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Author(s): Kautonen, Teemu & van Gelderen, Marco & Fink, Matthias
Title: Robustness of the Theory of Planned Behavior in Predicting Entrepreneurial Intentions and Actions
Year: 2015
Version: Post print

Please cite the original version:

Kautonen, Teemu & van Gelderen, Marco & Fink, Matthias. 2015. Robustness of the Theory of Planned Behavior in Predicting Entrepreneurial Intentions and Actions. Entrepreneurship Theory and Practice. Volume 39, Issue 3. 655-674. ISSN 1042-2587 (printed). DOI: 10.1111/etap.12056.

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This is an Authors' Accepted Manuscript of an article published online 21 July 2013:

Kautonen, T., Van Gelderen, M. and Fink M. (2015). Robustness of the Theory of Planned Behavior in Predicting Entrepreneurial Intentions and Actions. *Entrepreneurship Theory and Practice*, 39(3), 655-647.

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Robustness of the Theory of Planned Behavior in Predicting Entrepreneurial Intentions and Actions

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ABSTRACT

This analysis demonstrates the relevance and robustness of the Theory of Planned Behavior in the prediction of business start-up intentions and subsequent behavior based on longitudinal survey data (2011 and 2012; $N=969$) from the adult population in Austria and Finland. By doing so, the study addresses two weaknesses in current research: the limited scope of samples used in the majority of prior studies and the scarcity of investigations studying the translation of entrepreneurial intentions into behavior. The article discusses conceptual and methodological issues related to studying the intention-behavior relationship and outlines avenues for future research.

INTRODUCTION

Since the late 1980s, a considerable body of literature has addressed the concept of entrepreneurial intentions, viewing much of entrepreneurship as intentional behavior and the formation of an intention to start a business as a step in the process of founding an organization (e.g., Bird, 1988; Kolvereid, 1996; Krueger, Reilly, & Carsrud, 2000; Van Gelderen et al., 2008). The most commonly used theoretical framework in this stream of research (Schlaegel & Koenig, 2012) is the Theory of Planned Behavior (TPB), which conceptualizes strength of intention as an immediate antecedent of behavior (Ajzen, 1991; 2011).

To date, applications of the TPB in the business start-up context have been limited to explaining the formation of intentions. Twenty-five years after the appearance of Bird's (1988) seminal article, Schlaegel and Koenig's (2012) meta-analysis discovered only three published entrepreneurship studies that have applied the full TPB, and thus include the intention-behavior relationship. However, those studies do not focus on business start-up intentions (Kolvereid & Isaksen, 2006), use samples that are limited in size (Kautonen, Van Gelderen, & Tornikoski, 2013), or analyze data that concerns a niche population (academic scientists) and suffers from non-random sample attrition (Goethner, Obschonka, Silbereisen, & Cantner, 2012). The scarcity of studies including the intention-behavior relationship is somewhat surprising. After all, entrepreneurship is about actions rather than mere intentions, and the extent to which entrepreneurial intentions translate into action defines the relevance of intention research. Moreover, the existence of a sizeable intention-action gap would point to the importance of studying additional factors rather than mere intentions for predicting and explaining entrepreneurial behavior.

This analysis contributes to the entrepreneurial intentions literature by presenting a test of the full TPB model in the business start-up context. Our analysis adopts the theory as its originator, Icek Ajzen (2011), currently specifies it. We utilize two waves of survey data (2011 and 2012) from the Austrian and Finnish adult populations ($N=969$). Thus, our study overcomes the usual weaknesses of prior studies of using limited samples (often students) and not including the intention-behavior relationship. Moreover, the size and scope of the sample allows us to run an extensive range of robustness tests. We find strong support for all hypothesized relationships, and we also find them to be robust across a range of different demographic and biographical characteristics of individuals. Our study of the entrepreneurial intention-action link sheds light on conceptual questions regarding whether entrepreneurship is intentional or planned in nature, and on methodological questions concerning the timing of data collection and the level of specificity in operationalizing the TPB constructs.

THEORY OF PLANNED BEHAVIOR

The TPB posits that beliefs about attitude, control and norms influence behavior and are mediated by intentions. Ajzen (2011) defines intention as “a person’s readiness to perform a given behavior.” Intention has three cognitive antecedents (Ajzen, 1991): attitude refers to the individual’s evaluation (favorable or unfavorable) of the target behavior; subjective norms capture the opinions of social reference groups (such as family and friends) regarding whether the individual should engage in the behavior; and perceived behavioral control (PBC) denotes the perceived ease or difficulty of performing the behavior. Previous entrepreneurship studies

find that the three antecedents explain 30–45% of the variation in intentions (Kolvereid, 1996; Liñán & Chen, 2009; Van Gelderen et al., 2008).

Intention fully mediates the effects of attitude and subjective norms on behavior, whereas PBC has a double role in the TPB. In situations where the individual has a very high degree of control over the behavior, intention is a sufficient predictor of the individual exerting effort and taking action to achieve the goal (Ajzen, 1991). In such circumstances, intention fully mediates the effect of PBC. However, in situations where there are problems with control, PBC should also contribute to the prediction of behavior, over and above its partially mediated effect via intention, by serving as a proxy for actual behavioral control (Ajzen, 1985; 1991).

Studies of business start-up intentions that apply a pre-existing theoretical framework have adopted either the TPB or Shapero and Sokol's (1982) entrepreneurial event model (Schlaegel & Koenig, 2012). The entrepreneurial event model explains intentions on the basis of perceived desirability, perceived feasibility and the propensity to act. The two models overlap to a great extent, with Shapero and Sokol's perceived desirability and perceived feasibility corresponding to Ajzen's attitudes and PBC, respectively (Krueger et al., 2000; van Gelderen et al., 2008). In a direct comparison of the two models, Krueger et al. (2000) found both to be approximately equal in terms of predictive power. This article prefers the TPB because of its consistent and detailed specification, the great volume of research across disciplines dedicated to applying, criticizing and advancing the model (Armitage & Conner, 2001; Sheeran, 2002), and the opportunity to compare, and thus cross-validate, findings with those found in a range of other research domains.

While there is little evidence on the intention-behavior relationship in the entrepreneurship literature, meta-analytic evidence from other research domains supports the predictive power of intentions for subsequent behavior. In a meta-analysis of ten meta-analyses covering diverse behavioral domains, Sheeran (2002) reports that intention explains 28% of the variance in behavior, while Armitage and Conner (2001) find a mean explained variance of 22% in their meta-analysis of 185 independent tests of the TPB across multiple domains. In the business context the TPB has regularly been applied to marketing and consumer behavior (Ajzen, 2008), but to our knowledge no meta-analysis has focused specifically on these domains. In the realm of physical exercise, Downs and Hausenblas (2005) find intention and PBC account for 21% of the variance in exercise behavior. However, in a meta-analysis of experimental research designs in the health domain, Webb and Sheeran (2006) find that a medium-to-large change in intention ($d=0.66$) leads to only a small-to-medium change in behavior ($d=0.36$). Yet, McEachan, Conner, Taylor, and Lawton's (2011) meta-analysis finds that the type of health behavior being analyzed has a moderating effect on the model. For example, physical activity and diet behaviors were better predicted than practicing safe sex and abstaining from drug use.

The variability of these findings suggests that although support for the TPB is substantial, entrepreneurship research cannot rely solely on evidence from other domains to validate intention as a predictor of start-up behavior. Moreover, many intention-behavior studies concern single acts such as taking medicine, using contraceptives, exercising, or voting (Armitage & Conner, 2001; Sheeran, 2002). In contrast, starting a new venture is a complex mid-term goal that requires considerable effort to complete, and involves multiple actions that may be performed in any number of sequences (Liao, Welsh, & Tan, 2005; Lichtenstein, Carter, Dooley,

& Gartner, 2007; Newbert, 2005). Furthermore, the role of intentions may not be as straightforward in new venture creation as it is in other research domains. It has been suggested that not all behaviors that eventually lead to a start-up are intended as such when they are performed (Bhave, 1994). The classic case is the hobbyist who gradually discovers that a business can be made out of the hobby. Similarly, effectuation theory (Sarasvathy, 2001) posits that means-driven individuals can take enterprising action without necessarily having the ultimate goal of an independently owned business in mind. Thus, the intention to start a business is not necessarily the starting point of the entrepreneurial process.

This study contributes to the creation of a body of evidence on the impact of intention on subsequent behavior in the business start-up context by investigating whether those with intentions *to take steps* to start a business *in a defined upcoming period* (a year), will actually take subsequent action over that period (see the method section for our operationalizations of intention and behavior) – not whether the ownership of a business was originally, early, or consciously desired or planned. Thus, our sample may very well include founders who “storm the castle” without a formal plan (Brinckmann, Grichnik, & Kapsa, 2010), even though they may still demonstrate the planning of actions in a cognitive and behavioral sense (Frese, Van Gelderen, & Ombach, 2000) (after all one can intentionally decide to storm the castle rather than write a plan). The sample may also include hobbyists who at some point intentionally take action to convert the hobby into a business; necessity entrepreneurs who, although they may not prefer to become an entrepreneur, still intentionally take steps to set up their venture; and perhaps even “accidental entrepreneurs” (Fitzsimmons and Douglas, 2010) who may later say that “they never

intended to become entrepreneurs”, but at some point in time must have taken deliberate steps to make the business operational.

Finally, although some research on the TPB has raised a number of contested issues concerning the specification of the model and its individual components (Conner & Armitage, 1998), including a number of studies on entrepreneurial intentions (Krueger, 2009; Liñán & Chen, 2009), these modifications have not become established parts of the TPB. Therefore, the present study adopts the model as currently specified (Ajzen, 2011), and sets out to test its predictive relevance in the business start-up context.

DATA AND METHOD

Development of Survey Instruments

We conducted a postal survey targeting the adult population (20–64 years of age) in Austria and Finland in two waves (2011 and 2012). Two countries were included in the research design in order to examine the robustness of the findings across different national environments. The survey instruments were developed in English and subsequently translated into German and Finnish. The initial questionnaires were tested on small convenience samples of Austrian and Finnish participants. Next, the German and Finnish versions were translated back into English, the results were compared, and adjustments made, in line with recommendations by Hui and Triandis (1985). Further, a bilingual team member examined the final German and Finnish versions in order to ensure that the items carried the same connotations in both languages.

Additionally, in wave 1, a pilot test was conducted on a target population in Finland and its 200 responses confirmed that the survey instrument worked as expected.

Measures

Operationalization of the TPB. The TPB specifies that the predictor (intention) and the criterion (behavior) should be measured at the same level of specificity. In this study we will refer to entrepreneurial actions rather than behavior, defining actions as intentional behavior (Greve, 2001). The measures should be matched with respect to four components: action, target, time, and context (Ajzen, 1988). It is not uncommon for the TPB to be applied to behavioral categories (such as starting a business) rather than single acts (such as voting). For example, the TPB has been applied to the overall goal of finding a job, which requires multiple job search behaviors (Caska, 1998; Van Hooft et al., 2004). Also complex higher-level goals such as starting a new venture (Newbert, 2005) require individual actions to be completed if they are to be achieved, so the specificity requirement can be fulfilled by assessing intentions as well as behavior on the level of actions rather than the achievement of the goal.

Ajzen (2011) offers two options for operationalizing behavioral categories. One option is to measure the individual actions that make up the behavioral category, and then aggregate the resulting data to form an index. For example, in the context of starting a business one can elicit attitudes, PBC, norms, intentions, and actions with regard to doing market research, writing a business plan, arranging finance, and so forth. These gestation activities are themselves behavioral categories, so for example, within marketing activities one can elicit still more specific measures, such as attitudes, PBC, norms, intentions, and actions to start a print media

advertising campaign, which in turn can be broken into more specific behaviors (e.g., inquiries to various newspapers and magazines for their advertising rates), and so on going down to ever more detailed levels of specificity. The alternative Ajzen (2011) suggests is to employ measures at the level of the behavioral category itself, which we have opted to do in this study. We ask for intentions to engage in activities to start a new venture; and for behavior, we ascertain whether and how much action has been taken. Thus, we operationalize the TPB at an intermediate level of specificity. The rationale behind this choice was to limit the survey length in order to optimize the response rate. Nevertheless, our operationalization at the generic action level is more specific than has been common in research on entrepreneurial intentions to date, which typically uses measures aimed at the outcome rather than the action level (e.g., Liñán and Chen's (2009) item "I have the firm intention to start a firm one day"). Even so, as a robustness check, for behavior we include a measure of whether respondents engaged in various gestation activities (see the description of the behavior measure below).

Again, in accordance with the specificity principle, we set a uniform timeframe for our study by having all items refer to a one-year period. Thus, the intention items refer to taking steps to start a new venture in the next 12 months, and behavior was assessed after those 12 months had passed. The outcome measure was whether people had become a nascent entrepreneur (someone who takes action to start a new venture), or, in Krueger's (2009) terms, whether they had started trying. The choice of the 12-month timeframe is the result of a trade-off between two considerations. Investigators using the TPB are urged to let as little time elapse between intentions and actions as is required for the intention to have effect (Ajzen, 1985). On the other hand, a timeframe that is too short provides results that are limited in practical utility (Randall &

Wolff, 1994). Starting a business is not something that most people do overnight, and having too short a timeframe could result in not polling respondents who intend to start a venture in the medium term. Intention-behavior links have been shown to sustain over extended time periods (Randall & Wolff, 1994). However, the one-year period proposed does mean that some of those who take action may have formed their intentions within the year (after submitting their responses in wave 1). In the results section, we analyze the influence of that group, and how it affects the results.

Overall, our operationalization of the TPB constructs was guided by Ajzen's (2011) instructions for developing TPB questionnaires. All items were measured using six-point rating scales. The Appendix presents a list of all scale items.

Intention. Following the specificity principle, intention was measured in wave 1 with three items inquiring whether the individual intended to engage in activities aimed at starting a business in the next 12 months.

Behavior. The measurement scale for behavior comprised three items, measured in wave 2, which addressed the amount of effort, time and money the individual had invested in business start-up activities in the 12 months following wave 1. As a robustness measure, the wave-2 survey instrument included a list of nine gestation activities adapted from the Panel Study of Entrepreneurial Dynamics II (2012) that we used as an alternative operationalization of start-up behavior. The gestation activity items were again compatible with the specificity principle: they referred to the timeframe of 12 months following the initial survey and captured separate

activities. With reference to the intended business, these items inquired whether the respondent had 1) developed a business plan (written or unwritten), 2) developed a product or service, 3) planned marketing efforts, 4) talked with potential customers, 5) collected information about competitors, 6) produced financial projections, 7) approached financial institutions or other people for funds, 8) acquired equipment, supplies, premises or other concrete things, and 9) dealt with administrative issues related to starting a business. A preceding filter question ensured that only those who had taken at least some action were asked about the nature of these activities; all others were coded as having engaged in zero gestation activities. Since these activities are discrete, the gestation activity variable used in this analysis represents a count of the activities undertaken.

Antecedents of intention. The three antecedents of intention specified in the TPB were measured in wave 1. Attitude was measured with six bipolar scales attaching the idea of engaging in start-up activities in the next 12 months to a set of adjectives. The scale for PBC comprised four items; two addressed the ease of performing entrepreneurial activities and two captured the control that the respondent felt they would have over such behavior (Ajzen, 2002). The measurement of subjective norms comprised two sets of scales: one capturing the attitudes of family, friends, and people generally important to the respondent toward the respondent starting a business; and the other measuring the respondent's motivation to comply with the opinions of those groups of people (Kolvereid, 1996). The final scale for subjective norms thus comprised three items, which are products of the attitude and motivation-to-comply items.

Group identifiers for the multi-group sensitivity analysis. The survey instrument requested information on a range of demographic and biographical characteristics of the respondents as well as the nature of their entrepreneurial ambitions, which we used to examine the robustness of the TPB. A dummy variable indicating the respondent's gender picked up the potential effect of the common and consistent finding of a lower entrepreneurial propensity among women (e.g., Kelley, Bosma, & Amorós, 2010). Three age categories (20–34, 35–44, and 45–64 years) accounted for the effect of aging on entrepreneurial activity, the middle category capturing the entrepreneurially most active age (Parker, 2009). A dummy variable captured previous entrepreneurial experience, which prior research has established increases an individual's entrepreneurial propensity (Parker, 2009; Rotefoss & Kolvereid, 2005). We further inquired about the respondent's labor market status and educational attainment, which prior studies have identified as factors that influence entrepreneurial activity (Block & Koellinger, 2009; Fini et al., 2012; Le, 1999). The respective dummy variables denote whether the person is active within the labor force (e.g., an employee or a job seeker) or whether they are outside the labor force (e.g., retired, a student, or a homemaker), and whether the respondent has a higher education degree. A country dummy allowed us to examine the robustness of the TPB for Finnish and Austrian respondents. We also asked those respondents who reported positive intentions to indicate what type of business they aspired to create. A dummy variable splits the eligible sample of 371 individuals with positive intentions into two groups: those aiming to start a business on a part-time basis or to employ only themselves (57%), and those whose objective it is to start a business with at least a few employees or aim for growth (43%).

Data Collection

Wave 1. In the first wave of the survey, we sent out 10,000 questionnaires in Finland and 15,000 in Austria to respondents selected randomly in a representative range of regions according to a strategy devised in consultation with the Finnish Population Register Center and Statistics Austria. The survey was labeled an “Opinion survey on entrepreneurship” in order not to discourage the participation of people who are neither entrepreneurs nor harbor a desire to start their own business. In Finland, we ordered an exactly specified sample of individual postal addresses from the Population Register Center, which was representative of the target population by gender and age and weighted by the population sizes of the selected municipalities. In Austria, using such a central register for research purposes is not possible and thus we had to resort to a heuristic approach for sample generation. This involved using a digital phone book to identify addresses in the selected municipalities. While this approach enabled us to control regional and gender distribution, it did not allow us to consider age in the sampling process. Hence, the decision to send out more questionnaires in Austria than in Finland to generate a sufficient number of responses from Austrians in the target age range of 20–64 years. Full details of the sampling procedure are available from the authors upon request.

The postal survey generated a total of 2263 responses in Finland and 1024 responses in Austria (response rates: 23% and 7%, respectively). Due to the ex-ante difficulty in specifying the target age range in the Austrian heuristic sampling approach, the actual usable sample of Austrian individuals between 20 and 64 years of age comprises 766 respondents. Thus, the initial total sample amounts to 3029 individuals aged 20–64 years of whom 25% are Austrians.

Non-response bias in wave 1. Our survey strategy aimed at avoiding non-response bias by implementing several approaches proposed in the literature to facilitate response, such as careful questionnaire design, management of length, and establishment of survey importance (Yu & Cooper, 1983). Further, we assessed the wave-1 sample for potential non-response bias by utilizing archival and wave analysis (Rogelberg & Stanton, 2007).

Archival analysis targets passive non-response bias—external factors hindering the recipient from returning the completed questionnaire on time—by comparing the characteristics of the sample with the characteristics of the population (Rogelberg & Stanton, 2007). A comparison of our sample with relevant population statistics shows that the average ages of the respondents in the sample (46 years in Finland, 45 years in Austria) are somewhat higher than the national averages in the age group 20–64 (44 years in Finland, 42 years in Austria). Moreover, Finnish women have a higher comparative participation rate than Finnish men (57% in the sample, 49% in the population). The subsequent sensitivity analysis will account for any differences in the predictive relevance of the TPB due to gender or age.

Wave analysis compares early and late responses with the aim of controlling for active non-response, that is, non-response that results from the recipient's conscious decision not to respond (Rogelberg et al., 2003). We conducted a wave analysis by comparing the means of intention, attitude, subjective norms, and PBC between early and late responses (the first and the last 30% to arrive) in both countries separately. The independent samples *t*-tests did not reveal significant differences in the means.

Wave 2. The second wave of data collection focused on those wave-1 participants who were not already self-employed or engaged in business gestation activities and who did not have excessive missing responses in the TPB measurement scales. These exclusion criteria ensure that the people with intentions in wave 1 are those who were not already engaged in start-up activities when they reported their intentions. Another relevant concern in wave 2 is attribution bias. In order to avoid people with intentions in wave 1 reporting over-positively on their subsequent activities, the wave-2 questionnaire did not make any reference to wave-1 responses. It was again assigned the neutral label, an “Opinion survey on entrepreneurship.” A general filter question asked the respondent whether they had been involved in the process of, or thought about, setting up a business in the previous 12 months. If the person had at least thought about starting a business, they were advised to answer the more specific questions about their activities.

The follow-up survey was sent to all 455 eligible respondents in Austria and to those 1002 Finnish respondents who met the aforementioned criteria and who had given their permission to be contacted again. Participants from Finland, who had not responded in the first three weeks, were sent a reminder by post. In Austria, prior experience indicated that telephone calls would be the more effective follow-up method. This process resulted in 703 usable responses in Finland (response rate: 70%) and 266 in Austria (response rate: 58%).

Sample Characteristics

Table 1 presents a comparison of wave-1 and wave-2 samples. We compared the longitudinal sample of $N=969$ with those respondents who would have qualified for the follow-up study but either did not respond or opted out in wave 1. Chi-square tests for categorical, and t -tests for

continuous, variables were used to examine potential selection bias. The only statistically significant differences concern the age categories and the country dummy. The actual differences in the age distribution are very small: a slightly higher wave-2 participation rate in the 35-44 years compared to the 20-34 years age group. The significant country difference simply reflects the fact that the Austrian response rate in wave 2 was much higher, relatively speaking, than in wave 1 (58% versus 8%), compared to the Finnish case (70% versus 23%). The important conclusion, however, is that the means of the TPB variables are statistically equal between wave-2 participants and non-participants. In other words, our longitudinal sample does not suffer from non-random attrition bias in terms of the TPB constructs. Table 2 displays the correlation matrix for the longitudinal sample.

Insert Table 1 and Table 2 here

Analytical Strategy

We use structural equation modeling (SEM) for two reasons. First, the five TPB constructs are operationalized as multi-item scales and modeling them as reflective latent variables allows us to account for measurement error; second, the mediation hypotheses included in the TPB are best tested as indirect effects in structural models (Williams, Vandenberg, & Edwards, 2009). Due to the non-normality of both endogenous variables (intention and behavior), maximum-likelihood estimation with robust standard errors was used throughout the analysis (Hox, 2009). The estimations were performed using the Mplus 6 software package (Muthén & Muthén, 1998–2010).

RESULTS

Full Sample

Measurement model. Before estimating the structural model, we assessed the dimensionality, reliability, and validity of the measurement scales (Anderson & Gerbing, 1988) by means of exploratory and confirmatory factor analysis (CFA). Since an exploratory principal components analysis did not indicate a need to remove scale items, we proceeded to the CFA. The standardized factor loadings in the CFA are all significant at the .1% level and the currently recommended fit indices (Williams et al., 2009) suggest a satisfactory fit between the model and the data (Hu and Bentler, 1999): the comparative fit index (CFI) close to or above .95 (current CFA: .975), the root mean square error of approximation (RMSEA) < .06 (.038) and the standardized root mean squared residual (SRMR) < .08 (.035).

Table 3 reports the latent variable correlations in the CFA model together with the Cronbach's alphas, composite reliabilities, and square roots of the average variance extracted (AVE) scores for each factor. Since the square root of each construct's AVE is higher than its correlations with the other latent variables in the measurement model, we can conclude there is good discriminant validity (Fornell & Larcker, 1981). The Cronbach's alphas and composite reliabilities of all constructs exceed the recommended threshold level of .7, suggesting satisfactory reliability for the individual latent variables (Chin, 1998; Nunnally, 1978).

Insert Table 3 here

In order to further ensure discriminant validity and to control for common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), we estimated different specifications of the CFA model, such as one factor explaining all items collected in wave 1, or the items measuring intention and one of its antecedents loading on the same factor, while all other items load on their intended factors. In every possible specification, the fit of the model was worse than in the original one where all items load on their theoretically specified factors.

Structural model. Next, we added the structural relationships specified in the TPB to the model specification. The results depicted in Figure 1 provide clear support for the TPB: all predicted relationships are positive and statistically significant. In addition, the indirect effects of attitude, subjective norms, and PBC on behavior via intention (not shown in Figure 1) are positive and significant (.1%), which accords with the mediating role of intention specified in the TPB. The R-squared values for intention and behavior indicate that attitude, subjective norms, and PBC explain 59% of the variation in intention, while intention and PBC explain 31% of the variation in behavior. The fit indices suggest satisfactory fit between the model and the data ($\chi^2_{142df} = 343.3$; CFI = .975; RMSEA = .038; SRMR = .036). The effect size estimates (Cohen, 1988) suggest that subjective norms are the overall strongest predictor of intention, while intention is clearly a stronger predictor of behavior than PBC.

Insert Figure 1 here

We also estimated the model with the alternative behavior measure, the count of gestation activities (not shown in Figure 1). The structural equations involving the count variable were

estimated as negative binomial regressions. The substantive results are similar to Figure 1: all structural coefficients are positive and significant (.1%).

Multi-group sensitivity analysis

Before estimating multi-group comparisons of the structural coefficients, it is essential to test the measurement model for measurement invariance (Williams et al., 2009). After ensuring that the CFA estimated separately for each group produces satisfactory fit indices, we then tested the measurement model for configural, metric and intercept invariance (Williams et al., 2009) in each group comparison. All multi-group CFA models pass all three tests, indicating that the respondents in all groups understood the constructs in the same way.

Next, we added the structural paths to the multi-group models and constrained them—as well as the factor loadings and intercepts in the measurement model—to make them equal across the groups (e.g., the effect of intention on behavior is constrained to be the same for women and men). We then tested whether removing a specific structural constraint improves the model fit based on the chi-squared test. The test statistic for each path across six different grouping variables is displayed in Table 4. Only three significant differences were found. First, the effect of PBC on intention is stronger if the person has prior entrepreneurial experience: the standardized path coefficient is .09 ($z=2.46$) if the person has no prior experience, while it is 0.21 ($z=3.63$) if the individual has started and run a business before. Second, the effect of PBC on behavior is positive and significant (at the .01% level) if the person is within the labor force, while the effect is non-significant for those outside the labor force. Third, the effect of attitude on intention is stronger in Finland: the standardized path coefficient is .26 for people residing in

Finland and .14 for those living in Austria. The substantive significance of these findings is limited, however, as they concern moderations of relationships that have small effect sizes.

Insert Table 4 here

Incidence and effects of “non-intenders” taking action and “intenders” not taking action

The evidence presented thus far supports the predictive relevance of the TPB and the construct of entrepreneurial intention in the business start-up context. However, since this evidence consists of correlation and regression coefficients, the following questions arise: How many people took action even though they did not report any intention to do so in wave 1, and, how many people who reported positive intentions in wave 1 did not take any action? With regard to the first question, of the 173 individuals that reported some level of entrepreneurial behavior in wave 2, 34 (20%) had not reported positive intentions in wave 1, while 139 individuals (80%) did.

Unfortunately, our data does not permit us to examine why the 34 “non-intenders” took action. It is possible that their personal or professional circumstances may have changed, leading them to develop an intention to engage in start-up activity after wave 1 and rapidly act upon that intention. Alternatively, they might have become involved in entrepreneurial activity unintentionally. For example, think of a web designer who is laid off by their employer with the offer to keep on working for the company as a freelancer.

Regarding the second question, of the 371 respondents who reported positive intentions in wave 1, 139 (37%) did, and 232 (63%) did not take action. We also ran robustness checks by estimating the model in Figure 1 without “non-intenders” taking action and without “intenders”

who did not take action. Excluding either or both of these groups from the sample produces one notable change in the model outcomes: the effect of intention on taking action becomes stronger. The change in the structural coefficient is moderate when the 34 “non-intenders” who took action are excluded (.57 versus .49 in Figure 1). However, the change is more dramatic when the “intenders” who did not take action are excluded from the estimation sample (.71 versus .49).

DISCUSSION

This study set out to examine how well the Theory of Planned Behavior explains the emergence of business start-up behavior utilizing a bespoke longitudinal dataset comprising 969 adults from Austria and Finland. The theoretical specification and empirical operationalization of the model follow Ajzen’s (2011) guidelines. The empirical analysis shows that all hypothesized relationships are positive and significant as expected. Attitude, subjective norms, and PBC jointly explain 59% of the variation in intention, which is more than the 30–45% typical in previous studies of entrepreneurial intentions (Kolvereid, 1996; Liñán & Chen, 2009; Van Gelderen et al., 2008). Intention and PBC explain 31% of the variation in subsequent behavior, which is in line with results of meta-analyses in other behavioral domains (Armitage & Conner, 2001; Sheeran, 2002), as well as on a par with the closest comparable studies in entrepreneurship (Goethner et al., 2012; Kautonen et al., 2013). Taken together, our results support the relevance of the TPB in the context of business start-up behavior. One major contribution of this study is thus to show that a theory that has been applied in numerous studies of entrepreneurial intentions with implicit assumptions made about its relevance for predicting subsequent actions can now be applied with demonstrated validity.

Furthermore, robustness checks for a range of moderating variables show that the intention-behavior relationship maintains regardless of age, gender, experience, education, and nature of entrepreneurial ambition. We do find some of these variables moderate the effects of the antecedents of intentions on intention formation, but the moderated effects prove to have small effect sizes. Concerning the antecedents of intentions, we find that subjective norms have the strongest effect, which is contrary to previous research that tends to find subjective norms to be the weakest predictor of entrepreneurial intentions (Schlaegel & Koenig, 2012). The latter may be a residual effect of the frequent use of student samples in prior studies, as norms set by others may be less relevant for students than for the wider adult population.

Another related contribution of this study is its demonstration that self-reported intentions are a good predictor of subsequent entrepreneurial actions: Eighty percent of those who reported having engaged in activities aimed at starting a business also reported a positive level of intention to do so in the previous year. Moreover, this finding vindicates the decision to opt for a one-year time gap between the first and second wave of data collection in this study. Of the relatively few respondents who took action without having reported any intention to do so in wave 1, some will have formed their intentions within the one-year period between waves 1 and 2. A robustness check excluding this group shows a slight increase in the effect of intention on behavior. This suggests that a shorter time gap between waves 1 and 2 can be used in order to capture those individuals who form an intention and act upon it rapidly. On the other hand, using a shorter time interval such as six months could lead to an underestimation of the intention-behavior relationship because it would exclude people who need more than six months to take

action. Ideally, researchers should employ multiple measurements and aim to collect a panel dataset, although this may incur increased research costs and risk sample attrition.

Another explanation for people reporting action in wave 2, while not reporting intentions to do so in wave 1, may be that some people were already engaged in start-up related activities such as developing a product in wave 1, but did not consciously label those activities as antecedents of setting up a business. Future research can track the timing of entrepreneurial intentions. The finding that 80% of those taking action report an intention to do so in wave 1 provides evidence for the intentional nature of entrepreneurial action. Taking action is not necessarily planned in a formal sense (the TPB might perhaps be better called the “Theory of Intentional Behavior”), but is in many cases deliberately intended beforehand, and may still be planned in a cognitive sense (Frese et al., 2000). Our findings do not imply that entrepreneurial intentions always come early in the business start-up process though. Our research design ensured that only those who had not yet taken action to start a business were included in the final sample, so those who had taken action first and formed entrepreneurial intentions later would have been excluded from the study. We also note that the two dominant theories used to analyze entrepreneurship as intentional behavior do not necessarily imply that intention formation is the very first step in new venture creation. The entrepreneurial event theory posits that enterprising action is typically a response to an event (Shapero & Sokol, 1982), whereas the TPB explicates that intentions are not the starting point of the entrepreneurial process, as intentions themselves are formed on the basis of behavioral, control, and norm beliefs.

Another future research avenue would be to further increase the level of specificity and assess all TPB constructs at the level of various gestation activities, rather than for the aggregate behavioral category only. This research would be able to show whether different intention-action links hold for different start-up activities, such as developing a product, conducting market research, writing a business plan, and arranging finance. As a first indication, however, the count measure of gestation activities that we used as a robustness check for our behavior measure does not show differences in results compared to the aggregate measure. Such a research design needs to take into account, however, that the constructs making up the TPB may form at a generic level at first (“I intend to start a business in the near future but do not yet know what to do next”) and then over time solidify into specific gestation activities (“I intend to start developing a business plan”).

A limitation of our study is its reliance on self-reported data. Previous TPB applications show that the intention-behavior link is stronger in studies using self-reported data (Webb & Sheeran, 2006). Intention measures will be self-reported by definition, but for behavior, we have to consider self-reported responses as proxies rather than as absolute measures of start-up related actions taken by the respondents, even if our formulation of the behavior measures followed established practices (Ajzen, 2011; Panel Study of Entrepreneurial Dynamics II, 2012). Since objective measures of behavior (submission of patent or value-added tax number applications, for instance) may be limited owing to their specificity (one can take many actions toward setting up a business that do not show up in any official records), future research applying the construct of entrepreneurial intention should endeavor to combine objective and subjective measures of behavior and cross-validate them.

The finding that 63% of the 371 individuals reporting positive intentions in wave 1, did not report having taken any action in wave 2, points to the need to seek an understanding of why people do or do not follow up on their entrepreneurial intentions. Relative to other research fields that study the relationship between intention and behavior, entrepreneurship is characterized by uncertainty, risk, novelty, change, complexity, resource constraints, and both financial and psychological ownership (Baron, 2009; Gibb, 1993). It should not be a surprise, therefore, that actions do not always follow intentions.

There are various explanations for why intentions do not translate into actions. From the TPB perspective the strength of intention drives action: those with weaker intentions are less likely to take action. Intentions may lack stability or elaboration, and they might not enthrust the individual sufficiently to lead to action initiation. Another possibility is that some people's preferences change along with their personal and professional circumstances, with the result that their initial entrepreneurial intentions are no longer valid. It may also be the case that people deliberately postpone taking action: for example, until after they have saved some capital or gained some experience.

Yet another possibility is that volitional issues prevent the conversion of intention into action. Forming an intention has been described as being primarily motivational (i.e., what people want to achieve) whereas the regulation of the translation of goals into action is mostly volitional (i.e., how people exert their will to obtain what they desire) (Gollwitzer, 1999). Self-discipline or self-control may moderate the intention-behavior relationship, with those high in self-control being

better able to convert intentions into actions. Also implementation intentions (Gollwitzer, 1999) can be expected to facilitate action initiation. Another possible moderator, which is conceptually linked to the “propensity to act” construct in the entrepreneurial event model (Shapero & Sokol, 1982), is any personality attribute that refers to a preference for doing versus thinking, for example a preference for learning by doing and experimenting. Entrepreneurship research has not yet addressed these issues empirically. Located chronologically between studies of intention formation and nascent entrepreneurship, both of which have received extensive attention from the entrepreneurship research community, study of the conversion of entrepreneurial intentions into actions has only just begun.

APPENDIX: MEASUREMENT SCALE ITEMS

Variable (all measured on a 6-point Likert-style rating scale)

Intention (first wave)

("How well do the following statements describe you?")

I plan to take steps to start a business in the next 12 months

I intend to take steps to start a business in the next 12 months

I will try to take steps to start a business in the next 12 months

Attitude (first wave)

("Please rate the following statement based on the word pairs provided: 'For me, taking steps to start a business in the next 12 months would be...'"")

...unpleasant–attractive

...useless–useful

...foolish–wise

...negative–positive

...insignificant–important

...tiresome–inspiring

Subjective norm (first wave)

The subjective norm items have been computed by multiplying the following attitude items ("How well do the following statements describe your situation?") with their respective motivation-to-comply items ("And how much would you care about what these people think, if you wanted to take steps to start a business in the next 12 months?")

My closest family members think that I should take steps to start a business in the next 12 months

My best friends think that I should take steps to start a business in the next 12 months

People who are important to me think that I should take steps to start a business in the next 12 months

Perceived behavioral control (first wave)

("Please indicate your opinion on the following statements")

If I wanted to, I could take steps to start a business in the next 12 months

If I took steps to start a business in the next 12 months, I would be able to control the progress of the process to a great degree myself

It would be easy for me to take steps to start a business in the next 12 months

If I wanted to take steps to start a business in the next 12 months, no external factor, independent of myself, would hinder me in taking such action

Behavior (second wave)

("Please assess")

How much effort have you applied to activities aimed at starting a business in the last 12 months?

How much time have you spent on activities aimed at starting a business in the last 12 months?

How much money have you invested in activities aimed at starting a business in the last 12 months?

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Table 1

Descriptive statistics

	Range		(1) First wave (all, $N=1926$)		(2) First wave (not in second wave, $N=957$)		(3) Second wave ($N=969$)		Difference (2) and (3)
	Min	Max	Mean	SD	Mean	SD	Mean	SD	t -statistic / chi-squared
Behavior	1	5.67					1.19	.54	
Gestation activities	0	9					1.08	2.30	
Intention	1	6	1.59	1.02	1.57	1.00	1.60	1.04	$t = -.62$
Attitude	1	6	2.68	1.26	2.67	1.23	2.70	1.28	$t = -.49$
Subjective norms	1	22.67	4.32	3.32	4.29	3.22	4.35	3.43	$t = -.38$
PBC	1	6	3.14	1.30	3.08	1.28	3.19	1.31	$t = 1.80$
Female	0	1	.59		.58		.60		$\chi^2 = 1.33$
Age									$\chi^2 = 7.52^*$
20–34 years	0	1	.30		.32		.28		
35–44 years	0	1	.20		.18		.22		
45–64 years	0	1	.50		.50		.51		
Entrepreneurial experience	0	1	.14		.14		.14		$\chi^2 = .00$
Active in labor force	0	1	.76		.75		.77		$\chi^2 = .72$
Higher education	0	1	.36		.34		.37		$\chi^2 = .97$
Austria	0	1	.21		.15		.27		$\chi^2 = 46.72^{**}$

Notes: The difference column displays the two-tailed t -statistic ($df=1924$) for continuous variables and the Pearson chi-square for indicator variables. * $p < .05$; ** $p < .01$.

Table 2

Correlation matrix

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Behavior	1												
2. Gestation activities	.79**	1											
3. Intention	.50**	.53**	1										
4. Attitude	.40**	.43**	.60**	1									
5. Subjective norms	.38**	.44**	.66**	.60**	1								
6. PBC	.29**	.29**	.37**	.41**	.32**	1							
7. Female	-.07*	-.13**	-.18**	-.17**	-.08**	-.18**	1						
8. Age: 20–34 years	.00	.03	-.02	.01	.00	-.07*	.10**	1					
9. Age: 35–44 years	.04	.05	.08*	.08*	.10**	.09**	-.01	-.33**	1				
10. Age: 45–64 years	-.03	-.07*	-.05	-.07*	-.08**	-.01	-.08**	-.63**	-.53**	1			
11. Entrepreneurial experience	.16**	.14**	.18**	.15**	.12**	.24**	-.10**	-.16**	.01	.14**	1		
12. Austria	-.01	-.05	-.07*	-.15**	-.17**	.02	-.08*	.01	.09**	-.08*	-.04	1	
13. Active in labor force	.05	.06	.05	.11**	.10**	.09**	-.06	-.25**	.16**	.09**	.06	-.02	1
14. Higher education	.00	.03	.02	.04	.02	.07*	-.01	.21**	.05	-.23**	-.01	.01	.06

Notes: $N=969$. * $p < .05$, ** $p < .01$. Pearson product-moment correlation coefficients.

Table 3

Latent variable correlations, Cronbach's alphas, composite reliabilities (CR) and square roots of the average variance extracted (AVE, diagonal axis, *italicized*) for the full sample ($N=969$)

	Latent variable correlations						
	Alpha	CR	Behavior	Intention	Attitude	PBC	SN
Behavior	.85	.88	<i>.85</i>				
Intention	.93	.93	.54	<i>.90</i>			
Attitude	.94	.94	.43	.63	<i>.85</i>		
Subjective norms (SN)	.87	.87	.44	.73	.66	.83	
PBC	.82	.83	.34	.43	.47	.38	<i>.74</i>

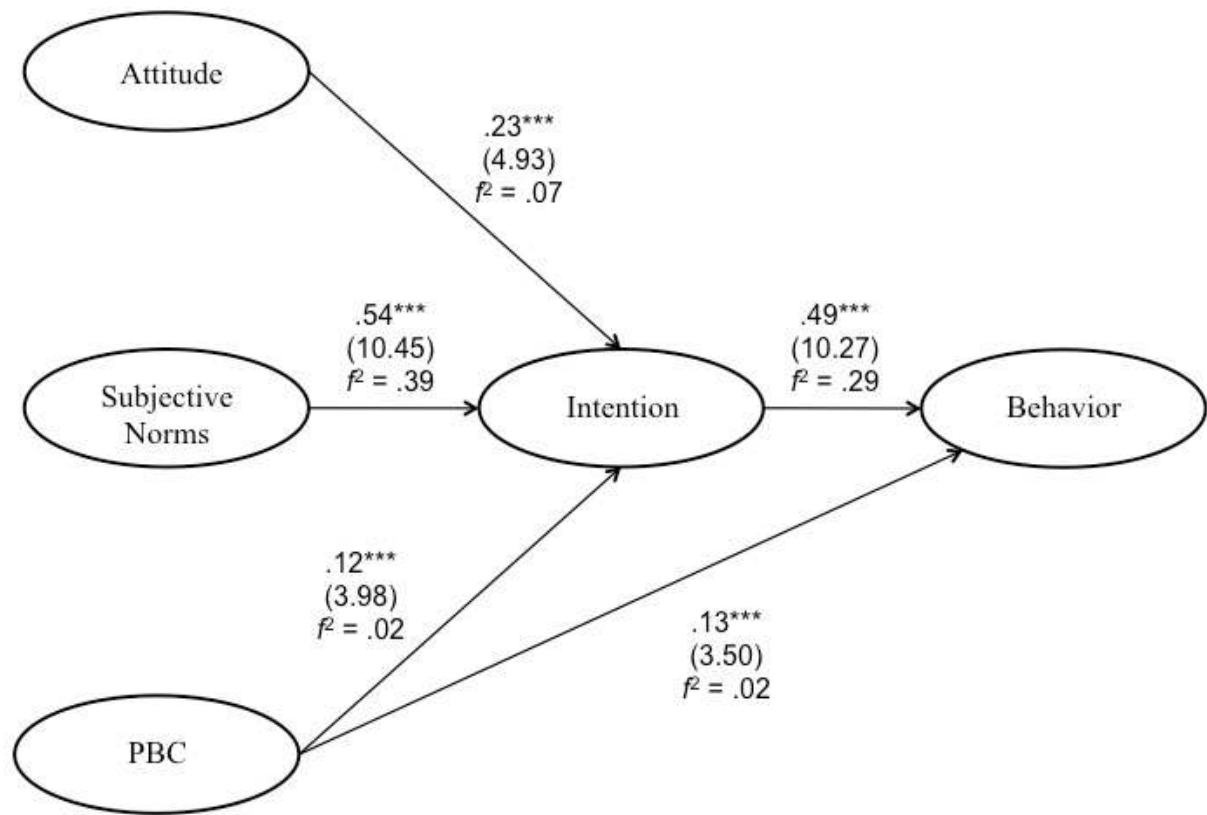
Table 4

Multiple-group comparisons

Path	Gender	Experience	Labor force	Education	Age	Country	Business type ¹
Attitude -> EI	.41	3.20	.01	.52	2.54	4.17*	.23
Subjective norms -> EI	1.58	1.38	.00	1.64	1.20	.04	.69
PBC -> EI	.00	4.70*	.10	1.33	1.32	1.90	.01
PBC -> Behavior	2.94	.64	6.66**	.85	1.09	.14	.26
EI -> Behavior	.01	1.99	2.94	.14	1.90	.00	2.93

Notes: * $p < .05$, ** $p < .01$. EI = entrepreneurial intention. Multiple-group models where measurement models (factor loadings and constants) and structural coefficients are constrained to be equal across groups. The chi-square statistic (1 df except for Age 2 df) reported tests invariance of structural coefficients: a significant test statistic indicates that the structural coefficient differs between the groups.¹ Business type refers to the type of business the respondents with positive intentions aspire to create: part-time or own-account versus firm with employees and potential growth-orientation. The test therefore excludes all respondents who did not report any intentions in wave 1. This also means that EI stands for intention strength only, as it does not include the possibility of having no intentions.

Fig. 1. Structural model for the full sample



Notes: $N=969$. Standardized path coefficients and the Wald test z -statistic (based on robust standard error estimates) in parentheses ($*** p < .001$). The f^2 scores denote Cohen's (1988) effect sizes: $f^2 > .35$ strong effect; $f^2 > .15$ moderate effect; $f^2 > .02$ weak effect. The R-squared values for intention and behavior are .59 and .31, respectively.