Strategic entrepreneurial behaviors: Construct and scale development

Brian S. Anderson1,2 | Yoshihiro Eshima3 | Jeffrey S. Hornsby1

1Bloch School of Management, University of Missouri, Kansas City, Missouri
2Ghent University, Ghent, Belgium
3Faculty of Business Administration, Osaka University of Economics, Osaka, Japan

Correspondence
Brian S. Anderson, Bloch School of Management, University of Missouri, Kansas City MO 64110-2446.
Email: andersonbri@umkc.edu

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Research Summary: Delineating between conservative and entrepreneurial firms to discern the causes, consequences, and benefits of entrepreneurial behavior is a key conversation in strategic entrepreneurship research. We introduce to this conversation a new construct, Strategic Entrepreneurship Behaviors, which we argue provides several theoretical and practical benefits to scholars exploring strategic entrepreneurship phenomenon. We develop and validate a measurement model for the Strategic Entrepreneurship Behaviors construct using a three-study design in Japan and in the United States. To facilitate reproducibility and replication of our results, we posted all data, R code, and Supporting Information on the Open Science Framework website available at https://osf.io/rqw5u/.

Managerial Summary: The driving question in strategic entrepreneurship research is the impact of an organization’s entrepreneurial activity on its performance. Answering this and related questions requires careful measurement of entrepreneurial activity. Existing measures and scales served the field well, but to answer questions establishing causal relationships, we need new constructs and measures robust to causal research designs. We introduce a new construct and scale, Strategic Entrepreneurial Behaviors, to capture the firm’s exploitation of new product-market opportunities through the intended commercialization of its product innovations. We hope this new measure for a firm’s entrepreneurial activity allows researchers to build more predictive theory, and to ask—and answer—new research questions that move the strategic entrepreneurship conversation forward.

KEYWORDS
construct development, entrepreneurial behaviors, entrepreneurial orientation, strategic entrepreneurship, structural equation modeling
Firm performance is the most important outcome in strategic management research (Bettis, Ethiraj, Gambardella, Helfat, & Mitchell, 2016). While several factors relate to performance in a meaningful way, it is widely accepted that behaving entrepreneurially is an important predictor of performance within—and between—firms (Rauch, Wiklund, Lumpkin, & Frese, 2009). Most scholars now agree that, all other things being equal, businesses that consistently exhibit entrepreneurial behaviors outperform conservatively managed peers (Rosenbusch, Brinckmann, & Bausch, 2011). The strategic entrepreneurship literature provides ample empirical evidence generally agreeing that it pays to be entrepreneurial (Ireland, Hitt, & Sirmon, 2003).

A critical part of this conversation is the constructs we use to delineate entrepreneurial firms. The question of what makes a firm entrepreneurial, and what does it mean to be entrepreneurial, lies at the heart of strategic entrepreneurship research (Wright & Hitt, 2017). These constructs help scholars identify the causes, consequences, benefits, and limitations of being an entrepreneurial firm (Covin & Lumpkin, 2011; Covin & Wales, 2012). In short, constructs tapping this domain are central to the field, and central to answering the questions we ask as strategic entrepreneurship scholars.

To this conversation, we introduce the Strategic Entrepreneurial Behaviors construct. Strategic Entrepreneurial Behaviors (SEBs) is the firm’s exploitation of new product-market opportunities through the intended commercialization of its product innovations. SEBs capture what it means for a firm to exhibit a sustained behavioral tendency to engage in product/market entrepreneurial activity. Our conceptualization of SEBs is similar to the firm’s entrepreneurial orientation (EO)—a firm’s innovative, proactive, and risk-taking behaviors and operating philosophies (Anderson, Covin, & Slevin, 2009; Covin & Slevin, 1991). Unlike EO, however, SEBs isolate only the behavioral elements to the firm’s strategic activities that directly place the firm in new product/market domains.

The value of our paper rests on two key assumptions. We first assume that the broader the construct, the more dimensions it has, and the more indicators that are used to measure it, the more likely it is to be misspecified (Bagozzi, 2011). Conceptually broad multidimensional constructs allow scholars to ask broader questions (MacKenzie, Podsakoff, & Podsakoff, 2011), but breadth comes at the expense of depth and precision (Edwards & Berry, 2010). Isolating causal relationships and building predictive theory requires confidence that what the researcher conceptualized aligns with what the researcher measured (Bagozzi, 2011). Building predictive theory also requires minimizing measurement error (Loken & Gelman, 2017). Measurement error is a serious threat—measurement error causes endogeneity, which causes bias in model estimates (Antonakis, Bendahan, Jaccard, & Lalive, 2010). For papers testing entrepreneurship theory, the strength of a paper’s contribution to science and to practice depends on well-specified measurement models and high quality measures (Bagozzi, 2011).

Our second assumption builds from the preceding—improving the quality of the measures of strategic entrepreneurial activity is not simply a matter of reconceptualizing existing constructs or tweaking existing measures (Anderson, Kreiser, Kuratko, Hornsby, & Eshima, 2015; George & Marino, 2011), but requires new construct conceptualizations and new measurement models. The challenge for strategic entrepreneurship researchers is to derive new constructs that capture similar nomological relationships to our existing constructs, but do so with more reliable measures that are easier to specify in causal models. As dealing with endogeneity and other threats to causal inference become de facto standards for publishing research in top entrepreneurship journals, existing constructs that are difficult to use in instrument variable and related research designs have demonstrably lower usefulness for entrepreneurship researchers. As we will demonstrate, SEBs perform a substantially similar nomological role as the existing EO construct, but does so with a more reliable measurement model and one that is easier to use in research designs meant to recover causal parameter estimates.

The target audience for our paper is strategic entrepreneurship scholars who are familiar with EO and theoretical questions associated with EO research, but who are struggling with ongoing debates over EO’s dimensionality and measurement (Anderson et al., 2015; Covin & Wales, 2012), and who find it difficult to use existing EO measures in
observational research designs while accounting for various types of endogeneity (Eshima & Anderson, 2017). For these scholars, we argue that SEBs capture the most salient—and less "noisy"—elements of a firm's strategic entrepreneurial activities. SEBs are a more precise way to investigate the nomological network generally associated with EO research, improving conceptual clarity and theory construction (Boyd, Gove, & Hitt, 2005).

Furthermore, SEBs improve the ability to estimate causal relationships between strategic entrepreneurial behavior and other phenomena of interest. By separating and clearly delineating a behavioral-centric strategic entrepreneurship construct, SEBs are easier to use in research designs meant to recover causal parameter estimates because the instrument variables necessary to "stand in" for random assignment need only relate to a focused, unidimensional conceptual space (Anderson, 2018). This feature of SEBs, along with our proposed measurement model, makes SEBs very useful for observational research with small samples and multiple endogeneity concerns that are common in strategic entrepreneurship research (Eshima & Anderson, 2017). Finally to facilitate reproducibility and replication, we posted all data, R code, and Supporting Information on the Open Science Framework website at https://osf.io/rqw5u/.

2 | WHY A NEW CONSTRUCT?

Before developing SEBs, we would first like to address why we feel a new construct is valuable to the field. There is no shortage of interesting—and useful—constructs within strategic entrepreneurship (Ireland et al., 2003). For example, an early 2018 Google Scholar search yielded over 3,400 scholarly publications with the phrase "entrepreneurial orientation"—arguably the most popular construct in strategic entrepreneurship research—in the title of the publication. However, we feel that there is a fundamental limitation to many of our widely used constructs, EO included, relating to multidimensionality. We address this limitation by developing and validating new constructs, rather than continuing to "tweak" existing constructs.

Consider the two most common EO conceptualizations—the Miller (1983)/Covin and Slevin (1989, 1991) model, and that offered by Lumpkin and Dess (1996). From both perspectives, EO's conceptual domain encompasses multiple, delineable, lower-order dimensions. In the case of Miller/Covin and Slevin, the lower order dimensions of innovativeness, proactiveness, and risk-taking overlap, and EO is conceptualized here is the shared variance between its constituent parts (Covin & Wales, 2012). In the Lumpkin and Dess (1996) perspective, the dimensions form dynamically as a function of the environmental conditions acting on the firm and the firm's strategic decision-making. The five dimensions that define EO may overlap, may interact, or some may be absent depending on the firm and the situation (Lumpkin & Dess, 1996).

The challenge of using EO from either the Covin and Slevin or Lumpkin and Dess perspectives, as with any multidimensional construct, is that the dimensions themselves capture—often substantially—different elements of the construct's conceptual domain. We can observe this empirically, for example, when researchers model EO as a unidimensional construct, and then in the same study split EO into its constituent parts and model hypothesized relationships to the dimensions directly (Kreiser, Marino, Dickson, & Weaver, 2010). Not surprisingly, researchers typically find differential relationships (Covin & Wales, 2012). The differences arise not because EO is best understood from one perspective versus the other, but simply that the variance in the dimensions have a different meaning when modeled independently as opposed to being modeled collectively (Bagozzi, 2011).

This reality of multidimensional constructs makes it difficult to specify antecedent relationships because a given antecedent must relate, in the same way and of the same magnitude, to each constituent dimension (MacKenzie et al., 2011). For example, in a study linking organizational learning to EO, the researcher would be assuming that learning causally effects innovativeness, proactiveness, and risk-taking at the same time, in the same way, and with the same effect size. This is conceptually problematic, because while innovativeness and proactiveness are generally assumed to represent specific firm behaviors, scholars also assume that risk-taking represents an attitudinal or philosophical disposition among senior managers (Anderson et al., 2015). In this case, the researcher effectively assumes
that organizational learning predicts a behavior and an attitude in the same fundamental manner, increasing the likelihood of interpretational confounding and threatening internal validity (Bagozzi, 2011).

Related to the preceding, multidimensional constructs also tend to exhibit greater measurement error, because the measurement model attempts to identify the commonalities between conceptually distinct underlying dimensions (Bollen, 1989). We say conceptually distinct because if the dimensions were fundamentally capturing the same conceptual domain—as is assumed in a reflective measurement model, the most common form found in management research (MacKenzie, Podsakoff, & Jarvis, 2005)—there would be no need for multiple dimensions. As such, multidimensional constructs have inherently more “noise” in their measurement model as compared to unidimensional constructs. Noisy measures can increase both Type I and Type II error rates, inflate coefficient estimates, and yield results that are inconsistent with what would be expected in a real-world setting (Loken & Gelman, 2017).

Finally, multidimensional constructs also suffer from a substantial limitation when it comes to dealing with endogeneity. Instrument variable models, such as Two Stage Least Squares (2SLS), depend on the assumption that the instrument variable(s) relate strongly to the potential endogenous variable, but then are independent (exogenous) of the disturbance term in the second equation of the model (Anderson, 2018). It follows then that to use an instrument variable with a multidimensional construct, the instrument must causally relate to each dimension, in the same way and in the same magnitude, while still being properly excluded from the second stage of the model (Semadeni, Wethers, & Certo, 2014). Given the difficulty in identifying valid instruments, the preceding sets a very high bar to identify causal effects using 2SLS and related methods with constructs that capture broad, multidimensional spaces. This is a substantial limitation for strategic entrepreneurship scholarship, given the number of multidimensional constructs in our field (Ireland et al., 2003).

Unfortunately, reconceptualizing existing multidimensional constructs into unidimensional constructs substantially changes the meaning of the construct itself (Bollen, 2011). In a sense, any reconceptualization would contribute to the boundary spanning and concept stretching concerns that already plague many popular constructs in our field (George & Marino, 2011). The solution to addressing the limitations of modeling antecedent relationships, reducing measurement error and making constructs easier to instrument and easier to employ in causal models is to conceptualize and validate new, unidimensional constructs that capture important conceptual areas to strategic entrepreneurship scholars. The challenge for researchers is to conceptualize these new constructs in such a way as to capture a similar nomological domain as existing, “noisier” constructs, but with a more reliable and easier to use measurement model. This is what we hope to accomplish with SEBs.

3 | CONCEPTUALIZING STRATEGIC ENTREPRENEURIAL BEHAVIORS

3.1 | Defining the construct

SEBs is the firm’s exploitation of new product-market opportunities through the intended commercialization of its product innovations. It exists only at the strategic business-level, in that the entrepreneurial behaviors characterizing SEBs are those involving products and services that the firm directly sells to its customers (Alvarez & Barney, 2007). In contrast, innovation in the firm’s supply chain or in its business model is not an SEB in this conceptualization. Similarly, corporate entrepreneurial activities such as organizational renewal, domain redefinition, and corporate venturing are not SEBs either as we define the construct (Covin & Miles, 1999). The preceding are all important, entrepreneurial functions undertaken by the firm. However, the value of SEBs to the literature is to specify clearly what business-level (i.e., firm) strategic entrepreneurial behaviors are, and what they are not. Simplicity and clarity are at the heart of SEBs contribution and its usefulness to strategic entrepreneurship researchers.

SEBs at the business level means that a single/dominant business firm, with one delineable business model, has a single SEB measure. Firm size is not a defining factor as to whether a firm has multiple, delineable SEB measures, but is likely a correlate. Small to medium size businesses generally operate in a single product/market space with a
dominant business model, and hence would likely have one SEB measure (Anderson & Eshima, 2013). In contrast, a large firm may have multiple business units that, while often supporting each other, operate in different product/market domains with different business models and value propositions. For such a firm, each business unit has a different SEB measure. SEBs do not exist, therefore, at the corporate strategy level (Covin & Miles, 1999).

3.2 | Centrality of product-market level

We argue that among the possible entrepreneurial activities a firm may pursue, those occurring at the product-market (or service, if a service-based business) level are the most important activities delineating entrepreneurial from conservative firms. There are three critical assumptions supporting our argument. Our first assumption is that engaging in product innovation is a necessary, but not sufficient condition for a firm to be entrepreneurial. To be entrepreneurial, the firm must be proactive about using their innovations to establish market or technological leadership (Covin & Slevin, 1991). As Miller (1983, p. 780) noted, "In general, theorists would not call a firm entrepreneurial if it changed its technology or product-line...simply by directly imitating competitors while refusing to take any risks. Some proactiveness would be essential as well." It is not simply what the firm creates, but what the firm does with what it creates that gives meaning to entrepreneurial behavior (Covin & Wales, 2012).

Our second assumption is that firms pursue entrepreneurial behavior to achieve a performance advantage over its competitors (Wiklund & Shepherd, 2011). The most visible behaviors and those most likely to yield a performance advantage are those exploiting product-market discontinuities (Alvarez & Barney, 2007). There are immediate, and tangible outcomes to product-market entrepreneurial activities that yield actionable strategic knowledge for the firm (Anderson et al., 2009; Eshima & Anderson, 2017). This knowledge is critical to helping the firm understand changing environmental exigencies and to facilitate organizational adaptation (Kreiser, 2011). Product-market innovation, and the interaction between those innovations and the firm's customers, have the highest inherent strategic value for the firm, and warrant specific attention (Covin & Lumpkin, 2011).

Our third assumption is that product-level innovation and proactiveness are, quite bluntly, easier to observe and to measure (Covin & Slevin, 1989, 1991). Entrepreneurial activities at the product-market level are also more likely to occur with some consistency, and are more likely to vary in response to changing environmental and competitive conditions (Covin & Lumpkin, 2011). The challenge with including, for example, innovation in a firm's supply chain or its business model is that these activities generally happen with much less frequency (Ireland, Covin, & Kuratko, 2009), and their causes and consequences are difficult to discern (Ireland et al., 2003). From a practical perspective, focusing on product-market level provides scholars with a source of observable and measurable behaviors that are comparable across firms and that are easier to specify in causal models.

3.3 | Necessary and sufficient conditions for the existence of SEB

Our conceptualization of SEBs is broadly consistent with the entrepreneurial behaviors concept introduced by Anderson et al. (2015) under the rubric of EO. In that study, the authors split EO into its constituent behavioral and attitudinal dimensions, under the constructivist assumption that a firm's strategic behaviors and separately its managerial attitude towards risk jointly form EO. We take a different view, leaving aside questions of operating philosophy, cultural elements, and the risk-taking preferences of senior managers to focus strictly on what the firm does at the product-market level. While SEBs necessarily encompass some element of risk (Miller, 1983), SEBs capture the behavioral risk inherent to product-market entrepreneurial activity—the product/market uncertainty accompanying innovation commercialization (Schumpeter, 1934). When faced with a new opportunity—whether created internally or identified in the market—the high SEB firm seeks to leverage its innovations by establishing market or technology leadership (Covin & Slevin, 1991). We thus expect a firm's SEBs to be largely stable over time because such bias necessarily entails an organizational comfort with behavioral risk (Lumpkin & Dess, 1996).
Under our conceptualization, because SEBs are behavioral, the firm must be engaging some product-market innovation commercialization activity for the construct itself to exist. While theoretically this implies that a firm with zero such behaviors would have no SEB measure, the sustained absence of all entrepreneurial activity within a firm generally precedes firm failure (Wiklund & Shepherd, 2011). Our assumption, therefore, is that all firms have at least some level of SEBs. We can think of the lower end of a hypothetical SEB scale to represent a lower level of sustained product/market innovation commercialization activities. The SEB continuum ranges then from low SEBs to high SEBs.

3.4 | A unidimensional construction

In a multidimensional construct, because the dimensions do not perfectly overlap, the conceptual domain represented by each dimension comes from a different ontological source (Edwards, 2001). But when modeling these dimensions as a single construct, as is done with a second- or higher-order reflectively measured construct (MacKenzie et al., 2005), researchers assume that causal relationships to the higher-order construct relate in the same way, and in the same manner, to all lower order dimensions (MacKenzie et al., 2011). Generally, the result is interpretational confounding—what the researcher assumes does not match what the researcher modeled (Edwards & Bagozzi, 2000). We see this result in EO research where the lower-order dimensions exhibit different nomological relationships than the higher-order construct—for example, research suggests that the effect of prior firm growth is stronger on entrepreneurial behaviors than it is on risk taking (Eshima & Anderson, 2017).

The advantage of a unidimensional conceptualization is that the researcher does not impose a complicated multidimensional structure that necessarily entails n ontological sources for n dimensions. By simplifying, the researcher lowers the probability of interpretational confounding by eliminating sources of conceptual contamination. A unidimensional conceptualization stems from a single conceptual domain, allowing a researcher to focus theory construction around only that conceptual space (Edwards & Bagozzi, 2000). Theoretical precision goes up and measurement error goes down, increasing the predictive power of the construct to draw accurate nomological conclusions (Boyd et al., 2005).

For SEBs, what delineates the entrepreneurial from conservative firm is not simply the act of innovation, but what the firm does with those innovations in the product/market spaces in which it operates. As Anderson et al. (2015: 1583) observed, “The argument is that entrepreneurial firms do not simply create; entrepreneurial firms create with the intent of employing those creations to establish market leadership positions, to develop new markets, and to preempt competitors...”. Because SEBs stem from the same underlying latent factor, there is no need to specify additional dimensions (MacKenzie, 2003). Change the latent factor, and we observe a corresponding change in the firm’s SEBs, and by extension, SEB’s indicators (MacKenzie et al., 2005). Researchers can specify—and test—causal relationships from other organizational phenomenon to SEBs conceptual domain without violating the ontological and epistemological assumptions of related multidimensional constructs (Anderson et al., 2015). Our approach makes SEBs easier to measure, easier to model, and easier to theorize about.

4 | SCALE DEVELOPMENT AND VALIDATION

4.1 | Process

We followed the scale development process outlined by MacKenzie et al. (2011) to develop the SEB construct and its measurement model, and used a three-study design. In Study 1, we employed a broad, exploratory census of potential SEB indicators to develop an initial measurement model. Study 2 is a confirmatory study, validating our initial measurement model with a new random sample. Study 3 is also a replication, and we then integrated Study 2 and
Study 3 to evaluate the construct validity of our SEB measurement model. We posted all data, R code, and other Supporting Information online at https://osf.io/rqw5u/, and outline all Supporting Information in Table 1.

4.2 Study 1—Indicator development and validation

The advantage of developing SEB indicators is that the existing literature is already replete with potential measures. As Covin and Wales (2012) noted, there is no shortage of strategic entrepreneurship scales and indicators tapping the same, or very similar, conceptual domains. Our task then was one of census—cataloging existing and related indicators that are potentially content valid indicators for SEBs (MacKenzie et al., 2011). To begin our list, we drew from three meta-analyses of the EO literature, Rauch et al. (2009), Rosenbusch et al. (2011), and Rosenbusch, Rauch, and Bausch (2013). We culled this list and evaluated other potential indicators for their content validity consistent with the conceptualization of SEBs. In many cases, we changed the wording of an indicator from a prior study to better reflect our focal conceptual domain. The initial list of 26 indicators is available in the Supporting Information.

In addition to the behavioral indicators for SEBs, we added a series of dispositional indicators that would likely associate with SEB’s conceptual domain. The idea was to evaluate whether the behavioral measures would emerge as the stronger set of indicators within the context of SEBs (Anderson et al., 2015). Our final survey instrument contained 26 potential indicators for SEB, the 9-item Covin and Slevin (1989) EO scale, an 8-item scale drawn from Anderson et al. (2009) to capture environmental exigencies (i.e., dynamism and hostility), a 8-item scale measuring subjective firm performance (Eshima & Anderson, 2017), and general background questions for the respondent. The survey instrument is available in the Supporting Information.

Sampling approach. We collected data for Study 1 in Japan. Following Anderson and Eshima (2013), a native speaker translated the survey into Japanese, and then a native English speaker fluent in Japanese back-translated the survey. Consistent with our conceptualization of SEBs as a business-level strategic phenomenon, and given that small to medium sized firms generally have a single dominant business model, we focused on firms with between 10 and 300 employees. We instructed respondents to provide responses in reference to his or her business unit, defined as “an independent, single-industry firm,” or in the case of a subsidiary business, “autonomous divisions or subsidiaries that have responsibility for their own profit-and-loss performance and business strategy.”

We purchased the contact information for the senior most executive of 2,000 firms (determined by budget constraints) in the information and communications industries from the Teikoku Data Bank Data File, a business information service in Japan similar to Dun and Bradstreet in the United States. We mailed each executive a survey, and then a follow-up survey 2 weeks later. We received 285 surveys, for a response rate of 14.25%. We then removed
public-sector firms (12), and those firms that were holding companies (4), for a reduced sample of 269. Data for the full 269 responses are available in the Supporting Information. Constraining to our sampling frame of between 10 and 300 employees and accounting for missing data, respondents reported an average of 53 employees, 25 years in operation, and had ¥105,886 and ¥2,271,312 (thousands of Yen) in assets and revenue respectively. Ninety-eight percent of respondents were privately-held firms.

While commonly done in mail surveys, we did not conduct test of nonresponse bias. The reason being is that the test is valid only if the variables being evaluated meet the exclusion restriction (Certo, Busenbark, Woo, & Semadeni, 2016). For example, it is common to conduct a mean difference test on firm revenue between responding versus non-responding firms (Anderson & Eshima, 2013). Researchers interpret a failure to reject the null hypothesis as evidence that there is no systematic difference between the two groups. Drawing this inference, however, is appropriate only if firm revenue is an appropriate proxy for the respondent’s self-selection into the survey condition (Certo et al., 2016). If revenue—or any other variable used in this type of analysis—does not relate to selection, whether the null hypothesis is rejected or retained does not provide any useful insight into the selection effect in the sampling procedure.

As with any observational design, however, selection effects—a form of omitted variable bias (i.e., endogeneity)—are certainly present (Rubin, 2005). The critical question is the extent to which they are influencing parameter estimates in the model. For the measurement model evaluation, we did not employ any correction for endogeneity because there were no structural relationships to evaluate. We outline in our discussion section, however, the ease with which a researcher may instrument SEBs to address selection and other endogeneity concerns.

Measurement model evaluation. We conducted our analysis using R, primarily with the lavaan package (Rosseel, 2012). We first employed a simple principal components analysis as an exploratory technique to visualize the factor structure in the data. We used listwise deletion to account for missing observations, yielding a final N of 225, although we later estimate models using full information maximum likelihood to deal with the missing data problem (Wooldridge, 2010). As expected, given that the indicators were developed to tap a single, unidimensional core, our initial analysis yielded a single dominant factor (eigenvalue = 13.64, explained variance = 52.45). We admittedly spent little time with exploratory methodologies. While useful, given that we were interested in a specific measurement model (unidimensional and reflective), we focused more on confirmatory factor analysis and related methods. For each confirmatory model, we set the scale of measurement by setting the variance of SEB at 1.0 (Bollen, 1989), and we report standardized parameter estimates to facilitate interpretation.

An initial confirmatory factor model with all 26 SEB indicators showed substantial misspecification ($\chi^2 = 1,148.156; p < 0.001; df = 299$). We used only the $\chi^2$ statistic in evaluating global model fit (Antonakis et al., 2010; Cortina, Green, Keeler, & Vandenberg, 2017; Hayduk, 2014a, 2014b). While norms in the field allow for the use of subjective fit indices (RMSEA, CFI, etc.), we preferred a more objective criteria to evaluate model fit. It is also worth noting that because most subjective fit indices follow a similar distributional assumption as the $\chi^2$ statistic, a failure to reject the null with the $\chi^2$ statistic typically yields subjective measures well within “recommended” cutoffs (Cortina et al., 2017). Inspection of the initial model's modification indices indicated substantive measurement error covariances, and several factor loadings (lambda [$\lambda$]) were below the recommended 0.7 threshold (MacKenzie et al., 2011).

We adopted a strict, empirically-driven methodology to trim our measurement model. Our goal was a four-indicator, reflective measurement model for SEBs. We chose four indicators to meet the minimum identification requirements for a model with a single latent construct (three indicators; see Bollen (1989)), and also retain the ability to estimate the $\chi^2$ statistic to evaluate the global fit of the model (Cortina et al., 2017).1 We used three decision rules

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1Three indicators for a model with a single latent construct just identifies the model, but precludes evaluating the fit of the model (Bollen, 1989). One additional indicator (or equivalently, a constrained parameter) provides an additional degree of freedom to construct a $\chi^2$ difference test between the specified model and a saturated model, allowing for evaluation of model fit (Cortina et al., 2017).
for this process, based on the assumption that the initial set of indicators were reasonably content-valid reflective measures for SEBs:

1. No evidence of model misspecification (non-statistically significant $\chi^2$ statistic).
2. No statistically significant measurement error covariances.
3. Maximize the explained variance of each indicator (squared lambda parameter).

Our first rule was that there could not be statistical evidence of measurement model misspecification (i.e., a non-statistically significant $\chi^2$ statistic). While failing to reject the null for the $\chi^2$ statistic does not provide evidence of a properly specified model, rejecting the null hypothesis does provide evidence of material misspecification (Bollen, 1989; Hidy, 2014a). Our second rule was that there should be no measurement error covariances. While it can be acceptable to free a measurement error covariance between indicators of the same latent construct, SEM estimators generally make the assumption that there is no residual covariance among the error terms (Bollen & Lennox, 1991). Our final decision rule was to maximize the explained variance of each indicator (lambda-squared, or equivalently, the $R^2$ of each indicator) as a function of the variance in SEB. In a reflective measurement model, variance in the latent construct reflects variance in the indicator, and we infer indicator validity using a high lambda-squared metric, generally over 0.5, suggesting that the latent construct accounts for at least half of the indicator’s variance (MacKenzie et al., 2011).

As we report in Table 2, we retained four indicators in our final measurement model (SEB 7, 9, 12, and 19 in the original numbering scheme, now listed as SEB1-SEB4). These indicators each tap product/market innovation and commercialization activities, for example, “In general, my firm is often the first to introduce new products in our industry [SEB9].” Our final model, reported under Study 1 in Table 3, showed no statistical evidence of misspecification ($\chi^2 = 1.34; p = 0.511; df = 2$). We also observed no statistically significant measurement error covariances. Sixty percent of the variance in each indicator (sq. lambda) stemmed from our SEB construct (ranging from 0.61 to 0.685), which met our inferential validity criteria. Finally, we observed a Cronbach alpha of 0.88 for our final model with an average inter-item correlation of $r = 0.65$, suggesting high internal response consistency.

Robustness evaluation. We concluded Study 1 with a series of robustness tests. Given our decision rules, calculating the Average Variance Extracted yielded an AVE of 0.65; well above the commonly used 0.5 threshold (Fornell & Larcker, 1981). Estimating our model using robust standard errors yielded a slight improvement in parameter inference and model fit (Robust $\chi^2 = 0.72; p = 0.699; df = 2$). We then used two approaches to probe our missing data problem. We first used listwise deletion for our final measurement model from the original dataset, yielding an N of 232. We observed no material change in our indicator parameters and model fit ($\chi^2 = 0.86; p = 0.651; df = 2$). We then returned to the full dataset, dropped the screening criteria of firms between 10 and 300 employees, and used full information maximum likelihood to estimate our model. This approach yielded a N of 261 (eight respondents

### TABLE 2  Final SEB indicators

<table>
<thead>
<tr>
<th>SEB1(7)</th>
<th>In general, the top managers of my firm prefer to lead our industry in new product introductions (Study 1).</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEB2(9)</td>
<td>In general, my firm is often the first to introduce new products in our industry.</td>
</tr>
<tr>
<td>SEB3(12)</td>
<td>In general, the top managers of my firm respond to competitors by introducing new product innovations.</td>
</tr>
<tr>
<td>SEB4(19)</td>
<td>In general, the top managers of my firm prefer to be ahead of the competition when introducing new products (Study 1). In general, the top managers of my firm have a bias toward being ahead of the competition when introducing new products (Study 2 and 3).</td>
</tr>
</tbody>
</table>

*The original list of possible indicators is available online at https://osf.io/rqw5u/. Scale numbers in parentheses are the original scale notation.*
returned surveys with no answers provided. This model showed no material differences in parameter estimates, and little change in fit ($\chi^2 = 1.2; p = 0.548; df = 2$). Our next step then was to replicate our results in Study 2.

### 4.3 Study 2—Replication

**Survey instrument.** We modified the survey instrument from Study 1 for Study 2 in a few ways. We first dropped from the survey instrument a number of SEB indicators from Study 1 that exhibited very poor reliability (generally those with lambda parameters below 0.3 or with substantial measurement error covariances; 12 in total), although we kept the original numbering scheme for consistency. As an improvement to our indicators, we integrated the phrase “have a bias toward” into the relevant SEB indicators. For example, SEB7 in Study 1 reads, “In general, the top managers of my firm prefer to lead our industry in new product introductions” whereas in Study 2 it reads “In general, the top managers of my firm have a bias toward leading our industry in new product introductions.” We also included additional strategic activity measures, and expanded versions of the environmental exigencies and firm performance scales. The survey for Study 2 is available in the Supporting Information.

**Sampling approach.** We followed a similar format to Study 1 for Study 2; we collected a new sample in Japan, used a back-translation process, and focused on firms between 10 and 300 employees. We purchased the contact information for the senior most executive of 3,000 firms (determined by budget constraints) in the electrical machinery and equipment manufacturing industries from the Teikoku Data Bank Data File; although we removed 9 public-sector firms from the initial purchased list. We mailed each executive a survey, and then a follow-up survey 2 weeks later. We received 269 surveys, for a response rate of 9%. Constraining our sample to between 10 and 300 employees and accounting for missing data, Study 2 respondents reported an average of 43 employees, 38 years in operation, and ¥35,670.5 and ¥827,575.5 (thousands of Yen) in assets and revenue, respectively. On average, firms in Study 2 were smaller, but older, than those in Study 1. Ninety-nine percent of respondents were privately-held firms. The full Study 2 data are available in the Supporting Information.

**Measurement model evaluation.** We began with a confirmatory factor model for our four-indicator SEB scale. As shown under Study 2 in Table 3, we largely replicate the Study 1 results. We observed no material measurement model misspecification ($\chi^2 = 1.2; p = 0.550; df = 2$). The lambda parameters are all statistically significant and well above the 0.7 threshold. The squared lambda parameters—the $R^2$ for each indicator—range from 65 to 72%, indicating that variance in the SEB construct accounts for the majority of the variance in the indicator(s). Finally, we observed no statistically significant measurement error covariances, and the Cronbach alpha for our model was 0.89, with an average inter-item correlation of 0.68.
Robustness evaluation. We conducted the same series of robustness tests for Study 2 as in Study 1. The average variance extracted for our model was 67.6%, and a model using robust standard errors yielded little change in model fit or parameter inference (Robust $\chi^2 = 0.87; p = 0.647; df = 2$). A model on the full $N = 269$ dataset (no range restriction) and using full information maximum likelihood to address missing data yielded little change in model fit ($\chi^2 = 0.59; p = 0.747; df = 2$) or in the parameter estimates. We then proceeded to Study 3.

4.4 Study 3—Replication

Given the design of Studies 1 and 2, there is the possibility that our results are idiosyncratic to the Japanese context. In Study 3, we sought to replicate our model using a sample of U.S.-based small and medium sized businesses. We used the English version of the survey instrument from Study 2, and converted it to an online version delivered via Qualtrics.

Sampling approach. We employed an email solicitation approach targeting firms between 10 and 300 employees. We purchased a list of contact information for 3,500 (determined by budget reasons) senior-most executives of small to medium sized businesses in the midwestern United States. Despite repeated solicitations, there were 133 surveys started, 60 fully completed, and only 41 usable, for a response rate below 2%. The low response rate and resulting small sample required a correction to the $\chi^2$ statistic (Nevitt & Hancock, 2001), and was the impetus for combining the Studies 2 and 3 data for our integrated data analysis, as we describe in the next section. Four additional respondents completed enough of the study to have usable data for the SEB measures, although not for our nomological evaluation. Study 3 respondents reported an average of 102 employees, roughly 40 years in operation, and had $34,509,218$ and $35,914,072$ in assets and revenue respectively. Ninety percent of respondents were privately-held firms. The full Study 3 data are available in the Supporting Information.

Measurement model evaluation. As reported under Study 3 in Table 3, and using a small sample correction for the $\chi^2$ statistic, we largely replicate the results from Studies 1 and 2 (Naive $\chi^2 = 0.25; p = 0.618; df = 1$; Adj $\chi^2 = 0.23; p = 0.631; df = 1$; see Nevitt and Hancock (2001)). We achieved the best fitting model after freeing a measurement error covariance between SEB1 and SEB4, as we describe in our online notes. The lambda parameters are all statistically significant, well above the 0.7 threshold, and the squared lambda parameters are well above 50% (70–90%). The Cronbach alpha for our model was 0.94 with an average inter-item correlation of 0.8. Although with only 41 usable observations, statistical power is particularly concerning.

4.5 Evaluating construct validity

Given the power concerns with the Study 3 data, we opted to combine the data in Studies 2 and 3 for our construct validity evaluation. Combining the two datasets is a form of integrative data analysis (IDA), in which we desire to increase sample heterogeneity and power by combining two or more datasets with similar designs and measures (Curran & Hussong, 2009). In this case, what distinguishes Studies 2 and 3 are the geographic setting (Japan and the U.S.), sampling strategy, and industry specification. The simplest way to evaluate the appropriateness of combining these datasets is to evaluate the measurement invariance of our focal SEB construct and our estimated confirmatory models, which is the approach we used here (Vandenberg & Lance, 2000). Using our combined data to estimate a CFA for SEB, as reported in the IDA column in Table 3, we observed no statistical evidence of measurement model misspecification ($\chi^2 = 1.173; p = 0.556; df = 2$), and our model revealed no evidence of significant difference in the factor structure, the lambda parameters, or the residuals, suggesting that the model does not differ as a function of the data source. Our resulting dataset had 285 observations, with some missing observations. To preserve power, we opted for a full information maximum likelihood approach to deal with missing data.

Convergent and discriminant validity. We next evaluated the convergent and discriminant validity of the SEB measurement model. In the classic definition, we infer a construct’s convergent validity by evaluating the extent to which the focal construct covaries with the same construct measured with different indicators (Bollen, 2011; MacKenzie
et al., 2011). The logic is that under a reflective measurement model, a construct exists independently of its measures; there are multiple valid ways in which to measure a reflectively specified latent construct (Edwards & Bagozzi, 2000). We infer discriminant validity by evaluating the extent to which a construct covaries with a nomologically similar construct (Henseler, Ringle, & Sarstedt, 2015). The logic is that a construct should exhibit an expected covariance, but should not share the majority of its variance with a similar construct tapping a different conceptual space (MacKenzie et al., 2011).

We assessed convergent and discriminant validity using the Covin and Slevin (1989) EO measures but under the Anderson et al. (2015) EO reconceptualization. Under Anderson et al. (2015), the innovativeness and proactiveness dimensions collapse into a new entrepreneurial behaviors dimension, which taps a similar conceptual space to our SEB construct. We use the entrepreneurial behaviors construct to evaluate convergent validity, under the assumption that SEBs and entrepreneurial behaviors should strongly covary. For discriminant validity, we used managerial attitude towards risk, which is the renamed risk-taking dimension of EO under Anderson et al. (2015). Our logic was that SEBs should positively covary with managers' willingness to pursue projects with uncertain outcomes, but by being fundamentally behavioral, SEBs would not share the majority of their variance with the dispositional risk-taking construct.

In our combined dataset, we observed substantial measurement model misspecification in our CFA between SEB and the two EO dimensions ($\chi^2 = 181.83; p < 0.001; df = 62$). Estimating a CFA using just the Covin and Slevin (1989) EO indicators loading into the two dimensions revealed a substantially poor fit ($\chi^2 = 114.47; p < 0.001; df = 26$), stemming from poorly loading indicators (i.e., squared lambda below 0.5) and several measurement error covariances, suggesting that the misspecification in the combined CFA stems from the EO indicators and not from the SEB indicators. Our finding here is in line with past EO research identifying a number of potentially problematic indicators with the original Covin and Slevin (1989) scale (Kreiser, Marino, & Weaver, 2002; Runyan, Ge, Dong, & Swinney, 2012). Rather than attempt to eliminate problematic EO indicators, while commonly done (Anderson et al., 2009), we opted to report the results using the full Covin and Slevin (1989) scale. Our caveat is to interpret the following with caution given the measurement model misspecification of the two EO dimensions.

We report the results of our analysis in Table 4. In line with expectations, SEBs and entrepreneurial behaviors correlate at $r = 0.75$, and share 57% of their variance. Further, SEBs and managerial attitude towards risk correlate at $r = 0.56$, sharing 31% of their variance. We employed the Fornell and Larcker (1981) method, taking the square root of the average variance extracted for SEB ($\sqrt{\text{AVE}} = 0.84$) and comparing this value to the two focal correlations. With a difference of only 0.09 (0.84–0.75), there is little material difference between SEB and entrepreneurial behaviors, supporting convergent validity between the constructs. Conversely, with a difference of 0.28 (0.84–0.56), we infer that SEB and managerial attitude towards risk are capturing two materially distinct conceptual domains, supporting the discriminant validity of our SEB construct relative to the EO's risk taking dimension (Fornell & Larcker, 1981). While not reported here but available online, using the heterotrait–monotrait ratio method proposed by Henseler et al. (2015) yields similar conclusions regarding discriminant validity.

Nomological validity. We next turned to the broader nomological validity of the SEB measurement model, to assess whether the new scale relates in a similar way to relationships already established in the EO literature. For this analysis, we chose the Rosenbusch et al. (2013) meta-analysis on the relationship between EO and environmental task exigencies. Specifically, we were interested in the correlation between SEBs and environmental hostility, and between SEBs and environmental dynamism. While we collected data on technological complexity, a CFA with these indicators was substantially misspecified and not usable.

We report our results in Table 5. Initial analyses using our three indicators for hostility and dynamism yielded similar correlations to what we present here, but a poorly specified model. As such, we opted for a more parsimonious two indicator model for both dynamism and hostility ($\chi^2 = 22.6; p = 0.163; df = 17$). We observed a strong

\(^2\)Construct-level convergent validity differs from indicator-level convergent validity, which we generally evaluate using the average variance extracted method (MacKenzie et al., 2011).
### TABLE 4  Convergent and discriminant Validity$^a$

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEB1 &lt;-- SEB</td>
<td>0.83</td>
<td>0.02</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>SEB2 &lt;-- SEB</td>
<td>0.83</td>
<td>0.02</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>SEB3 &lt;-- SEB</td>
<td>0.86</td>
<td>0.02</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>SEB4 &lt;-- SEB</td>
<td>0.83</td>
<td>0.02</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>EO1 &lt;-- EB</td>
<td>0.65</td>
<td>0.04</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>EO2 &lt;-- EB</td>
<td>0.68</td>
<td>0.04</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>EO3 &lt;-- EB</td>
<td>0.76</td>
<td>0.03</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>EO4 &lt;-- EB</td>
<td>0.52</td>
<td>0.05</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>EO5 &lt;-- EB</td>
<td>0.59</td>
<td>0.05</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>EO6 &lt;-- EB</td>
<td>0.37</td>
<td>0.06</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>EO7 &lt;-- MATR</td>
<td>0.76</td>
<td>0.04</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>EO8 &lt;-- MATR</td>
<td>0.77</td>
<td>0.03</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>EO9 &lt;-- MATR</td>
<td>0.73</td>
<td>0.04</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Covariance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEB ~~ EB</td>
<td>0.75</td>
<td>0.04</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>SEB ~~ MATR</td>
<td>0.56</td>
<td>0.05</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>EB ~~ MATR</td>
<td>0.75</td>
<td>0.04</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td><strong>Model fit</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>285</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model $\chi^2$</td>
<td>181.83</td>
<td>62</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

*Note. EB: entrepreneurial behaviors; MATR: managerial attitude towards risk. $^a$ Standardized parameter estimates; SE in parentheses.*

### TABLE 5  Nomological validity$^a$

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEB1 &lt;-- SEB</td>
<td>0.83</td>
<td>0.02</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>SEB2 &lt;-- SEB</td>
<td>0.83</td>
<td>0.02</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>SEB3 &lt;-- SEB</td>
<td>0.85</td>
<td>0.02</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>SEB4 &lt;-- SEB</td>
<td>0.84</td>
<td>0.02</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>HOS2 &lt;-- HOS</td>
<td>0.62</td>
<td>0.07</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>HOS3 &lt;-- HOS</td>
<td>0.84</td>
<td>0.08</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>DYN2 &lt;-- DYN</td>
<td>0.83</td>
<td>0.09</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>DYN3 &lt;-- DYN</td>
<td>0.72</td>
<td>0.08</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Covariance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEB ~~ HOS</td>
<td>−0.33</td>
<td>0.07</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>SEB ~~ DYN</td>
<td>−0.05</td>
<td>0.08</td>
<td>0.504</td>
</tr>
<tr>
<td>HOS ~~ DYN</td>
<td>0.39</td>
<td>0.07</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td><strong>Model fit</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>285</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model $\chi^2$</td>
<td>22.6</td>
<td>17</td>
<td>0.163</td>
</tr>
</tbody>
</table>

*Note. HOS: environmental hostility; DYN: environmental dynamism. $^a$ Standardized parameter estimates; SE in parentheses.*
negative correlation between SEB and hostility \((r = -0.33)\), in line with Rosenbusch et al. (2013). We observed no statistically significant relationship, however, between SEB and environmental dynamism \((r = -0.05)\). This is a departure from Rosenbusch et al. (2013), which reports a correlation of \(r = 0.21\) between EO and dynamism. Given the pattern of nomological results we are not concerned with the preceding result, however, this will be an area for future research. In summary, we find initial support for our parsimonious, unidimensional measurement model for SEBs. In the next section, we offer a nomological comparison between SEBs and EO.

### 4.6 SEBs, EO, and firm growth

SEBs are not necessarily a replacement for EO, or more specifically, for the entrepreneurial behaviors dimension under the Anderson et al. (2015) EO reconceptualization. However, SEBs and our proposed measurement model do have several advantages over EO for strategic entrepreneurship scholars. We argue that SEBs allow researchers to measure a demonstrably similar conceptual domain as EO—including a behavioral element of strategic risk-taking—but with a more-reliable, parsimonious measurement model with lower measurement error and that is less likely to exhibit material misspecification.

To illustrate, consider the results presented in Table 6. Here we model the relationship between SEBs and a latent construct representing the respondent’s subjective satisfaction with the firm’s growth. We separately

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Note that our measure of environmental hostility is the inverse of the environmental munificence scale reported in Rosenbusch et al. (2013), which reported a correlation of \(r = -0.34\).
estimated another model between EO to firm growth. We estimated both models using the data from the integrated data analysis (Studies 2 and 3). Subjective firm growth is a common construct found in EO research, often with indicators of satisfaction with growth in the firm’s sales, assets, and profitability, as we do here (Rauch et al., 2009; Rosenbusch et al., 2013). In the SEB model and the EO model, we observe a demonstrably similar standardized parameter estimate for the focal structural relationship. But the key difference between the two models lies in the measures and in the evaluation of the fit between the model and the data. For the SEB model, all of the lambda (measurement) parameters exceed the 0.7 threshold, suggesting that each indicator is a reliable indicator for SEBs and that the latent SEB construct explains more than 50% of the indicator’s variance. For the EO model, only one indicator meets that criteria in this data.

In the SEB model, we observed no material evidence of model misspecification ($\chi^2 = 4.99; p = 0.975; df = 13$). We interpret the small $\chi^2$ statistic as evidence that the model we have specified differs in only a small, trivial way from the underlying covariance structure in the data (Bollen, 1989). The EO model is another story; we observed substantial model specification ($\chi^2 = 223.85; p < 0.001; df = 53$). Examination of the modification indices suggested numerous measurement error covariances, and material covariances between the indicators and the disturbance term for firm growth suggests the potential for endogeneity to be biasing the structural model.

This is, admittedly, a simple structural example and not representative of the more complex models typically of interest to EO scholars. That we observed such a stark difference, however, in the fit between the SEB model and the EO model for this simple relationship should give EO scholars pause. To be clear, we are not advocating SEBs as a replacement to EO, nor are we suggesting that the most popular measurement model for EO is fundamentally flawed. What we are suggesting is that as strategic entrepreneurship scholars turn increasingly to more complicated models that take endogeneity into account, SEBs offer several advantages. We explore these advantages in the discussion section.

5 | DISCUSSION AND CONTRIBUTION

A valuable criteria to judge the usefulness of a study is to ask what can the field do as a result of this study that it could not do before (Whetten, 1989). For SEBs, we argue that the construct provides substantive improvements to the rigor of strategic entrepreneurship research. Admittedly, this grounds the contribution and usefulness of SEBs primarily from an empirical perspective. However, in the spirit of Miller (2011), Covin and Miller (2014), and Covin and Lumpkin (2011), we argue that a new conceptualization and a new measurement model capturing strategic entrepreneurial behaviors will accelerate research in nomological areas very similar to EO research. From this perspective, SEBs usefulness is also theoretical—SEBs allow scholars to better unpack causal relationships of interest and to build better predictive theories about strategic entrepreneurship relationships. To illustrate these advantages, we next explore how a researcher would specify a model with SEBs as a mediator between strategic learning (a common relationship found in EO research) and firm growth, of the form Strategic Learning → SEB → Firm Growth.

5.1 | SEBs as consequence and cause

The advantage of a unidimensional specification. SEBs are the firm’s exploitation of new product-market opportunities through the intended commercialization of its product innovations. That is, effectively, all SEBs are—specific entrepreneurial activities at the product-market level. A mediation model illustrates the value of a clearly defined conceptual domain. As the mechanism through which a change in a predictor (strategic learning) influences an outcome (firm growth), a change in the predictor must causally induce a change in the mediator (SEBs), and the resulting change in the mediator must causally induce a change in the outcome (Pearl, 2014). In this case, there is a straightforward logic connecting the three constructs together. Strategic learning, the firm’s ability to take in strategically relevant knowledge and to identify strategic changes based on that knowledge, exposes new product-market opportunities
Consider this same mediation chain, but replacing SEBs with EO. Because a reflectively construed multidimensional construct requires antecedents to predict variance in each dimension in the same way and of the same magnitude, the researcher must link a change in strategic learning to EO’s constituent parts using the same underlying logic (MacKenzie et al., 2005). Given that innovativeness and proactiveness largely reflect strategic behaviors, it is plausible that increasing the firm’s ability to take in relevant knowledge and identify opportunities for strategic change (strategic learning) would increase both the firm’s innovativeness and its proactiveness in a similar way. But it is much less clear how a change in strategic learning would result in an equivalent change in a managerial disposition towards risk. Dispositions and attitudes tend to be more stable (Anderson et al., 2015), and while strategic learning may influence attitude towards risk, this effect likely manifests over a longer time period, and with a smaller magnitude than the change in innovativeness and proactiveness (Anderson et al., 2009). The result though of modeling the Strategic Learning → EO → Growth relationship, however, is interpretational confounding—there is a disconnect between the theory underlying the proposed model and what the researcher tests statistically (Bollen, 2007). Interpretational confounding results in biased effect sizes—in this case, the indirect effect of learning on growth that passes through EO—and at worse, incorrect nomological conclusions (Bollen, 2007).

The advantage of a more reliable measurement model. The issue here is the difficulty separating the signal from the noise. Strategic entrepreneurship scholars have every incentive to use measures with lower measurement error. One reason is to lower the likelihood of endogeneity caused by measurement error, a non-trivial concern in mediation and moderation models (Bettis et al., 2016). The second reason, and particularly for those scholars working with smaller datasets (e.g., n < 250), is that measurement error can just as easily inflate coefficient estimates in multiple independent variable models as it can diminish the estimated effect size (Bollen, 1989). In small samples, the inflationary effect of measurement error can result in effect size estimates well beyond a “true” effect, making a Type I—false positive—error substantially worse (Loken & Gelman, 2017). Further, reducing measurement error yields exponential gains in the cost of a study; a reduction in measurement error by a factor of two is just as beneficial for lowering the standard error of a coefficient estimate as increasing sample size by a factor of four (Loken & Gelman, 2017).

In the case of our mediation example, reducing measurement error in SEBs as the mediator lowers the likelihood of a spurious indirect effect. Measurement error in the mediator effects the estimate of the “a” path (strategic learning → SEB) and also the “b” path (SEB → Firm Growth) (Baron & Kenny, 1986). Error in the resulting indirect effect—the product of “a” and “b”—is a function of error in the constituent paths; the lower the error of “a” and “b,” the better the estimate of the indirect effect (Aguinis, Edwards, & Bradley, 2017). In contrast, a broader multidimensional construct like EO, whether collapsed into a single dimension or modeled separately, has inherently more noise because of its multidimensional structure. The noisiness of EO increases the likelihood that the researcher may overestimate the magnitude of the indirect effect between learning and growth, or in an extreme case, may observe an incorrect sign for one of the constituent paths (Gelman & Carlin, 2014).

Improving causal inference. As Holland (1986) noted, there is no causation without manipulation. Absent the ability to randomly assigned study participants to a manipulated treatment, it is impossible to definitively establish whether variation in the dependent variable was truly caused by a change in the independent variable. Unfortunately, for most questions in strategic entrepreneurship research, it is not possible—or ethical—to randomly assign firms to a treatment condition. Simulations, conjoint studies, policy capture and related designs approximate a decision-making scenario, but they are still an approximation (Aiman-Smith, Scullen, & Barr, 2002). The preceding is why most research on strategic entrepreneurship has been, and will likely continue to be, observational in nature (Certo et al., 2016).

Our mediation example is familiar to strategic entrepreneurship researchers as an observational/measured-mediation design, where the researcher measures both the independent variable (strategic learning) and the mediator (SEBs) (Bollen & Pearl, 2013). For this design, the researcher must assume that there are omitted variables or
alternative explanations influencing the path from learning to SEBs and from SEBs to growth (Pearl, 2014). Dealing with the omitted variable problem to recover a consistent estimate of the indirect effect requires taking additional steps to identify a variable that "stands in" for the exogenous variation to a treatment condition (Wooldridge, 2010). This variable—an instrument—must causally relate to the potential endogenous variable and then must relate to the dependent variable only through its relationship to that endogenous variable (Semadeni et al., 2014).

But in the case of our mediation model, SEBs are both an outcome and a predictor; strategic learning may be endogenous to SEBs, and SEBs may be endogenous to growth. Consider the first case where the researcher must find instruments that strongly predict learning, but those instruments must be exogenous to—do not directly predict—SEBs. This is where the focused, delineated conceptualization for SEBs provides the researcher an advantage over multidimensional constructs such as EO. Part of EO's usefulness to the field is that scholars have found associations between EO and a diverse array of firm-level phenomenon (Covin & Lumpkin, 2011). But this usefulness comes at a price—the more things that relate to EO, the harder it is to identify an instrument that would predict learning, but then would not relate to EO. SEBs, being only behavioral and only at the product-market level, increases the likelihood of a researcher finding instruments meeting the exclusion restriction (Antonakis et al., 2010).

Now consider the case where SEBs predict firm growth. Again, the researcher must find instruments that predict SEBs but would not directly relate to firm growth, and again, SEBs provide an advantage over EO. Recall that under a reflective measurement model, the researcher assumes that an antecedent relates in the same way and in the same magnitude to all lower order dimensions (MacKenzie et al., 2011). In practice, this means that for an instrument to be valid, it must predict variance in each of EO's dimensions in a fundamentally equivalent way. But with SEBs, researchers need only identify instruments that manipulate the firm's level of product-market innovation and commercialization. With SEBs narrower conceptualization, we have substantially narrowed the requirement for instrument validity. The instrument need not relate to three dimensions of EO (Covin & Slevin, 1991), or two (Anderson et al., 2015), or five (Lumpkin & Dess, 1996), but only to one focused behavioral domain. In short, SEBs address a key limitation constraining strategic entrepreneurship research—finding appropriate and valid instruments—and improves a researcher's ability to deal with endogeneity when he or she models SEBs as a consequence or as a cause.

5.2 | Asking new questions

SEBs usefulness extends beyond revisiting existing strategic entrepreneurship relationships. We also see SEBs facilitating several new research questions, which we summarize in Table 7 and explore briefly below.

**SEBs as a contextual factor.** Empirically, SEBs unidimensional conceptualization and measurement model should improve the ability to estimate and evaluate interaction effects (Aguinis et al., 2017). Similar to a mediation model, the reliability of the interaction term created by multiplying a predictor and a moderator is, roughly speaking, the product of the reliabilities of the two constituent terms (Busemeyer & Jones, 1983). For example, if two latent constructs exhibit an internal consistency reliability of 0.7 (a commonly found threshold), the interaction term of these constructs has an approximate reliability of 0.49 (0.7 * 0.7); over half of the variance in the interaction term is noise. Improving the reliability of the constituent terms improves the ability to detect a meaningful interaction effect, but also helps to avoid detecting spurious interaction effects (Murphy & Russell, 2017).

Theoretically, SEBs as a contextual factor opens several new research opportunities. One such opportunity is the role of organizational culture or structure on firm performance. There is substantial interest among strategic entrepreneurship scholars in how firms leverage organic or flat structures, or leverage creative and risk-taking cultures, to improve performance, and what the are contextual factors influencing those relationships (Ireland et al., 2009; Kuratko, Ireland, Covin, & Hornsby, 2005). EO is a possibility as a moderator, but unfortunately, scholars generally assume that EO encompasses a cultural component; that is, a "creative culture" would be part of EO's conceptual domain (Anderson et al., 2009; Covin & Lumpkin, 2011). By isolating only product-market entrepreneurial activities
that exist outside of a firm's culture, scholars using SEBs can draw from additional organizational theory resources to enrich our theoretical understanding how SEBs might change the nature of the relationship between structure and culture and firm performance.

The causal effect of managerial dispositions on strategic behavior. Another exciting research opportunity with SEBs is to explore the causal factors linking how managers think about, conceptualize, and interpret strategic risk and how those cognitive processes influence changes in strategic behavior (March & Shapira, 1987; Shepherd, McMullen, & Ocasio, 2017). We see this as a substantial research opportunity for strategic entrepreneurship scholars. The challenge with EO is that managerial attitudes and dispositions are part of EO's conceptual domain—there is no way to explore causal, or even associational, relationships between managerial cognition and EO's behavioral elements (Anderson et al., 2015). This is a meaningful limitation, and one that SEBs address.

The relative ease with which a researcher may instrument SEBs as opposed to EO allows scholars to tease out relationships between managerial attributes and SEBs. For example, CEO narcissism may encourage higher levels of EO, but such a relationship is likely confounded by the CEO's inherent risk-taking preferences and self-efficacy (Engelen, Neumann, & Schmidt, 2013). With SEBs clearly delineated conceptual space, a researcher has a larger pool of potential instruments that predict changes in a manager's individual attitude or cognition, but then have little influence on the firm's actual behavior (Antonakis et al., 2010).

SEBs from a hierarchical perspective. We see a number of advantages with SEBs for scholars to empirically investigate hierarchical (multilevel) questions posited in the EO literature, but that current EO conceptualizations struggle to model effectively (Wales, Monsen, & McKelvie, 2011). One possibility is the change in SEBs over time, and specifically the entrepreneurial responses of the firm to changing environmental exigencies and competitive threats. Another possibility, because a firm with multiple independent business units would have multiple independent values for SEBs in each unit, is to explore how a corporate entity manages and leverages the SEBs of its portfolio businesses to maximize corporate performance. Yet another possibility is to investigate the relationship between entrepreneurial activities such as strategic renewal and domain redefinition that exist at the corporate strategy level (Covin & Miles, 1999) on SEBs that exist at the business-strategy level.

### TABLE 7 New research opportunities with SEBs

<table>
<thead>
<tr>
<th>Research Questions?</th>
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<tbody>
<tr>
<td>SEBs as a contextual factor...</td>
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<tr>
<td>• Do SEBs change the nature of the relationship between organizational culture or structure and various dimensions of organizational performance?</td>
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<tr>
<td>• Would the presence of high SEBs mitigate the downward pressure of environmental dynamism and environmental hostility on firm profitability?</td>
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<tr>
<td>• From a conditional indirect effect perspective, do SEBs translate the effect of slack resources on organizational adaptation, and might SEBs also change the nature of that effect?</td>
</tr>
<tr>
<td>• What is the role of SEBs as a boundary condition between competitive threats and organizational survival?</td>
</tr>
</tbody>
</table>

| The causal effect of managerial dispositions on strategic behavior... |
| • What is the "decay effect" between the attitude towards risk of a founder/CEO and the firm's SEBs during the firm early years of development? |
| • Does heterogeneity in the risk-taking perspective of the senior management team maximize SEBs? |
| • Are there leadership attributes among senior managers that encourage—Or discourage—The exhibition of SEBs, and similarly, are there leadership attributes that change the nature of the relationship between SEBs and performance outcomes? |

| SEBs from a hierarchical perspective... |
| • How do SEBs change over time, and what are the strategic factors—Internal and external—That cause changes in a firm's SEBs? |
| • How do firms manage a portfolio of business units, each with a delineable level of SEBs? Do firms use a portfolio approach, analogous to a hybrid between exploitation and exploration, to maximize corporate performance? |
| • How do corporate strategic entrepreneurial behaviors such as strategic renewal and domain redefinition influence the effectiveness of SEBs? |
5.3 | Alternate measures

An important, and valuable, feature of reflective measurement models and constructs conceptualized under a realist frame is the assumption that the construct exists independently from its measures (MacKenzie et al., 2011; Podsakoff, MacKenzie, & Podsakoff, 2016). As part of the scale development process, researchers must ensure that potential measures for the latent construct are content valid reflections of the construct's conceptual domain as defined by the researcher (Bollen, 1989). But the pool of potential indicators is, theoretically, almost unlimited (Nunnally & Bernstein, 1994). For our study, given our definition of SEBs as the firm's exploitation of new product-market opportunities through the intended commercialization of its product innovations, we feel comfortable in the content validity of our proposed SEB predictors. Our scale, however, is not the only possible scale for SEBs, nor is it the “best” scale. We say this because we want to explicitly encourage the development of alternate measures for SEBs. We believe that the focused conceptual domain and unidimensional specification for SEBs facilitate the development of different psychometric indicators than what we propose here, but also using proxy indicators (e.g., the rate of new product introductions, or perhaps a firm's trademark activity). We believe that the usefulness of the SEB construct increases with purposeful research into alternate, and ideally better, ways in which scholars can measure SEB’s conceptual domain.

5.4 | Limitations

We would like to point out three limitations of our study. As with any new scale development process, norming the scale requires substantially more studies than the three reported here (MacKenzie et al., 2011). Relatedly, a strength of our conceptualization and measurement model is parsimony. In practice, however, this means that the type of research questions that can ask and answer with SEBs must be narrow in scope and with more theoretical precision. While we believe that this is a positive for strategic entrepreneurship research, it does mean that researchers must carefully define the theoretical contribution a study employing SEBs makes to the literature. Finally, we would encourage researchers using SEBs outside of an native-English speaking country to collect and report a comparison sample with a native-English speaking country. The reason being is to further evaluate the measurement invariance of the scale and to aid researchers in understanding whether respondents interpret the indicators differently as a function of language or culture.

6 | CONCLUSION

Employing several popular constructs, EO included, strategic entrepreneurship scholars have answered several important questions for our field, and provided valuable insights into the causes and consequences of what it means for a firm to be entrepreneurial. Our intention is that SEBs build on this foundation. As our field embraces more rigorous methods to improve the causal inference in our research (Bettis et al., 2016), the conceptual clarity and rigorously developed measurement model for SEBs will, we hope, be a valuable tool for strategic entrepreneurship researchers to advance the science of our field.

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ORCID

Brian S. Anderson https://orcid.org/0000-0001-9749-4104
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