A NOVEL USE OF HONEY'S AGGREGATION APPROACH TO THE ANALYSIS OF REPERTORY GRIDS

Céline Rojon, Almuth McDowall and Mark NK Saunders

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This paper examines and appraises a novel approach to generating shared group constructs through aggregative analysis: the application of Honey's aggregation procedure to repertory grid technique (RGT) data. Revisiting Personal Construct Theory's underlying premises and adopting a social constructivist epistemology, we argue that, whilst "implicit theories" of the world, elicited via RGT, are unique to individuals, the constructs on which they are founded may be shared collectively. Drawing on a study of workplace performance, we outline a protocol for this novel use of Honey's (1979a; 1979b) approach demonstrating how it can be utilized to generate shared constructs inductively to facilitate theory building. We argue that, unlike other grid aggregation processes, the approach does not compromise data granularity, offering a useful augmentation to traditional idiographic approaches examining individual-level constructs only. This approach appears especially suited to addressing complex and implicit topics, where individuals struggle to convey thoughts and ideas.

Keywords: repertory grid; Personal Construct Theory; interview; aggregation; analysis

Studying complex social or behavioral phenomena presents researchers with a dilemma. Whilst individual participants' data offers depth and granularity, the multi-level nature of associated issues often necessitates aggregation compromising individual-level detail (cf. Hodgkinson 1997b; Hodgkinson 2002). In this paper, we offer a novel use for Honey's (1979a; 1979b) aggregation approach, examining and appraising its utility for generating shared group constructs whilst preserving individual-level granularity of RGT (repertory grid technique) (Kelly 1955; 1963) data.

Since its inception, RGT has been used widely to elicit individual psychological constructs. Aggregative analyses of these data at group-level have typically adopted a nomothetic perspective, relying on methods such as principal components or cluster analysis. Such methods risk losing the inherent complexity and individual perceptual richness in elicited data. In contrast, Honey (1979a; 1979b) offers a potential 'hybrid' approach for data aggregation, capitalizing on strengths of both nomothetic and idiographic approaches. We commence by reappraising the theoretical foundations and epistemological assumptions of RGT and aggregation. Within this we outline how Honey's approach can be reconciled with Kelly's original Personal Construct Theory (PCT) through adopting a social constructivist epistemological position. Building upon this we offer a protocol for using RGT and Honey's inductive grid aggregation to elicit shared constructs, illustrated with worked examples from a study of workplace performance. We appraise this novel use of Honey's aggregation approach, with particular consideration of prioritizing depth versus data aggregation.

REAPPRAISING RGT AND AGGREGATION

RGT is grounded in Kelly's (1955; 1963) PCT. PCT's fundamental postulate states an individual's processes are channeled psychologically by the way they anticipate events, their interpretation of associated information varying according to 11 underlying corollaries. Of these, the individuality and commonality corollaries are particularly pertinent to aggregative analysis. The former notes persons differ in their construction of events; the latter that where one person's construction is similar to another's, underlying psychological processes are similar. Kelly (1963) argued individuals' constructions of the world are abstract and personal, being subject to revision or replacement when tested against everyday reality using notions of similarity and difference. Constructs therefore develop and change as a consequence of individuals' reflection on past and anticipation of future experiences. Formed by one relationship of similarity and one of difference, they are expressed through bipolar anchors such as 'unhappy' – 'cheerful' (Kelly 1955; 1963). The ways individuals speak about these anchors reveals the meanings they attach to a construct.

To enable construct elicitation, Kelly developed RGT, an idiographic technique allowing individuals to express their own subjective understandings of their social practices (Daniels, de Chernatony, and Johnson 1995). Originally developed within Clinical Psychology settings (Slater 1977), RGT is now used more widely, a recent bibliometric review noting 46% of empirical articles were from outside Psychology; disciplines including Health, Computer Science, Marketing and Business Administration (Saúl et al. 2012). RGT uses broad questions focusing on 'elements' such as people, objectives, activities or events (Jankowicz 2004) to help participants to formulate their own constructs relevant to the topic being explored.

Collection, analysis and interpretation of RGT data can adopt a variety of approaches. These usually focus on the individual level, emphasizing the unique nature of constructs, highlighting the technique's utility in enabling insights into an individual's construct system; and often adopting an interpretivist epistemology (Table 1: 'Individual-level'). Once communicated, such constructs may be shared across individuals with varying idiosyncrasy (Kelly 1963; Simpson and Wilson 1999; Grice 2004; Arnold et al. 2010), offering epistemological justification for group-level analysis. Within an interpretivist epistemology this is likely to involve manual content analysis to pinpoint similarities and differences within and between individuals' constructs. For group-level aggregation approaches operationalized within other, often implicitly ascribed, epistemologies (Table 1: 'Group-level'), this frequently involves using similarity matching/rating or variable reduction techniques to develop constructs that can be described or manipulated statistically, risking losing the depth of individual-level data. In contrast, grid aggregation approaches relying on either data or theory driven content analysis, offer for the former greater flexibility and closeness to data and for the latter greater transparency (Green, 2004). Yet, Honey's (1979a; 1979b) use of inductive content analysis has rarely been mentioned as an approach, despite potential for revealing similarities and differences between individuals' constructs whilst preserving the inherent complexity and individual perceptual richness in elicited data. Rather, the dominant view is that all such group-level aggregation approaches are epistemologically incompatible with Kelly's original ideas and likely to result in substantial distortions (Easterby-Smith, Thorpe, and Holman 1996; Marsden and Littler 2000).

Contrary to viewing Honey's (1979a; 1979b) approach as incompatible, Hill (1995) contends that within a social constructivist epistemology grid aggregation can facilitate accurate expression of common or shared constructs; embodying all participants' categorized views, whilst conserving idiosyncrasy and richness though maximum participant-specific information (Gergen 2015). From this epistemological stance, grid aggregation satisfies the core tenets of RGT and maintains granularity by not reducing elicited constructs to themes, reference concepts or components. Compared to other group-level approaches where participants rate similarity between their own constructs and reference concepts derived from prior research (Table 1: 'Group-level'), the influence of existing concepts is also minimal, suggesting aggregative RGT data analysis is possible (Jankowicz 2004).

Table 1 about here

A literature search (of Business Source Complete and PsycINFO databases) revealed the novelty of Honey's grid aggregation, the approach being referenced in only six peer reviewed studies and five unpublished doctoral theses or conference proceedings since its 1979 inception[1]. We contend this is likely to be for three reasons: Firstly, Honey's original article (1979a) was published in *Industrial and Commercial Training*, which has a predominantly practitioner readership. As such, it is unlikely to have come to the attention of many scholars. Second, scholars aware of the approach might be unconvinced that advantages outweigh the disadvantages. Finally, despite Kelly's (1955; 1963) commonality corollary recognizing the potential for shared abstractions, and grid aggregation being considered compatible with RGT within a social constructivist epistemology as previously outlined, some researchers (Easterby-Smith et al. 1996; Marsden and Littler 2000) still deem shared constructs and cross-grid analysis epistemologically incompatible, maintaining "the grid is *par excellence* a technique for measuring individual perceptions" (ibid.: 26)

Guided by a social constructivist epistemology we now consider how these concerns can be addressed, thereby allowing us to offer a novel use of Honey's aggregation approach (1979a; 1979b) for generating shared group constructs from RGT data, maintaining PCT's individuality corollary as well as congruence with the commonality corollary (Kelly 1955; 1963).

USING RGT AND GRID AGGREGATION TO ELICIT SHARED CONSTRUCTS

Our exemplar study focuses on conceptualizations of individual workplace performance behaviors, a widely researched phenomenon in management and organization studies (Campbell 2010), yet one where controversy remains, particularly regarding conceptualization (Griffin, Neal, and Parker 2007). For example, whilst Borman and Motowidlo's (1997) distinction between task and contextual performance has been supported empirically (Oh and Berry 2009), it is criticized for being broadly defined. Conversely, empirical scrutiny of Campbell and colleagues' (1993) widely cited eight-factor model offers sparse support (Varela and Landis 2010). Given these, our study's objective was to identify both idiosyncratic constructs pertaining to one person and constructs where there was communality across persons (Kelly 1955). These would be used to refine our understanding of the phenomenon.

Participants

A heterogeneous sample of 25 managers and professionals with at least three years' experience was selected purposefully from public, private and third sector organizations across various sectors, on the basis that common ground across their constructs would indicate commonality (cf. Daniels et al. 1995; Hodgkinson 1997a).

Procedure

Data on individual workplace performance constructs based on participants' day-to-day experience of interacting with others in their own working environments were elicited using traditional RGT structured, semi-standardized interviews (detailed in Jankowicz 2004), each lasting on average 45 minutes. At the start of their interview, each participant is asked to provide nine elements, in our study comprising "three high, three medium and three low (workplace) performers, with whom they had interacted in their current or former work environment". Although elements can be introduced in various ways, we asked participants to select the persons whose behaviors they were going to discuss during the interview to ensure familiarity (Curtis et al. 2008). Participants needed to have observed their chosen nine elements' work behaviors sufficiently to make statements about their performance. During each interview, elements serve as referent points of comparison, providing the participant with an interaction with the environment when thinking about their constructs. Participants record their elements on separate cards and at the top of an interview grid (Figure 1: 'Individual elements') to aid construct elicitation.

Next, each participant assigns an ‘Overall rating’ to each element ranging from one (very low) to five (very high), noting it in the first grid line, directly underneath each of the nine element names. Subsequently, bipolar constructs are elicited using the difference method (Epting, Suchman and Nickeson 1971): Presenting a triad of three name cards, each participant was instructed to “pair up two of the persons (elements) that have something in common regarding their (performance-related) behaviors, that differentiates them from the third person (‘single’ element)”. Participants were then asked to “elaborate on these behaviors” (the constructs), the ‘Pair’ description being noted on the left and the ‘Single' description on the right of the grid (Figure 1)[2]. The attribution of a description to pair or single depends therefore on the triad presented. Further bipolar constructs are elicited until a participant can think of no more. Finally, for each element, the participant assigns a rating to each construct using a five-point Likert scale (5 = “very much like the pair”, 1 = “very much like the single”; Palmer, 1978). In our study 317 bipolar constructs were generated (Figure 1: ‘Example…’), ranging from 6 to 18 (*SD* = 3.06) per participant.

Figure 1 about here

Data Analysis

Individual-level analysis

Initial analysis focuses on individual participants’ construct systems. Similarity scores (‘importance scores’ in Jankowicz 2004) are calculated for all elicited constructs, indicating the likeness between each construct and the participant’s overall rating; in our example those most similar (Honey 1979b) to the overall performance rating (Figure 1, right: 'Similarity'). To do this, firstly each participant's overall ratings for elements (Figure 1: first line of grid) are compared against their ratings for each construct, absolute differences across each construct being cumulated. For the construct "Do not think about their work at home; job stops at 5pm" – "Engrossed in her work, never stops thinking about her work" comparison of overall ratings with this construct's specific ratings resulted in absolute differences of 1,0,0,1,0,1,0,0,1; cumulated to a 'Comp1' value of 4 (Figure 1, right); the 'pair' description being associated with high, and the 'single' description with low performance. Given attribution of 'pair' and 'single' construct descriptions depends on the triad presented, an alternative triad might have result in these being reversed. Rather than reverse ratings for each construct, next overall ratings are reversed (Figure 1, bottom: 'Reversed…') and the comparison and cumulating process is undertaken again, absolute differences being recorded (Figure 1, right) as a 'Comp2' value: 24 for the first construct. The absolute difference between these two sets of comparison values represents each construct's similarity score. A relatively high construct score, in our example 20, indicates great similarity to the overall [performance] rating. A relatively low construct score indicates difference. These scores are also used for subsequent aggregative analyses across grids.

Aggregative (group-level) analysis: a novel use of Honey (1979a)

For aggregative analysis each participant's grid constructs are first ranked separately according to their similarity scores and then divided equally into top, medium and tail terciles (Honey 1979a; Jankowicz 2004); the number of constructs in each tercile being dependent on the number of constructs in the grid. Top constructs are those associated most, and tail constructs those associated least with the topic being investigated. Constructs for all participants are then examined together. Within each tercile, constructs are sorted into categories and sub-categories according to commonalities represented by narrower, more specific aspects or subordinate components of the higher-level categories; non-categorizable constructs being placed in a miscellaneous category. Next, the constructs forming categories, as well as the ratio of top, medium and tail data in each are examined. Categories comprising predominantly of top- and medium-level constructs are retained forming an initial model, given individual participants consider these to be important. Categories with more tail than top constructs are discarded as participants do not associate these strongly with the topic.

Following Honey (1979a) our entire categorization process was undertaken independently by two researchers to reduce unwitting data distortion. The first's categorization comprised nine categories and ten subcategories, and the second's comprised twelve categories and two subcategories. These were compared and contrasted taking into account respective subcategories, 55% of constructs being categorized into nine conceptually identical categories. Given partial overlap, an expert panel (Honey 1979a) was used to categorize the remaining 45% of constructs. Five management and organization studies and industrial/organizational psychology experts, split into two groups, were asked to sort the uncategorized constructs. Where constructs could not be placed in the existing categories, we requested they sort them into either a new or a "miscellaneous" category. A final facilitated discussion comprising all experts was undertaken to resolve sorting disagreements. Their resulting categorization had 11 categories and 57 subcategories, constructs for each category having been elicited from, on average, 15 participants (Table 2). This final model was discussed with all participants to check understanding and conclusions drawn (Hill 1995). Subsequent comparison with Borman and Motowidlo's (1977) task/contextual performance distinction and Campbell et al.'s (1993, 2010) eight factor model (Table 2) revealed aspects where each had neglected to capture the complexity of performance; neither incorporating constructs categorized as 'displaying self-confidence' or 'balancing work and life'.

Table 2 about here

APPRAISAL

Taking a social constructivist framework, the methodological procedure outlined here demonstrates that it is possible to retain individual richness when aggregating personal constructs to the group-level. Through such extension of the idiographic usage of Kelly's RGT to a nomothetic application, we demonstrate that, as individuals' elicited constructs are a product of interactions through social relationships, they can be aggregated using Honey's (1979a; 1979b) approach, offering a flexible, multipurpose methodology. The social constructivist position remains true to Kelly's PCT, countering aforementioned criticism that such aggregation is epistemologically not defensible for this method. Moreover, this procedure appears suitable for participant-generated rather than researcher-supplied elements, emphasizing utility for maintaining the data's inherent richness.

We propose that the approach and associated protocol discussed here makes two methodological contributions: Firstly, unlike many scholars who, following Kelly's individuality corollary have analyzed data within single grids at the individual level, we have illustrated how data may be aggregated across grids without compromising individual-level detail. Our novel use of Honey's approach (1979a; 1979b) and associated protocol allows consideration of the content of participants' constructs and their associated ratings. In drawing on all information provided and comparing individual thoughts and ideas, we address concerns regarding loss of data richness when aggregating information across several grids (Easterby-Smith et al. 1996). Such comprehensive aggregation enables insight into the prevalence of constructs, offering a structured, replicable alternative to techniques for eliciting shared understandings such as focus groups. Secondly, we highlight how this inductive approach can facilitate new understandings, even for comparatively well-researched topics. As such, we address Hibbert and colleagues' (2014) call for methodologies and practices that can offer new, contextualized theoretical insights. Our research reveals Honey's grid aggregation approach can allow a heterogeneous group of individuals' constructs to be used as a basis for new theoretical understanding from which, although each participant has had different experiences, aggregative analysis can reveal commonalities regarding behaviors. Applying this to individual grid data showed the potential to reveal new aspects considered important, but previously not included in existing frameworks in a comparatively well researched topic. We recognize that our research has only established the utility of aggregating one group's grid data in one context, which may not be useful or possible where data are highly idiosyncratic. Further work is therefore needed to evaluate the extent to which this new use can be applied with other groups and alternative contexts.

We note using Honey's (1979a; 1979b) aggregative approach to analyzing RGT data requires substantial time investment. Whilst this is an associated cost, it enables the researcher to remain immersed in the minutiae of participants' actual data (Patton 2015). Acknowledging immersion is a standard component regarding the analysis of qualitative data, we note its pertinence for a research context where use of specific (e.g., Idiogrid) or generic software (e.g., SPSS) to analyze data elicited via the RGT (Scheer 2016), at the individual or group-level, is the norm.

CONCLUSION

We examined and appraised a novel approach and offered a protocol to enable complimentary idiographic and nomothetic approaches to preserve individual granularity whilst undertaking aggregative analysis of data elicited via the RGT. Using Honey's approach (1979a; 1979b) within a social constructivist epistemology offers a novel alternative not only to traditional solely idiographic approaches within the RGT, but also to other group-level data elicitation methods, such as focus groups.

Offering a single exemplar our research is invariably constrained, and we recognize further application of this use of Honey's aggregation approach within our protocol would allow boundary conditions to be examined (Dubin 1976; Sackett and Larson 1990); providing a better understanding of where the RGT and such subsequent aggregation might best be used.

Finally, our exemplar study reveals Honey's approach to grid aggregation using content analysis can provide the basis for new theoretical insights even into well-researched topics. Our protocol regarding how to aggregate individual-level data to the group-level whilst retaining idiosyncratic complexities provides an epistemologically consistent guide for fellow researchers. We therefore propose scholars, where faced with the dilemma of whether to focus upon depth or aggregation, now consider utilizing RGT combined with Honey's aggregative approach within a social constructivist epistemology.

ENDNOTES

[1] These are (in chronological order): Hisrich and Jankowicz 1990; Díaz De Leó and Guild 2003; Dobosz-Bourne and Jankowicz 2006; Ensor, Robertson, and Ali-Knight 2007; Müller et al. 2008 (conference proceedings); Muir 2008 (PhD thesis); Müller et al. 2009 (conference proceedings); Dima 2010 (DBA thesis); Thota 2011 (conference proceedings); Kreber and Klampfleitner 2012; Raja et al. 2013.

[2] In the grid presented in Figure 1, single descriptions appear to depict positive, whilst pair descriptions appear to depict more negative performance-related behaviors. This is coincidence; pair descriptions and single descriptions may refer to what might be perceived as negative, positive or neutral (value-free) behaviors.

REFERENCES

Arnold, John, Ray Randall, Fiona Patterson, Joanne Silvester, Ian Robertson, Cary Cooper, Bernard Burnes, Don Harris, Carolyn Axtell, and Deanne Den Hartog. 2010. *Work Psychology: Understanding Human Behaviour in the Workplace*. 5th ed. London, UK: Financial Times/Prentice Hall.

Ashleigh, Melanie. J., and Joe Nandhakumar. 2007. "Trust and Technologies: Implications for Organizational Work Practices". *Decision Support Systems* 43:607-617.

Borman, Walter C. 1987. "Personal Constructs, Performance Schemata, and 'Folk Theories' of Subordinate Effectiveness: Explorations in an Army Officer Sample". *Organizational Behavior and Human Decision Processes* 40:307-322.

Borman, Walter C., and Stephan J. Motowidlo. 1997. "Task Performance and Contextual Performance: The Meaning for Personnel Selection Research". *Human Performance* 10:99-109.

Campbell, John P., Rodney A. McCloy, Scott H. Oppler, and Christopher E. Sager. 1993. "A Theory of Performance". Pp. 35-70 in *Personnel Selection in Organizations*, edited by Neal Schmitt, and Walter C. Borman. San Francisco, CA: Jossey-Bass.

Campbell, John P. 2010. "Individual Occupational Performance: The Blood Supply of Our Work Life". Pp. 245-254 in *Psychology and the Real World: Essays Illustrating Fundamental Contributions to Society*, edited by Morton A. Gernsbacher, Richard W. Pew, and Leatta M. Hough. New York, NY: Worth Publishers.

Christie, Donald F. M., and Joan G. Menmuir. 1997. “The Repertory Grid as a Tool for Reflection in the Professional Development of Practitioners in Early Education”. *Teacher Development* 1:205-218.

Curtis, Aaron, Taylor Wells, Paul B. Lowry, and Trevor Higbee. 2008. “An Overview and Tutorial of the Repertory Grid Technique in Information Systems Research”. *Communications of the Association for Information Systems (CAIS)* 23:37-62.

Daniels, Kevin, de Chernatony, Leslie, and Gerry Johnson. 1995. “Validating a Method for Mapping Managers’ Mental Models of Competitive Industry Structures”. *Human Relations* 48:975-991.

Díaz De Leó, Enrique, and Paul Guild. 2003. “Using Repertory Grid to Identify Intangibles in Business Plans”. *Venture Capital: An International Journal of Entrepreneurial Finance* 5:135-160.

Dima, Carmen. 2010. “Implementation of Operational Environmental Practices in the Ontario (Canada) Wine Industry: Perceptions, Constructs, Intent”. DBA dissertation, Edinburgh Business School, Heriot-Watt University, UK.

Dobosz-Bourne, Dorota, and Devi Jankowicz. 2006. “Reframing Resistance to Change: Experience from General Motors Poland”. *The International Journal of Human Resource Management* 17:2021-2034.

Dubin, Robert. 1976. “Theory Building in Applied Areas”. Pp. 17-39 in *Handbook of Industrial and Organizational Psychology*, edited by Marvin D. Dunnette. Chicago, IL: Rand McNally.

Easterby-Smith, Mark, Richard Thorpe, and David Holman. 1996. “Using Repertory

Grids in Management". *Journal of European Industrial Training* 20:3-30.

Ensor, John, Martin Robertson, and Jane Ali-Knight. 2007. "The Dynamics of Successful Events – the Experts' Perspective". *Managing Leisure* 12:223-235.

Epting, Franz R., David L. Suchman, and Carl J. Nickeson. 1971. "An Evaluation of Elicitation Procedures for Personal Constructs". *British Journal of Psychology* 62:513-517.

Gergen, Kenneth J. 2015. *An Invitation to Social Construction*. 3rd ed. London, UK: Sage.

Green, Bob 2004. "Personal Construct Psychology and Content Analysis". *Personal Construct Theory and Practice* 1:82-91.

Grice, James 2004. "Bridging the Idiographic-Nomothetic Divide in Ratings of Self and Others and on the Big Five". *Journal of Personality* 72:203-241.

Griffin, Mark A., Andrew Neal, and Sharon K. Parker. 2007. "A New Model of Work Role Performance: Positive Behavior in Uncertain and Interdependent Contexts". *Academy of Management Journal* 50:327-347.

Hibbert, Paul, John Sillince, Thomas Diefenbach, and Ann L. Cunliffe. 2014. "Relationally Reflexive Practice: A Generative Approach to Theory Development in Qualitative Research". *Organizational Research Methods* 17:278-298.

Hill, Robin A. 1995. "Content Analysis for Creating and Depicting Aggregated Personal Construct Derived Cognitive Maps". Pp. 101-132 in *Advances in Personal Construct Psychology*, edited by Robert A. Neimeyer and Greg J. Neimeyer. Greenwich, CN: JAI Press.

Hisrich, Robert D., and Devi Jankowicz. 1990. "Intuition in Venture Capital Decisions:

An Exploratory Study Using a New Technique". *Journal of Business Venturing* 5:49-62.

Hodgkinson, Gerald. P. 1997a. "The Cognitive Analysis of Competitive Structures: A Review and Critique". *Human Relations* 50:625-654.

Hodgkinson, Gerald. P. 1997b. "Cognitive Inertia in a Turbulent Market: The Case of UK Residential Estate Agents". *Journal of Management Studies* 34:921-945.

Hodgkinson, Gerald. P. 2002. "Comparing Managers' Mental Models of Competition: Why Self-Report Measures of Belief Similarity Won't Do". *Organization Studies* 12:63-72.

Honey, Peter. 1979a. "The Repertory Grid in Action. How to Use It to Conduct an Attitude Survey". *Industrial & Commercial Training* 11:452-459.

Honey, Peter. 1979b. "The Repertory Grid in Action. How to Use It as a Pre/Post Test to Validate Courses". *Industrial & Commercial Training* 11:358-369.

Huang, Xu, Robert P. Wright, Warren C. K. Chiu, and Chao Wang. 2008. "Relational Schemas as Sources of Evaluation and Misevaluation of Leader-Member Exchanges: Some Initial Evidence". *The Leadership Quarterly* 19:266-282.

Industrial and Commercial Training. 2017. "Industrial and Commercial Training Information". Retrieved March 28, 2017 (http://emeraldgrouppublishing.com/products/journals/journals.htm?id=ict).

Jankowicz, Devi. 2004. *The Easy Guide to Repertory Grids*. Chichester, UK: Wiley.

Jankowicz, Devi, and K. Cooper. 1982. "The Use of Focussed Repertory Grids in Counseling". *British Journal of Guidance & Counselling* 10:136-150.

Kelly, George A. 1955. *The Psychology of Personal Constructs. A Theory of Personality*. Vol. 1. New York, NY: W. W. Norton & Company.

Kelly, George A. 1963. *A Theory of Personality: The Psychology of Personal Constructs*. New York, NY: W. W. Norton & Company.

Kreber, Carolin, and Monika Klampfleitner. 2012. “Construing the Meaning of Authenticity in University Teaching: Comparing Explicit to Implicit Theories”. *Journal of Constructivist Psychology* 25:34-69.

Marsden, David, and Dale Littler. 2000. “Repertory Grid Technique: An Interpretive Research Framework”. *European Journal of Marketing* 34:816-834.

Muir, Errol. 2008. “What’s Important to Raters Judging Work Performance: Mapping Individual Priorities and Management Team Differences”. PhD dissertation, Graduate School of Business, Royal Melbourne Institute of Technology University, AU.

Müller, Jörg, Marc Jentsch, Christian Kray, and Antonio Krüger. 2008. “Exploring Factors that Influence the Combined Use of Mobile Devices and Public Displays for Pedestrian Navigation”. Pp. 308-317 in *Proceedings of the Fifth Nordic Conference on Human-Computer Interaction: Using Bridges*. Lund, SE.

Müller, Jörg, Dennis Wilmsmann, Juliane Exeler, Markus Buzeck, Albrecht Schmidt, Tim Jay, and Antonio Krüger. 2009. “Display Blindness: The Effect of Expectations on Attention towards Digital Signage”. Pp. 1-8 in *Pervasive 2009: Proceedings of the 7th International Conference*, edited by Hideyuki Tokuda, Michael Beigl, Adrian Friday, Bernheim A. J. Brush and Yoshito Tobe. Nara, JP.

Oh, In-Sue, and Christopher M. Berry. 2009. “The Five-Factor Model of Personality and Managerial Performance: Validity Gains through the Use of 360 Degree Performance Ratings”. *Journal of Applied Psychology* 94:1498-1513.

Palmer, C. J. 1978. “Understanding Unbiased Dimensions: The Use of Repertory Grid Methodology”. *Environment and Planning* 10:1137-1150.

Patton, Michael Q. 2015. *Qualitative Research and Evaluation Methods*. 4th ed. Thousand Oaks, CA: Sage.

Purvis, Lynne J., and Mark Cropley. 2003. “The Psychological Contracts of National Health Service Nurses”. *Journal of Nursing Management* 11:107-120.

Raja, Jawwat Z., Dorota Bourne, Keith Goffin, Mehmet Çakkol, and Veronica Martinez. 2013. “Achieving Customer Satisfaction through Integrated Products and Services: An Exploratory Study”. *Journal of Product Innovation Management* 30:1128-1144.

Sackett, Paul R., and James R. Larson. 1990. “Research Strategies and Tactics in Industrial and Organizational Psychology”. Pp. 419-489 in *Handbook of Industrial and Organizational Psychology*. 2nd ed. Vol. 1., edited by Marvin D. Dunnette and Leatta M. Hough. Palo Alto, CA: Consulting Psychologists Press.

Saúl, Luis A., M. Angeles Lopez-Gonzalez, Alexis Moreno-Pulido, Sergi Corbella, Victoria Compan, and Guillem Feixas. 2012. “Bibliometric Review of the Repertory Grid Technique: 1998-2007”. *Journal of Constructivist Psychology* 25:112-131.

Senior, Barbara, and Stephen Swailes. 2007. “Inside Management Teams: Developing a

Team Survey Instrument”. *British Journal of Management* 18:138-153.

Scheer, Jörn. 2016. “Computer Programmes for the Analysis of Repertory Grids”. Retrieved March 28, 2017 (http://kellysociety.org/comp-prog.html).

Simpson, Barbara, and Mary Wilson. 1999. “Shared Cognition: Mapping Commonality and Individuality”. *Advances in Qualitative Organizational Research* 2:73-96.

Slater, Patrick. 1977. *Dimensions of Intra-Personal Space: The Measurement of Intra-Personal Space by Repertory Grid Technique*. New York, NY: John Wiley & Sons.

Thota, Neena. 2011. “Repertory Grid: Investigating Personal Constructs of Novice Programmers”. Pp. 23-32 in *Proceedings of the 11th Koli Calling International Conference on Computing Education Research*. Koli National Park, FI.

Varela, Otmar E., and Ronald S. Landis. 2010. “A General Structure of Job Performance: Evidence from Two Studies”. *Journal of Business and Psychology* 25:625-638.

Table 1

Comparison of individual- and group-level analytical approaches

	Individual-level	Group-level[1]			
		Generic content analysis	**Similarity matching/rating**	**Variable reduction techniques**	**Grid aggregation**
Description of procedure	Interpretative, idiographic and qualitative analysis of each interview enabling in-depth insight into an individual's construct system	Manual qualitative content analysis to identify underlying themes, within and across cases, thereby generating insight into individuals' understanding and constructs elicited	Similarity rating between participant's own constructs and reference concepts (e.g., derived from previous studies) undertaken by participants; resulting numerical construct definitions correlated across participants	Statistical procedures such as Principal Components Analysis or Factor Analysis to reduce data into smaller components	Data or theory driven content analysis and aggregation of RGT data across all participants to identify the salient shared constructs, whilst preserving interpretation of individual-level constructs
(Ascribed) epistemolo-gical stance	Often interpretivist, yet other positions (e.g., pragmatist) possible	Typically interpretivist or (social) constructivist	Variable, for example pragmatist, positivist or (social) constructivist	Generally positivist or pragmatist	Variable, for example (social) constructivist or pragmatist
Example research questions	How do other individuals perceive the personality of a defensive person? (Jankowicz and Cooper 1982); What is early education practitioners' understanding of young children? (Christie and Menmuir 1997)	What are nurses' contract expectations? (Purvis and Cropley 2003); How do organizational members in volatile organizational settings conceptualize trust? (Ashleigh and Nandhakumar 2007)	What schemata may be used in making work performance judgments? (Borman 1987); What are managers' mental models of competitive industry structures? (Daniels et al. 1995)	How do members of management teams conceptualize teamwork? (Senior and Swailes 2007); What are leaders' and members' relational schemas in making sense of and evaluating the leader-member exchange relationship? (Huang et al. 2008)	How do lecturers conceptualize authenticity in teaching (and how do their notions compare to existing theories)? (Kreber and Klampfleitner 2012)

Note. [1] The group-level analytical approaches presented here are not exhaustive. Both within individual-level and group-level approaches, data collection usually follows the traditional pattern of conducting interviews using the RGT (see section "procedure").

Table 2

Category scheme

Category				
Name	**Participants elicited from**	**Subcategories**	**Inclusion in framework of**	
	N	***N***	**Borman and Motowidlo (1997)**	**Campbell et al. (1993, 2010)**
Communicating effectively	11	3	✓	✓
Leading/managing others	17	4	✓	✓
Engaging with others	21	9	✓	✓
Demonstrating effort and drive	20	6	✓	✓
Planning and organizing	17	6	(✓)	✓
Behaving professionally	10	4	×	✓
Displaying self-confidence	20	6	×	×
Balancing work and life	4	1	×	×
Demonstrating knowledge and skills	17	5	✓	✓
Showing creativity/openness for change	13	5	(✓)	×
Showing counterproductive conduct	20	8	×	✓
All (= 100%)	25	57		

Note: *N* = number; ✓ included; (✓) = partially included × = not included

Individual elements
(i.e., 3 high/medium/low performers each)

Overall ratings
(1 = very low workplace performance,
5 = very high workplace performance)

Assigned (bipolar) construct ratings
(1 = very much like the single,
5 = very much like the pair)

Example of bipolar construct

Comp1: comparison of overall ratings against (bipolar) construct ratings, cumulated across each line of the grid (absolute scores)

*Comp2: comparison of **reversed** overall ratings against construct ratings, cumulated across each line of the grid (absolute scores)*

Similarity: Similarity scores = (absolute) difference scores between Comp1 and Comp 2

Pair	Roger A	Dorothy B	Karen C	Michael D	David E	Alex F	Colin G	Nick H	Richard I	Single
	2	4	1	5	1	5	5	4	3	
Do not think about their work at home; job stops at 5pm	3	4	1	4	1	4	5	4	4	Engrossed in her work, never stops thinking about her job
Unable to cope with challenges	2	4	1	4	1	4	5	4	4	Confidence in what she's produced means she is able to cope well with challenges
Have difficulty in bringing across their viewpoint (not so confident in doing this)	2	4	2	5	3	4	5	4	5	Confident in what she's doing because she has looked at every detail
They have a set way of doing things, follow a routine	3	4	2	4	1	4	5	4	3	Able to link information, drawing data to a coherent story
Not so rational, somewhat guided by their emotions	3	4	1	3	1	5	1	3	3	'Blinding' intelligence: sharp, rational, logical thinker
Focused either on breadth or depth, but not using both to understand a problem	4	3	1	3	1	4	5	5	4	Good at comprehensively describing a problem
Do not come up with groundbreaking ideas	3	4	1	4	1	4	5	4	4	Constantly comes up with groundbreaking ideas, constant innovation
Don't take action, indecisive	3	5	3	5	2	4	3	3	3	Pushy, takes action when required
***Reversed** overall ratings*	*4*	*2*	*5*	*1*	*5*	*1*	*1*	*2*	*3*	

Comp 1	*Comp 2*	*Simi-larity*
4	*24*	*20*
3	*25*	*22*
6	*24*	*18*
4	*22*	*18*
8	*18*	*10*
8	*22*	*14*
4	*24*	*20*
9	*19*	*10*

Figure 1. Annotated completed interview grid with analysis (in italics)