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The Interplay of Attitudes, Norms and Control in Sustainable Entrepreneurship: An Experimental Analysis

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Abstract: Entrepreneurs are potentially powerful solvers of challenges faced by sustainable development, especially when they combine narrower technological expertise with wider social motivations. Yet, to what degree trade-offs exist between different motivations is still largely unresolved. In this paper, we examine the choices made by potential entrepreneurs when aligning their prospective ventures with their personal attitudes and social norms. Extending the theory of planned behavior and—as a novel experimental technique in our context—drawing on a choice-based conjoint analysis with 4155 data points, we identify predictors for sustainable entrepreneurship intentions based on structural equation modelling. We find that entrepreneurial and sustainability-related attitudes as well as entrepreneurial norms are critical when it comes to the decision as to whether or not to pursue a sustainable venture, and that the link between attitudes and intentions is amplified by a positive moderation effect of entrepreneurial and sustainability-related attitudes, which supports identity coupling but refutes moral disengagement.

Keywords: entrepreneurship; sustainability; characteristics; conjoint experiment; structural equation modelling

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1. Introduction

The interweaving between the realms of economic advancements and the protection of social and ecological assets constitutes a complex system which needs to be kept in balance to realize the sustainable development of humankind [1]. Entrepreneurs are potentially powerful solvers of challenges faced by sustainable development, but in order to be called *sustainable*, entrepreneurship needs to consider all, and sometimes contradictory, directions of value creation if it wants to provide benefits for both entrepreneurs and the systems influenced by a venture [2–4]. Extending the findings of past research, in this article, we synthesize prior findings in a comprehensive model and analyze their interdependencies. Building on a well-established psychological theory, this enables us to shed more light on the interweavement of potentially conflicting entrepreneurial and sustainability-related attitudes.

On the organizational level, hybridity constitutes a fitting concept with which to achieve this, since it couples values with missions and relates to differing aspects of sustainability [5]. On the individual level, identity coupling represents a corresponding approach [6], since it enables a person to integrate varying values and to tackle the challenges inherent in sustainable entrepreneurship. The purpose of this article is therefore to clarify the role of identity coupling in the process of intention formation for individuals who can potentially provide solutions to the challenges that humanity is facing by strategically implementing them in their ventures' mission. More specifically, we aim to shed light on the question of which antecedents of intentions are relevant for becoming active entrepreneurially whilst simultaneously acting in a sustainable manner—i.e., we examine the psychological origins of sustainable entrepreneurship.

Based on this, our contribution to the literature is twofold. First, we extend the theory of planned behavior (TBP) proposed by Ajzen [7] linking sustainable entrepreneurship with identity coupling. The efficiency and robustness of TBP in the context of entrepreneurial intentions have been well documented [8]. Since the original TPB model cannot capture the intentions of types of entrepreneurship that include secondary goals such as sustainable development, we develop an adjusted model that accounts for these multifaceted aspects of entrepreneurial intention. Our approach is based on the identity-coupling concept, the integration of which into the process of forming entrepreneurial intentions theoretically justifies our extension. Based on this, we empirically analyze the influence of the building blocks of identity—namely, attitudes and social norms—on sustainable entrepreneurship intentions. We specifically address the question of if and how orientations towards entrepreneurship and sustainable development interact. This relation has become particularly relevant since Gast et al. [9] pointed out that values that focus on sustainability alone are not sufficient for scalable solutions intended to achieve sustainable development globally.

Second, Muñoz and Cohen [10] call for the use of new methods in sustainable entrepreneurship research and especially point out the deficiencies in the measurement of dependent variables in this respect. Therefore, as a second contribution in this article, we develop and apply a novel experimental method for collecting data relating to the sustainability aspect of entrepreneurial ventures where the individual simultaneously has to consider the aspects of income and riskiness. This approach results in a dependent variable that avoids social desirability bias and thus is a stronger measurement of a crucial dependent variable in this field.

The remainder of this article is structured as follows: Initially, we review the current state of sustainable entrepreneurship in the scientific literature and the literature on TPB that is relevant to this research. Second, we use prior knowledge and novel reasoning based on our extension of TPB to develop our hypotheses. Third, we detail the process of data collection, our chosen sample, and the instruments used in the survey. Fourth, we introduce the methodological basis for this study—namely, choice-based conjoint analysis and structural equation modelling—and subsequently apply these methods to test the hypotheses. Fifth, we report the results of the analysis and discuss them in the context of the extant literature. Finally, we indicate the potential limitations of the analysis and discuss the impact of the findings as well as prospective directions for future research.

2. Literature Review

2.1. Entrepreneurial Intention, Opportunity, and the TBP

Two concepts commonly used by individuals for evaluating opportunities are desirability (the extent to which a person believes it is possible to realize a utility gain) and feasibility (the extent to which a person considers him-/herself capable of exploiting an opportunity) [11]. Shapero [12] used this idea in a more abstract manner to describe the roots of a credible opportunity that results in an entrepreneurial event (the execution of actions necessary to become an entrepreneur). This reasoning is in line with Ajzen's [7] TPB, which is the conceptual inspiration for this research. The TPB can be used to determine entrepreneurial intentions [13,14], acts as a robust model in multiple fields of application [15], and also permits the conceptual integration of desirability and feasibility. The TBP overcomes the shortcomings of the theory of reasoned action [16] and the issues of aggregating behavior and the poor performance of predictors [7]. It is therefore well-suited for explaining behavior in specific contexts and uses intentions as an antecedent for behavior.

In following the TBP, three predictors of intentions need to be equally addressed in order to substantially increase the likelihood of a certain behavior. First, the attitude towards the behavior expresses the desirability of the action. Second, the subjective norm determines the external influence of others on the desirability due to social perceptions. Finally, the perceived behavioral control reflects the sensed ability of the individual to perform well in the assessed behavior and the feasibility of this. Recently, the TPB was

applied to the topic of sustainable entrepreneurship by Shahidi [17], who evaluated the moderating effects of sustainability orientation on entrepreneurial intention and found that high levels of the moderator had a positive impact on the dependent variable. However, his study was not focused on measuring the sustainability content of entrepreneurial intentions and was based on a student sample.

2.2. Sustainable Entrepreneurship

The basic problem of sustainable development is the balance between the environmental–social effects and the economic effects of a given action. Originally, the non-profit-oriented aspects of this balance were perceived as working against economic value creation. The term *trade-off*, signifying the need for an entrepreneur to choose between growing their business and avoiding the depletion of natural and social resources, was introduced to depict this [18–20]. In contrast to traditional entrepreneurship guided by the aim of profit maximization, sustainable entrepreneurship tries to reconcile economic, social, and ecological goals [21]. This is also in line with the general literature on this topic, which includes non-economic revenues as part of the overall scope of value creation [22,23]. Even for economic benefit alone, Roxas et al. [24] show that sustainable practices lead to superior firm performance and therefore are more competitive in the long run.

Schaltegger and Wagner [25] suggested sustainable entrepreneurship as a key driver of sustainable development, since entrepreneurs who pursue sustainable development use their competitive spaces to create benefits for society. This idea is in line with the entrepreneurial view of the firm–environment relationship, where the entrepreneur shapes the marketspace through their beliefs and entrepreneurial actions [26]. It is important here to note that someone needs to believe that entrepreneurship can improve the world, as sustainability orientation without this belief seems to hinder entrepreneurial action; however, the study mentioned—based on a student sample—did not measure the sustainability content [27]. Referring back to the findings of Shahidi [17], it becomes clear that the relationship between sustainability orientation and entrepreneurial intention remains complex and that the sustainability content of the latter and the interaction of the two need to be assessed in further detail.

In this respect, two contributions that stand out in the field of sustainable entrepreneurship, providing important yet opposing insights, are the works by Shepherd et al. [28] and York et al. [29]. The first addressed the dilemma faced by entrepreneurs when confronted with potentially profitable opportunities that stand in contrast to their values. This article identified a cognitive disengagement process in which entrepreneurs decouple themselves from values that would prevent them from pursuing attractive opportunities. In a sense, this notion seems to underpin the idea of an internal trade-off.

In contrast to this, York et al. [29] analyzed the impact of identities and their underlying logics on the behavior of entrepreneurs. They identified three identity types: commercial dominant, ecological dominant, and blended coupling. These reflect the main driving identities of entrepreneurial behavior. More fine-grained identities found by Muñoz and Cohen [3] support the idea of identity coupling existing in sustainable entrepreneurship. Given the divergence of results obtained, the question of how far entrepreneurial and sustainability intentions are at odds or enhance each other when it comes to sustainable entrepreneurship remains.

Khizar et al. [30], in their review of definitions and measurements for sustainability orientation, evaluated the theoretical framework, antecedents, and outcomes and highlight a need for innovative measurement approaches. Muñoz and Cohen [10] identified several sub-themes of sustainable entrepreneurship that are closely related to our analysis: entrepreneurial self-efficacy, motivation and intention, values and attitudes, business orientation, and moral cognition. While early research mainly focused on the origins and types of ecologically aware entrepreneurs between the poles of profitability and intrinsic motivations [31,32], the focus has now moved to the antecedents of holistic sustainable

entrepreneurship value creation—for instance, in De Clercq and Voronov [33] analyzed the impacts and moderators of legitimacy on the conduct of sustainable entrepreneur.

The majority of articles about predictors of sustainable entrepreneurship relating to individuals are centered around pro-sustainability attitudes and values that have a corresponding effect on entrepreneurial intentions [9]. This pattern can be also recognized in the literature review conducted by Khizar et al. [30], who found the TPB and upper echelons theory to be the most commonly utilized theoretical frameworks. Soomro et al. [34], again building on a student sample, discussed the outcome of "green" entrepreneurship inclinations in a conceptual framework similar to the TPB, but left out the interacting link between the antecedents of entrepreneurial and sustainability orientation as well as effects of social norms.

In summary, the current literature examines partial aspects of the relationship between entrepreneurial and sustainable intentions, but either only evaluates one side of this complex relationship or does not put them in a comprehensive theoretical and methodological framework. Thus, our analysis wishes to improve upon the existing research in these areas. Furthermore, we measure a narrowly defined sustainable entrepreneurial orientation based on an experimental approach that improves on extant measurement techniques and we utilize a sample of working adults, allowing for the better generalizability of our findings beyond student populations.

3. Hypotheses

3.1. Beliefs and Personal Attitudes

The idea that entrepreneurs are only motivated extrinsically by potential financial gains has been challenged by more recent research because it ignores many other possible alternative explanations for entrepreneurial activity [35]. One alternative approach identified personal attitudes and intrinsic satisfaction as key drivers for the creation of new companies [36,37]. Notably, this idea does not contradict the classic concept of utility maximization, since utility gains may be obtained not only from financial earnings but also through the fulfillment of intrinsic goals [38]. Nonetheless, individuals may pursue sustainable entrepreneurial opportunities without any intrinsic motivation [39], which is a possibility that the approach used in the current article also allows us to account for.

Values and beliefs are linked to behavior and employment decisions because they play an important role in the assessment of situations and choices [40]. The definition we use is based on the work of Bansal and Roth [41], who state that "values are enduring, emotionally charged abstractions that are important to individuals." Based on this, values and beliefs may be interpreted as preferences for particular results [42]. To illustrate the relationship between attitudes and sustainable entrepreneurship, two types of attitudes are examined: the attitude towards entrepreneurial behavior in general and the attitude towards sustainable development. The aim is then to assess the combined effect of both of these attitudes on venture choices.

The influence of entrepreneurial attitudes on the intention to start a business has been well established [13,43,44]. We therefore concur that this well-established association also holds true for sustainable entrepreneurship intentions. In contrast, the association between attitudes in favor of sustainable development (in short, sustainability attitudes) and the intention to act sustainably is not equivocal, which is partly due to the possibility of extrinsic incentives crowding out intrinsic motivations [39]. This means that intrinsically motivated individuals dislike receiving monetary incentives for completing sustainable actions, since rewards blur the signaling of their intrinsic motivation. Research on the environment-related [45,46] and sustainability-related behavior [47] of business managers found support for a positive link between this kind of behavior and related attitudes. Since intentions are the precursors of behavior, intentions should have similar effects—especially in the context of sustainable entrepreneurship. This study, therefore, posits that the desirability of sustainable entrepreneurship for individuals with strong sustainability

attitudes is strongest if they act in accordance with their beliefs. We therefore propose the following hypotheses:

Hypothesis 1a. *Individuals with stronger entrepreneurial attitudes have a higher level of intention to start a sustainable venture.*

Hypothesis 1b. *Individuals with a stronger sustainability orientation have a higher level of intention to start a sustainable venture.*

Concerning the question of if and how entrepreneurial and sustainability-related attitudes interact in the context of sustainable entrepreneurship, different arguments have been presented and supported by empirical evidence. Shepherd et al. [28] analyzed the link between pro-environmental values, entrepreneurial self-efficacy, and entrepreneurial decision making. Building on a moral self-regulation theory [48], they suggest that an internal conflict between self-worth and value compliance arises when a person has both strong pro-environmental values and a high level of entrepreneurial self-efficacy. Individuals who seek to avoid this conflict might disengage from their values and reduce the emphasis on these values during the decision-making process. As a result, Shepherd et al. [28] found that environmentally oriented individuals with a high level of entrepreneurial self-efficacy were more likely to choose options that harmed the environment than people with a low self-efficacy score.

In opposition to this, York et al. [29] found that environmental entrepreneurs combine pro-social and commercial identities. Generally, the question appears to be: What is most preferred way to ultimately resolve a possible tension that arises from these two conflicting attitudes. While, on the one hand, the profit orientation associated with entrepreneurial attitudes might counteract sustainability-related goals, the combination of both attitudes could, on the other hand, enable the individual to identify a new set of venturing opportunities that would generate an even greater long-term utility according to the concept of identity coupling. In line with this, Spence et al. [49] called for a combination of rational and emotional drivers to be acknowledged as motivations for sustainable entrepreneurs. They identified three types of entrepreneurs along the spectrum of commitment to indifference, out of which we believe only the *committed* type is consistent with the definition of a sustainable entrepreneur who simultaneously strives to generate value in the realms of economy, ecology, and society.

Thus, the decoupling process described in Shepherd et al. [28], while leading to short-term utility in ad hoc decision-making, might not be well suited for decisions that have a lasting effect, such as employment choices. The situation may differ depending on whether the focus is on currently active entrepreneurs or on the employment decisions made by potential future entrepreneurs. Particularly in the latter case, it again appears more plausible that individuals would aim to maximize long-term utility by coupling dual identities rather than by decoupling their values. In this case, according to Shapero and Sokol [11], a strong entrepreneurial attitude can increase feasibility, and a high sustainability orientation can raise the desirability of an opportunity, jointly amplifying the wish to pursue sustainability-related opportunities. This idea is supported by the findings of Kuckertz and Wagner [50], who identified a positive association between sustainability orientation and entrepreneurial intention, which, however, diminishes with increasing business experience. We therefore propose the following hypothesis:

Hypothesis 1c. *There is a positive moderating effect between sustainability orientation and entrepreneurial attitudes on the intention to start a sustainable venture.*

3.2. Social Norms

Beyond addressing the characteristics of the individual and his or her role in determining sustainable venturing intentions, this article also integrates the influence of social interactions and institutions that are additional drivers for decisions made by individu-

als in the TPB context [51]. Repeated social interactions lead to social norms. These are non-legal agreements concerning the behavior of a defined group of people who sanction non-compliance and reward observance [52]. Social norms affect the individual's costs and the benefits of the choice of an employment option; these norms, therefore, play an important role, as they influence the expected utility of different options [51].

As the definition of sustainable entrepreneurship includes the alignment of entrepreneurial behavior with societal goals, it seems reasonable to assume that the sustainability-related norms of social groups play an equally important role in the decision to become a sustainable entrepreneur. Multiple stakeholder groups, including employees, governmental institutions, and local communities, demand that business models do not put the natural environment at risk [53]. The legitimacy gained when meeting these demands may therefore enhance the future prospects of the potential venture and, thus, increase its desirability and ultimately prevalence [54]. Supporting this line of argument, when analyzing the impact of social norms related to sustainable development on behavior, Ostrom [55] found a positive link between the norms of peers and eco-friendly actions. Furthermore, Meek et al. [56] identified two sets of norms that both relate to core aspects of sustainable development (namely, environmental consumption norms and family interdependence norms) to positively affect the number of solar energy firms in various American states.

Overall, the evidence therefore suggests that concerns about being punished for deviating from or being rewarded for conforming to group rules and norms influence the intentions of individuals in our research context. In this respect, Muñoz and Dimov [57] found that sustainable entrepreneurs can act as conformists who align themselves to pro-sustainability social norms or as insurgents who oppose non-sustainable normative patterns, where, in particular, the latter compensates for a weaker entrepreneurial intention. As a result, the joint influence of social norms on both entrepreneurship and sustainability has to be considered in the context of sustainable entrepreneurship. We therefore propose the following hypotheses:

Hypothesis 2a. *Individuals who perceive stronger entrepreneurial norms have a higher level of intention to start a sustainable venture.*

Hypothesis 2b. *Individuals who perceive stronger sustainability norms have a higher level of intention to start a sustainable venture.*

3.3. Locus of Control, Self-Efficacy, and Perceived Behavioral Control

Intentions not only foster the initial ability to recognize an opportunity but also influence the probability of opportunity exploitation. Researchers have previously highlighted relations between several traits of potential entrepreneurs and the willingness of these entrepreneurs to act on opportunities. Two traits widely cited in the psychological literature are of special interest in this research: the loci of control and self-efficacy, both personality characteristics which have frequently been linked to entrepreneurial action [58–60].

The locus of control has been a subject of major interest to entrepreneurship researchers, especially in the 1980s [61], which is partly because it was a component of the original TPB [7]. Initially proposed by Rotter [62], this concept describes the mindset of a person in terms of that person's self-assessed beliefs about their level of control over their life. More internally oriented individuals have a strong conviction that the main factors that influence the outcomes of their actions are their own efforts, abilities, and skills. In contrast, more externally oriented people tend to believe that external circumstances that they cannot influence mainly determine their lives. Extant research has found robust positive effects that link a more internal orientation to the likelihood of becoming self-employed [58,63]. The trait of self-efficacy has been described as " . . . people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances to the extent that their level of motivation, affective states and actions are based more on what they believe than on what is objectively true" [64].

The entrepreneurship literature widely uses this definition [65,66]. People who score highly on this personality dimension, especially in an entrepreneurial context, attribute themselves with the distinct ability to successfully execute their plans and seize opportunities [67]. Self-efficacy has also been linked to the locus of control in the context of the TPB [68]. An internally oriented mindset as well as high levels of self-efficacy have been associated not only with stronger entrepreneurial intentions but also with a greater probability of acting on opportunities to become self-employed [59,69].

Judge et al. [70] combined these two traits conveniently in a core self-evaluation scale (CSES). Armitage and Connor [68] argued that self-efficacy and the locus of control are both elements of perceived behavioral control in the context of the TPB framework. Ajzen [7] utilized self-efficacy as a proxy for perceived behavioral control [71], and stated that the locus of control can broaden the concept, making it applicable to a wider range of behavioral situations [65]. The CSES includes these two traits as well as self-esteem and neuroticism. In our opinion, the CSES can be sub-divided into two parts: on the one side, the traits of self-efficacy and locus of control, which mainly influence conscious decisions, and on the other side, self-esteem and neuroticism, which mainly affect the outcomes of affective decision processes. We believe that the choice to become self-employed is mainly a rational one and, therefore, is made consciously. In consequence, we created a reduced CSES scale based on self-efficacy and the locus of control which fits well into the overarching concept of the TPB.

For example, Ferris et al. [72] found that individuals with a high level of core self-evaluation set more ambitious objectives and pursue these more persistently than the average person. They give an orientation toward positive goals as an explanation for this difference. This behavior is compatible with the challenges of an entrepreneurial environment, and particularly those of sustainable entrepreneurship. Theoretical arguments and empirical evidence support the idea of entrepreneurs having strong core self-evaluation abilities. Individuals who score highly on core self-evaluation not only find their work more intrinsically satisfying [73] but also generally have a stronger intrinsic motivation [72].

This also results in individuals who set and pursue more challenging [74] and more intrinsically motivated objectives [75]. Such individuals have a stronger commitment to their (self-imposed) objectives and are, therefore, more persistent in pursuing them [74]. It follows that high core self-evaluation levels, especially those that relate to conscious decisions, are also positively associated with the ability to consider intrinsic motives during the selection of goals. Consistent with the findings of York et al. [29] having high levels of self-efficacy and an internal locus of control should enable individuals to couple their identities and thus be less prone to the decoupling process described by Shepherd et al. [28]. Given that there is a largely unavoidable tension between the goals that entrepreneurs who aim for sustainable development need to pursue due to the fact that simultaneously private and social benefits are involved [76], we propose the following hypothesis:

Hypothesis 3. *Individuals with higher levels of self-efficacy and a stronger internal locus of control have a higher level of intention to start a sustainable venture.*

Figure 1 summarizes the set of hypotheses and shows the correlations between the independent variables derived from the TPB. Our modelling allows us to account for all relevant aspects, which means that the intention to act sustainably and engage in entrepreneurial activities is modelled simultaneously.

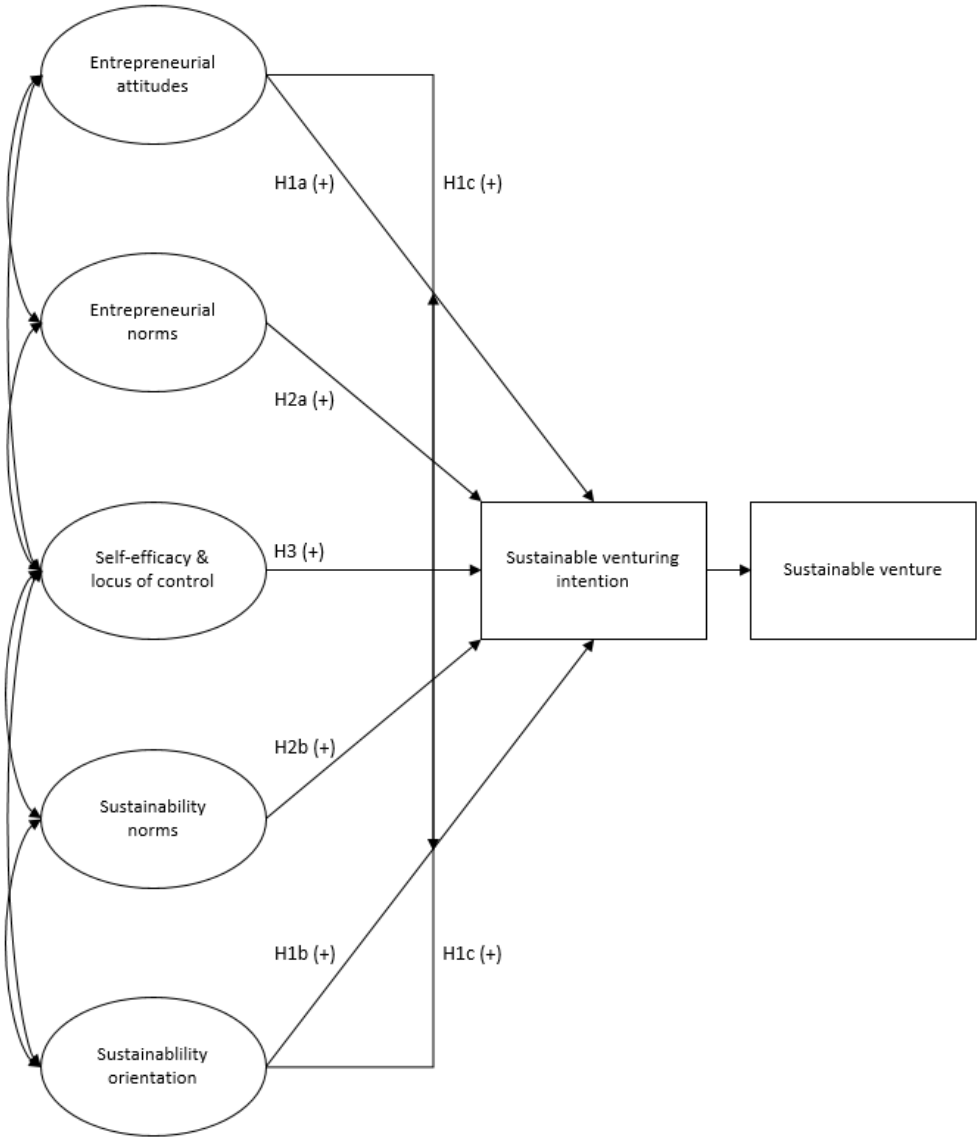

Figure 1. Framework for the hypotheses.

4. Data Material and Variables

To test our hypotheses, we implemented a survey that makes use of the Sawtooth software to present an anonymous three-part online questionnaire: a cover letter; a questionnaire aiming to collect demographic information, personality-related items, and attitudes along with perceptions of social norms; and a conjoint design. The survey was distributed via the alumni office of a large German university to 2000 potential respondents. After two e-mail reminders were sent to the targeted group, 277 participants completed the questionnaire, which represents a response rate of 14 percent. Concerning response bias, the characteristics of early respondents were not significantly different from those who gave late replies based on t-tests for all variables included across the different models shown below between the first and last 15 per cent of respondents, except for the sustainability norms and sustainability orientation, where the mean values for the late respondents were significantly higher at the 5% level. Furthermore, broad variability was found in the responses, which strongly speaks against the presence of non-response bias. Due to this and given our high response rate, we are confident, that our data are not prone to non-response bias.

Specifically, the data reflect that the respondents were 58% male and 42% female. The average age of those who completed the survey was 43.2 years. The distribution of age was slightly skewed towards younger people because entrepreneurs are generally younger

than the average person in Germany [77]. Most respondents either held a master's degree (33.21%) or a doctorate (29.79%). Therefore, the gathered data consisted of responses from individuals who were not only more likely to become sustainable entrepreneurs but who should also tend to be more successful after doing so [78]. The main variables used in our analysis are summarized in Table 1. We used the logarithm of "sustainability content" to arrive at a normal distribution. The latent variables were all normalized with a mean of zero and a standard deviation of one.

Table 1. Summary of the main variables (Exo: exogenous; Endo: endogenous).

	Variable	Exo/Endo	Type and Items (If Applicable)	Mean	Std. Dev.	Alpha	Loading
1	Self-employment intent	Endo	Likert scale	2.47	1.56	n/a	
2	Sustainability content (log)	Endo	Conjoint analysis	3.04	0.69	n/a	
3	Perceived control (self-efficacy and locus of control)	Exo	Latent Confident Success Tasks No control of tasks Control of life No control of career	0.00	1.00	0.69	 0.72 0.68 0.58 −0.52 0.69 −0.61
4	Entrepreneurialattitudes	Exo	Latent High income Own boss New company	−0.003	1.01	0.59	 −0.72 0.80 0.70
5	Entrepreneurialnorms	Exo	Latent Achievement Autonomy Risk Creativity Responsibility	0.05	0.99	0.80	 0.74 0.86 0.61 0.73 0.79
6	Sustainability-oriented norms	Exo	Latent Freedom Equality Solidarity Nature Tolerance Responsibility	0.01	0.98	0.85	 0.76 0.71 0.84 0.77 0.82 0.63
7	Sustainability orientation	Exo	Latent Eco-challenge Corp. responsible Pioneer Employees Finance rating CSR	0.03	0.98	0.77	 0.77 0.87 0.85 0.09 0.20 0.77
8	Parents self-employed	Exo	Binary	0.31	0.46	n/a	
9	Self-employed	Exo	Binary	0.29	0.45	n/a	

The survey separately elicited entrepreneurial and sustainability intentions from the respondents. First, to measure basic entrepreneurial intentions, we adopted a question that utilized a 5-point Likert scale, anchored with "completely agree" and "completely disagree" [44]. The associated statement was: "I intend, within the next five years, to become or remain self-employed." We thereby ensured that respondents who were already

self-employed could also respond. Second, we applied a conjoint design to measure the importance of sustainability-related motives in the course of venturing. The two measures multiplicatively combined to generate the dependent variable—namely, sustainable venturing intention. To score highly on this measure, the individual needed to meet two conditions simultaneously: a high general venturing intention and a strong attribution of importance to sustainability goals in the venturing process.

The reduced CSES scale, entrepreneurial attitudes, entrepreneurial norms, sustainability norms, and sustainability orientation were all operationalized as items rated on the same 5-point Likert scale. The six CSES items introduced by Judge et al. [71] for self-efficacy and the locus of control that were also used by us are: "I am confident I will get the success I deserve in life"; "when I try, I generally succeed"; "I complete tasks successfully"; "Sometimes, I do not feel in control of my work (reversed)"; "I determine what will happen in my life"; and "I do not feel in control of my success in my career (reversed)".

We employ Kuckertz and Wagner's [50] six-item scale to measure sustainability orientation. It comprises the following items: "German firms should take an international leading role in the field of environmental protection; Firms that are environmentally oriented have advantages when recruiting and retaining qualified employees; In the future, the environmental performance of a company will be considered more and more by financial institutions; Corporate social responsibility should be part of the foundations of each company; I think that environmental problems are one of the biggest challenges for our society; I think that entrepreneurs and companies need to take on greater social responsibility." We also used the measure for entrepreneurial attitudes developed by Lüthje and Franke [44], which consists of three items: "I'd rather be my own boss than have a secure job; You can only make big money if you are self-employed; and I'd rather found a new company than be the manager of an existing one."

We used the University of Michigan's Panel Study of Entrepreneurial Dynamics (PSED) scale for entrepreneurial norms. Its five items are: "The social norms and culture of your personal environment are highly supportive of success achieved through one's own personal efforts; The social norms and culture of your personal environment emphasize self-sufficiency, autonomy, and personal initiative; The social norms and culture of your personal environment encourage entrepreneurial risk-taking; The social norms and culture of your personal environment encourage creativity and innovativeness; The social norms and culture of your personal environment emphasize the responsibility that the individual has in managing his or her own life."

We could not identify any instrument for measuring sustainability norms in the extant literature. The closest fitting scale is that of Meek et al. [56] for environmentally responsible consumption. However, this scale does not include social aspects and does not measure norms in the personal environment. Since we also wanted to measure entrepreneurial and sustainability norms in a comparable way, we refrained from using this scale and instead opted for developing a new scale that utilized the wording of the scale for entrepreneurial norms. To ensure content validity, we based our questions on the categories of Shepherd, Kuskova, and Patzelt's [79] sustainable development value (SDV) scale. We conducted a pre-test with a group of students to validate the measure. The Kaiser–Meyer–Olkin value of 0.777 was satisfactory; therefore, we included the scale in its original version. The six items of the measure are: "The social norms and culture of your personal environment are highly supportive of the value of freedom of the individual; The social norms and culture of your personal environment emphasize the equality of all human beings; The social norms and culture of your personal environment encourage solidarity in communities; The social norms and culture of your personal environment emphasize a caring relationship with nature; The social norms and culture of your personal environment encourage tolerance toward the unknown; The social norms and culture of your personal environment give priority to shared responsibility for all actions."

In addition to the major variables of concern, we included two more binary variables in the analysis as controls: the self-employment status of the individual and the individual's

parents. For self-employment status [80] and self-employed parents [81,82], the scientific literature has reported links between these two variables and other factors that influence entrepreneurial intentions. The inclusion of the self-employment status was particularly relevant, as it includes experience in the entrepreneurial space and addresses a potential sampling bias that could have been caused by the relatively high ratio of self-employed respondents (26%). While the existence of such a bias cannot be ruled out [83], the inclusion of this control variable ensures that the effects of the main variables were independent of the self-employment status. We are, therefore, confident that the results reflect the impact of attitudes, norms, self-efficacy, and the locus of control for an average individual.

5. Methods

We applied choice-based conjoint analysis (CBC) to determine the importance of sustainability characteristics in the process of deciding whether or not to start a new venture. One of the major concerns regarding directly eliciting information from survey participants is self-report bias because of social desirability. This issue is relevant in various research areas [84,85], including our context of sustainability. While the data collection method of an online survey and the associated anonymity may considerably reduce such bias, the application of CBC eliminates this issue far more comprehensively. Conjoint analysis enables the researcher to retrieve information on decision-making processes in a decompositional manner [86]. In this method, the individual is offered a set of stimuli that represent an object with certain attributes. An example of such a stimuli set can be seen in Table 2. The respondents' choices made under the CBC approach are quite similar to those that would be made in real-life situations [87,88]. Therefore, the choice-based elicitation of data points further reduces the risk of social desirability issues and common method bias [89].

Table 2. Example of CBC stimuli set.

	Venture 1	**Venture 2**	**Venture 3**	**Venture 4**
Social benefit for society	Social benefit as a complement (medium)	Social benefit as a coincidence (low)	Social benefit as a core function (high)	Social benefit as a complement (medium)
Environmental protection	Environmental protection as a core function (high)	Environmental protection as a coincidence (low)	Environmental protection as a core function (high)	Environmental protection as a complement (medium)
Risk of failure	20% risk	20% risk	80% risk	20% risk
Income	+20% income	+20% income	+/−0% income	+/−0% income
Choice (e.g.,)	X	O	O	O

In our study, the participants decided in favor of their most desirable potential start-up based on four criteria: the change in income relative to their current income and the risk associated with the change (since expected income was assumed to be the major factor influencing economic decisions), the role of ecological goals, and the role of social goals in the start-up. These four dimensions represent the main influences of the trade-off we introduced when we derived our first hypothesis. The levels associated with these criteria were as follows: relative income (+20%, +/−0%, −20%), risk of failure (20%, 50%, 80%), and ecological and social goals (as coincidental, complementary, or core tasks). The manifestations of the last two criteria build on the types of sustainable entrepreneurs described in Spence et al. [49] and on the classification designed by Schaltegger and Wagner [25]. Each respondent made decisions regarding 17 choice sets (the first two of which were included to familiarize participants with the procedure).

The information taken from the respondents' choices made it possible to calculate the utilities of individual participants for the aforementioned criteria based on a hierarchical Bayes model, as it outperforms logit estimations when CBC analysis is used [90]. To deter-

mine the importance of each criterion in the decision-making process of the respondent, we calculated the difference in utility between the lowest-rated and highest-rated manifestation for a given criterion. The sum of the importance of ecological and social goals was used to represent the sustainability orientation of the venturing intention in our study. The range obtained was comparable to the results found in our pre-test of the CBC tool for a student sample before the main survey.

To test our hypotheses formally, we applied structural equation modeling (SEM) with robust standard errors, employing a set of statistical procedures and thus revealing the underlying causal relationships between variables. We conducted a confirmatory factor analysis to determine the factor loadings of the items that constituted the latent constructs [91]. We allowed the variables of our model to correlate so as to allow for interdependencies, which is a normal procedure in TPB. As the TPB has been successfully tested in various applications, it is assured that the model was theoretically well grounded and that covariance-based SEM was applicable. This, together with the sufficiently large number of observations, made covariance analysis the optimum choice for creating our model.

The current model also incorporated additional control variables. The self-employment status of both individuals and their parents was included as an additional independent variable with the potential to predict sustainable venturing intention. In principle, these variables can be correlated with each other and with all the variables that deal with the entrepreneurial dimension of the model (entrepreneurial attitudes, entrepreneurial norms, and the CSES). Covariance analysis made it possible to integrate these covariances. Finally, an interaction term between entrepreneurial and sustainability orientation was included to test Hypothesis 2b. During the construction of the interaction variable, named "*Entrep.attitude x Sustainab.orient.*", both constituent variables were mean-centered [92]. We validated the results of this approach by additionally applying the unconstrained method of Marsh et al. [93] and found there to be no bias.

6. Results

Prior to the presentation of the SEM estimates for the model, the results of the optimization algorithm used for the CBC analysis needed to be evaluated. First, the values for the relative importance in the sample were 29.97% for income, 46.75% for risk, 11.07% for ecological goals, and 12.21% for social goals. These results indicated that risk and income play dominant roles for most individuals when determining their venturing intention. However, the importance values for the different dimensions varied markedly among the respondents. Secondly, the root likelihood (RLH) value was used as an indicator of goodness-of-fit for the estimated parameters with the actual decisions made by the individuals [90]. The RLH showed the probability of a correct choice being made for each choice set when the utility values of the individuals were applied. The pure chance RLH value was 0.25 in our study because there were four stimuli per choice set; in comparison, the value of 0.69 meant that the prediction made via estimated utilities was 2.75 times better than that made based on pure chance. This result indicates that there was a good fit between the estimated utilities and the choices made by the participants. An overview of the correlations for all variables can be found in Table 3.

Turning to the SEM estimation, we applied established measures to evaluate the goodness-of-fit of the overall model. Several researchers have called for the use of a combination of relative fit indices and absolute fit indices to gain a thorough insight into model quality in the context of SEM [94]. Given that the χ^2 criterion is extremely sensitive to deviations from multivariate normality and depends on the size of the sample [95], we focused on the χ^2/df (degrees of freedom) measure. Its value of 1.55 was below the recommended cut-off value of 2 and thus indicated a good fit. To obtain a more holistic view, we next assessed the values of the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), and the comparative fit index (CFI). The results obtained for RMSEA (0.045) and SRMR (0.067) indicated a good fit [94] and

thus suggested that the model had a good specification; the value of the CFI (0.905) was marginally above the cut-off threshold of 0.9 recommended for an acceptable fit in SEM. This was probably due to the rather complex relational system and the high number of factors and indicators included. Additionally, CFI is more meaningful in the case of exploratory than confirmatory models [96]. Given that the goodness-of-fit requirements were satisfied, the estimated path coefficients could be interpreted reliably.

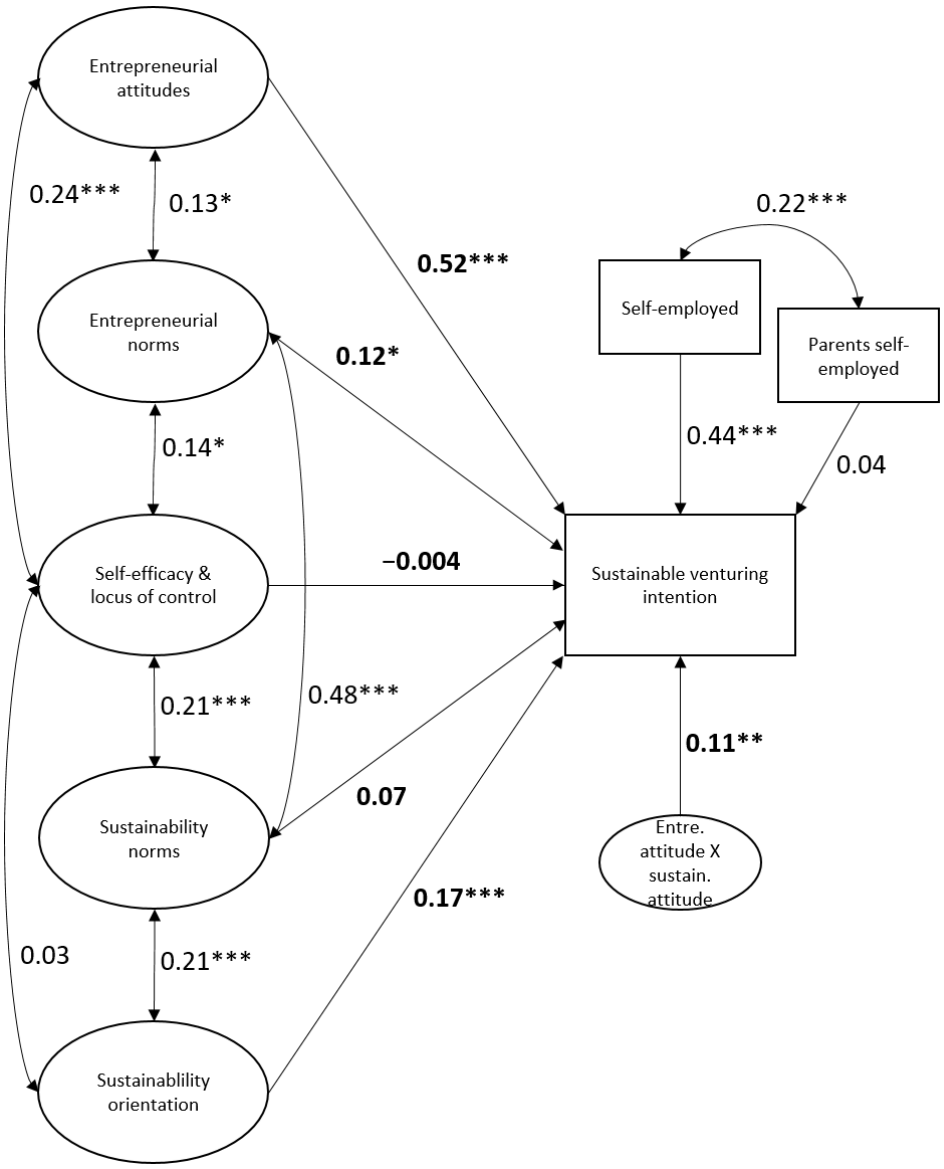

Figure 2. Results of the structural equation model. Notes: path diagram reports standardized coefficients; *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Figure 2 displays the results of the SEM we used to test the proposed hypotheses. The depicted path coefficients were standardized to allow a comparison of the effect sizes. The sustainability orientations and entrepreneurial attitudes had a significant positive association with the dependent variable, supporting Hypotheses 1a and 1b. Hypothesis 1c also found support, since the interaction of entrepreneurial attitudes and sustainability orientations was found to be associated positively and significantly with sustainable venturing intention. The positive coefficient of entrepreneurial norms was significant, thus supporting Hypothesis 2a.

Table 3. Correlations.

Variable		1	2	3	4	5	6	7	8	9
1	Intent	1.00								
2	Sustainability (log)	0.053	1.00							
3	Perceived control	0.137	0.034	1.00						
4	Entrepreneurial attitudes	0.558	0.069	0.177	1.00					
5	Entrepreneurial norms	0.094	0.19	0.124	0.096	1.00				
6	Sustainability orientation	0.013	0.378	0.003	−0.052	0.104	1.00			
7	Sustainability norms	0.062	0.215	0.153	0.016	0.367	0.257	1.00		
8	Parents self-employed	0.168	−0.026	0.000	0.121	−0.021	−0.08	0.032	1.00	
9	Self-employed	0.618	0.011	0.065	0.406	0.024	−0.048	0.017	0.207	1.00

Notes: Correlations above 0.1 are significant at $p < 0.05$; there are minor differences compared to the correlations shown in Figure 2 due to the independent estimation of correlations.

Hypothesis 2b was not supported directly because the progress from sustainability norms to the dependent variable was insignificant. One explanation for this result might be that sustainability norms were most strongly interwoven in the overall model. They showed a high correlation (0.48) with entrepreneurial norms. This was reasonable, since the perceived strength of a normative background should have an influence on all kinds of norms. Furthermore, they significantly correlated with sustainability orientation (0.21). If all significant links to other variables were considered, sustainability norms had an indirect positive effect of 0.09on the sustainable venturing intention. This suggested that Hypothesis 2b might not have been wholly unsupported. The association of self-efficacy and locus of control with the dependent variable was weakly negative but insignificant, and hence did not support Hypothesis 3. Moreover, self-employment had a strong influence on the dependent variable. In comparison to all other links in the model, this path had the second highest coefficient and was significant. This effect was largely due to the higher level of intent to remain self-employed of those who already were.

In contrast to the respondents' self-employment status, the self-employment status of their parents did not have a significant effect on the dependent variable. However, the analysis did identify a positive influence of parents' self-employment on the self-employment status of the respondents, which was in line with extant research [97].

Summarizing our findings, we could see that the effect of attitudes on sustainable entrepreneurship intentions was positive and especially strong in the case of entrepreneurial attitudes. While norms had a positive influence on sustainable entrepreneurial intentions as well, it was less strong than the influence of attitudes. For both attitudes and norms, the entrepreneurial aspect was more influential than the sustainability aspect. In opposition to this, perceived behavioral control did not appear to have a major influence on sustainable entrepreneurship decision making but was strongly linked to the other predictors of our model.

We conducted several checks to ensure that the results we obtained from the SEM were robust. First, we created the model excluding self-employed respondents (see Figure 3) and found that all results, particularly those concerning our hypotheses, remained unchanged, with the only exception being that the coefficient for entrepreneurial norms became insignificant.

Second, we constructed an ordinary least squares (OLS) regression model that incorporated additional control variables which could not be included in the SEM analysis. Prior research on this topic indicated that appropriate additional controls are age, gender, individual risk aversion, academic degree, study field for that degree, and perceptions about the support for and barriers to entrepreneurship.

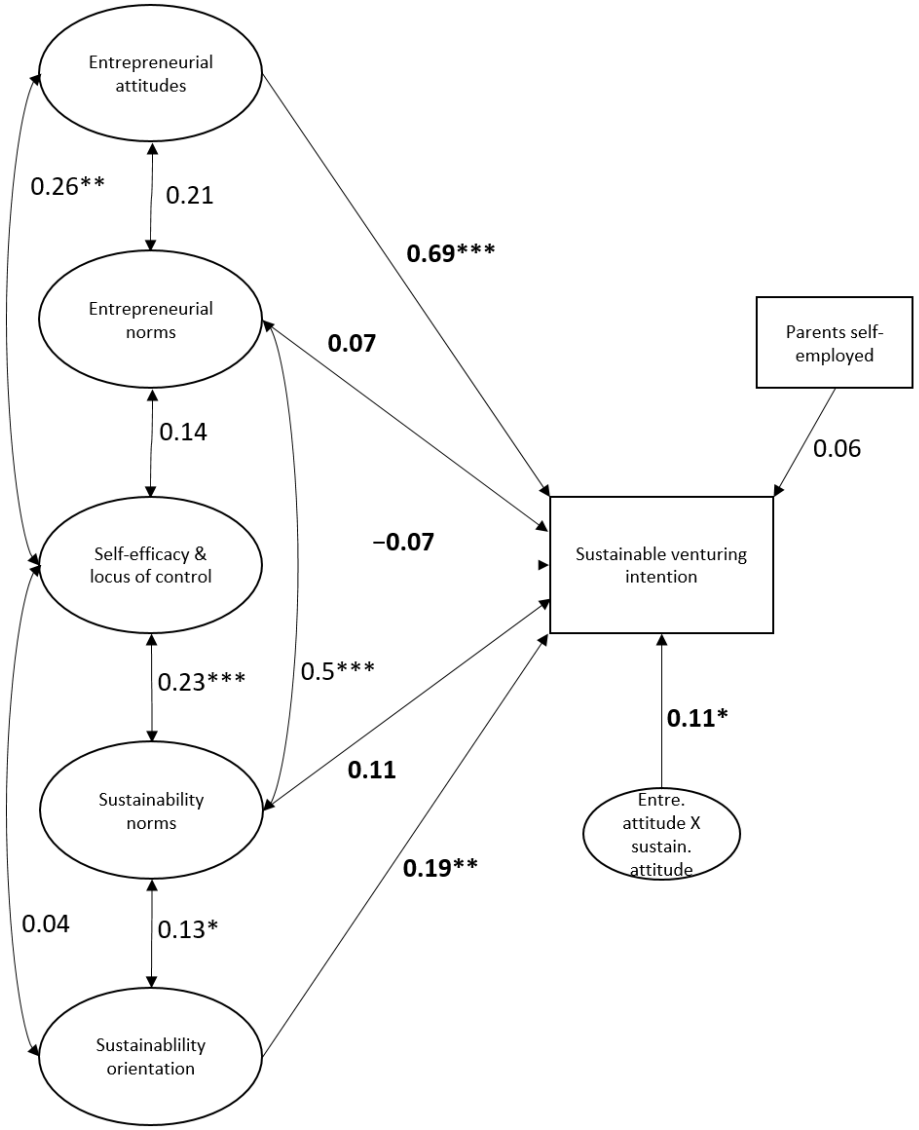

Figure 3. Results of the structural equation model (with self-employed respondents excluded). Notes: path diagram reports standardized coefficients; *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

The coefficient values for the variables we included in both the OLS estimation and the SEM were very similar, and there are no changes in the signs and significance levels for any of the variables of interest. Furthermore, the OLS model (Table 4) was highly significant, and an adjusted R^2 of 0.55 indicated that the estimation explained the variance of the dependent variable very well. In comparison to the regression model that included only control variables, the value of the adjusted R^2, 0.70, was higher by 0.15 than that of the full model. A Chow test ($F = 15.82$; $p < 0.001$) was performed and indicated that the difference in the variance found between the restricted and full model was highly significant. When excluding self-employed respondents in the OLS estimation, the results also did not change compared to those of the corresponding SEM model. In summary, therefore, our results appeared to be highly robust across a number of additional sensitivity analyses.

Table 4. Results of the linear regression robustness check.

Variable	Restricted Regression Model (Only Controls)	Full Regression Model
Perceived control		0.25 (0.44)
Entrepreneurial attitudes		1.97 *** (0.29)
Entrepreneurial norms		0.53 ** (0.25)
Sustainability orientation		0.60 ** (0.24)
Sustainability norms		0.26 (0.25)
Entrep. attitudes × Sustainab. orientat.		0.43 * (0.24)
Self-employed	5.90 *** (0.62)	4.48 *** (0.70)
Parents self-employed	0.09 (0.58)	0.30 (0.49)
Age	−0.01 (0.02)	−0.03 (0.02)
Gender	0.24 (0.6)	0.43 (0.57)
Risk	0.86 *** (0.28)	0.39 (0.26)
Positive image of entrepreneurship	0.59 * (0.32)	0.29 (0.33)
Services for start-ups	0.61 * (0.32)	0.13 (0.31)
Hard to get a loan	−0.04 (0.33)	−0.05 (0.29)
Regulation hostile toward start-ups	−0.13 (0.28)	−0.20 (0.26)
Academic degree (categorical)	included (9 categories)	included (9 categories)
Discipline (categorical)	included (7 categories)	included (7 categories)
F	7.57 (29, 245)	10.45 (29, 245)
Prob > F	<0.0001	<0.0001
R^2	0.4085	0.5529
Observations	275	275

Notes: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

7. Discussion and Implications

The research presented here identified a positive association between entrepreneurial attitudes and sustainable venturing intentions and simultaneously confirmed that sustainability orientation plays a significant role in the decision about whether or not to act sustainably when pursuing a venture. Furthermore, the positive interaction effect found between these two independent variables lent support to the notion that a trade-off between entrepreneurial attitudes and sustainability is not likely. This suggested that decoupling in the sense of moral disengagement [28] is neither the only mechanism influencing the behavior of entrepreneurs nor the one that predominantly guides the entrepreneurial

decision-making process. Instead, our results aligned with the reasoning that a coupling of identities, as described by York et al. [29], guides the vocational choice of an individual. While the average entrepreneur might be prone to disengage from sustainability-related objectives, an entrepreneur with coupled identities and a clear mission to follow up on sustainability-related goals should be impervious to disengagement. Furthermore, our current research contributes to extant scholarship by showing that entrepreneurial norms directly support sustainable venturing intentions and that sustainability norms, while not directly related to sustainable venturing intentions, do indeed correlate strongly with other influential variables in the model.

The various modes that illustrate the direct and indirect impact on the dependent variable can be explained based on the nature of norms. Efforts undertaken to preserve nature or develop social communities might not be visible at the same level and may have a delayed impact. Therefore, the expected reward that can be obtained through adhering to social norms is higher for entrepreneurial action than for sustainable action, which may explain the non-significant coefficient of sustainability norms in the regression. Additionally, the scale we used for sustainability norms potentially had a strongly normative character.

Across all explanatory variables, self-employment status had a strong effect; this was in line with work conducted on serial entrepreneurship that indicates that experienced entrepreneurs judge the decision to establish or continue with a new venture more positively than novices do [98]. However, our findings showed that even after considering these additional effects by excluding individuals who were already self-employed, the mechanisms we proposed in the hypotheses mainly remained valid.

With respect to the TPB, which we chose as the framework, intentions are formed by the interaction of individuals' attitudes towards certain behaviors, social norms, and perceived behavioral control [7]. By modifying the TPB and incorporating further aspects, we could account for the complexity of sustainable entrepreneurship. Overall, our extension identified novel aspects that contribute to improving the prediction of intentions regarding sustainable entrepreneurship. We showed how the inclusion of pro-social motives in an analysis can help to explain shifted impact trajectories in the context of entrepreneurship. The non-significant paths fit with the original TBP; as Ajzen [7] states: "the relative importance of attitude, subjective norm, and perceived behavioral control [. . .] is expected to vary across behaviors".

In summary, the findings of this study can offer a useful and relevant practical reference for policy makers and other actors (for example, universities) who are concerned with fostering sustainable development in practice. The results obtained should not only help to identify those individuals who have the potential to solve the sustainability challenges mentioned in the introduction but also help to enlarge this group of potential entrepreneurs.

Specifically, students need to be informed about sustainability issues during their courses—for example, by means of depictions of wicked challenges. Exposure to social and environmental problems should help to foster a sustainability orientation based on improving individuals' understanding of the need to address such problems. However, it is equally important to support the development of positive attitudes (and the skills required for said attitudes) towards entrepreneurship among individuals with a strong sustainability orientation. It appears that if both attitudes interact positively, such support will accelerate the creation of the positive social and environmental effects derived from new venture creations.

Furthermore, based on our findings, organizational actions should aim to develop a strong institutional culture by promoting sustainability and entrepreneurial norms—for example, in educational establishments. This may be achieved via extra-curricular competitions that seek entrepreneurial solutions to sustainability-related issues to heighten the perceived desirability of sustainable entrepreneurship. It is possible that such actions are complementary, because we tested interactions between attitudes and norms in the SEM without finding any negative linkages (none of these further interactions were significant and, thus, were not included in the reported model). Both directions are also relevant for

policy-making in general—i.e., beyond the education sector—since a link between national prosperity and social entrepreneurship has been identified.

8. Limitations and Future Research

The approach applied in this paper focuses on measuring the closest neighbor to behavior—namely, intention. Due to our use of cross-sectional data, casual claims need to remain limited, meaning that we would gain additional value from longitudinal studies [17] that ideally would also include information on actual behavior in order to further validate the findings of our SEM. Furthermore, the aforementioned dual nature of perceived control in sustainable venturing intentions opens up new prospects for research, as it remains unclear what causes the diametrical effect in the social and environmental realm.

Finally, our experimental measurement of the relevance of sustainability allows us to address several novel questions relating to the future: What are individuals willing to sacrifice in terms of economic gains and security to stay true to their ideals? What role do attitudes and norms play in this trade-off? Addressing such issues could help us to better understand the underlying decision-making processes and then enable us to develop novel approaches for encouraging sustainable entrepreneurship.

One additional research direction of particular interest with regard to these questions is, in our opinion, the application of neuro-economic methods such as functional magnetic resonance imaging (fMRT) and electroencephalography (EEG) in order to better determine the neurological underpinnings of these mechanisms. Yet, we believe that our experimental measurement should be tested on similar data sets first in order to enhance the coverage of different socioeconomic and geographical groups and the external validity of the tool.

9. Conclusions

Our current research addresses the issue of how to foster intentions to create sustainable enterprises where profitability is not the ultimate objective. This study develops a model that explains the determinants of sustainable entrepreneurship by building on Ajzen's [7] TPB. In doing so, it extends the model in such a way that it answers parts of the question which antecedents of intentions are relevant to the decision to become entrepreneurially active whilst simultaneously acting in a sustainable manner. In addressing this question, our research offers insights into those mechanisms that can counter social dysfunctionality and moral disengagement among firms and that support compassionate, emphatic, and pro-social organizations at the level of the individual entrepreneur. In particular, our research lends support to the claim of identity coupling in the controversy surrounding the trade-off and convergence of entrepreneurial and sustainability orientations. We identify entrepreneurial attitudes, sustainability orientations, and entrepreneurial norms as antecedents of sustainable entrepreneurship intentions, and our findings support the notion that an identity coupling process is at the center of sustainable entrepreneurial action.

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