individual level and the need for individuals to select the best option from an intraindividual perspective, as opposed to the interindividual perspective used in our study. For such an analysis, larger

²⁶ The means and ranges of the scores in this sample are as follows: interest-major fit ($M = 1.62$, range = -0.33 to 2.92 on a scale ranging from -3 to 3+), skill-major fit ($M = 0.74$, range = 0.29 to 1.00, on a scale ranging from 0 to 100% correctly solved), and High School-GPA ($M = 1.46$, range = 1.0 to 2.60, on a scale ranging from 1 to 6 where 1 is the best grade and 6 the worst).

sample sizes are necessary to be able to use cross-validating techniques for the predictions (Yarkoni & Westfall, 2017). Second, future research should extend this research to include education at the master's level and eventually career outcomes. Third, it is important to examine the stability versus changeability of interests and skills. In our research we focused on stability to make predictions for the future. However, change, such as that missing skills can be learned, or interests can evolve with increasing skills is important too, especially, if interests and skills do not align in the study orientation phase. In study orientation, focusing solely on stability and thus discouraging prospective students from pursuing a major they are interested in but lack skills for, or from choosing a major where they are highly skilled but lack interest, seems risky given past research indicating that interests and abilities can change (Stoll et al., 2021). Furthermore, focusing on stability is risky because it might oppose a growth mindset—believing in the potential for abilities to change (Claro et al., 2016)—which is crucial for change processes. Therefore, future research on study choices should consider not only the stability of interests and skills but also their development and potential for change. Fourth, in our longitudinal field study the assessment and the feedback of objective forecasts were always conducted consecutively. Therefore, we cannot draw conclusions on whether the assessment and/or the feedback produces the found associations with study major choice and major-specific success and therefore they are treated as a joint intervention in our empirical model. A first study which distinguishes assessment and feedback of objective expectation-major fit in the context of choosing a study major showed that both assessment and feedback play an important role in the study major choice process (Merkle, Bürkle et al., 2024). Further studies are needed to disentangle these specific effects regarding the assessment of objective interest-major fit, objective skill-major fit and the objective valence of expectation-major fit. However, as our results indicate promising initial findings regarding the potential usefulness of assessment and feedback of objective major-specific fit, withholding feedback might pose

ethical challenges. One way to address these issues in such studies would be to provide delayed feedback to the group that initially does not receive any feedback, as demonstrated by Merkle, Bürkle et al. (2024). Last, future research should explore the impact of different timings for administering assessments and feedback. The exploratory analyses found no significant difference between receiving feedback after enrollment at the beginning of the studies, and receiving it prior to enrollment, which could be explained by the possibility that some mechanisms, such as expectation management, may still operate after enrollment. However, the additional lack of difference between the group that received feedback after enrollment and the group that received no feedback may suggest that certain processes (e.g. change one's study major) may be less feasible after enrollment. Therefore, examining the timing of the interventions in greater detail appears to be a promising avenue for further investigation to gain a clearer understanding of the role of objective forecasts provided in feedback before enrollment compared to feedback given after enrollment and to derive practical implications accordingly.

7.4 Practical implications

In recent years, a variety of online-self-assessments has been developed to support prospective students in their study orientation process to self-reflect upon their expectations, interests, and skills (Hell, 2009). These tools attract many users due to their accessibility and low costs and therefore can have a big impact on prospective students' study major choices. Therefore, it is highly relevant to find out whether objective major-specific fit when displayed in online-self-assessments can effectively guide prospective students or potentially misleads them (Merkle, Bürkle et al., 2024).

Our research demonstrates that objective interest-major fit, objective valence of expectation-major fit and objective skill-major fit show a relatively good incremental predictive validity for success beyond prospective students' subjective forecasts and other established constructs in the field (e.g., High School-GPA). Additionally, objective major-

specific fit when revealed in feedback to prospective students predicts study major choices and assessment and feedback of objective forecasts relate to study success. Assuming these results are generalizable, promoting the use of online-self-assessments to display objective major-specific fit in feedback could be a cost-effective way to support prospective students in their decision-making process.

Existing measures of interest, skills, or expectations often have limitations in assessing objective *major-specific* fit. Many focus on vocational interests (e.g., Allen & Robbins, 2010) rather than study major-specific interests, require payment and presence (e.g., Scholastic Assessment Test versus being available online for free), or lack rigorous validation. The latter is particularly concerning if prospective students rely on these measures - as our research indicates they do - for objective skill-major fit even despite our instructions stating that these items are just a selection of example items, not valid measures of their skills. Therefore, we recommend investing in the scientific development and continuous evaluation of both new and existing tools. Current advancements around artificial intelligence could be promising, as they may enable the cost-efficient development of these tools on a large scale for multiple study majors (Merkle & Janke, 2024).

Additionally, it is important to further motivate prospective students to use validated tools. This could be achieved by better structuring the current infrastructure of online-self-assessments, highlighting validated online-self-assessments and potentially making the use of such validated assessments a requirement for enrollment as is already common practice in some universities. Additionally, greater effort should be put into designing assessments and feedback mechanisms to better encourage prospective students to incorporate valid feedback into their study major decision-making.

8. Conclusion

The purpose of the current work was to examine factors that can improve the prediction of study success beyond subjective forecasts and therefore potentially support the study orientation process. We found that objective major-specific fit regarding interests, skills and expectations predicted major-specific success and predicted actual study choice beyond subjective forecasts. As one of the first studies to examine the predictive value of factors beyond subjective forecasts, this work underscores the advantages of more objective predictors such as objective major-specific fit and identifies potential for future major-fit research as well as online-self-assessment practice.

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Supplemental Table 1*Items of the Skill Test*

Text Comprehension	
Task	Response Options
German Text	
<p>In psychology, a variety of different sources of information are used to develop and test research questions. Based on a categorization by R. B. Cattell, it is essential to distinguish between self-report data (S-data), other-report data (O-data), test data (T-data), and life data (L-data).</p> <p>S-data is primarily collected through questionnaires and interviews. The subject of self-reports mainly includes interests, attitudes, opinions, or personal behaviors on which respondents are asked to comment. Self-report data is particularly time-efficient and provides access to a person's inner life. However, the quality of S-data depends on the introspective ability (the ability to describe oneself accurately) of the respondent, the degree of standardization of the survey, and the willingness to participate conscientiously.</p> <p>Other-report data refers to information provided by third parties about a person. These third parties may know the person well (e.g., the peer group) or may not, but instead possess a certain expertise (e.g., diagnosticians). Similar questionnaires to those used for self-report are often employed, with slight rewording. The information provided by the assessors can be generated both in a natural context (e.g., family life) and in artificial or standardized contexts (e.g., laboratory observation or interview). A disadvantage of O-data is that its quality not only depends on the assessment competence of the reporting person but also on how much information the reporting person has about the person being assessed. This is often mitigated by collecting multiple assessments from several individuals with, for example, different expertise and proximity to the assessed person. If these different assessments are similar, this is referred to as high inter-rater reliability, and it is assumed that the assessments are reliable and accurate.</p> <p>In addition to self-report data, test data (T-data) is primarily collected in psychological research. T-data captures manifest behavior, i.e., behavior that can be concretely observed. Individuals are instructed to perform a specific task as well as they can with maximum effort, and their performance is measured. For this, individuals must be aware of the test situation and willing and able to complete the given task with maximum effort. Data collected in this way exhibit high objectivity and reliability but only cover the best possible performance of a person, not typical performance (e.g., in everyday life).</p> <p>Life data (L-data) consists of objectively measurable data, such as a person's age, number of siblings, or officially recognized educational qualifications. This data is largely objective and is often used for predictive validation of psychological procedures, i.e., for calculating the predictive power of psychological procedures. For example, it may be of interest to understand what enables the most accurate prediction of academic success (e.g., completing studies within the standard period of study). To do this, universities collect the duration of study for all students and examine whether S-, O-, and T-data (e.g., self-reported personality traits, other-reported life circumstances, and an intelligence test) can be used to make an accurate prediction of how long a student will take to complete their degree.</p>	
1) Which of the following is O-data?	<ul style="list-style-type: none"> a) Assessment of a candidate's achievement motivation by observers in an interview * b) Statements about the candidate's own achievement motivation in an interview c) Result of an achievement motivation test of a candidate d) Hobbies and leisure activities in the resume
2) Which data most directly capture concrete behavior?	<ul style="list-style-type: none"> a) O-data b) S-data c) L-data d) T-data *
3) Which of the following specific data are the most reliable?	<ul style="list-style-type: none"> a) A friend's assessment of how often another person lies

Table continues on next page.

- b) Self-report of one's own intelligence relative to all people of the same age
- c) IT skills reported in the resume
- d) Assessment of a student's purposefulness by four teachers *

English Text

The human brain is constantly faced with a large amount of information: it must process this information and derive decisions from it. When making decisions, it is not always possible to consider all of the available information. Researchers Kahneman and Tversky have therefore proposed the theory that two systems can be distinguished in human thinking. Processes in system 1 run quickly, unconsciously, and mostly automatically. System 2, on the other hand, is slow, since processes are conscious, largely logical, and deliberate. System 1 makes it possible to make correct decisions without taking all information into account by using simplified decision rules (heuristics). Some of these heuristics are described below. In the availability heuristic, the ease with which examples of a certain event can be retrieved from memory is used as an indicator of the frequency of an observed event. It assumes that frequent and probable events are well-represented in memory and are therefore easily retrievable. For example, after media reports of a recent plane crash, the danger of air travel is usually highly overestimated, although it remains low. The danger of a fatal car accident, on the other hand, is often underestimated because reports on it are less common in the media and examples are correspondingly more difficult to recall from memory. The representativeness heuristics can be used to decide whether a person or an object belongs to a certain category. When a concrete case is assessed as representative for a given category, a person sees a high probability that the case belongs to this category, even if the true probability is low. The conjunction fallacy is part of the representativity heuristic and describes the mathematically impossible fact that the probability of general events is often estimated to be lower than the probability of a specific event. This phenomenon is typical when sick people research their symptoms on the Internet. For example, if the search results in symptoms that would fit a rare hereditary disease as well as a common flu, people tend to suspect a rare hereditary disease, although a common flu is much more likely. When making a decision, it is usually a good idea to take existing information into account. For example, people often use an initial value as an "anchor", which they adapt and adjust to form their judgement on similar characteristics. However, they are often subject to the anchor effect, which describes how people have difficulty moving away from initial information, even if it is obviously irrelevant or incorrect, or turns out to be so later. This principle is often used in illegal forms of price discounting. To make a rebate appear larger, the original price just before the rebate action is set unnaturally high to set a high anchor. Afterwards, the price is for example only reduced by 5% of the original value, but due to the increase it appears like a discount of 50%. Even if the customer now hears the original price, the discounted price will usually seem cheaper than if the anchor had not been set higher.

- | | |
|--|---|
| 1) Which heuristic compares the characteristics of a person to the characteristics attributed of a particular group? | a) Anchor heuristic
b) Representativity heuristic *
c) Availability heuristic
d) Conjunction fallacy |
| 2) Two groups of people are asked to estimate what proportion of the countries in the UN are African countries. Before guessing, group A is shown a spinning wheel that stops at the number 65 and group B is shown a spinning wheel that stops at the number 10. Which mean estimates of the two groups are most likely, considering the findings on anchor heuristics? | a) Group A: 21%; Group B: 23%
b) Group A: 43 %; Group B: 47
c) Group A: 69%; Group B: 11% *
d) Group A: 9%; Group B: 62 |
| 3) Participants in an experiment are described a fictional person named Klaus as rebellious and freedom-loving. Many people are now asked to assess whether Klaus is a "forklift driver" or a "forklift driver and freedom fighter". The majority of people decide for "forklift driver and freedom fighter". What happened? | a) Misjudgement through availability heuristics
b) Misjudgement through anchor heuristics
c) Conjunction fallacy *
d) Overcoming representativity heuristics |

Knowledge Tests

Task

Response Options

Table continues on next page.

Mathematics	
1) Given is the function $f(x) = \frac{x^4 \cdot (x-3)^2 - 1}{x^4 - 8x + 2x^3 - 16}$. At which point is the function $f(x)$ not defined?	a) 1 b) 2 * c) 3 d) 0
2) A set of 24 cards is numbered with positive integers from 1 to 24. The cards are shuffled, and one card is drawn at random. What is the probability that the number on this card is divisible by 4 or 6?	a) $\frac{1}{3}$ * b) $\frac{1}{4}$ c) $\frac{7}{24}$ d) $\frac{1}{6}$
3) The functions $f(x)$ and $g(x)$ are given by $f(x) = x - 1$ und $g(x) = (x + 3)^2$. Then $g(f(x))$ is equal to:	a) $x^2 + 8$ b) $(x + 3)^2 - 1$ c) $(2x - 2)^2$ d) $(x + 2)^2$ *
Biology Skills	
1) For which substance does the human body not have receptors?	a) Adrenaline b) Chromatin * c) Dopamine d) Serotonin
2) Which cells in the retina can generate action potentials so that visual information is directly transmitted to the brain?	a) Horizontal cells b) Amacrine cells c) Bipolar cells d) Ganglion cells *
3) What happens during the depolarization phase of an action potential?	a) Strong outflow of calcium ions from the cell b) Strong inflow of calcium ions into the cell c) Strong inflow of sodium ions into the cell * d) Strong outflow of sodium ions from the cell
Reasoning Tests	
Task	Response Options
Numerical Reasoning	
1) Two students are writing tasks for an intelligence test. Student A writes 8 tasks per hour and Student B writes 2 tasks in 20 minutes. How many tasks do both students complete together in three hours?	a) 28 b) 32 c) 42 * a) 48
2) A script has 420 slides and serves as the basis for 14 lecture sessions. The lecturer would like to repeat some slides from the previous session in each 90-minute lecture. How long can she repeat previous slides per session if she always needs 8 minutes for 3 slides so that all slides have been discussed by the end of the semester?	a) 12 minutes b) 10 minutes * c) 15 minutes d) 8 minutes
3) In an online personality questionnaire, 3 questions are presented on each page. These questions are randomly drawn from an item pool of 18 questions on conscientiousness, 7 questions on extraversion and 5 questions on openness. On which page at the latest will	a) 6 b) 7 c) 8 d) 9 *

Table continues on next page.

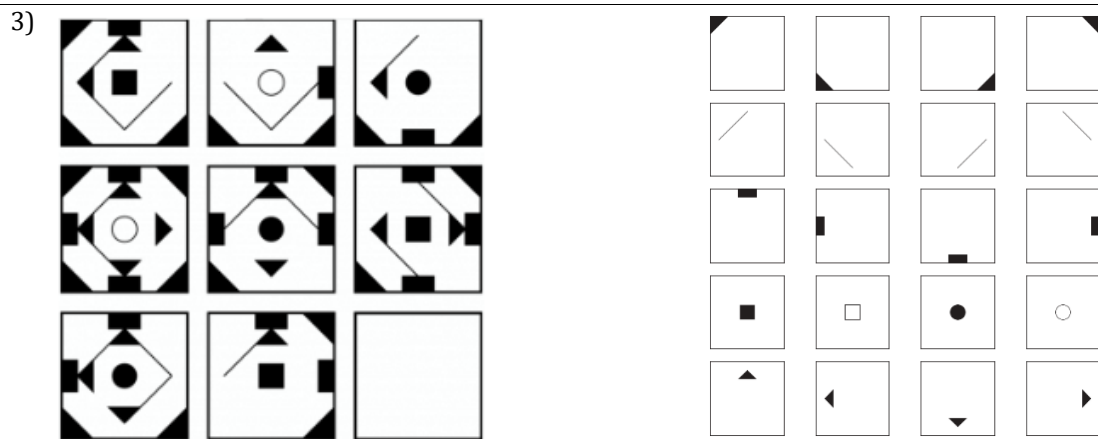
a question on openness be presented, assuming no question is repeated?

Verbal Reasoning

- | | |
|--|--|
| <p>1) Anna is tired if and only if she has a lecture at 8 AM. Anna is tired. Anna has a lecture at 8 AM or she goes jogging after university.</p> <p>2) Lucy does not study if and only if she cooks or Leon calls her. Katja is happy if and only if Lucy does not study. Robin sings if and only if Ariane plays the piano. Leon calls Lucy and Ariane plays the piano.</p> <p>3) Valentin dances or Paula paints. Daniel does not read or Lisa plays the piano. Klaus plays tennis or Wolfgang does not smoke. Lisa plays the piano if and only if Kathrin is out and Valentin does not dance. Daniel reads and Klaus does not play tennis.</p> | <p>a) Anna goes jogging after university.</p> <p>b) Anna does not have a lecture at 8 AM.</p> <p>c) Anna does not go jogging after university.</p> <p>d) Anna has a lecture at 8 AM. *</p> <p>a) Lucy cooks and she does not study.</p> <p>b) Robin sings and Lucy studies.</p> <p>c) Katja is happy and Lucy cooks.</p> <p>d) Katja is happy and Robin sings. *</p> <p>a) Wolfgang does not smoke and Kathrin is out. *</p> <p>b) Wolfgang smokes and Lisa plays the piano.</p> <p>c) Paula does not paint and Kathrin is out.</p> <p>d) Paula paints and Lisa does not play the piano.</p> |
|--|--|

Figural Reasoning

<p>1)</p>	
<p>2)</p>	



Note. Objective Skill-Major Fit was measured with 21 items adapted from Watrin et al. (2022) regarding reasoning (figural, numerical and verbal content), prior knowledge (Math, Biology, English) and psychology comprehension.

Supplemental Table 2.1*Mean Scores, Standard Deviations for All Continuous**Variables of the Hierarchical Univariate Multiple Regression Analyses Predicting**Major-Specific Success*

Variable	<i>M</i>		<i>SD</i>	
	1 st Sem / 3 rd Sem		1 st Sem / 3 rd Sem	
Trait Well-Being	5.39 / 5.58		1.10 / 1.01	
Highschool GPA	5.56 / 5.67		0.34 / 0.33	
Subj. Well-Being F.	6.21 / 6.16		0.64 / 0.63	
Subj. Performance F.	5.02 / 5.13		0.64 / 0.62	
Subj. Interest-MFF	5.91 / 5.93		0.76 / 0.75	
Subj. Skill- Major F.	5.80 / 5.84		0.77 / 0.76	
Obj. Interest-MFF	1.62 / 1.65		0.65 / 0.68	
Obj. Val.Exp.-MFF	-.89 / -.70		1.27 / 1.13	
Obj. Skill-MFF	0.74 ^a / 0.74 ^b		0.14 ^a / 0.13 ^b	
Intrinsic Motivation	5.55 / 5.36		0.96 / 1.06	
Satisfaction	5.96 / 5.65		0.93 / 0.94	
Positive Affect	3.88 / 3.77		0.65 / 0.57	
Negative Affect	3.80 / 3.60		0.68 / 0.63	
Dropout Intention	6.26 ^c / 6.16		0.87 ^c / 0.88	
Achievement	- / 5.36		- / 0.36	

Note. Values left of / belong to 1st semester outcomes: $N = 396$;

Values right of / belong to 3rd semesters' outcome: $N = 136$.

For all variables higher values represent higher success GPA = Grade Point Average;

F. = Forecast; MFF = Major Fit Forecast; Subj. = Subjective;

Obj. = Objective; Val. Exp = Valence of Expectation.

^a $N = 271$. ^b $N = 42$. ^c $N = 291$.

Supplemental Table 2.2*Intercorrelations for All Continuous Variables of the Hierarchical Univariate Multiple Regression Analyses Predicting Major-Specific Success*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Trait Well-Being		.16	.32	.35	.14	.22	.22	.03	-.10 ^b	.16	.18	.35	.28	.15	.10
2. Highschool GPA	.06		-.16	.05	.00	.12	.18	.07	-.08 ^b	.12	.09	.13	.04	.01	.17
3. Subj. Well-Being F.	.30	-.11		.41	.60	.43	.51	-.19	-.26 ^b	.19	.15	.30	.09	.08	-.07
4. Subj. Performance F.	.29	.16	.32		.36	.45	.25	-.06	.01 ^b	.06	.09	.17	.19	.03	-.05
5. Subj. Interest-MFF	.20	-.04	.65	.33		.64	.39	-.21	-.29 ^b	.10	.08	.16	.04	.09	-.08
6. Subj. Skill-MFF	.23	.07	.43	.52	.58		.26	-.08	-.11 ^b	.01	.04	.09	.07	-.05	-.03
7. Obj. Interest-MFF	.17	.10	.41	.25	.41	.30		-.23	-.22 ^b	.15	.03	.11	-.17	-.12	-.04
8. Obj. Val. Exp.-MFF	-.08	.00	-.22	-.14	-.28	-.17	-.38		.10 ^b	.04	.16	-.02	.21	.14	.24
9. Obj. Skill-MFF	-.03 ^a	.01 ^a	.01 ^a	.06 ^a	-.03 ^a	-.03 ^a	-.01 ^a	.02 ^a		-.31 ^b	-.25 ^b	-.13 ^b	-.02 ^b	-.24 ^b	.44 ^b
10. Intrinsic Motivation	.25	.00	.25	.12	.17	.14	.33	-.17	.08 ^a	*	.76	.64	.52	.52	.04
11. Satisfaction	.24	-.05	.32	.13	.23	.18	.28	-.12	.06 ^a	.77	***	.64	.52	.66	.22
12. Positive Affect	.33	-.06	.22	.12	.13	.09	.17	-.09	.03 ^a	***	.64	***	.54	.45	.22
13. Negative Affect	.30	.02	.14	.21	.13	.14	.08	.01	-.03 ^a	***	***	.63	***	.54	.19
14. Dropout Intention	.33 ^c	-.03 ^c	.29 ^c	.22 ^c	.27 ^c	.23 ^c	.17 ^c	-.12 ^c	.02 ^a	***	***	.53 ^c	.49 ^c	***	.15
15. Achievement	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note. Values left of / belong to 1st semester outcomes: $N = 396$; Values above the diagonal belong to 3rd semester' outcome: $N = 136$. For all variables higher

values represent higher success. GPA = Grade Point Average; F. = Forecast; MFF = Major Fit Forecast; Subj. = Subjective; Obj. = Objective; Val. Exp =

Valence of Expectation.

^a $N = 271$. ^b $N = 42$. ^c $N = 291$.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Supplemental Table 2.3*Hierarchical Univariate Multiple Regression Analyses Predicting Major-Specific**Positive and Negative Affect*

Outcomes	Positive Affect		Negative Affect	
	Sample A	Sample B	Sample A	Sample B
	1 st Sem/3 rd Sem	1 st Sem/3 rd Sem	1 st Sem/3 rd Sem	1 st Sem/3 rd Sem
Predictors	β	β	β	β
Step 1: Controls				
Δ Adj. R ²	.115***/.146***	.123***/.055	.095***/.049	.091***/-.017
Step 2: Controls + Obj. MFF				
Trait Well-Being	.29***/.26**	.31***/.15	.26***/.25**	.27 ***/.15
Highschool GPA	-.08/.19*	-.06/.24	-.02/.08	.03/.09
Subj. Well-Being-F.	.12/.34**	.12/.41	.00/.15	-.02/.15
Subj. Performance-F.	.01/.01	.07/.10	.13*/.13	.14/.28
Subj. Interest-MFF	-.03/.05	-.02/.29	.06/.09	.08/.14
Subj. Skill-MFF	-.04/-.13	-.08/-.02	-.02/-.08	-.04/.03
Obj. Interest-MFF	.10* /-.15	.04/-.46*	.00/-.33***	-.03/-.64**
Obj. Val.Exp.-MF	-.01/.00	-.08/.09	.06/.17*	.04/.13
Obj. Skill-MFF	-	.03/-.02	-	-.03/-.07
Adj. R ²	.119***/.147***	.122***/.111	.094***/.154***	.084***/.182*
Δ Adj. R ²	.004/.001	-.001/.056	-.001/.105***	-.007/.199**

Note. Values left of / belong to 1st semester outcomes; Values right of / belong to 3rd semesters' outcome;

Sample A does not include skill-major fit as predictor: $N = 396 / N = 136$. Sample B does include

skill-major fit as predictor: $N = 271 / N = 42$. For all variables higher values represent higher success.

GPA = Grade Point Average; F. = Forecast; MFF = Major Fit Forecast; Subj. = Subjective;

Obj. = Objective; Adj. = Adjusted; grey = control results; black = hypothesis results; bold = hypothesis-conform results; p-values for hypothesis-testing are one-sided.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Supplemental Table 3.1

*Mean Scores, Standard Deviations for all Continuous Variables of
the Hierarchical Univariate Multiple Regression Analyses Predicting
Motivation for a Major*

Variable	<i>M</i>	<i>SD</i>
Trait Well-Being	5.33	1.13
Highschool GPA	5.24	0.54
Subj. Well-Being Forecast	6.21	0.69
Subj. Performance Forecast	5.02	0.71
Subj. Interest-MFF	5.95	0.77
Subj. Skill- Major Forecast	5.68	0.84
Obj. Interest-MFF	1.65	0.64
Obj. Val.Exp.-MFF	-1.10	1.40
Obj. Skill-MFF ^a	0.67	0.15
Intrinsic Value	6.18	0.67
Post-Intrinsic Value	6.13	0.72
Attainment Value	5.56	1.05
Post-Attainment Value	5.42	1.13
Utility Value	6.24	0.77
Post-Utility Value	6.04	0.87
Costs	1.62	0.74
Post-Costs	1.66	0.77
Post-Performance Forecast	4.94	0.77
Intention to Choose	6.20	1.59
Post-Intention to Choose	6.21	1.62

Note. N = 4482. For all variables higher values represent

higher success. Post- = Assessed after the feedback; all other motivation aspects were assessed before the feedback. GPA = Grade Point Average;

F. = Forecast; MFF = Major Fit Forecast; Subj. = Subjective;

Obj. = Objective; Val. Exp = Valence of Expectation.

^a N = 2565.

Supplemental Table 3.2

Intercorrelations for all Continuous Variables of the Hierarchical Univariate Multiple Regression Analyses Predicting Motivation for a Major

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Trait Well-Being	.07																		
2. Highschool GPA	***	-.14																	
3. Sub. Well-Being F	***	***	.41																
4 Subj. Performance F	***	***	***	.36															
5. Subj. Interest-MFF	***	***	***	***	.55														
6. Subj. Skill- Major F.	***	***	***	***	***	.29													
7. Obj. Interest-MFF	***	***	***	***	***	***	-.16												
8. Obj. Val. Exp.-MFF	***	***	***	***	***	***	***	-.36											
9. Obj. Skill-MFF ^a	-.01	.26	-.02	.05*	-.03	.07	-.04	.14											
	***	***	***	***	***	***	*	***											
10. Intrinsic Value	.15	-.06	.54	.37	.54	.37	.32	.32	-.02										
	***	***	***	***	***	***	***	***	***										
11. Post-Intrinsic Value	.20	-.03	.56	.35	.49	.34	.39	.20	.04	.67									
	***	***	***	***	***	***	***	***	*	***									
12. Attainment Value	.03	-.08	.34	.20	.30	.22	.22	.24	-.06	.50	.37								
	*	***	***	***	***	***	***	***	***	***	***	.37							
13. Post-Attainment Value	.04	-.07	.35	.18	.29	.19	.26	-.21	-.02	.40	.49	.75							
	**	***	***	***	***	***	***	***	***	***	***	***	.75						
14. Utility Value	.11	-.07	.37	.21	.35	.24	.23	-.23	-.06	.49	.37	.67	.52						
	***	***	***	***	***	***	***	***	***	***	***	***	***	.52					
15. Post-Utility Value	.11	-.05	.36	.20	.30	.21	.26	-.19	-.02	.38	.50	.57	.70	.71					
	***	***	***	***	***	***	***	***	***	***	***	***	***	***	.71				
16. Costs	-.04	.02	-.20	.06	-.24	-.10	-.20	.09	.00	-.15	-.13	-.15	-.12	-.22	-.17				
	**	***	***	***	***	***	***	***	***	***	***	***	***	***	***				
17. Post-Costs	-.02	.02	-.18	.08	-.17	-.03	-.18	.07	.03	-.09	-.20	-.11	-.15	-.22	.68				
	***	***	***	***	***	*	***	***	***	***	***	***	***	***	***				
18. Post-Performance F.	.21	.08	.35	.74	.31	.49	.25	-.18	.14 ^a	.31	.41	.16	.22	.17	.24	.06	.10		
	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***		
19. Intention to Choose	.15	-.05	.44	.20	.38	.26	.21	-.10	.03	.22	.28	.10	.13	.16	.18	-.13	.19		
	***	**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***		
20. Post-Intention to Choose	.15	.00	.39	.19	.33	.24	.18	-.08	.09	.19	.31	.08	.13	.13	.19	-.13	.24	.77	
	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***

Note. N = 4482. For all variables higher values represent higher success. Post- = Assessed after the feedback; all other motivation aspects were assessed before the feedback. GPA = Grade Point Average; F. = Forecast; MFF = Major Fit Forecast; Subj. = Subjective; Obj. = Objective; Val. Exp = Valence of Expectation.^a N = 2565. *p < .05. ** p < .01. ***p < .001.

Supplement Table 3.3*Hierarchical Univariate Multiple Regression Analyses Predicting Motivation for a Major**Specifically Attainment Value, Utility Value and Costs*

Variables	Post-Attainment Value		Post-Utility Value		Post-Costs	
	Sample A	Sample B	Sample A	Sample B	Sample A	Sample B
Step 1: Controls						
Adj. R ²	.566***	.547***	.511***	.479***	.476***	.465***
Step 2 Controls + Obj. MFF						
Trait Well-Being	-.01	.00	.01	.02	.01	.01
Highschool GPA	.00	-.02	.01	-.01	-.01	.00
Subj. Well-Being Forecast	.09***	.11***	.09***	.11***	-.09***	-.11***
Subj. Performance Forecast	-.01	-.01	.02	.02	.06***	.06***
Subj. Interest-MFF	.00	-.01	-.01	-.05**	.01	.04*
Subj. Skill MFF	-.02	-.01	-.02	-.02	.05**	.05*
Motivation for a Major	.71***	.68***	.66***	.64***	.66***	.66***
Obj. Interest-MFF	.08***	.09***	.08***	.08***	-.05***	-.05**
Obj. Val.Exp.-MF	.01	.00	.01	-.02	.00	.00
Obj. Skill-MFF		.03**		.04**		.02
Adj. R ²	.571***	.553***	.516***	.486***	.477***	.467***
Δ Adj. R ²	.005***	.006***	.005***	.007***	.001***	.002**

Note. Sample A does not include skill-major fit as predictor: $N = 4482$. Sample B does include skill-major fit as predictor: $N = 2565$. For all variables

higher values represent higher success. Post- = Assessed after the feedback; all other motivation aspects were assessed before the feedback. GPA =

Grade Point Average; F. = Forecast; MFF = Major Fit Forecast; Subj. = Subjective; Obj. = Objective; Motivation for a Major = respective motivation

aspect (attainment value, utility value or cost) assessed before the feedback; Adj. = Adjusted; grey = control results; black = hypothesis results; bold =

hypothesis-conform results; p-values for hypothesis-conform results are one-sided.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Supplement Table 4.1

Means and Standard Deviations for all Continuous Variables of the Hierarchical Univariate Multiple Logistic Regression Analyses Predicting Enrollment

Variable	No Enrollment		Enrollment		df	t	p	d
	M (n)	SD	M (n)	SD				
Trait Well-Being	5.31 (4132)	1.14	5.41 (538)	1.10	697.75	-1.93	.054	-.09
Highschool-GPA	5.19 (4132)	0.55	5.56 (538)	0.35	930.76	-21.84	<.001	-.71
Subj. Well-Being Forecast	6.20 (4132)	0.71	6.21 (538)	0.65	710.95	-0.34	.733	-.01
Subj. Performance	5.02 (4132)	0.72	5.06 (538)	0.67	707.78	-1.38	.168	-.06
Subj. Interest-MFF	5.94 (4132)	0.78	5.93 (538)	0.77	688.21	0.09	.927	.00
Subj. Skill- Major Forecast	5.66 (4132)	0.85	5.81 (538)	0.79	705.43	-4.04	<.001	-.18
Intrinsic Value	6.17 (4132)	0.67	6.18 (538)	0.66	691.07	-0.14	.889	-.01
Attainment Value	5.57 (4132)	1.05	5.52 (538)	1.01	696.94	0.99	.322	.04
Utility Value	6.24 (4132)	0.78	6.18 (538)	0.79	679.14	1.64	.102	.08
Costs	1.63 (4132)	0.74	1.63 (538)	0.80	662.25	-0.18	.857	-.01
Intention to Choose	6.13 (4132)	1.65	6.37 (538)	1.51	714.01	-3.46	<.001	-.15
Obj. Interest-MFF	1.64 (4132)	0.64	1.65 (538)	0.67	671.74	-0.19	.423	-.01
Obj. Val.Exp.-MFF	-1.10 (4132)	1.41	-0.89 (538)	1.27	720.13	-3.63	<.001	-.15
Obj. Skill-MFF	0.65 (2348)	0.15	0.73 (313)	0.14	404.05	-9.02	<.001	-.53

Note. Group size in parentheses. For all variables higher values represent higher success. GPA = Grade Point Average; MFF = Major Fit

Forecast; Subj. = Subjective; Obj. = Objective.

Supplement Table 4.2*Intercorrelations for all Variables of the Hierarchical Univariate Multiple Logistic Regression Analyses Predicting Enrollment*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Enrollment ^a														
2. Trait Well-Being	.03													
3. Highschool GPA	.22	.07												
4. Subj. Well-Being F.	.00	.22	-.13											
5. Subj. Performance F.	.02	.21	.08	.41										
6. Subj. Interest-MFF	.00	.19	-.11	.64	.36									
7. Subj. Skill-Major F.	.06	.22	.10	.43	.55	.55								
8. Intrinsic Value	.00	.16	-.05	.55	.38	.54	.38							
9. Attainment Value	-.01	.04	-.09	.35	.20	.30	.21	.49						
10. Utility Value	-.02	.11	-.07	.37	.20	.34	.24	.49	.67					
11. Costs	-.00	-.03	.03	-.20	.06	-.24	-.10	-.15	-.15	-.22				
12. Intention to Choose	.05	.15	-.05	.44	.20	.38	.26	.23	.10	.16	-.15			
13. Obj. Interest-MFFt	.00	.17	-.02	.40	.26	.39	.30	.32	.21	.22	-.19	.22		
14. Obj. Val.Exp.-MFF	.05	-.10	.14	-.25	-.16	-.24	-.16	-.25	-.24	-.23	.09	-.10	-.36	
15. Obj. Skill-MFF ^b	.17	-.01	.26	-.03	.04	-.04	.07	-.02	-.06	-.06	.00	.02	-.03	.14
	***	***	***	***	*	***	***	***	**	**	***	***	***	***

Note. N = 4670. For all variables higher values represent higher success.

GPA = Grade Point Average; MFF = Major Fit Forecast; Subj. = Subjective; Obj. = Objective.

^a Enrollment: 0 = Not enrolled, 1 = Enrolled; ^b N = 2661.**p* < .05. ***p* < .01. ****p* < .001.

Supplement Table 5.1*Intercorrelations for all Continuous Variables of the Analysis of Covariance of First Semester Students'**Major-Specific Success*

	1	2	3	4	5	6
1. Highschool-GPA						
2. OSA Participation ^a	.03					
3. Intrinsic Motivation	-.01	.07				
4. Satisfaction	-.04	.07	.76***			
5. Positive Affect	-.03	.07	.62***	.62***		
6. Negative Affect	.00	.06	.44***	.48***	.65***	
7. Dropout Intention ^b	-.01	.09	.55***	.70***	.56***	.49***

Note. $N = 587$. For all variables higher values represent higher success. GPA = Grade Point Average

OSA = online-self-assessment.

^a OSA Participation: 0 = Not participated, 1 = participated; ^b $N = 406$.

*** $p < .001$.

Supplement Table 5.2*Intercorrelations for all Continuous Variables of the Analysis of Covariance of**Third Semester Students' Major-Specific Success*

	1	2	3	4	5	6	7
1. Highschool-GPA							
2. OSA Participation ^a	.20**						
3. Intrinsic Motivation	-.01	-.05					
4. Satisfaction	-.05	.03	.69***				
5. Positive Affect	-.01	.05	.60***	.64***			
6. Negative Affect	-.03	-.03	.48***	.50***	.53***		
7. Dropout Intention	-.01	-.01	.48***	.67***	.46***	.43***	
8. Achievement	.32***	.25***	.06	.14*	.15*	.15*	.14*

Note. $N = 259$. For all variables higher values represent higher success. GPA = Grade Point Average

OSA = online-self-assessment.

^a OSA Participation: 0 = Not participated, 1 = participated.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Supplement Table 5.3

Intercorrelations for all Continuous Variables of the Analysis of Covariance of Fifth Semester Students'

Major-Specific Success

	1	2	3	4	5	6	7
1. Highschool-GPA							
2. OSA Participation ^a	.25**						
3. Intrinsic Motivation	-.07	-.04					
4. Satisfaction	-.17*	.12	.57***				
5. Positive Affect	-.05	.15	.40***	.61***			
6. Negative Affect	-.15	.07	.33***	.45***	.63***		
7. Dropout Intention	-.11	.05	.39***	.66***	.42***	.36***	
8. Achievement	.32***	.28***	.13	.08	.27***	.13	.05

Note. $N = 155$. For all variables higher values represent higher success. GPA = Grade Point Average

OSA = online-self-assessment.

^a OSA Participation: 0 = Not participated, 1 = participated.

* $p < .05$. *** $p < .001$.

Supplemental Table 5.4

Analysis of Covariance of Major-Specific Positive and Negative Affect as a Function of OSA Participation

with High-School GPA as Covariate

Variable	No OSA Participation			OSA Participation			F-value	p	η^2_p
	EMM	SE	n	EMM	SE	n			
First Semester							$df=1,584$		
Positive Affect	3.76	0.05	154	3.87	0.03	433	3.30	.035	.006
Negative Affect	3.69	0.05	154	3.78	0.03	433	1.88	.086	.003
Third Semester							$df=1,256$		
Positive Affect	3.68	0.06	108	3.73	0.05	151	0.53	.234	.002
Negative Affect	3.62	0.06	108	3.58	0.05	151	0.25	.310	.001
Fifth Semester							$df=1,152$		
Positive Affect	3.55	0.06	103	3.78	0.09	52	3.71	.028	.029
Negative Affect	3.25	0.07	103	3.42	0.10	52	0.72	.198	.012

Note. For all variables higher values represent higher success. OSA = online-self-assessment; GPA = Grade

Point Average; EMM = Estimated Marginal Means; SE = Standard Error. bold = hypothesis-conform results;

p-values for hypothesis-testing are one-sided.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Supplemental Table 5.5*Exploratory Analysis of Covariance of Major-Specific Success as a Function of Three Groups of OSA**Participation with High-School GPA as Covariate*

Variable	No OSA Participation		Post-Enrollment Participation		Pre-Enrollment Participation		F-value	p	η^2_p
	EMM	SE	EMM	SE	EMM	SE			
Third Semester	n=108		n=105		n=151		df=(2,360)		
Intrinsic Motivation	5.44	0.10	5.45	0.10	5.33	0.08	0.63	.532	.003
Satisfaction	5.52	0.10	5.77	0.10	5.60	0.08	1.71	.183	.010
Dropout Intention	6.13	0.09	6.22	0.09	6.11	0.07	0.49	.611	.003
Achievement	5.16	0.04	5.24	0.04	5.32	0.03	9.69	<.001	.027
Positive Affect	3.67	0.05	3.81	0.05	3.74	0.05	1.37	.255	.008
Negative Affect	3.63	0.07	3.58	0.07	3.57	0.06	0.13	.880	.001
Fifth Semester	n=103		n=161		n=52		df=(2,312)		
Intrinsic Motivation	5.21	0.11	5.27	0.08	5.13	0.15	0.37	.691	.002
Satisfaction	5.21	0.11	5.61	0.09	5.65	0.15	2.84	.060	.029
Dropout Intention	6.15	0.09	6.26	0.07	6.29	0.13	0.29	.746	.004
Achievement	5.22	0.03	5.32	0.03	5.37	0.05	8.78	<.001	.024
Positive Affect	3.54	0.06	3.76	0.05	3.77	0.08	3.64	.028	.028
Negative Affect	3.25	0.07	3.48	0.06	3.39	0.10	2.67	.071	.020

Note. For all variables higher values represent higher success. OSA = online-self-assessment (no participation, participation post-enrollment, participation pre-enrollment). GPA = Grade Point Average; EMM = Estimated Marginal Means; SE = Standard Error.

* $p < .05$. ** $p < .01$. *** $p < .001$.

For significant ANCOVAs additional post-hoc comparison t-tests were conducted.

Tukeys's T-test revealed for third semesters' achievement that the group that participated in the OSA before enrollment received significant better grades than the group with no OSA participation $t(360) = -3.16, p = .005$.

Tukeys's T-test revealed for fifth semesters' achievement that the group that participated in the OSA before enrollment received significant better grades than the group with no OSA participation $t(312) = -2.45, p = .039$.

Tukeys's T-test revealed for fifth semesters' positive affect that the group that participated in the OSA after enrollment (at the beginning of their studies) experienced more positive affect than the group with no OSA participation $t(312) = -2.83, p = .01$