

The theory of planned behavior in entrepreneurship research: what we know and future directions

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Abstract The entrepreneurship literature utilizing the Theory of Planned Behavior (TPB) has grown considerably over the last 20 years. Therefore, it is time to take stock of the TPB's contributions to our understanding of entrepreneurship thus far. In this paper, we review the relevant literature and present research suggestions that will guide scholars in the future. First, we organize the literature according to the part of the TPB utilized along four main themes found in the literature. We also outline the many additions and alterations that entrepreneurship scholars have implemented to the TPB. We then suggest future research based on the review. Taken together, our contributions highlight important contexts that have been understudied, and highlight important theoretical relationships that have received only a small amount of attention but have the potential for large future findings. Our contributions also speak to entrepreneurial behaviors and entrepreneurial intentions, the two main dependent variables of research that uses the TPB.

Keywords Entrepreneurial behaviors · Entrepreneurial intentions · Entrepreneurship · Theory of planned behavior

The Theory of Planned Behavior (TPB) has become one of the most utilized theories in terms of explaining and predicting behaviors of individuals. The TPB has been cited over 5000 times according to the Web of Science since Icek Ajzen originally published it in book (1988) and article (1991) form. The TPB's main assertion's are that behavior is preceded by one's intentions to perform the behavior and perceived control over the behavior (Ajzen 1991). Further, individuals' intentions are determined by their attitudes toward the behavior, subjective norms, and perceived control over the behavior. The TPB has been used to explain and predict intentions and behaviors in all types of research fields, such as health sciences (Godin and Kok 1996), leisure studies (Hagger et al. 2003), psychology (Austin and Vancouver 1996), and marketing (Pavlou and Fygenson 2006).

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The TPB has been used to explain and predict planned behaviors in entrepreneurship as well. Almost all entrepreneurship scholars that have incorporated the TPB into their research establish the foundation that starting and growing a business (and various other behaviors related to entrepreneurship) are planned behaviors (Kolvereid and Isaksen 2006; Krueger and Reilly 2000; Krueger et al. 2000; Shook et al. 2003). As Krueger et al. (2000, p. 414) explained, “In general, much of human behavior is planned; it is difficult to envision starting a business where the nascent firm is launched simply as a conditioned response to a stimulus”. Entrepreneurship is an intentional process in which individuals cognitively plan to carry out the behaviors of opportunity recognition, venture creation, and venture development.

Due to the applicability of the TPB, a large amount of entrepreneurship research has used parts of Ajzen’s (1991) model. Also, because the TPB is an established theory, its use in the entrepreneurship literature has followed certain themes. These lines of research have grown substantially since the TPB was first published, as it can be seen in Fig. 1. The use of the TPB is on the rise in the entrepreneurship literature, however, there seem to be a lack of understanding between the many different ways that the TPB has been used. In many cases, the TPB has been cut-up and compartmentalized for authors’ individual uses and therefore the results across the literature are fragmented in terms of what the TPB actually says in the context of entrepreneurship. This review reunites the many different parts of the TPB back together in order to assess the complete theory in terms of its applications to the entrepreneurship field.

There two main purposes for this manuscript. First, we present a review of the entrepreneurship literature that has utilized Ajzen’s TPB. Our review organizes the research utilizing the TPB and shows support for the theory in the context of entrepreneurship. We also synthesize and categorize this area of the entrepreneurship literature that provides for a useful reference to scholars. Second, based on the review, we present specific future research streams that are useful for expanding and directing entrepreneurship research in the future.

Our main contributions by accomplishing these two main purposes are as follows. First, we contribute to the growing stream of entrepreneurship-based literature that uses the TPB by systematically organizing the findings of this literature stream and presenting meaningful avenues for future research. Our

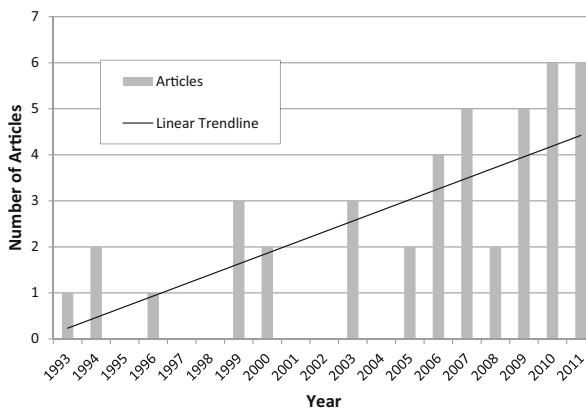


Fig. 1 The number of entrepreneurship articles utilizing the TPB

contributions highlight important contexts that have been understudied, and highlight important theoretical relationships that have received only a small amount of attention but have the potential for large future findings. Finally, our review also contributes to the research streams on venture creation intentions, venture creation behaviors, venture development intentions, and venture development behaviors as these are the four main dependent variables of interest for researchers utilizing the TPB in entrepreneurship research.

The remainder of this manuscript will progress as follows. First, we present an outline of the TPB that will highlight Ajzen's original arguments for its applicability in explaining and predicting any type of planned behavior. Next, we present a review of the entrepreneurship literature which has utilized the TPB. Our review will highlight how the TPB has been used in the entrepreneurship literature, and highlight the themes and additions/changes that have been found to be applicable to the theory. Finally, we will list important future research directions based on the gaps that have been discovered in our review of the literature.

The theory of planned behavior

The basic premise of the Theory of Planned Behavior is that some type of intentionality towards the behavior (see Fig. 2) precedes any planned behavior. Intentions are understood as capturing the motivational factors that influence a behavior in that they are indications of how hard an individual is willing to try, and of how much effort an individual is planning to exert in order to perform the behavior. The stronger the intention to perform a behavior, the more likely the behavior will be performed by an individual. This link between intentions and subsequent behaviors has been confirmed by a general meta-analysis (Armitage and Conner 2001) and a more recent entrepreneurship specific meta-analysis (Schlaegel and Koenig 2014). As Kolvereid (1996) explained, attitudes or beliefs do not directly predict behaviors; instead, these factors are either fully or partially captured by intentions. This mediated relationship between intentions, attitudes, subjective norms, and perceived behavioral control is displayed in Fig. 2.

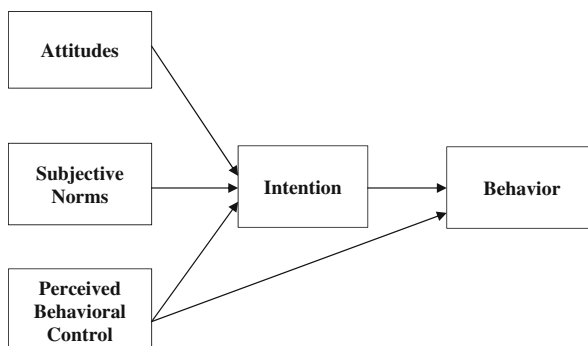


Fig. 2 The theory of planned behavior according to Ajzen (1991)

Ajzen (1991, p. 188) described the attitude one holds towards a behavior as, “the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question”. Depending on how favorable individuals evaluate behaviors, their subsequent intentions will be formed. The attitude construct was originally based on Fishbein and Ajzen’s (1975) Expectancy-Value Model which explained that the subjective value of a given outcome affects the attitude in direct proportion to the strength of the belief (Armitage and Conner 2001).

Subjective norms refer to the perceived social pressure to perform or not perform the behavior in question. Subjective norms are the attitude that an individual holds about how important referent others or groups approve or disapprove of performing a given behavior (Ajzen 1991). Important referent others normally refers to family members, significant others, and friends that one is close to. One’s attitudes about the subjective norms that exist for a given behavior reflect the perceptions that person has about how positively or negatively others view the behavior in question. Subjective norms are largely a function of salient normative beliefs (Armitage and Conner 2001).

The Theory of Planned Behavior is an extension of Ajzen’s earlier work named the Theory of Reasoned Action (Ajzen and Fishbein 1980). In fact, the two theories are very similar in that the TPB only differs from the Theory of Reasoned Action in the addition of the construct of perceived behavioral control (PBC). PBC refers to the perceived ease or difficulty of performing the behavior by the individual. Not only does one’s attitude towards the PBC refer to past experiences, but it also refers to anticipated obstacles and other factors impeding the performance of the behavior (Ajzen 1991). Individuals who believe they have a large amount of control over a behavior will develop subsequent intentions to perform the behavior. Together, attitudes, subjective norms, and PBC have an additive effect on an individual’s intentions. This implies that it is possible for individuals to have high intentions even though one or two of the antecedents preceding their intentions might be low.

As it is seen in Fig. 2, PBC not only affects one’s intentions but also directly affects one’s behavior as well. This partially mediated relationship between PBC, intention, and behavior is the main difference between the Theory of Reasoned Action (Ajzen and Fishbein 1980; Fishbein and Ajzen 1975) and the Theory of Planned Behavior (Ajzen 1988; Ajzen 1991). Ajzen (1991) argued that intentions alone are sufficient in predicting behaviors that individuals have complete volitional control over. However, Ajzen argued that as volitional control over the behavior begins to drop, PBC becomes increasingly important in directly determining subsequent behavior. As Armitage and Connor (2001, p. 473) described,

Ajzen argue(d) that under conditions where behavioural intention alone would account for only small amounts of the variance in behaviour (i.e. where there are problems of volitional control), PBC should be independently predictive of behaviour. This is based on the rationale that increased feelings of control will increase the extent to which individuals are willing to exert additional effort in order successfully to perform (sic) a particular behaviour.

The theory of planned behavior in entrepreneurship research

Review methods

We began our review of the entrepreneurship literature by utilizing the Web of Science and ABI/INFORM Complete databases to retrieve a list of all of the articles which cited either Ajzen's 1988 book *Attitudes, Traits, and Actions* or his 1991 article in *Organizational Behavior and Human Decision Processes*. Both the book and the article contain parts of the TPB while the article also presented arguments for the PBC construct and a meta-analysis review. According to the Web of Science, the 1988 book is cited about 1500 times while the article is cited over 5000 times. Almost all of the citations for Ajzen's 1988 book also cite the 1991 article. These citation counts are a testament to the overall generalizability of the TPB to explaining and predicting almost any type of planned behavior.

Once we had a working list of all the articles that have cited the TPB, we then began to narrow the search by choosing the appropriate journals for the review. Included in this initial journal search were all of the entrepreneurship journals with a quality rating of three or higher according to the Association of Business Schools (ABS) Academic Journal Quality Guide (March, 2010 edition). The ABS guide serves as a guide to the relative quality of business journals. Also, in order to capture those entrepreneurship articles published in the main stream management literature, general management journals with an ABS quality rating of four or 4* were included. All of the articles from entrepreneurship journals were included in the next part of the analysis while the articles in the mainstream management journals were analyzed to determine if the topic of the article was entrepreneurship or not. This produced a list of 65 entrepreneurship articles which had cited the TPB.

A secondary search of these 65 articles was then conducted. All 65 articles were manually searched in order to find any other articles which were not discovered in the initial search. This was done by evaluating references and citations. This was a necessary step since the databases used have not indexed relevant journals back far enough to capture all of the articles since 1988. For example, *Entrepreneurship: Theory and Practice* is only indexed back to 2001 in certain databases that the Web of Science and ABI/INFORM utilize. This secondary manual search of the articles already retrieved produced another ten relevant articles to be included in the coding process below.

The coding of each article began with a general overview of the abstract and the specific use of the TPB. Of the 75 articles that had made it to this point in the analysis, 33 did not specifically utilize any part of the TPB. A majority of these articles that were dropped from the analysis had cited Ajzen's work, but did not use the TPB specifically. Instead, these authors were using Ajzen's work as a citation to support a general argument of intentions leading to behaviors that was not integral to the purpose of their article. Since these articles were not utilizing the TPB itself (empirically testing, or theorizing about, a TPB relationship) they were not included in the final review. This step produced a final database of 42 entrepreneurship articles which utilized at least one part of the TPB in either an empirical or conceptual way. This final count of 42 articles and their respective journals can be seen in Table 1.

Table 1 Final journal count

Journal	# of Articles	% of Articles
Entrepreneurship: theory and practice	12	28.6 %
Journal of business venturing	8	19.0 %
International small business journal	6	14.3 %
Entrepreneurship & regional development	3	7.1 %
Journal of small business management	3	7.1 %
Technovation	3	7.1 %
Journal of management studies	2	4.8 %
Academy of management journal	1	2.4 %
Journal of vocational behavior	1	2.4 %
Journal of business research	1	2.4 %
Journal of applied psychology	1	2.4 %
Small business economics	1	2.4 %
Total	42	100 %

All 42 articles were coded according to the following criteria: author, year of publication, journal, focus (empirical or conceptual), survey measures utilized, nature of empirical data (cross-sectional, longitudinal, or qualitative), whether students were used as subjects, entrepreneurship category (venture creation, new venture development, scale development, or other), and level of analysis (individual, meso, or other). In addition to the previous information, each article was coded according to which part of the TPB was used conceptually or tested empirically, and whether the study found empirical support for the relationship. Finally, notes were taken on each article in order to document other variables that affect the TPB or alternate configurations of the TPB that had been tested. The effort of this coding process is seen in Table 2.

Basic categorizations of the literature

The 42 articles that were evaluated were published in a variety of academic journals. This can be seen by the breakdown in Table 1 where we show 12 different journals published from 2 to 28 % of the articles. It is promising to see that 48 % of the articles were published in *Entrepreneurship: Theory and Practice* and *Journal of Business Venturing*, which are the top entrepreneurship journals according to ABS ratings and impact factors. This shows that the TPB has generally made an important impact where it has been utilized in the entrepreneurship literature. Only 9 % of the articles were published in the top general management journals (ABS 4 and 4* general management classifications). When comparing the ABS 4 and 4* journal outlets alone (both entrepreneurship and general management categories) it turns out that 83 % of the articles have been published in the top entrepreneurship journals as compared to the 17 % in the top general management journals. This seems to indicate that the TPB is used for specific research questions in the entrepreneurship literature that might be too specific for the top mainstream management journals. Finally, 32 (76 %) of the articles

Table 2 A review of the TPB in entrepreneurship research

Author	Focus	Survey	Data	Student sample	Part of the TPB used			TPB category	Entrepreneurship category	Level of analysis
					A - I	SN - I	PBC - I - B			
Entrepreneurship: theory and practice										
Kickul et al. (2009)	Empirical	Cox et al. (2002) and Grant (1996)	Cross-Sectional	✓	✓	✓	I	Venture Creation	Individual	
Linan and Chen (2009)	Empirical	EQ	Cross-Sectional	✓	✓	✓	I	Scale Development	Meso	
Thompson (2009)	Empirical	Thompson (2009)	Cross-Sectional				I	Scale Development	Individual	
Delmar and Wiklund (2008)	Empirical	Specific	Longitudinal				✓ B	New Venture development	Meso	
Brigham et al. (2007)	Empirical	O'Reilly et al. (1991)	Longitudinal				✓ B	Other	Individual	
Dimov (2007)	Empirical	Specific	Cross-Sectional	✓			✓ B	Venture Creation	Individual	
Peterman and Kennedy (2003)	Empirical	Krueger (1993)	Longitudinal	✓			A, PBC	Venture Creation	Individual	
Kolvereid (1996)	Empirical	Specific	Cross-Sectional	✓	✓	✓	I	Venture Creation	Individual	
Boyd and Vozikis (1994)	Conceptual	None	None		✓	✓	I, B	Venture Creation	Meso	
Entrepreneurship: theory and practice										
Krueger and Brazeal (1994)	Conceptual	None	None		✓	✓	I	Venture Creation	Meso	
Krueger (1993)	Empirical	Specific	Cross-Sectional	✓	✓	✓	I	Venture Creation	Individual	

Table 2 (continued)

Author	Focus	Survey	Data	Student sample	Part of the TPB used				TPB category	Entrepreneurship category	Level of analysis
					A - I	SN - I	PBC - I	PBC - B			
Journal of business venturing											
Fitzsimmons and Douglas (2011)	Empirical	Douglas and Shepherd (2000)	Cross-Sectional	✓	✓	✓	✓	I	Venture Creation	Individual	
Lee et al. (2011)	Empirical	Specific	Cross-Sectional					I	Venture Creation	Meso	
Soutaris et al. (2007)	Empirical	Kolvereid (1996)	Longitudinal	✓	✓	✓	✓	I	Venture Creation	Individual	
Cassar (2006)	Empirical	PSED, Specific	Longitudinal		✓			I	New Venture development	Individual	
Kolvereid and Isaksen (2006)	Empirical	Kolvereid (1996), Gundry and Welsch (2001)	Longitudinal		✓	✓	✓	B	Venture Creation	Individual	
Douglas and Shepherd (2000)	Conceptual	None	None		✓	✓	✓	I	Venture Creation	Individual	
Krueger et al. (2000)	Empirical	Krueger et al. (2000)	Cross-Sectional	✓	✓	✓	✓	I	Venture Creation	Individual	
Kaufmann (1999)	Empirical	Specific	Longitudinal					A,SN	Venture Creation	Individual	
Academy of management journal											
Vissa (2011)	Empirical	Specific	Cross-Sectional		✓		✓	I,B	Other	Individual	
Journal of applied psychology											
Zhao et al. (2005)	Empirical	Chen et al. (1998)	Longitudinal	✓		✓	✓	I	Venture Creation	Individual	
Entrepreneurship & regional development											
Linan et al. (2011)	Empirical	EIQ	Cross-Sectional	✓	✓	✓	✓	I	Venture Creation	Meso	

Table 2 (continued)

Author	Focus	Survey	Data	Student sample	Part of the TPB used				TPB category	Entrepreneurship category	Level of analysis
					A - I	SN - I	PBC - I	PBC - B			
Henley (2007)	Empirical	Specific	Longitudinal		✓			B	New Venture development	Individual	
Tkachev and Kolvereid (1999)	Empirical	Kolvereid (1996)	Cross-Sectional	✓	✓	✓		I	Venture Creation	Individual	
International small business journal											
Kautonen et al. (2010)	Empirical	Kolvereid (1996)	Cross-Sectional		✓	✓		I	Venture Creation	Individual	
Ramos-Rodriguez et al. (2010)	Empirical	GEM, Specific	Cross-Sectional		✓			I	Other	Individual	
Doern (2009)	Conceptual	None	None					I, B	Venture Creation	Meso	
Radu and Redien-Collof (2008)	Empirical	Specific	Qualitative		✓	✓		I	Venture Creation	Meso	
International small business journal											
Arenius and Kovalainen (2006)	Empirical	GEM, Specific	Cross-Sectional		✓	✓		I	Venture Creation	Individual	
LeBrasseur et al. (2003)	Empirical	Specific	Longitudinal					I, B	New Venture development	Individual	
Journal of business research											
Carr and Sequeira (2007)	Empirical	Specific	Cross-Sectional		✓	✓		I	Venture Creation	Individual	
Journal of small business management											
Carsrud and Braemback (2011)	Conceptual	None	None		✓			I, B	Venture Creation	Individual	
	Empirical	Specific	Longitudinal					B		Individual	

Table 2 (continued)

Author	Focus	Survey	Data	Student sample	Part of the TPB used				TPB category	Entrepreneurship category	Level of analysis
					A - I	SN - I	PBC - I	PBC - B			
Stenholm (Stenholm 2011)									New Venture development		
Chrisman (1999)	Empirical	Specific	Cross-Sectional			✓		B	Venture Creation	Individual	
Technovation											
Prodan and Dmrovsek (2010)	Empirical	Krueger et al. (2000)	Cross-Sectional		✓			I	Venture Creation	Individual	
Lucas et al. (2009)	Empirical	Specific	Cross-Sectional	✓	✓			PBC	Venture Creation	Individual	
Montalvo (2006)	Empirical	Specific	Cross-Sectional		✓	✓		I	Other	Meso	
Journal of management studies											
Dimov (2010)	Empirical	PSED, Specific	Longitudinal					PBC	Venture Creation	Individual	
Wiklund and Shepherd (2003)	Empirical	Davidsson (1989)	Cross-Sectional				✓	B	New Venture development	Individual	
Journal of vocational behavior											
Obschonka et al. (2010)	Empirical	CAMI	Cross-Sectional		✓			PBC,I	Venture Creation	Individual	
Small business economics											
Maula et al. (2005)	Empirical	GEM, Specific	Cross-Sectional			✓		B	Other	Individual	

^a A Attitudes, SN Subjective Norms, PBC Perceived Behavioral Control, I Intentions, B Behavior

centered their studies at the individual level of analysis, while nine (21 %) used a meso-level (House et al. 1995) approach.

Thirty-seven of the 42 (88 %) articles published were empirical in nature. This is somewhat expected as the TPB is a well-established theory and empirical research often tests hypotheses derived from established theory (Hunt 2002, 2010). 24 (65 %) of these articles used cross-sectional data while 12 (32 %) utilized longitudinal data, and only one (2 %) used qualitative data. 24 (65 %) of the empirical studies used non-student data while 13 (35 %) used students as subjects.

How has the TPB been used in the entrepreneurship literature?

Based on the review of the literature, the TPB has been used to explain and predict a large number of entrepreneurial intentions and behaviors. The columns under “Part of the TPB used” in Table 2 code the relationships of variables from the TPB that each article tested empirically or theorized to exist. We have summarized and compiled these into Fig. 3, which shows the number of articles that empirically tested or theorized each relationship along with the corrected mean recently found via meta-analysis for each relationship (Schlaegel and Koenig 2014).

The ways that the TPB has been used are interesting. Only one article (Kolvereid and Isaksen 2006) from the review tested the entire TPB, but it did not find support for the entire TPB in explaining and predicting entry into self-employment, using longitudinal data on new business start-ups in Norway (Kolvereid and Isaksen 2006). Every other article reviewed considered only parts of the TPB, or either antecedents or alternate configurations of the model. Despite the fact that the one article that tested the full model did not find full support for the theory, Fig. 3 shows impressive support for the individual TPB relationships. However, it also shows a few gaps in the literature as far as the number of articles utilizing certain relationships from the TPB.

All of the relationships, except for the PBC to behaviors link, had at least 13 articles propose or test their existence in the entrepreneurship context. Three of these relationships had an impressive amount of attention as well as at least 90 % of the articles

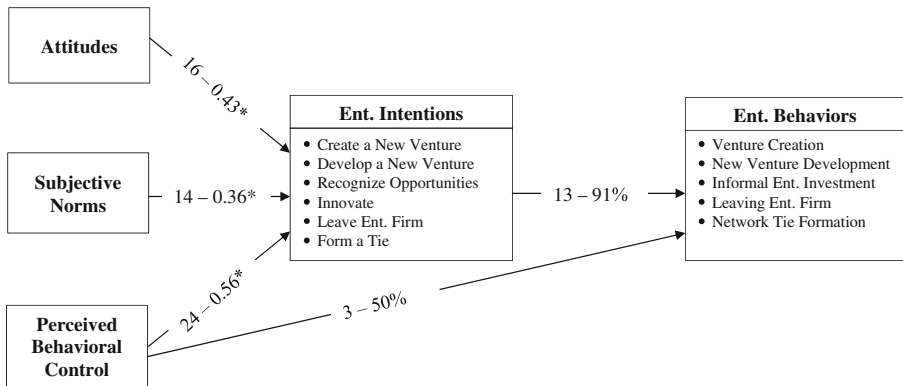


Fig. 3 Relationships tested or proposed on the intentions and behaviors in the entrepreneurship literature. Relationship paths display the total number of articles which either theorized that the relationship existed, or empirically tested the relationship along with the correct means acquired from Schlaegel and Koenig (2014). Note that Behavior relationships were not evaluated in the meta-analysis. The percentage represents the percent of empirical articles that found support for the relationship (two articles for PBC and 11 for intentions)

confirming the relationship. These were (1) attitudes to intentions, which had 16 articles, all of which supported the relationship, (2) PBC to intentions, which had 24 articles, 90 % of which supported the relationship, and (3) intentions to behaviors, which had 13 articles, 91 % of which supported the relationship.

The subjective norms to intentions relationship received considerable attention with 14 articles investigating the relationship. However, out of all of the relationships, subjective norms to intentions received the lowest support in the literature with 86 % of the articles finding supporting evidence. For example, Linan and Chen (2009) did not find support for the subjective norms to intentions relationship based on their sample of university students from Spain and Taiwan using structural equation modeling. Other earlier research in the entrepreneurship literature indicates doubt in this relationship as well, for example, Krueger et al. (2000) also found that subjective norms did not relate to intentions. However, both of these articles used student samples for their analyses, and their results must be evaluated with caution.

The other relationship which has questions surrounding it is the PBC to behavior link. This is interesting since (1) PBC is the integral factor separating the TPB from the Theory of Reasoned Action (Ajzen and Fishbein 1980), and (2) PBC as a construct was substantially utilized as a dependent and independent variable in the literature. Of the three articles which utilized the PBC to behavior relationship only two were empirical. One theoretical article proposed that entrepreneurial self-efficacy/PBC would directly affect future entrepreneurial venture creation in an individual's life (Boyd and Vozikis 1994). This relationship was later empirically tested and did not receive statistical support when Kolvereid and Isaksen (2006) used longitudinal data of Norwegian new businesses to test whether entrepreneurial self-efficacy/PBC affects subsequent entrepreneurial behaviors. Their analysis showed that PBC at time 1 did not add to variance explained in entrepreneurial behaviors at time 2.

However, the other empirical study did find statistical support for the relationship in evaluating entrepreneurial self-efficacy and its effects on future informal entrepreneurial investments (Maula et al. 2005). While this does support the relationship in the entrepreneurship context, it is not a specific entrepreneurship behavior such as starting or growing a business. The PBC construct is similar (and somewhat interchangeable according to some scholars) with the Entrepreneurial Self-Efficacy (ESE) construct. However, as it is seen above, only three articles have used this construct in the TPB context. With the recent development of an ESE measurement scale (Chen et al. 1998; McGee et al. 2009), more empirical research of the Perceived Behavioral Control to Entrepreneurial Intentions relationship should be carried out.

What has the TPB explained and predicted in the entrepreneurship literature?

There are four main themes that run through the entrepreneurship literature utilizing the TPB. These themes are the result of evaluating the dependent variables in the TPB from each study, and the entrepreneurship area of the literature in which each article fits. These two dimensions used for evaluation are illustrated in Table 2 under the column headings of "TPB Category" and "Entrepreneurship Category". The "TPB Category" indicates the construct(s) within the TPB that the author(s) used as the dependent variable. Between the five different constructs the "Entrepreneurship Category" indicates whether the author was seeking to explain and predict the venture creation

process, or new venture development. Of note about these two constructs is the idea that they are human behaviors that should not be confused with venture actions or outcomes. For example, while many articles reviewed quantified “growth intentions” or “growth behaviors” these constructs represent firm level behaviors and serve as an empirical proxy of the actual human behavior of development behaviors, or, those human actions that work towards growing a venture. By far, venture creation and venture development were the two main phenomena that authors in the entrepreneurship literature have evaluated with the TPB. A two-by-two matrix based on these two categories displays the number of articles that fall into each cell in Table 3.

Table 3 presents an interesting picture of what the TPB has explained and predicted in the entrepreneurship literature. While 21 articles have attempted to use the TPB to explain and predict entrepreneurial intentions to create a new venture (Cell 1, Table 3), only two have attempted to explain and predict the intentions to develop a new venture, and only six and five have attempted to explain and predict venture creation and new venture development behaviors respectively. One should note that not all of the 42 articles are included in these four categories since there were other entrepreneurial intentions or behaviors that were explained and predicted. Figure 3 displays these other entrepreneurial intentions and behaviors that do not fall into the two-by-two matrix.

The intention to create a new venture theme (Cell 1, Table 3) is well developed in the entrepreneurship literature that utilizes the TPB. Kolvereid (1996) was one of the first to use the TPB to explain and predict individuals’ intentions to create a new venture and found support for attitudes, subjective norms, and PBC as antecedents to venture creation intentions. Carr and Sequeira (2007) found support for the three main antecedents on venture creation intentions as well as support for prior family business exposure as an antecedent to attitudes, subjective norms, and PBC. Arenius and Kovalainen (2006) found support for subjective norms and PBC relating to venture creation intentions in their sample of four different Nordic countries in the Global Entrepreneurship Monitor (GEM) dataset. Also, Souitaris et al. (2007) found evidence of an entrepreneurship program affecting the attitudes, subjective norms, PBC, and intentions to create a new venture of students that took the educational program. These four examples are only a small sample of the 21 articles which show how the TPB has been used to explain and predict intentions to create a new venture. From these four articles alone, it can be seen that this theme has developed a large diversity of findings for this theme, and that the TPB is applicable as a theoretical basis for explaining and predicting the intention to create a new venture.

Only two articles utilized the TPB to explain and predict individuals’ intentions to develop their new businesses (Cell 2, Table 3). Cassar (2006) successfully predicted development intentions with PBC. PBC was operationalized with constructs such as

Table 3 Article categorization based on the TPB category and entrepreneurship category

		Entrepreneurship category	
		Venture creation	New venture development
TPB category	Intentions	21 (Cell 1)	2 (Cell 2)
	Behaviors	6 (Cell 3)	5 (Cell 4)

managerial experience and college education in Cassar's model. The second article to use the TPB to explain intentions to develop a new venture was LeBrasseur et al. (2003) who showed that pre-startup activities affect PBC and subsequent intentions to develop a new business. These results could be viewed as PBC affecting intentions to develop a new business as pre-startup planning behaviors have been shown to affect individuals' PBC over subsequent behaviors (Dimov 2010). Overall, it is unclear whether the TPB is applicable in this particular theme since only PBC has been utilized.

Six articles fall into the venture creation behavior theme of the literature (Cell 3, Table 3). Of these six, three are conceptual (Boyd and Vozikis 1994; Carsrud and Braennback 2011; Doern 2009). One example is Doern (2009) which changes the level of analysis and theorizes that venture creation behaviors will be affected by environmental factors, specifically in transition economies. An empirical example of the venture creation behavior theme found support for outside assistance (in the form of utilizing a Small Business Development Center) moderating the intention to behavior relationship (Chrisman 1999). However, as it can be seen from these two examples, the findings for this category are largely scattered and underdeveloped, and the question of whether the TPB is applicable is still relatively unknown.

Finally, five articles fall into the new venture development behavior theme of the literature (Delmar and Wiklund 2008; Henley 2007; LeBrasseur et al. 2003; Stenholm 2011; Wiklund and Shepherd 2003). All five of these articles were empirical, and four of the five found support for venture development intentions predicting subsequent venture development behaviors (Delmar and Wiklund 2008; Henley 2007; Stenholm 2011; Wiklund and Shepherd 2003). Also, four of the five articles utilized longitudinal data in order to observe development intentions and whether they led to subsequent behaviors (Delmar and Wiklund 2008; Henley 2007; LeBrasseur et al. 2003; Stenholm 2011). For one example, these intentions to develop a new venture turned into subsequent behaviors aimed at growing the new venture in less than a year (Henley 2007). The findings in this theme lend strong support for supporting the overall idea of development intentions leading to development behaviors. However, this seems to be the main relationship utilized, and for the most part the authors do not incorporate other aspects of the TPB. The question of whether the TPB is applicable is somewhat confirmed for this theme; intentions do lead to venture development. However, it is still relatively unknown what the effects of attitudes and subjective norms (mediated by intentions seen in cell 2), along with perceived behavior control (both direct effects and mediated by intentions) are on venture development behaviors.

Modifying and expanding the TPB to entrepreneurial phenomena

Scholars have worked diligently to use the TPB to explain and predict all different types of intentions and behaviors in the entrepreneurship literature. In addition to venture creation and new venture development intentions and behaviors, which have been described above, the intention to, and subsequent behavior of, recognizing opportunities (Ramos-Rodriguez et al. 2010), innovating (Montalvo 2006), leaving an entrepreneurial firm (Brigham, De Castro, and Shepherd 2007), making an informal entrepreneurial investment (Maula et al. 2005), and forming an entrepreneurial network tie (Vissa 2011) have also been explained by the TPB. Entrepreneurship Scholars have altered and expanded the TPB over the past 20 years in order to use the TPB to explain

and predict all of these entrepreneurial phenomena. Figure 4 models all of the different additions or alterations that were reviewed in the literature. Figure 4 is best evaluated by locating one of the five TPB constructs of interest and evaluating the relationships that lead to or from the construct. It is also useful in seeing different constructs that have been connected through separate empirical investigations, but that have not yet been studied together. More on this idea is further explained under the future research directions section below.

Figure 4 shows a large amount of additions to the TPB. A large majority of these additions come in the form of antecedents to the attitudes, subjective norms, and PBC constructs. As Ajzen (1991) originally theorized, attitudes, subjective norms, and PBC were believed to be preceded by one’s general beliefs. Entrepreneurship scholars have expanded upon this original theorization to include all types of different variables that precede the TPB.

For example, some entrepreneurship scholars theorized that subjective norms might act as an antecedent to attitudes or PBC (Boyd and Vozikis 1994) due to some of the original failures of subjective norms to directly predict intentions. These relationships of subjective norms and intentions being mediated by attitudes and PBC were subsequently supported with empirical evidence (Linan and Chen 2009; Linan et al. 2011).

Other constructs that were not a part of the original TPB have also been tested as antecedents to the model. For example, Gender has been found to be a significant antecedent to attitudes, subjective norms, and PBC (Kolvereid 1996; Zhao et al. 2005). Kolvereid and Isaksen (2006) found support for autonomy, authority, self-realization, and economic opportunity as antecedents

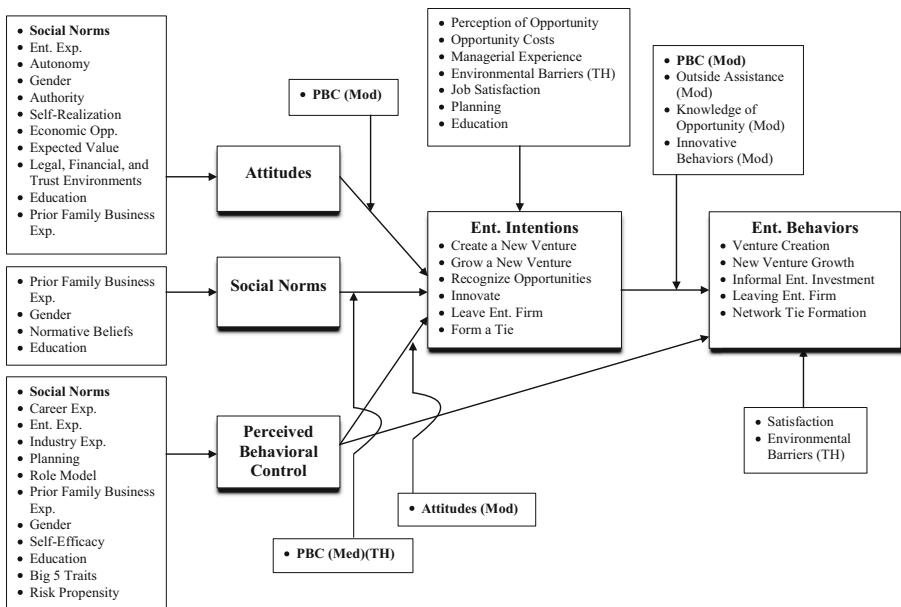


Fig. 4 Expansions and modifications to the TPB in the entrepreneurship literature. *Bolded* constructs indicate a TPB construct as an antecedent, moderator, or mediator. *Mod* Moderator, *Med* Mediator, *TH* Theorize. All relationships received statistical support in at least one article in the review unless marked with a (TH)

to attitudes while other scholars have found the Big Five personality traits (i.e. openness, conscientiousness, extraversion, agreeableness, and neuroticism) as antecedents to PBC (Obschonka et al. 2010). Finally, past entrepreneurial experience, education, and growing up in a family with a family business have all been found to be antecedents as well (Carr and Sequeira 2007; Dimov 2010; Lim et al. 2010; Peterman and Kennedy 2003; Zhao et al. 2005). Studies like the examples seen here have expanded upon the TPB to better explain eventual entrepreneurial intentions and behaviors.

The same way scholars have proposed antecedents to attitudes, subjective norms, and PBC, they have also proposed alternate antecedents to intentions as well. For example, opportunity costs (measured as household income and reflecting current job salaries) and managerial experience have been shown to affect future development intentions of new ventures (Cassar 2006).

In addition to antecedent affects, moderating and mediating changes to the TPB have been proposed and supported in the entrepreneurship literature. PBC has been theorized or found to mediate or moderate every other relationship in the TPB (Boyd and Vozikis 1994; Kickul et al. 2009; Wiklund and Shepherd 2003). Stenholm (2011) found that innovative behaviors in a new firm moderate development intentions and subsequent development in the firm. In all, these additions and alterations provide for different perspectives on the TPB and its use in entrepreneurship research.

Future research directions

The review of the research which has utilized the TPB in the entrepreneurship context presented above not only organizes the relevant literature and identifies important themes, but also reveals gaps and inconsistencies which should be addressed in future research. What follows are suggestions for future research which should help guide the efforts of scholars concerned with using the TPB in an entrepreneurship context. Also, the following should help guide researchers who are investigating entrepreneurial intentions and behaviors as well. All of the research suggestions below have been summarized in Table 4.

Levels of analyses and theory building

As noted above, 32 (76 %) of the articles evaluated in this review used an individual level of analysis, while nine (21 %) used a meso-level (House et al. 1995) approach. Meso theory and research has been defined as the simultaneous study of at least two levels of analysis in which (1) one or more levels contains individual or group processes or variables, (2) one or more levels concern organizational processes or variables, and (3) the differing levels of analysis are related through propositions or research hypotheses (House et al. 1995). The benefit of a meso approach to research is the solution to a single level of analysis's problem which has distinctive qualities that cannot be interpreted at that level (House et al. 1995). Only by incorporating another level of analysis can some problems be solved, and a full theoretical

Table 4 Summary of research suggestions for entrepreneurship research utilizing the TPB

Category	Suggestions
Level of analysis and theory building	<ul style="list-style-type: none"> • Utilize a meso approach to theory building and empirical research • Conduct more research at the environmental/institutional level of analysis • Ground more research in theoretical arguments
Uses of the TPB in future entrepreneurship research	<ul style="list-style-type: none"> • Examine the link between opportunities and intentions in terms of behaviors • Explore the connections between intentions and planning (both formal and informal) • Investigate the full TPB in the context of entrepreneurship
Data	<ul style="list-style-type: none"> • Utilize more longitudinal data • Continue to stay away from student samples • Incorporate more qualitative research such as interviews
Scales and measures	<ul style="list-style-type: none"> • Validate the two intention scales developed • Refine and create scales for the other four major constructs of the TPB in the entrepreneurship context
Literature gaps	<ul style="list-style-type: none"> • Focus on the three themes that have received less research attention. • Investigate the PBC to Behavior link while still expanding the research base for the other relationships as well • Use established relationships of main constructs (i.e. PBC to Intentions) with differing variables.

explanation presented. Future entrepreneurship research utilizing the TPB should attempt to use a meso approach that will better explain and predict entrepreneurial intentions and behaviors. Research questions that look to investigate the effects of organizational, contextual, or environmental effects on individual intentions and behaviors would help fill existing gaps in this area of the research.

While nine articles took a meso approach in the literature, only one incorporated the TPB ideas at the environment level (Doern 2009). While technically a meso approach, Doern (2009) was the only article which theorized environmental factors would affect entrepreneurial intentions and behaviors. Environmental/institutional factors have been used extensively in other parts of the entrepreneurship literature (Kirzner 1997 for example), yet, they are almost completely absent from the literature using the TPB. Specific environmental or institutional factors should be incorporated into the existing entrepreneurial TPB models.

One way to facilitate more research that spans more or higher levels of analyses is to theoretically develop and ground arguments. As some theorists have observed, theoretical work often precedes empirical work in a cyclical manner (Hunt 2002, 2010). As noted earlier, only five of the articles included in the review were conceptual. Of those five, one was a review, meaning that only four were theoretical in their aim. While it is understandable that working with an established theory often implies empirical testing in a specific context, theoretical work should also produce valuable insights that cannot be revealed through empirical work alone. This became somewhat evident throughout the review as scholars selected new variables to insert into the existing model with little new theoretical work for supporting the relationship between these selected variables.

Figure 4 is a testament to this as a majority of the variables included are somewhat haphazardly tacked on to the TPB and not grounded in the theory per se. Future research would benefit from theoretical explanations for some of the variables displayed in Fig. 4, as any new constructs that might be presented in the future.

Uses of the TPB in future entrepreneurship research

More research should examine the link between intentions and opportunities. While a large number of articles looked at entrepreneurial intentions (either as an independent or dependent variable) there was little discussion over the relationship between intentions and opportunities. For example, as Short et al. (2010: 40–41) state, “A potential entrepreneur can be immensely creative and hardworking, but without an opportunity to target with these characteristics, entrepreneurial activities cannot take place”. Some authors have taken the approach of using the knowledge of opportunities as antecedents of intentions or attitudes, while others have utilized opportunity as a moderator between intentions and behaviors. Overall, it is relatively unknown how opportunities should fit into an entrepreneurial model utilizing the TPB. Some research questions that come from this line of thinking are: what are the relationships between one’s intentions to create a new business and the same person’s ability to recognize an entrepreneurial opportunity? Are there certain personality traits that affect these two ideas differently? What happens when someone has the intention but cannot recognize an opportunity? How exactly do opportunities moderate the intention to behavior link?

Another significant research stream which might be connected with the existing entrepreneurship utilizing the TPB is formal business planning (Castrogiovanni 1996; Delmar and Shane 2003). As Mintzberg and Waters (1982, 1985) has indicated, formal, long-term planning is not a pre-requisite to venture creation and success. This idea of marginalizing the contributions of formal planning on success echoes theoretical contributions of Castrogiovanni (1996) who argued that formal planning and venture survival are related only by highly contextualized instances. Yet, from the review above, it is seen that entrepreneurship is a planned behavior (whether it be formal or informal) that often leads to some type of entrepreneurial action. Scholars should explore this connection between intentions and planning according to the existing ideas of entrepreneurial strategy-making as an intentional and controlled behavior (Mintzberg and Waters 1982; Mintzberg and Waters 1985).

Surprisingly, only one article tested the full TPB in the entrepreneurship context of venture creation (Kolvereid and Isaksen 2006). The full model was not supported in that research, however, due to the lack of evidence for PBC being related to intentions and behaviors (Kolvereid and Isaksen 2006). In effect, that analysis supported the Theory of Reasoned Action and not the TPB. Two explanations were provided for this: (1) the Norwegian sample used in the study faced considerable environmental munificence (Castrogiovanni 1991) which made the behavior highly volitional, and (2) the operationalization and measurement of the constructs were not specific enough (Kolvereid and Isaksen 2006). Future research needs to empirically investigate the complete TPB model in order to determine if there is full validity. Statistical methods such as structural equation modeling would be beneficial because of the complex mediation and partial mediation relationships.

Data

One of the reasons for the smaller number of empirical articles exploring the intention to behavior and PBC to behavior link is inherently due to the need for longitudinal data. Only ten empirical articles investigated the intention to behavior link, six of which used longitudinal data. To investigate causal relationships with behaviors, longitudinal data is of the utmost importance. Future research should work to collect longitudinal data, or utilize available longitudinal databases such as the Panel Survey of Entrepreneurial Dynamics. Student data or other convenience samples were much more prevalent in the earlier years of this literature. Scholars have, for the majority, moved away from student samples and should continue this practice. However, only a single article used a qualitative approach (Radu and Redien-Collot 2008). Future research might utilize interviews in order to present further evidence for the proposed relationships in the TPB beside quantitative evidence.

Reliable scales and measures

Table 2 displays the survey methods used for each empirical study. A “specific” survey meant that the authors developed their own measures for the purpose of measuring one of the five main constructs of the TPB in the entrepreneurship context. As it can be seen in Table 2, there is very little in terms of established scales. As it was seen with Kolvereid and Isaksen’s (2006) study above, measurement was one of the theorized reasons for lack of support of theorized relationships. Recent work has been done to develop specific scales, such as the Entrepreneurial Intention Questionnaire (EIQ, Linan and Chen 2009) and the intentions measurement developed by Thompson (2009). However, future research should work to validate these measures as there has only been one study (Linan et al. 2011) which has replicated the EIQ and no studies which have replicated the Thompson (2009) measure.

Literature gaps

Table 3 displays the four main themes which emerged from the literature review. While a considerable amount of research has utilized the TPB to explain and predict intentions to create a new venture, the other three themes of intentions towards developing a new venture, creating a new venture, and developing a new venture have not received as much attention. There are a number of potential research questions that could be developed from these themes. For example: do intentions to develop a new venture lead to actual development? How does the availability of capital affect the relationship between development intentions and actual development? What antecedents in addition to the TPB antecedents affect venture development and/or venture creation intentions?

Figure 3 shows that the PBC to behavior link has been understudied when compared to the other relationships. However, with the growth of this literature, it would be beneficial to continue to research the other relationships as well in order to build towards future meta-analyses. Future research should therefore focus on investigating the PBC to behavior link while also incorporating the other relationships as well.

Another interesting way to approach the literature is by evaluating Fig. 4. Figure 4 shows that a large number of antecedents have been proposed for different constructs in

the TPB, however, a majority of the antecedents have only been connected to a single intention or behavior. For example, an antecedent to attitudes which has received support in the literature is prior entrepreneurial experience (Kolvereid 1996). However, Kolvereid (1996) only showed that attitudes mediate prior entrepreneurial experience and an intention to create a new venture. There are five other entrepreneurial intentions seen in Fig. 4 which prior entrepreneurial experience (mediated by attitudes) might affect. By tracing the different paths which have been supported to alternate ends, a plethora of research questions (inherently grounded in the established TPB) can be developed. Researchers can focus on established conceptual relations with differing specific variables using this method.

Concluding thoughts

The entrepreneurship literature that has utilized the TPB has grown considerably over the last 20 years. Our review has accomplish two goals: review the relevant literature and present research suggestions which will guide scholars in the future. First, our review organized and synthesized the literature according to the part of the TPB utilized as well as along four main themes that emerged from the review. We also outlined the many additions and changes that the entrepreneurship literature has implemented on the TPB. Based on our findings, the future research suggestions that we proposed should help to fill the existing gaps that were identified.

We have contributed to the entrepreneurship literature by synthesizing the existing research on the TPB in a way that is easy to access for future researchers. In addition to presenting an easy to understand roadmap of existing research (in Fig. 4 and Table 2) we have also contributed to the growing stream of literature by highlighting important future research directions for researchers interested in using the TPB in entrepreneurship research. In addition, our work has contributed to the literatures on venture creation intentions, venture creation behaviors, venture development intentions, and venture development behaviors, which are important areas of interest for entrepreneurship scholars.

The TPB has made a considerable contribution to the entrepreneurship literature, yet, there are many questions and gaps that remain unanswered and unfilled. Further, a certain level of caution should be observed as the mostly positive findings for the TPB may be due to current publishing standards where only significant results make it to publication. Scholars should continue to grow this stream of the literature as significant contributions remain to be made.

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