The Use of the Guttman Scale in Development of a Family Orientation Index for Small-to-Medium-Sized Firms

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This research study tests whether family orientation criteria in small-to-medium-sized businesses (SMEs) can be ordered in difficulty from broad to narrow, using an existing statistical technique referred to as the Guttman scaleogram or scale. The results of the study lend support to the notion of imbeddedness of criteria, at least among SMEs, that is, some criteria are easier to meet than others, and also that the sets of firms meeting the more difficult criteria are subsets of the firms meeting easier criteria. Furthermore, in the sample under study (885 Dutch SMEs), the family orientation index produced via Guttman scaling techniques predicts self-perceptions as a family business almost as well as a statistical approach treating criteria as separate variables in a multiple regression.

Introduction

The purpose of this article is to introduce a new approach for operationalizing family business variables. A wide variety of family business definitions and related measures already exist. They have often been classified as broad or narrow, depending on the criteria included (Klein, 2000; Shanker & Astrachan, 1996; Westhead & Cowling, 1996). One of the criticisms launched against the broad definitions is that they can be so inclusive, especially when applied to small-to-medium-sized enterprises (SMEs), that the vast majority of SMEs are classified as family businesses. For instance, the London Business School (LBS) definition requires that only one of the following criteria are met: (1) more than 50% of shares owned by one family; (2) members of the family are able to control the business substantially, and/or (3) at least 50% of the management comes from one family (Hulshoff, 2001). In a recent study of Dutch SMEs (companies with between 1 and 100 employees, excluding self-employed individuals with no employees), 83% of the firms are classified as family firms according to the LBS definition. Although broad definitions are perhaps useful for family business advocates, such definitions make it difficult to carry out empirical research examining the differences between family and nonfamily SMEs. Further, the use of dichotomous indices further restricts the variation that might be useful in explaining family effects (Brockhaus, 1994).

Part of the challenge regarding the definition of a family business is that it is multidimensional in nature. Thus, it is difficult to pinpoint any one characteristic that is so all encompassing that both practitioners and academics can agree to it. However, there do appear to be cumulative effects such that the more characteristics that are present, the more "family oriented" the company is likely to be in its objectives, strategies, tactics, and corporate culture. For this reason, several researchers have proposed definitions based on multiple criteria replacing the "broad versus narrow" paradigm (Litz, 1995). The F-PEC scale, an index of family influence developed by Astrachan, Klein, and Smyrnios, is one such example (Astrachan, Klein, & Smyrnios, 2002). However, whereas the goal of the F-PEC is to define three independent subscales (power, experience, and culture), the present article aims to test the feasibility of combining different dimensions into one index. The ability to combine these different dimensions of family influence into a single index is useful in large-sample empirical studies examining the independent and control effects of family orientation on other organization variables. The Guttman scaling technique offers a method for combining different dimensions or criteria into one index and tests whether these criteria can be ordered according to difficulty. Additionally, it tests whether the more difficult criteria define subsets of cases that are contained or "imbedded" within the subsets defined by the more easily met criteria. This article demonstrates the use of the Guttman scaling procedure on a random sample of 885 Dutch SMEs. More specifically, the research question is as follows: "Can various criteria of family orientation of a business be sorted along a single continuum of difficulty and, furthermore, can they be validly combined together into one index (using Guttman scaling techniques)?"

The motivation for applying the Guttman scale in the current study came in part from past theory in the field of family business suggesting that criteria for family orientation vary in difficulty, leading to broad versus narrow definitions of a family business. Furthermore, some preliminary analyses of the data set for the current study contained data in which respondents answered the question: "What do you feel are the characteristics of a family firm?" The answers appeared to be spread out, with certain answers mentioned far more frequently than others, but in a pattern that suggested the possibility of a Guttman scale. Because of this pattern in the data, a first test of the scale was designed to predict self-perceptions owners had about the family orientation of their businesses.

In the last part of the article, the initial output from the Guttman scaling technique is used to create four variations of a family orientation index, each of which is used to predict whether or not a business perceives itself to be a family firm (*self-perceptions as a family business*). "Self-perceptions as a family business" is chosen as a dependent variable in the present study as one means to compare the different variations of the family orientation index to one another. Some recent research uses self-perception measures of family business as a part of or even in place of objective measures, taking the viewpoint that such self-reports may more accurately integrate the different elements of a complex phenomenon.[1] This

[1] Per discussion with Andrew Godfrey, Grant Thornton International. Also used as the primary indicator for a family business in the PRIMA international study sponsored by Grant Thornton.

viewpoint is not without its critics. As Chua, Chrisman, and Sharma point out, academics frequently come across firms that in spite of matching several key objective characteristics of a family firm (e.g., multiple owners and managers from the same family) may still vehemently deny describing their firm as such (Chua, Chrisman, & Sharma, 1999, p. 19). However, Chua et al. go on to argue that a theoretical definition should be biased toward being inclusive of more firms. They point out, in particular, that "it seems unreasonable to use a definition that excludes a large number of family businesses that insist they are so" (Chua et al., 1999, p. 23). On balance, it was decided to use the self-perceptions measure not because it was considered a more appropriate underlying measure of family business, per se, but to see how it relates to the other objective and subjective measures commonly in use. Thus, self-perceptions are used as a dependent variable of interest in relationship to the other commonly used family business variables and as a way to illustrate the use of the Guttman scale.

The remainder of the article is organized as follows. The second section, "Literature Review," provides a short overview of past approaches used in defining the family firm as well as background regarding the Guttman scale. The third section, "Research Methodology," presents information about the sample, variables, and data analysis used in the present study. The fourth section, "Results," is divided into two parts. The first part presents the results related to development of the Guttman scale; the second part presents results of an exploratory study that provides some initial information regarding the validity of the Guttman scale and how different scoring techniques influence results. The "Discussion" section presents suggestions for further content and methodological development of the scale. It also discusses the possible advantages and disadvantages of the Guttman scaling technique, both for theoretical and empirical development in family business research. The "Conclusion" reiterates the key purpose and results and summarizes some key implications of the study.

Literature Review

Past Definitions of Family Business

It is beyond the scope of this article to include a full review of family business definitions. However, a broad array of approaches abound (Astrachan et al., 2002; Donckels & Fröhlich, 1991; Handler, 1994; Litz, 1995; Neubauer & Lank, 1998; Shanker & Astrachan, 1996). The reader can also find reviews of family business definitions in other recent publications (Astrachan et al., 2002; Flören, 2002; Hulshoff, 2001). The remainder of this section focuses primarily on two concepts that form the core of the present study: the family universe bull's eye (Shanker & Astrachan, 1996) and the F-PEC scale (Astrachan et al., 2002).

Shanker and Astrachan (1996) present the concept of a family universe bull's eye. In this paper, Shanker and Astrachan note that many definitions presented in the family business literature can be conceptually nested within each other, resulting in a range of definitions from broad to narrow. They hypothesize, but do not test empirically, the notion that one can embed subsets of firms fitting more narrow definitions within subsets of firms fitting successively broader definitions.

Based on their review of the literature, Astrachan et al. (2002) identify three specific

dimensions of family influence. The first, the power dimension, is based on the extent of family ownership, family governance (for larger firms, on a board of directors), and family participation in management. This component draws from definitions of family business proposed by other researchers. Some combination of family representation in ownership, management, or governance is widely used by different research groups (Cowling & Westhead, 1996; Cromie, Stevenson, & Monteith, 1995; Daily & Dollinger, 1992, 1993; Flören, 1998; Heck & Trent, 1999; Hulshoff, 2001; Klein, 2000; Martin & Suarez, 2001; Westland & Cowling, 1996). Astrachan et al. (2002) also identify second and third dimensions, experience and culture. The experience dimension incorporates the concept of the generation in charge of ownership, governance, and/or management and also the number of contributing family members. A number of authors consider the succession of a business to at least the second generation as a necessary requirement for classification of a firm as a family business (e.g., Handler, 1989; Heck & Trent, 1999; Ward, 1987). Finally, the third dimension proposed by Astrachan et al. (2002) is that of culture. The culture scale from the F-PEC instrument assesses the extent to which family and business values overlap, as well as the extent of the family's commitment to the business, derived from a subscale developed by Carlock and Ward (2001). In addition to these dimensions some researchers include self-perceptions of the firm as a family business as part of the definition of the family firm (Guttmann & Peereboom, 1999; Wijers, 1993).

In summary, whereas many authors in the field of family business propose some sort of multidimensional definition of family business, they differ in their proposals regarding not only which dimensions to include but also the manner in which these dimensions should be combined. Thus, whereas Shanker and Astrachan (1996) suggest that these definitions be nested, leading to a single index of family orientation, Astrachan et al. (2002) suggest that the different dimensions be kept separate, essentially being treated as separate variables. Still others suggest that the dimensions be combined in an either/or combination, referred to by Flören as a "multiple inclusive" approach. That is, as with the example of the LBS definition provided earlier, if any of several parameters is fulfilled, then a company can be considered a family firm. Alternatively, others suggest that an entire list of criteria be met, referred to by Flören as a "multiple exclusive" approach. Though there is merit in all three approaches, the remainder of this article sets out primarily to test the merit of the nested approach presented by Shanker and Astrachan (1996).

The Guttman Scale as a Tool to Develop Multidimensional Scales

Scaling refers to the various procedures that have been devised to enable the researcher to assign numbers to a series of objects (Manheim, 1977). Practically all the techniques of scaling have been developed since the late 1920s in connection with research on attitudes and, to a lesser extent, psychophysical and psychometric research (Manheim, 1977). Most scales used by researchers today are "summated" scales. A widely known example is the Likert scale. According to this scale, the subject responds to each item by indicating whether he or she agrees, disagrees, or is undecided. Then the items are summed. Applying this approach, for instance, one might simply add

together the scores on the subscales of family power, experience, and culture. Typically, to develop a summated scale, factor analytic methods and a test of internal reliability coefficients, such as Cronbach's alpha, are used to determine whether individual items belong within the same scale or in different scales. This is the technique used by Astrachan et al. (2002), for example, to identify the three subscales, power, experience, and culture in the F-PEC scale.

By contrast, the scale produced by the Guttman scaling technique is an example of a "cumulative" scale. Presumably, the items on such a scale measure only a single dimension, and thus if the individual agrees with a given item he or she will also agree with all the other items that represent a less (or more) extreme attitude (Guttman, 1954; Hagood & Price, 1952; Mannheim, 1977; Mokken, 1970; Moser & Kalton, 1971; Stouffer et al., 1950). Most important, the different criteria must clearly be ordered in a way so that they are progressively more difficult to meet. Although in the past, the technique has been applied primarily in social psychology for research on attitudes, the technique can be used in any social scientific application where items are to be combined into one scale.[2] However, in practice, researchers have applied the Guttman scale far less frequently than the summated scale. It has been criticized for its analytical complexity, as well as the difficulty inherent in applying the technique to a widely diverse item set (Moser & Kalton, 1971). But, given the proposed nesting of family business definitions (from broad to narrow), as proposed by Shanker and Astrachan, and based on other empirical evidence gathered in recent research, this may indeed provide a meaningful application of the Guttman scale (Shanker & Astrachan, 1996).

Research Methodology

The Sample

The sample is drawn from the "MKB-Beleidspanel," a representative panel of Dutch SMEs participating in a longitudinal study conducted by telephone interview at EIM Business and Policy Research, a research institute located in Zoetermeer in the Netherlands. The participants in the panel are selected on the basis of a representative sample drawn from a Dutch database based on information gathered by the Netherlands Chamber of Commerce. Although the total panel consists of 2,000 SMEs with less than 100 persons employed, these include a sizeable number without any employees. These are excluded from the current study, leaving a sample of 885 firms. The remaining cases in the panel represent nine sectors in the following distribution: construction (12.5%), manufacturing (14.2%), trade (17.0%), hotel and restaurant (10.7%), transport (7.6%), financial services (10.0%), leasing (10.0%), other commercial services (6.3%), and nonprivate (11.8%).[3] The size classes (in terms of persons employed) are 9 or less (34.6%), 10–49 (36.9%), and 50–99 (28.5%). The panel is constructed to be roughly representative in sector for the Netherlands. Larger SMEs are intentionally oversampled in order to have more information about them. In

[2] Per discussion with Jan Hutjes, statistician, EIM Business and Policy Research, Zoetermeer, the Netherlands.

[3] The nonprivate sector comprises many different subsectors, such as medical services and environmental services. These subsectors are generally not rated as part of the SME sector.

Table 1 Variables Used in the Study

Item (*N* = 815)	Percent[a]	Mean	*SD*	Factor Loadings on Factor 1
1. *Family ownership of firm*: Are more than half the shares of the firm in the hands of one family? (1 = yes; 2 = no)	72.4	1.24	0.43	0.816
2. *Representation of family in management*: One or more of the management team is drawn from the family that owns the business. (1 = yes; 2 = no)	73.6	1.22	0.42	0.859
3. *Family proportion of management team*: Is at least 50% of the management team drawn from the family that owns the business? (1 = more than half; 2 = precisely half; 3 = less than half)	67.2	1.60	0.90	0.822
4. *Family determines strategy*: Members of one family determine the general strategy or direction of the company at least to a certain degree. (1 = to a very strong degree; 2 = to a certain degree; 3 = scarcely or not at all)	42.3	1.52	0.50	0.527
5. *Plans to transfer to family*: Current management plans to transfer the enterprise to the next generation. (1 = yes; 2 = not sure or don't know yet; 3 = no)	25.3	2.24	0.83	0.426
6. *Self-perception as a family business*: Would you describe your company as a family business? (1 = yes; 2 = no)	47.1	1.96	0.91	0.591

[a] From valid responses.

the interview protocol, the interviewer asks to speak with the "entrepreneur."[4]

Variables

The items measured for the study are listed in Table 1. The first five items, V1: Family ownership of the firm, V2: Representation of family in management, V3: Family proportion of management team, V4: Family determines strategy, and V5: Plans to transfer to family, are obvious candidates for the family orientation index. Though lacking the comprehensive coverage of the concepts found in the F-PEC scale, for instance, the items do represent a variety of ideas regarding family orientation.[5] V6: Self-perceptions as a family business is listed in the table, but not treated as an aspect of family orientation itself in this study, but rather as a dependent variable upon which to validate the family orientation scale in a later stage.

Data Analysis

Part 1: Development of the Guttman scale

Development of the Guttman Scale in this article follows a step-by-step procedure, guided by past applications of the technique. The steps are as follows.

[4] Literally, in Dutch, the interviewer asks to speak with the "ondernemer," which can mean the employer or the proprietor. In practice, in the smaller firms, the interviewer is then generally given the owner-manager. In larger firms, he or she is usually given the general manager to speak with.

[5] Number of generations was also computed in the original study, but due to a problem with missing data, this item had to be excluded from further analysis. Because the study is a secondary analysis, choice of items and variables was limited by previously made decisions by other researchers. Furthermore, constraints imposed by use of a telephone interview required simplification of the wording of several of the questions. This was, for example, the reason that dichotomous variables and/or three-point scales were used whereas in a questionnaire a more extensive answer set would have been easier to implement.

• *Step 1: A factor analysis of items under consideration*. The first step is similar to that used for building a summated scale. A factor analysis is carried out to check the structure of the items across different factors. Since the intent of the Guttman scale is to develop one scale along a continuum, the different items to be combined should load positively on the same (unrotated) factor. Items not clearly loading on the same factor should be considered for deletion at this point.

• *Step 2: Review pattern of intercorrelations among items*. More insight into the items can be found using a correlation matrix. To meet the criteria needed for the Guttman scale, these correlations should be such that when items are ordered as they would be for the Guttman scale, the intercorrelations are progressively smaller to the right of each row and toward the bottom of each column. However, all items should ideally be positively related with one another. Uncorrelated and negatively correlated items are deleted at this point.

• *Step 3: Cross-tabulations between pairs of items under consideration*. A cross-tabulation is then carried out between each pair of items. In cases where an item has three or more points on the scale, it must first be modified to a dichotomous (two-point) scale thus producing a 2×2 matrix of frequencies for each pair of items (see Figure 1). This analysis is used to determine the ordering of items by difficulty. There are two requirements to be met in drawing such a conclusion. First, more cases should answer Variable *A* in the affirmative as compared with Variable *B* (589 vs. 214 in the example in Figure 1). But further, as a rule of thumb, the number of responses for which Variable *B* is negative but for which Variable *A* is positive (404 in this example) should usually be at least 10 times the number of responses for which Variable *A* is negative but Variable *B* is positive ($N = 29$ in the example). These 29 latter cases are referred to as *reversals*, that is, cases for which an easier criterion may be skipped in favor of a more difficult criterion.

• *Step 4: Review of reversals*. Once the ordering of the items is identified, using the cross-tabulation technique, the final choice of items is made based on the reversals across all pairs of variables. In some cases, if items are too similar to one another, a choice has to be made either to drop one of the items, or to combine them into a newly constructed item.

• *Step 5: Testing for exceptions using Loevinger's H*. As a final step in the scale construction, the statistical test, Loevinger's H, is applied to the data to test the probability that the data represent a "true" Guttman scale. In essence, Loevinger's H measures the probability that the number of exceptions to the ordering of the Guttman scale exceeds a certain probability level. Generally, values above 0.50 are considered sufficient to support the assumption that the criteria can be ordered according to a Guttman scale (Swanborn, 1993).

• *Step 6: Choosing the desired approach to assign values to cases*. Once the ordering of items is confirmed by the previous step, two additional decisions must be made by the researcher regarding case selection and scoring in order to attach a value to each case for use in further analyses. First of all, one must decide whether to include only the cases conforming to the Guttman scale or to include the reversals as well. Retaining only those cases for which the Guttman scale fits perfectly and treating the remaining cases as missing data is referred to in this article as the *Pure Guttman scale technique*. Alternatively, reversals can be

included but a decision still must be made regarding how each reversal is to be coded. In this study, three alternatives are considered for coding reversals consistent with the literature (see Moser & Kalton, 1971). Before presenting these alternatives, consider two cases: Case I conforms to the Guttman scale, meeting Criteria 1, 2, and 3, but not Criterion 4. However, Case II is a reversal, meeting Criteria 1, 3, and 4 but not Criterion 2. Further assume in this illustration that Criterion 1 is the easiest criterion and Criterion 4 the most difficult. Note that regardless of the technique chosen, nonmissing data must be available for all criteria to be used the scale.

The Likert scale technique: With this technique, a point can be assigned for each criterion met, regardless of the difficulty of the criterion being met. Thus, both Case I and Case II would be assigned a score of 3 (one point for each criterion met).

Most difficult criterion technique: With this technique, a score can be assigned based on the most difficult criterion met. Thus, using this technique, Case I would again be assigned a 3 but Case II would be assigned a score of 4 (since Criterion 4, the most difficult criterion, is met). Easiest criterion technique: With this technique, a score can be assigned for the first uninterrupted string of criteria from easiest to most difficult. Thus, Case I would again be assigned a score of 3 but Case II would be assigned a score of 1 (since there is a break between Criterion 1 and Criterion 3, with Criterion 2 not being met).

For Case I in the example above and, generally, for all cases conforming to the pattern of a Guttman scale, note that the value assigned each case is the same regardless of the technique used. The different scoring techniques only affect the reversals. Thus, with relatively few exceptions in the overall data set, the impact on the analyses is relatively small. The literature on the Guttman scaling technique provides no à priori rules about which of these scoring techniques to use; the choice is left to the individual researcher. However, past research suggests that the findings for the Likert scale tend to correlate most highly with the findings derived from using the pure Guttman scale on the more limited sample and that the results of the three scoring types correlate quite highly with one another, making the choice less consequential.[6]

Part II: Using the Guttman scale to predict self-perceptions as a family business

Using the analyses from Part I, four different scores are derived for family orientation for each case in the study, based on the four case selection/scoring techniques described in the previous section (pure Guttman scale, Likert scale, most difficult criterion, and easiest criterion techniques). To explore the differences between these scoring techniques, a simple study is defined: using the family orientation index to predict whether or not a firm would define itself as a family business (referred to previously as the variable, self-perceptions as a family business). A zero-order correlation coefficient is computed between family orientation and the dependent variable, self-perceptions as a family business, using four versions of the index based on the different scoring techniques described earlier. As a test of the utility of the Guttman scale, the predictive validity of each version of the index is

[6] Moser and Kalton (1971) as well as examples presented in an unpublished student reader by Dutch statistician, Jan Hutjes.

		Variable *B*		
		Affirmative	Negative	Total
Variable *A*	Affirmative	185	404	589
	Negative	29	208	237
	Total	214	612	826

Figure 1 Illustration of a Cross-Tabulation Analysis.

Table 2 Intercorrelations Among Family Business Variables

	1	2	3	4	5	6
1. Family ownership of firm	1.00					
2. Representation of family in management	0.777	1.00				
3. Family proportion of management team	0.687	0.791	1.00			
4. Family determines strategy	0.484	0.472	0.440	1.00		
5. Plans to transfer to family	0.336	0.365	0.303	0.312	1.00	
6. Self-perception as a family business	0.431	0.353	0.357	0.447	0.386	1.00

All correlations significant at $p < 0.001$.

compared with one another and with a model that treats each of the criteria as separate variables in a multiple regression on the dependent variable.

Results

Part I: Development of the Guttman Scale

Step 1: A factor analysis of items under consideration

Following the steps of the Guttman scaling procedure, first a factor analysis of the items is conducted using a principal axis factoring extraction method. The factor analysis results in only one factor with an eigenvalue exceeding 1.0 (eigenvalue = 3.322) explaining 55.4% of total variation in the matrix. The factor loadings are presented in Table 1. The variable, self-perceptions as a family business, is included even though it is not part of the family orientation index.

Step 2: Review pattern of intercorrelations among items

Intercorrelations among the family orientation items are presented in Table 2. The order of the intercorrelations again provides an indication that the items may conform to the requirements of a Guttman scale. Note that the intercorrelations become progressively smaller to the right of each row and toward the bottom of each column.

Step 3: Cross-tabulations between pairs of items under consideration

To determine the ordering and inclusion of the remaining items, cross-tabulations are computed between each of the pairs of variables. Two examples of such cross-tabulations are presented in Tables 3 and 4.

As described in the "Data Analysis" section, for the purpose of Guttman scale development, key attention is paid to the two diagonal cells shown

Table 3 Cross-Tabulations Between Family Ownership of the Firm and Representation of Family in Management

	V2: Representation of family in management		
	Yes	**No**	**Total**
V1. Family ownership of the firm			
Yes	599 (cell 1)	***40 (cell 2)***	639
No	*47(cell 3)*	192 (cell 4)	239
Total	646	232	878

Table 4 Cross-Tabulations Between Family Proportion in Management Team and Plans to Transfer to Family

	V5: Plans to transfer to family		
	Yes	**No or Not Sure**	**Total**
V3. Family proportion in management team			
50% or more	185 (cell 1)	***404 (cell 2)***	589
Less than 50%	*29 (cell 3)*	208 (cell 4)	237
Total	214	612	826

in italics (Cells 2 and 3). In particular, in order to conclude that meeting the criterion in the column heading (e.g., V2 in Table 3) is *more* difficult than is meeting the criterion in the row heading (e.g., V1 in Table 3), the upper right cell (Cell 2, shown in bold italics) should be clearly *greater* than the count for the lower left cell (Cell 3). In Table 3, the count for the cells on the diagonal are roughly the same size (e.g., 40 vs. 47 cases), ruling out the conclusion that one criterion is particularly more or less difficult than the other. Because of these results, Guttman scaling guidelines require that either V1: Family ownership of firm or V2: Representation of family in management alone, or in combination be used, but not both separately, in further analyses.

As a counterexample, Table 4 shows that V5 is clearly a more difficult criterion to meet than is V3, with 404 cases failing the more difficult criterion while passing the easier criterion, and only a small number (29) of reversals.

Based on the number of affirmative cases for each criterion, an initial ordering of the criteria according to difficulty is as follows: V1: Family ownership of the firm and V2: Representation of family in management are tied for easiest criterion (with, respectively, 72.4% and 73.6% of responding firms meeting each criterion). These criteria are followed by V3: Family proportion of management team (met by 67.2% of the sample), V4: Family determines strategy (met by 42.3% of the firms), and, finally, the most difficult of the criteria, V5: Plans to transfer to family, met by only 25.3% of the firms. Though all the details are not shown here, the cross-tabulations also suggest that these criteria are progressively more difficult.

Step 4: Review of reversals

In Step 4, patterns of reversals are again reviewed, but in the context of the entire data set. Table 5 provides a summary of cross-tabulations carried out in Step 3. Above and to the right of the diagonal are the numbers of cases that pass the criterion listed in the column, but not the row. These cases present no problem since they confirm the ordering of the criteria. On the other hand, the frequencies below and to the left of the diagonal represent the reversals, those cases that pass the easier criterion listed in the row but not the more difficult criterion listed in the column. At this step, a final decision must be made regarding which items to include. There are again no set guidelines offered by Guttman scaling to make this decision and it is left to the researcher, based on his or her own considerations, to decide which criteria to include. However, one accepted guideline is that ideally there should be a difference of about 20% in frequency of affirmative cases (known as *popularity* of the item) for each point in the scale. V1 and V2 are nearly identical in popularity and thus a choice between the two must be made, either to use V1, V2, or a combined criterion. There are pros and cons for each choice. For instance, V1 offers more unique content compared as compared with V2. On the other hand, only 15% of the sample are reversals using V2 compared with 18% reversals using V1. Finally, although a combined index of V1 and V2 provides the same number of reversals as V2 alone (about 15% reversals), further analyses are somewhat difficult to interpret if the two criteria are combined into a composite variable. For illustrative purposes, V2 was finally chosen in this study over the use of V1 or over the use a composite variable of V1 and V2. However, other researchers could have weighed the content issues more heavily and chosen for V1 instead.

Step 5: Testing for exceptions using Loevinger's H

Loevinger's H, as mentioned previously, is used in Guttman scaling to test the probability that the data represent a "true" Guttman scale. For the proposed distribution, Loevinger's H = 0.63, exceeding the generally accepted cut-off criterion of 0.50 (Swanborn, 1993) and thus further supporting the conclusion that these family orientation items can be ordered according to a Guttman scale.

Step 6: Choosing the desired approach to assign values to cases

The final step in developing a family orientation index using the Guttman scaling technique is to choose the way to assign values to cases. In this study, we decided to compare all the approaches for their ability to predict self-perceptions of family orientation. Thus, we defer this step to the next section.

Part II: Use of the Guttman Scale to Predict Self-Perceptions as a Family Business

In the second part of the analyses, further exploration of the applicability of the Guttman scale to the concept of family orientation involves the use of the scale to predict self-perceptions of family business. Results from using the four different approaches for assigning values to cases (pure Guttman scale, Likert scale, most difficult criterion, and easiest criterion) are compared to each other and to results using a multiple regression of all five family orientation items as well as the four finally selected for use in the Guttman scale. Table 6 presents results of a correlation analysis relating

Table 5 Summary of Frequencies for Cross-Tabulations Among Items of the Guttman Scale

	V1	V2	V3	V4	V5
V1. Family ownership of the firm	—	*40*	*97*	*292*	*436*
V2. Representation of family in management	47	—	*86*	*297*	*440*
V3. Family proportion of management team	28	6	—	*240*	*381*
V4. Family determines strategy	25	23	42	—	*238*
V5. Plans to transfer to family	21	16	34	89	—

$N = 855$. Items to the left of the diagonal run counter to predictions, where a case fails a less difficult criterion but passes a more difficult one. The frequencies to the right of the diagonal, in italics, are consistent with the predicted ordering of the Guttman scale.

Table 6 Zero-Order Correlation Coefficients Between the Family Orientation Index Based on Guttman Scaling Procedures and the Variable, Self-Perception as a Family Business

Family Orientation Index According to	Self-perception family business
Pure Guttman scale technique[a]	–0.552* ($N = 698$)
Likert scale technique	–0.508* ($N = 817$)
Most difficult criterion technique	–0.482* ($N = 817$)
Easiest criterion technique	–0.473* ($N = 817$)

[a]The only cases included in this table fit the ordering of the Guttman scale. Thus reversals are omitted.
*$p < 0.001$.

family orientation as variously measured to the variable, self-perceptions as a family business.

Although correlations between the family orientation index and self-perceptions as a family business are slightly lower when the full sample is used than in the instance when the pure Guttman scale is applied, the differences are relatively small and all correlations are statistically significant ($p < 0.001$). Among the three remaining approaches, the Likert scale does the best in approximating the result found using the pure Guttman scale, though differences with the other two techniques (most difficult criterion and easiest criterion) are relatively minor.

Next, a multiple regression of the individual criteria on the dependent variable is compared with the use of the index. Table 7 shows the results of the multiple regression analysis, where initially all five of the original variables are included in a stepwise forward regression. The variation explained by the Guttman scale (R ranging from –0.473 to –0.552) compares favorably with that of the multiple regression analysis ($R = 0.535$ for the four-variable model and 0.552 for the five-variable model). Note that the negative signs in the bivariate correlations between the different versions of the Guttman index and self-perceptions as a family business reflect a reversal of the Guttman index from the original criteria. Thus a negative sign actually needs to be interpreted as a positive relationship between the indices.

Discussion

The results presented in the previous section illustrate the manner in which data about SMEs can be

Table 7 Multiple Regression of Individual Family Business Items on the Variable, Self-Perception as a Family Business

	β	*t*	β	*t*
V1. Family ownership of firm	0.212	4.68**		
V2. Representation of family in management	–0.046	–0.87	0.055	1.12
V3. Family proportion of management team	0.066	1.33	0.116	2.39*
V4. Family determines strategy	0.259	7.54**	0.284	8.25**
V5. Plans to transfer to family	0.245	7.77**	0.255	7.98**
R^2-adjusted	0.301		0.283	
R	0.552		0.535	
DF	5,809		4,810	
F	71.04**		81.24**	

*$p < 0.05$; **$p < 0.001$.

combined to form a cumulative index, referred to as a Guttman scale. The fact that in this study most of these variables could be ordered in difficulty is consistent with the notion that the more narrow definitions of family business define subsamples imbedded within larger firm samples (see Shanker & Astrachan, 1996). Because the study is a secondary analysis, the choice of variables and items was limited by decisions made by other researchers. Thus, the items selected may or may not prove to be the definitive items for defining family business in the future. However, the fact that these items could be ordered is a promising outcome with respect to the potential of the Guttman scale for future research in family business.

There are some distinct similarities and differences between the Guttman scale index developed for the current study and the F-PEC scale (Astrachan et al., 2002). Similar to the F-PEC scale, this study includes at least two aspects of family orientation: power, with respect to ownership and management of one family in the firm; experience, at least indirectly, with respect to plans to transfer the enterprise to the next generation; and, possibly, depending on one's interpretation of V4: Family determines strategy, an aspect of the F-PEC culture dimension. Admittedly, the set of items used is much more narrowly defined than that proposed or the F-PEC scale and is meant primarily for illustrative purposes to demonstrate how Guttman scaling could be a tool to create a family orientation scale. Given the lack of stability of Guttman scales in past research (Moser & Kalton, 1971), it is imperative that a replication of findings takes place before the index is adopted for future research.

There are other differences between the Guttman scale and the F-PEC scale. First of all, Guttman scaling, by definition, requires a dichotomization of a variable to create a distinct cut-off criterion for each point in the multidimensional scale. These different dimensions are treated as separate variables in the F-PEC scale rather than one combined scale. Also, from a content perspective, the current study omits items relating to family involvement on a board of directors. This was done intentionally since many small firms do not have a board of directors distinct from the executive team. Nevertheless, this con-

trasts with the inclusion of a board of directors variable for the power dimension of the F-PEC scale.

Clarification of whether at least two people from the same family are either owners or managers in the business is an important omission within the experience dimension. In very small firms, it is possible that a single person is 100% owner and represents 100% of the management team. This oversight should be corrected in further data collection. Also, the intention to transfer a business to a family member, measured in this study, may or may not be an appropriate substitute for the actual transference of family ownership and/or management from one generation to the next, as defined by the experience dimension of the F-PEC scale. Future research studies might compare intentions to transfer ownership and/or management with each other and with actual transfer of ownership and/or management to see whether they indeed reflect the same dimension (e.g., with factor analysis tests for instance as described in Step 1 above).

Finally, as noted earlier, the culture dimension is also treated in a limited way in this study. Future research might tap more explicitly the perceptions regarding the degree to which the family and the business share the same perspectives, not only regarding overall mission and objectives, but also regarding underlying values and to what degree family owners are unified about their views of the business.[7]

Over and above its limitations as related to the F-PEC scale, it should be noted that the data set was drawn from SMEs. At its best, the proposed Guttman scale should not be seen as generalizing to larger family firms. In summary, the material presented in this article is intended primarily as an illustration of how items can be combined into a single ordinal scale of family influence on the SME. Its purpose is to provide a tool to differentiate among SMEs, the vast majority of which tend to be classified as family firms when using more inclusive definitions of family orientation. Future research is required to test for scale effects, that is, the reliability of the Guttman scale on both SMEs and on larger firms, and to include a broader range of items in the scale. Further, as pointed out by Klein (2000) and Astrachan et al. (2002), many current approaches to family business measurement do not adequately take into account companies with a small number of families (e.g., perhaps the descendents of two partners) that in many aspects may still behave like other family firms.

In sum, much is still left to explore regarding the appropriate measurement of family business. But Guttman scaling offers a clear and promising approach to measure family orientation.

Conclusion

The purpose of this article was to introduce a new approach for operationalizing family business variables, in particular based on the idea of imbedded criteria, that is, that criteria can define a successively smaller subset of firms nested within a larger set of firms. Past research has not validated the assumptions underlying these definitions using statistical methods. The Guttman scaling technique provides a means for doing so. This article is an effort to demonstrate the use of the Guttman scaling procedure on a

[7] The author is grateful for the suggestions provided for augmenting data collection received from Joe Astrachan and Albert Jan Thomassen at the 2002 meeting of the International Family Enterprise Research Academy in Trier, Germany.

random sample of 885 Dutch SMEs. More specifically, the research question for this article is as follows: "Can various criteria for family orientation of a business be sorted along a single continuum of difficulty, and furthermore, can they be validly combined together into one index (using Guttman scaling techniques)?"

In conclusion, the results suggest that it is possible to incorporate items sampling different aspects of family business into one ordinal scale. This scale also appears to provide predictive ability for the chosen dependent variable, whether or not a business would describe itself as a family firm, at least as well as a statistical approach using all items separately in a multiple regression. A tentative answer to the central research question is affirmative for this particular sample. However, additional work is needed to explore the different items that should be used in future research as well as the stability of the Guttman scale for different samples. The items included in this study were limited to those available from an existing data set. Future research should include additional items to more represent a more complete set of family orientation criteria, for instance, those included in the F-PEC scale (Astrachan et al., 2002). In particular, whether or not the firm's ownership and/or management passes (and/or intends to pass) to the next generation, the degree to which family values influence the business and the number of family owners and/or managers are important criteria omitted in the current study. However, the methodology presented in this article may prove to be a useful tool in resolving some of the persistent issues regarding operationalization of multidimensional definitions of family orientation within the field of family business.

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