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Developing and validating the multidimensional proactive decision-making scale

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ABSTRACT

On the basis of an extensive interdisciplinary literature review proactive decision-making (PDM) is conceptualised as a multidimensional concept. We conduct five studies with over 4000 participants from various countries for developing and validating a theoretically consistent and psychometrically sound scale of PDM. The PDM concept is developed and appropriate items are derived from literature. Six dimensions are conceptualised: the four proactive cognitive skills 'systematic identification of objectives', 'systematic search for information', 'systematic identification of alternatives', and 'using a decision radar', and the two proactive personality traits 'showing initiative' and 'striving for improvement'. Using principal component factor analysis and subsequent item analysis as well as confirmatory factor analysis, six conceptually distinct dimensional factors are identified and tested acceptably reliable and valid. Our results are remarkably similar for individuals who are decision-makers, decision analysts, both or none of both with different levels of experience. There is strong evidence that individuals with high scores in a PDM factor, e.g. proactive cognitive skills or personality traits, show a significantly higher decision satisfaction. Thus, the PDM scale can be used in future research to analyse other concepts. Furthermore, the scale can be applied, e.g. by staff teams to work on OR problems effectively or to inform a decision analyst about the decision behaviour in an organisation.

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1. Introduction

"If I were given one hour to save the planet, I would spend 55 minutes defining the problem and five minutes resolving it."

Albert Einstein

In the last decades, the methods in Operational Research (OR) made substantial progress. Researchers developed methods, which can be used to "solve problems" about which earlier generations had dreamt. These OR methods have a great positive impact on the quality of individual and organisational decisions. In line with the famous quote from Albert Einstein it is important to spend effort in defining a problem. The more appropriate the problem is defined and structured, the greater the potential for positive impact of OR methods. This paper contributes to skilful problem structuring by providing a new concept concerning proactive decision-making and an

empirically validated scale that measures proactive cognitive skills and personality traits to support making better decisions.

Woolley and Pidd (1981, p. 197) described problem structuring as "the process by which the initially presented set of conditions is translated into a set of problems, issues and questions sufficiently well defined to allow specific research action." In theory and practice, problem structuring methods have gained more and more attention (Franco & Montibeller, 2010; Mingers & Rosenhead, 2001; Tavella & Papadopoulos, 2014). Problem structuring methods (PSM) are described by Rosenhead (2013, p. 1162) as a "broad group of model-based problem handling approaches whose purpose is to assist in the structuring of problems rather than directly to derive a solution." These methods are most frequently applied by groups and are characterised by participation and interactivity (Rosenhead, 2013).

Franco and Meadows (2007) indicated that McGrath's (1984) circumplex is the most accepted framework for group decision support, theory, and research. McGrath identifies four basic actions that need to be performed in a decision related meeting: generating, choosing, negotiating, and executing decisions. The main tasks of a group contain generating alternatives (i.e. ideas, plans, strategies, etc.) and negotiating conflicting preferences. "Within the context of a

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PSM-supported process, groups will engage in information gathering and the designing of strategic options (generate). They will also structure and evaluate the relative advantages and disadvantages of different strategic options before selecting a problem focus and/or a course of action (negotiate)” (Franco & Meadows, 2007, p. 1624). Both generating as well as negotiating are crucial for success. However, we argue that a reasonable result in a generation phase is prerequisite for an effective negotiation phase. Therefore, we are convinced that a focus on the generating tasks is crucial to success.

Many studies recommend that cognitive styles and decision-making styles do have an impact on individual decision-making (e.g. Epstein, Pacini, Denes-Raj, & Heier, 1996; Novak & Hoffman, 2009; Scott & Bruce, 1995), and on group decision-making processes (e.g. Hough & Ogilvie, 2005; Schwenk, 1995). This applies also for the design, use and acceptance of group decision support systems (e.g. Benbasat & Dexter, 1982; Lu, Yu, & Lu, 2001; Taylor, 2004).

As a support for group decision-making Franco and Meadows (2007) emphasise the importance of cognitive style in PSM research and application. They pioneered in systematically analysing the impact of Jung’s (1971) theory of psychological types in context of PSM and derive logically from literature eight hypotheses, e.g. that “sensing and intuitive individuals will play a lead role during option designing tasks, in comparison to thinking and feeling individuals” (p. 1626). Garfield, Taylor, Dennis, and Satzinger (2001) identified empirically that innovative, radical alternatives are created by intuitive and feeling individuals more often than by sensing and thinking individuals.

To the best of our knowledge, none of the existing psychological tests and scales are suited for explaining the process of “generating” comprehensively. In particular, it is of interest which skills individuals have in the generating phase and how much and why they take initiative. Research on decision-making lacks a psychometrically reliable scale for measuring proactive decision-making. In this paper, we develop a scale that distinguishes four cognitive skills and two personality traits relevant to the generation phase in PSM. Our scale measures proactive cognitive skills derived from value-focused thinking and proactive traits derived from proactive behaviour.

Bateman and Crant (1993) define proactive behaviour as the relatively stable tendency to effect environmental change. The essential characteristic of *proactive behaviour* is that “people can intentionally and directly change their current circumstances, social or nonsocial, including their physical environment” (Bateman & Crant, 1993, p. 104, referring to Buss, 1987). The prototypical proactive personality is relatively unaffected by situational forces and interacts with its environment actively. Individuals classified as reactive, by contrast, are relatively passive and are rather shaped by their environment than shaping it themselves (Parker, Bindl, & Strauss, 2010). Proactive individuals actively search for opportunities, take initiative, and proceed with their actions until they achieve their objectives (Bateman & Crant, 1993). Schwarzer (1999) develops a scale to measure the personality trait *proactive attitude*, which can affect motivations and imply actions. Proactive individuals have a vision and are driven by their values. They follow goals that they think are worth reaching for (Parker et al., 2010; Schwarzer, 1999). Bateman and Crant’s *proactive behaviour* and Schwarzer’s *proactive attitude* have in common that individuals show initiative and strive for improvements in their lives. Individuals cannot change their personality traits related to decision-making easily (VandenBos, 2007). However, Kirby, Kirby, and Lewis (2002, p. 1542) find empirical evidence that proactivity can be trained by the “development of context specific knowledge and skills”.

Making decisions, personal or work-related, is an essential part of everyone’s life. However, not everyone and every organisation make good decisions. As it has been postulated and verified empirically, proactive personality traits (e.g. Siebert, Crant, & Kraimer, 1999; Thompson, 2005) as well as proactive cognitive skills (Keeney, 1992) can have positive impacts on an individual in decision situa-

tions. It can be presumed that PDM enables people to make better decisions with results they are more satisfied with. Thus, we consider PDM to be a relevant concept that is worth being looked at in more detail.

Research in OR focuses on best practices or on developing and improving highly sophisticated methods (e.g. Corbett, Overmeer, & Van Wassenhove, 1995). Hämäläinen, Luoma, and Saarinen (2013, p. 623) indicate the importance of behavioural operational research (BOR) as “the study of behavioural aspects related to the use of [...] OR methods in modelling, problem solving and decision support”. Lu et al. (2001) state that in OR applications, the personality as well as the communication style of the decision analyst and the decision-maker may have a huge impact. Appropriate tools and methods for eliciting information about the decision analyst and the decision-maker are still needed, in particular in problem structuring, since hardly any behavioural research has been done “on the process itself and on the role of the analyst and problem owner” (Hämäläinen et al., 2013, p. 623). These tools and methods have to be selected “on the basis of the skills, knowledge, personal style and experience of the analyst” (Hämäläinen et al., 2013, p. 624, referring to Ormerod, 2008). We develop a scale to measure an individual’s behaviour in decision situations. Measurements on this scale can be used to select effective procedures using OR techniques in consideration of behavioural aspects and to analyse behavioural facets in problem structuring.

In this interdisciplinary paper we explicate PDM as a multidimensional concept that combines aspects of *proactive personality traits* and *proactive cognitive skills* in decision situations. We develop a new PDM scale and test it empirically in order to identify reliable and valid measures. In particular, we pursue four objectives: firstly, PDM is conceptualised, i.e. the concept is defined, clarified by its dimensions, and differentiated from other constructs; secondly, the dimensions of PDM are operationalised; thirdly, the *multidimensional PDM scale* is empirically tested and validated in several studies; fourthly, decision satisfaction is explained by PDM.

The paper is organised as follows. In Section 2, we summarise the theoretical foundation of proactive behaviour, decision-making, value-focused thinking, and basic psychological concepts. In Section 3, we conceptualise PDM and derive suitable dimensions from literature. In Sections 4 and 5, we describe the operationalisation of constructs and the methodology. In Sections 6 and 7, we summarise and discuss the results of our empirical studies. In Section 8, we discuss implications for OR, limitations, and further research. In Section 9, we draw our conclusions.

2. Theoretical foundation of proactive decision-making

PDM is based on different disciplines such as psychology, decision theory, and behavioural OR. The term ‘proactive’ refers to personality traits and cognitive skills. Therefore, PDM is framed by insights into proactive personality traits and decision theories in general, value-focused thinking as well as thinking and decision-making styles in particular.

2.1. Proactive personality traits

Grant and Ashford (2008) point out that proactive behaviour involves acting in advance of future situations. Individuals consider future events in their current decisions with foresight, i.e. before they occur. Researchers describe this characteristic using the adjectives ‘future-focused’, ‘anticipatory’, and ‘forward-looking’ (Frese, 2006; Frese & Fay, 2001; Frese, Kring, Soose, & Zempel, 1996; Greenglass, 2002). Proactive behaviour is characterised by the intention of having a “discernible effect on the self and/or the environment” (Grant & Ashford, 2008, p. 9). Proactive individuals are change-oriented and interested in creating a meaningful impact on their environment (Buss, 1987; Diener, Larsen, & Emmons, 1984). Reactive individuals,

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