The International Journal of Management Education 16 (2018) 180–192

Contents lists available at ScienceDirect

The International Journal of Management Education

journal homepage: www.elsevier.com/locate/ijme

How numeracy mediates cash flow format preferences: A worldwide study

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ARTICLE INFO

Keywords:
Cash flow statement formats
Framing effects
Loan decisions
Numeracy
Financial literacy*JEL classification:*
M410
M490

ABSTRACT

688 students from 9 countries on 5 continents participated in this research. The objective was to ascertain what effects, if any, using the direct or indirect format for the operating activities section of the cash flow statement has, if any, on a loan decision and on the ratings of various attributes of the cash flow statement. Students were pretested on their accounting skills with a few simple calculations, then asked to make the loan decision and finally requested to give their opinion of the financial statements in general and of the statement of cash flows in particular. Format had only a minor effect on the loan decision itself but significantly more favorable comments on user friendliness were received on the direct format than on the indirect. Significant differences were found, however, as regards the loan decisions between the students who had correctly done the calculations and those who had not, to such a degree that the effects of innumeracy became the main contribution to knowledge of this research. We find that the ability to perform accurate calculations, a fundamental foundation of financial numeracy, has an effect on financial decision making that has been ignored in previous studies of financial statement users and uses. This has significant implications for accounting and investing practice, and opens up an important field of research in accounting which can learn from what has already been studied on the effects of innumeracy in the health management field.

1. Introduction

This paper is a byproduct of a study in nine countries comparing cash flow formats. That study is the subject of a separate article (Poli et al., in press). A key finding of the study was that numeracy was a strong and salient mediator of the responses of student

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https://doi.org/10.1016/j.ijme.2018.01.004
Received 22 March 2017; Received in revised form 24 January 2018; Accepted 24 January 2018

subjects to the direct versus indirect Cash Flow Statement formats. The present paper describes and evaluates this result in the light of previous studies of the effect of numeracy levels on decision making. Very few of such studies have been in finance or accounting, and it is surmised that is because most researchers using accounting and business student subjects have assumed numeracy is not a factor affecting their results because students would not choose accounting or business studies if they had serious numeracy concerns. However, studies by Alexander and Mattray (1989), Aly and Islam (2003) and Joyce, Hassall, Arquero-Montano, and Donoso-Amos (2006) reveal that business students have significant 'math anxiety' and accounting students show significant 'communication apprehension'. This implies any student sample being asked to process numerical information and then comment on it will contain a number of subjects who are significantly impaired in being able to do either or both activities. It may be that the general population suffers from such shortcomings to an even greater extent than business and accounting students. That in turn means numeracy is a factor that should be taken into account in studies of any users of numerical data, and that the conclusions reached by such studies might be more applicable to the wider public than critics of student samples are apt to argue. (For a further discussion of this issue see section 5 of this paper).

Almost all studies of the SCF format have been single country studies. The study of which the present paper is a result takes its evidence from nine countries all around the world. This is wider geographical and cultural spread of sample subjects comment on SCF formats than has ever done before. It means that any patterns in the study are less open to the criticism that they are incapable of general application. There were significant cross country differences and these are addressed in a paper by Poli et al. (forthcoming). The present paper deals with patterns across the countries and we can state that none of the patterns discussed here showed a systematic association with any particular country or cluster of countries, though naturally some scored higher on average in some aspects than others. Similarly the differences noted in the present paper within the worldwide sample showed no systematic association with graduate versus undergraduate status, with male as opposed to female gender, with use of English as a first as opposed to a second language nor with whether the major a subject studied was accounting or another business discipline.

The rest of the paper is presented in sections as follows.

Section 2 reports the main thrust of the literature on framing effects and on format effects specifically in previous studies of cash flow statements.

Section 3 reports previous studies of the impact of low numeracy on risk sensitive and other decisions.

Section 4 relates the foregoing to our research design.

Section 5 presents our results, evaluates the limitations and draws practical and future research implications from them.

2. Framing effects

2.1. Introduction to framing effects

The two formats of the SCF contain virtually the same substantive information, but present the operating cash flow part of the statement very differently. The indirect format reconciles cash flows with profits, whereas the direct format presents cash flows from operations as a receipts and payments style of account. If people make different decisions about loan requests, or have different views of such attributes as user friendliness, clarity and succinctness, when faced with one format rather than the other; then framing effects are likely to be at work.

Framing effects are simply a term for the easily and generally observed phenomenon that people's choices are affected by how a situation is described or framed (Frisch, 1993; Peters et al., 2006; Tversky & Kahneman, 1981). The camera never lies (so the saying went in the days before Photoshop at least) but the one who shoots the picture decides which parts of the general field of reality will be sampled for immortal preservation. The camera itself has framing effects, so any verbal descriptions of reality have them a fortiori. The term, framing effects, was first used in its present sense in Kahneman and Tversky (1979) account of their newly conceived prospect theory. Their theory arose from their empirical findings that framing a decision on terms of avoided losses produced riskier behaviour than framing it in terms of new gains, even though the situation concerned, the amounts involved and the decision to be taken were invariant across the two frames. Many studies in many fields have supported the existence of framing effects since then, and the original single type of framing effect has been expanded into three by Levin, Schneider, and Gaeth (1998). The three kinds of framing are risky choice, goal and attribution framing.

Risky choice frames different risk levels differently. Attribution framing frames attractiveness or unattractiveness on one single attribute. Goal framing frames outcomes of a behaviour change the speaker seeks around avoidance of loss or acquisition of gains such as lives saved. In line with prospect theory, people tend to take higher risks when information is framed around avoidance of loss rather than around the chance to realise gains.

Goal framing and risky choice framing effects arise from focusing on gains or losses from taking a recommended course of action and these are congruent with prospect theory. For example, losses from not using a credit card are more persuasive than gains from using it (Ganzach and Karsahi, 1995). Both frames aim at the same change in behavior but fear motivates better than greed.

Attribution framing is exemplified by beef tasting after being told it contains 75% lean rather than 25% fat; with the positive frame of lean resulting in a higher rating of the taste. Success rates v failure rates frame similarly. Attribution framing effects are mitigated by strongly held views or high personal involvement – mitigated but not eliminated; and effects are weaker for extreme values of the attribute (Levin et al., 1998).

In our study of SCF formats, we are concerned with both risky choice and goal framing effects when we report the impact of format on loan decisions and with attribution framing when we consider the subjects' judgments of format qualities such as clarity, succinctness and user friendliness.