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How to Sample Behavior and Emotions of Traders:

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How to Sample Behavior and Emotions of Traders: A Psychological Approach and an Empirical Example[1]

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Abstract

This paper describes an empirical approach based on psychological methodology, which assumes that individual behaviour must be studied within its natural environment. This approach is called experience sampling (ESM). To illustrate the potentials of employing ESM in the stock-trading domain, we report on observations from an explorative pilot study designed to shed light on the following issues: how outcomes of trades are perceived by traders; the reasons traders associate with good and bad trades; and how traders' moods fluctuate over a trading day.

Key words: Day-traders; Emotions; Experience-sampling; Mood fluctuation; Self-attribution

JEL Classification Code: C80; D14; G00; M00

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1. This article is a revision of the paper presented at the Irish Academy of Management conference at Trinity College Dublin, September 2004. We thank the participating day-traders for their cooperation and people at the company Teknik i Media AB for their help with software. Helpful comments by Robin Hogarth, Håkan Källmén, Brian Lucey, Philipp Schmitz and participants at the conference are gratefully acknowledged. The first author is indebted to the research foundation of Svenska Handelsbanken and to SFB 504 for financial support. The workload was as follows: the second author collected the data and the first author analysed the data and wrote the paper.

INTRODUCTION

The advent of behavioral finance has meant that psychological findings have been incorporated into models as well as used as explanations for anomalies and suboptimal investor behavior (Glaser, Nöth & Weber, 2004). Researchers in behavioral finance often draw inferences from analyses of transaction data, which consist of thousands of trading accounts at stockbrokers, and conclude that observed patterns of trading behavior depend on various psychological tendencies (e.g., Barber & Odean, 2000; 2001; 2002). Such conclusions are, however, speculations, because the tendencies have not been directly observed. Consider, for example, the well-known notion of overconfidence, which is claimed to be an important determinant of suboptimal trading behavior (cf. Barber & Odean, 2002; Gervais & Odean, 2001). Overconfidence concerns the propensity to overestimate one's judgmental abilities (Ayton, 1998) or to think that one possesses skills better than average (Svenson, 1981). In behavioral finance, variables like gender and trading volume have been used as proxies for overconfidence (Barber & Odean, 2001; 2002). Given recent evidence that male and female business students tend to be equally overconfident (Biais, Hilton, Mazuerier & Pouget, 2005), gender does not appear to be a reliable indicator of overconfidence. Furthermore, an unpublished study suggests that overconfidence is unrelated with trading volumes (Glaser & Weber, 2004). Thus, the claim in behavioral finance that overconfidence governs trading behavior has limited empirical support. It should also be noted that analyses of transaction data merely indicate performance and patterns of stock-trading behavior. They do not give insights into the psychological mechanisms underlying investor and trader behavior.

In this paper, we describe an empirical approach that gives such insights. The approach is called experience sampling (ESM). Based on psychological methodology, this approach assumes that individual behavior must be studied within its natural environment. To illustrate the potentials of employing ESM in the stock-trading domain, we report on

observations from an explorative pilot study aimed to shed light on the following issues: (1) how outcomes of trades are perceived by traders; (2) which reasons do traders associate with good and bad trades; and (3) how mood of traders fluctuates over a trading day.

The remainder of the present paper is organized into four parts. First, the method of experience sampling is described. Second, a description of the pilot study including its rationale and data collection is provided. Third, the results of the pilot study are presented. Fourth, the paper ends with a discussion.

DESCRIPTION OF EXPERIENCE SAMPLING

Background

The fundamental assumption of experience sampling is that individual behavior and its underlying psychological mechanisms must be studied within their natural settings. This assumption dates back to some 50 years ago when the theory of probabilistic functionalism was introduced by Egon Brunswik; an Austrian psychologist who argued that psychological research should not only consider the individual but also the environment, or the ecology, surrounding the individual (Cooksey, 1996). Briefly, the theory of probabilistic functioning assumes that individuals attempt to adapt to an ambiguous environment reflected in probabilistic cues of information and that the adaptation is achieved with some uncertainty (Cooksey, 1996). As a consequence of his methodological concern, Brunswik emphasized that experiments should involve tasks that are representative for the individual as well as for the environment. In other words, ecological validity is vital. A simple way of ensuring representative designs is to employ ESM.

The idea of ESM is simple: Subjects are asked to report on their behavior and experiences, while functioning within their natural settings. Specifically, subjects give reports on their everyday activities and adherent psychological processes like attitudes, emotions, and

values. The following three research studies exemplify experience sampling. Sjöberg and Magneberg (1990) asked 152 subjects (e.g., students and retired people) to give reports, five times per day during a week, on everyday actions, and adherent values and emotional reactions. Totterdell (1999) prompted (using pocket computers) 33 professional cricketers to rate their mood four times per day while taking part in a game spanning four days. Hogarth (In press) studied decision-making behavior in everyday life by prompting 13 managers and 11 students (via messages to their mobile telephones) to describe their decisions, confidence in these decisions, and feedback.

Different techniques of experience sampling

There are three types of experience-sampling designs (Bolger, Davis & Rafaeli, 2003; Scollon, Kim-Prieto & Diener, 2003). First, subjects are required to regularly report on their behavior and experiences at pre-specified intervals (e.g., hourly or daily). For example, in a study of mood and risk-taking (Hockey, Maule, Clough & Bdzola, 2000), subjects were instructed to keep daily diaries of their mood. This approach is referred to interval-contingent sampling. A disadvantage is that the variation of experiences might not be captured as subjects try to estimate their global or average scores.

Second, subjects may complete self-reports once a certain event occurs (e.g., conflicts or intimacy). For instance, football fans might be asked to describe their feelings when their favorite team scores a goal or loses a cup match. Called event-contingent sampling, this approach demands that the triggering events are clearly defined (Bolger et al., 2003); otherwise the subjects might fail to report relevant cases or excessively report cases.

Third, subjects may be prompted by randomly sent signals to complete self-reports (cf. Sjöberg & Magneberg, 1990; Hogarth, In press). This type is referred to as signal-contingent sampling and is advantageous as it captures the variability of experiences (cf. Scollon et al., 2003), given sufficient numbers of responses. In such designs, the number of signals per day

is an important issue. Too many signals may discourage subjects from taking part or encourage them to fake self-reports. Signal-contingent sampling studies have generally used between four and eight prompting signals (Beal & Weiss, 2003).

Advancement in technology has improved the bases of ESM. In the 1970s when this method was introduced, electronic signaling devices (e.g., beepers) and a booklet of self-report forms were given to research subjects. This procedure was costly and effortful in that the devices were expensive, required programming and maintenance, and the subjects needed to be trained in the usage of the devices (Bolger et al., 2003). Given the wide availability of mobile telephones among people nowadays, there is no need to hand out beeping devices to subjects: They can be prompted by simple SMS messages. Although this approach facilitates the use of experience sampling, it requires automatic transmission of SMS messages at pre-determined or random moments. In addition, it still demands that the subjects have obtained a booklet of forms in advance.

Feldman Barrett and Barrett (2001) have developed an approach of computerized experience sampling in which data is collected by handheld computers. Throughout the data collection period, subjects carry these devices and record their experiences directly on the computer. The responses and the reaction times are then stored on the computers and latter transferred to the researcher. A benefit with computerized sampling is that reaction times can be measured precisely and accurately; something that might not be the case for the paper-and-pencil design.

Pros and cons with experience sampling methods

Like other research methods, ESM has its pros and cons. Scollon et al., (2003) discussed four major strengths. First, the problem of retrospection that has plagued data based on self-reports can be reduced as subjects record their experiences in immediate connection with their activities. In general, it is assumed that the less time that has passed between the action and

the self-report, the less risk for memory and selection bias. Consequently, ESM makes self-reports more reliable, especially if signal-contingent sampling is used.

Second, this method makes it possible to gain insights into the underlying factors of behavior (e.g., see Sjöberg & Magneberg, 1990; Hogarth, In press). Third, the level of ecological validity is strongly increased with better possibility for generalizing research findings. Fourth, psychological processes can be analyzed with respect to between-subjects as well as within-subjects levels. In other words, it is possible to investigate how emotions, attitudes, and mental states of an individual vary over time rather than restrictively investigate differences between individuals. Analyses of data collected by ESM may consider the between-subjects effects and the within-subjects effects, implying that statistical methods like repeated measures ANOVA, multi-level models, and panel-data analyses may be used (cf. Bolger et al., 2003).

Experience sampling has also disadvantages. On the whole, the disadvantages concern issues related to subjects and situations (cf. Scollon et al., 2003). Because ESM requires commitment of subjects for a longer period, the method is effortful for them. Although a single self-report form may take little time to answer (e.g., about five minutes), the task of responding to several forms over a period of weeks (e.g., six forms per day in two weeks) means a subject has to allocate several hours (e.g., 7 hours) to participation. Therefore, many studies employing ESM have had fewer subjects than in other field studies (cf. Beal & Weiss, 2003).

Probably, as a result of the effortful commitment, there may also be a problem of response compliance. An obvious mean of increasing commitment and compliance is to provide monetary incentives. Alternatively, subjects might be more willing to take part if they understand the importance of the study, but they should, of course, not be aware of the hypotheses (cf. Scollon et al., 2003). Another subject-related concern is that ESM may intrude

into people's private lives. In its simplest form, this intrusion means that a signal may distract subjects from carrying out activities (for an example, see Sjöberg & Magneberg, 1990).

The main situational concern is that the sampled data may be distorted by subjects who complete self-reports at one single occasion rather than recording their experiences when prompted (Scollon et al., 2003). This tendency may be more likely to happen when paper-and-pencil designs are used than when computerized ESM is used. A simple precaution would be to ask subjects to return self-reports on a daily basis. Alternatively, subjects record the time when answering the self-reports; enabling evaluation of the time lag between signals and responses.

DESCRIPTION OF PILOT STUDY

Rationale

The pilot study was motivated by three circumstances. First, day-traders have been claimed to be victims of self-attribution bias (e.g., Barber & Odean, 2002). Self-attribution bias is the tendency to associate successes with personal factors (e.g., abilities and skills) and failures with environmental factors (e.g., bad luck and coincidence), see Kelley & Michela (1980). Social psychological evidence points out that this tendency is almost universal (cf. Kelley & Michela, 1980; Wärneryd, 2001). When day-traders evaluate their achievements, they may believe that their good and bad trades are due to factors inside and outside their control, respectively (cf. Barber & Odean, 2002). However, there is little empirical support for this claim.

Second, in recent years there has been an increased interest in the role of emotions for economic behavior and decision-making (e.g., Damasio, 1994; Loewenstein, 2000). Emotions are affective states triggered by conscious or unconscious cognitive appraisals, and often resulted in physiological responses. On the whole, emotions and moods are similar, except

that emotions are less durable but more intensive than moods (Bagozzi, Gopinath, & Nyer, 1999). Positive affect may lead to better decisions (Isen, 2000), but at the same time it may vouch for simplified information-processing and, accordingly, poor decisions (Schwarz, 2000). Moreover, feelings are argued to be important determinants of risky decision-making (Loewenstein, Weber, Hsee & Welch, 2001). Two published empirical investigations have looked at the role of emotions for trading. One study documented that body temperature, respiration, and pulse of professional traders changed as they were trading currencies and that the changes were linked to market events (Lo & Repin, 2002). Another study showed that subjects induced to be in a sad mood performed better on an experimental market than subjects stimulated to be happy (Au et al., 2003). Thus, besides these two studies, there is little research on moods of traders.

Third, to the best of our knowledge, experience sampling has not been previously applied to the area of stock trading. Apart from the aforementioned studies by Hogarth (In press) and Sjöberg and Magneberg (1990), related studies in the area of human resources management suggest that the method seems to be appropriate to employ in research on investors and traders. Using ESM, Teuchmann and coauthors (1999) studied work demands and emotional reactions of accountants. Recently, Ilies and Judge (2002) relied on ESM to collect some 1,900 observations from 27 professionals and established that mood and job satisfaction were positively correlated (on between-subjects and within-subjects levels) and this relationship was partly influenced by personality factors.

Participants

Despite difficulties, five (all male) Swedish day-traders were recruited to take part on a voluntarily basis and without any economical incentives. Their age was between 25 and 35 years. Their experience of stock trading ranged from six to twelve years. They spent between

50 and 70 hours per week on trading and adherent activities like corporate analyses and book-keeping. The participants sat in different trading rooms situated in separate locations.

Procedure

The pilot study used the approach of signal-contingent sampling. Data were collected for a period of ten trading days in October 2003; a period when the index of the Stockholm Stock Exchange (henceforth SSE) went up 0.72 points. The five participants were told that during this period they would receive six daily SMS messages on their mobile telephones prompting them to respond to three types of short questionnaire: forms A, B, and C. The number of daily signals were chosen with respect to earlier research (e.g., Sjöberg & Magneberg, 1990; Hogarth, In press) and to the hectic working condition of traders. Form A and Form C were to be answered before the opening and after the closure of the SSE, respectively. Form B was to be answered at four random moments during the opening hours of SSE. The forms were handed to the participants before the data collection begun.

A software program sent out the daily messages, which followed a standard format, e.g., "Please respond to Form A". Two messages were sent at two fixed moments: (1) in the morning (09:10) before the opening of the SSE and (2) in the evening (17:40) when the SSE had closed. The remaining four messages were sent at random moments (identical for the participants) between 09:40 and 17:30. The software ensured that those SMS messages were transmitted with intervals of at least 20 minutes. Every participant received 60 (10 + 40 + 10) messages; meaning that each of them had the task of completing 60 questionnaires.

Questionnaires

To restrict interference with the trading activities of the participants, the forms had few measures and few numbers of items.

Form A. Designed to be answered before the opening of the SSE, this form involved questions with regard to (1) expected development of stock index and confidence in this

prediction, (2) expected trading performance of the day and confidence in this expectation, and (3) mood.

Form B. This form was filled out during the day. The participants were asked to think of the recently completed trade and respond to some questions regarding the following issues: (1) time when answering the form, (2) name of shares, (3) number of shares, (4) time when recent trade was completed, (5) trade outcome, (6) reasons for the trade outcome, and (7) mood at the time of completing the trade.

Form C. Designed to be answered when the SSE had closed, this form included questions with respect to the following topics: (1) actual development of stock index, (2) actual trading result, (3) reasons for trading decisions, (4) evaluation of trading results, (5) risk-taking, and (6) mood.

Measures

As described above, the three types of questionnaires included several measures, but this paper only considers the following measures.

Trade outcomes. When receiving the randomly sent SMS, the participants were asked to rate the outcome of the recently completed trade on a six-point scale with the endpoints "very negative" (1) and "very positive" (6). Admittedly, this measure was subjective and might deviate from the actual return. Nevertheless, the measure had relevance as it reflected the psychological values of trades (cf. Sjöberg & Magneberg, 1990).

Trade amounts. The participants also gave details about the name and the number of share. To calculate the amounts of the sampled trade, the closing price at the end of the respective day was used.

Reasons for trade outcomes. In connection to the rating of their trades, the participants were asked to state the perceived reasons for the outcomes of the recent trades by selecting two of six alternative factors: (1) "brain work", (2) "personal experience", (3)

"sense of knowing the stock market", (4) "unpredictability of the stock market", (5) "ambiguous information", and (6) "too risky". In line with the theory of attribution bias (cf. Kelley & Michela, 1980) the three former (latter) factors were assumed to relate to personal (circumstantial) reasons.

Trading performance. At the end of each day, the participants were asked to report how much money they had earned (or lost) from trading. By all means, this subjective measure is a rough and slightly biased estimate of performance. Objective calculations of the daily trading profits (losses) would have been preferred, but that would required access to the transaction records and, thus, violated the privacy of the participants.

Mood. Mood was assessed on a measurement including the following six emotional dimensions: (1) tense vs. relaxed, (2) indifferent vs. interested, (3) sad vs. happy, (4) annoyed vs. restrained, (5) dearth of ideas vs. full of ideas, and (6) surprised vs. acknowledged. The first three dimensions were taken from Sjöberg and Magneberg (1990), whereas the latter three dimensions were chosen with respect to the working condition of traders. Each dimension was rated on separate six-point bipolar scales. Averaging the six dimensions resulted in a measure called mood scores, where a high score reflected a more positive mood. Across the three types of questionnaire and the five participants, Cronbach's alpha was 0.76; indicating a fairly good level of reliability (Peterson, 1994).

Response compliance

In total, the participants responded to 244 out of the 300 SMS messages. Two participants did not engage in trading activities during two days. Adjusting for those non-trading days resulted in a mean compliance of 88.4%. Individual responses ranged from 75.0% to 98.3%. While the messages sent in the morning and the evening had an average compliance of 100%, the mean rate of messages transmitted at random occasions was lower, 82.6%; leaving a sample of 152 trades to analyze.

Chi-square tests on response frequencies showed that the participants were no more likely to respond on particular days or on particular week days. The randomly sent messages were categorized into four two-hour phases: 09:30 – 11:29, 11:30 – 13:29, 13:30 – 15:29, and 15:30 – 17.30. This categorization resulted in a variable called day phases. Chi-square test did not find any significant tendencies that participants would be inclined to respond on a specific day phase.

In Form B, the participants recorded both the time when they responded and the time of completed trades. Ideally, the difference between these points of times should be small, as that would indicate a greater chance that the collected data was not contaminated by selection bias or memory distortions. For all participants, the median (mean) difference was 12 (46) minutes. One participant stated response time and trade time in only 11 out of 39 cases; indicating potential concern for memory bias. Kruskal-Wallis test showed that the time differences of the other participants were similar.

RESULTS OF PILOT STUDY

Outcomes and amounts of sampled trades

The 152 sampled trades concerned 51 shares listed on the SSE. The two commonly traded shares of the participants were Nokia (7.2 % of the sampled trades) and Atlas Copco (6.6%). For all participants, the median (mean) amounts of trade were €30,218 (€55,832) with minimum and maximum values of €353 and €1,081,651, respectively. The median amounts of the participants ranged from €15,963 to €48,853. As indicated by the Kruskal-Wallis test, the trading amounts differed significantly between the participants (mean ranks = 87.11, 63.40, 55.19, 86.94, and 84.87, chi-square (4) = 16.28, $p < 0.01$). On average, the subjectively rated trade outcomes was 3.57 (SD = 1.03). The participants did not differ with respect to trade outcomes. Amounts and outcomes of the trades were unrelated.

The mean values concerning trade outcomes for the day phases were 4.00, 3.62, 3.39, and 3.22 (SDs = 0.90, 1.12, 1.10, 0.80). An ANOVA-model with trade outcomes as the dependent variable and day phases as the independent variable, suggested significant differences ($MS = 4.21$, $F(3, 150) = 4.28$, $p < 0.001$). Thus, trades made before noon tended to be rated more positively than trades completed later in the day. Median values of trade amounts for the day phases were as follows: €26,950, €41,835, €15,367, and €42,477. Kruskal-Wallis nonparametric test indicated that these values differed significantly (mean ranks = 67.38, 83.46, 56.93, and 83.20, chi-square (3) = 10.25, $p < 0.05$). It seems, accordingly, that the participants put different amounts of money at stake at different time of the day.

Other sources of time effects were weekdays and the two weeks. Mean rating of trade outcomes for Monday, Tuesday, Wednesday, Thursday, and Friday were not significantly different and ranged from 3.38 to 3.91 ($0.92 < SDs < 0.10$). Similarly, trade amounts did not differ with respect to weekdays; the median values varied between €25,321 and €40,688. No differences in trade outcomes and amounts could be found with regard to the two weeks.

Perceived reasons for trade outcomes

For each sampled trade, the participants selected two factors that they believed could explain the outcomes. “A sense of knowing the market”, “brain work”, “personal experience”, “unpredictability of the market”, “ambiguous information”, and “too risky” were mentioned as reasons in 22.8%, 20.5%, 19.5%, 19.2%, 14.5%, and 3.6% of the sampled trades.

To test whether the participants were inclined to attribute good (bad) trades with factors inside (outside) their control, the measures denoting reasons were transformed into a variable that could take three levels: environmental factors, personal factors, and a combination of these factors. The third level was, however, eliminated due to lack of observation. The resulting binary variable was then used to analyze to what extent the

participants were prone to self-attribution bias. As regards trade outcomes, the mean values for environmental factors (n = 40) and personal factors (n = 111) were 2.58 and 3.94 (SDs = 0.71 and 0.88). This difference was strongly significant as shown by an ANOVA-model (MS = 54.41, F (1, 150) = 77.89, $p < 0.001$); implying that personal factors were associated with better trade outcomes. As regards trade amounts, no significant difference could be found between environmental factors and personal factors.

Table 1: Multiple regression analysis for various effects on mood (N = 151)

Independent variables	Unstandardized Beta weight	T-values
Constant	2.14	5.57 ***
Trade outcomes	0.34	7.45 ***
Log. Trade amounts	0.03	0.79
09:30 – 11:29	0.28	2.06 *
11:30 – 13:29	0.21	1.60
13:30 – 15:29	0.09	0.64
Tuesday	0.10	0.77
Wednesday	0.29	2.09 *
Thursday	-0.13	-0.86
Friday	-0.12	-0.81
Adjusted R^2	0.37	

Note. All independent variables, except for trade outcomes and trade amounts, were coded as dummies. The variables representing evening (15:50 – 17:30) and Monday were automatically excluded from the analysis by the statistical software (SPSS)
* $p < 0.05$ *** $p < 0.001$

Mood linked to the sampled trades

Across all participants, the mood scores linked to the sample trades averaged to 3.84 (SD = 0.69). Mean mood scores of the participants ranged from 3.61 to 4.32 ($0.60 < SDs < 0.81$). An ANOVA-model suggested that the participants had different mood scores (MS = 2.01, F (4, 151) = 3.97, $p < 0.01$). As expected, mood correlated positively with trade outcomes ($r = 0.59$, $p < 0.001$). All participants had this emotional tendency to a varying degree ($0.44 < r < 0.80$). In contrast, the correlation between mood and (logarithmic transformed) trade amounts was insignificant and similar for all participants.

A multiple regression model was performed to simultaneously evaluate the effects of trade outcomes, trade amounts, and points of time. The dependent variable consisted of the mood scores linked to the sampled trades, while the independent variables were trade outcomes, logarithmic transformed trade amounts and dummy-coded measures representing day phases and weekdays. As described by Table 1, the regression model accounted for 37% of the variance and trade outcomes were the most significant predictor. Mood associated with the trades tended to be more positive in the beginning of the day. Wednesday appeared to have slightly but significantly higher mood scores than the other weekdays.

Trading performance

In the evening when the SSE had closed, the participants stated how much money they had earned from trading. Whereas four participants responded with amounts, one participant chose to answer on his own scale with three steps: loss, break-even, and profit. The trading amounts of the other participants ranged from a loss of €32,100 to a profit of €36,700 with a median profit of €920. Using the aforementioned three-point scale, the reported earned amounts were transformed into a categorical variable, which had the following mean values concerning loss and profit: €-12,714 and €3,813 (SDs = 16.71 vs. 8.51). Across all participants, the frequencies for loss, break even, and profits were 21%, 9%, and 70%; a suggestion that the participants might be able to successfully make money on their trading (at least for the period when data were collected). However, this observation could be biased because the participants might have failed to consider transaction costs and other costs associated with trading.

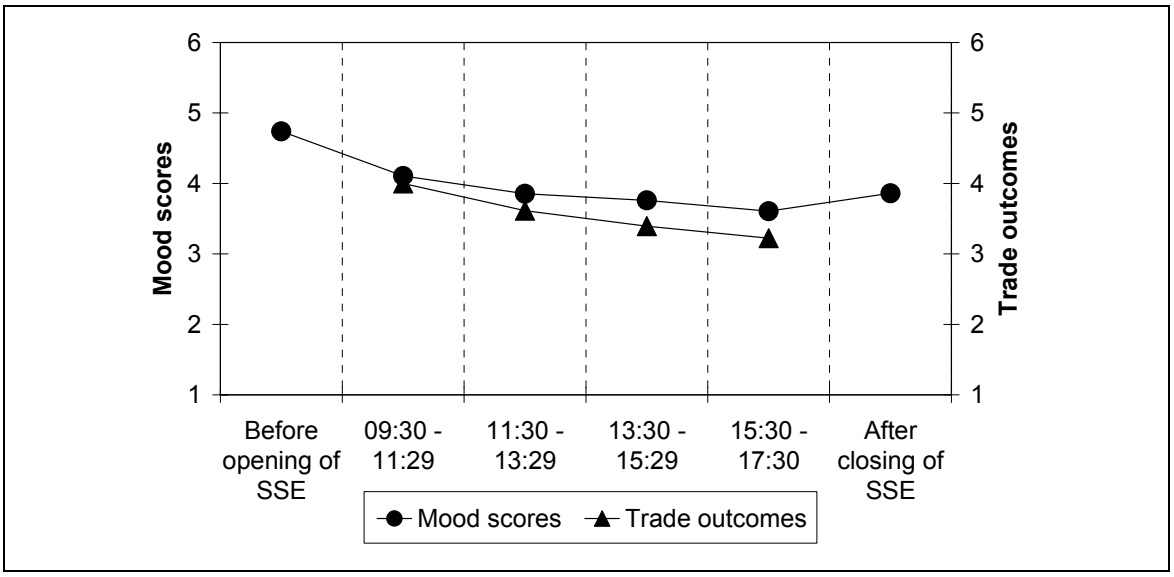

Figure 1: Mood fluctuations and trade outcomes during a trading day. The variables representing mood scores and trade outcomes have been averaged across the participants. The higher (lower) the score is, the more positive (negative) mood and outcomes, respectively.

Mood fluctuation of the trading day

The participants reported their mood before the opening and after the closing of the SSE. On average, the mood scores were 4.74 and 3.86 (SDs = 0.39 and 0.71). By integrating the mood scores of the sampled trades with those of the morning and evening, it was possible to illustrate how mood fluctuated over the trading day. Figure 1 shows that mood dropped in the course of the day but rebounded a bit when the stock market had closed.

A repeated measures ANOVA model involving one within-subject variable (morning vs. evening) and one between-subjects variable (the five participants) was performed. To control for effects caused by weekdays and trading performance (losses, break-even, and profits), covariates for these variable were also included in the model. The model indicated the following significant results: (1) within-subjects effects ($MS = 3.50$, $F(1, 37) = 11.27$, $p < 0.01$), (2) between-subjects effects ($MS = 3.60$, $F(4, 37) = 4.10$, $p < 0.01$), and (3) a covariate representing performance ($MS = 1.73$, $F(1, 37) = 7.85$, $p < 0.01$). In other words, mood

scores were higher in the morning than in the evening and mood varied among the participants. In contrast to days with losses, mood scores were higher for days with profits.

A further test on the link between mood and sampled trades

Across the participants, Pearson coefficients of correlations were calculated between the variables of mood scores and trade outcomes. Morning mood was almost unrelated to the mood of the other day phases ($0.07 < r < 0.35$, n.s.), while evening mood was moderately correlated with mood scores of the noon ($r = 0.47$, $p < 0.05$) and of the afternoon ($r = 0.56$, $p < 0.01$). Evening mood was strongly linked to the trade outcomes of the phase 15:30 – 17:30 ($r = 0.74$, $p < 0.01$). The idea that positive mood would foster good trades had little support, because the correlations between mood scores of one occasion (e.g., morning) and the outcomes of the next occasion (e.g., 09:30 – 11:29) were poor and insignificant. Thus, it seems reasonable to conclude that good trades lead to positive mood rather than the other way around.

DISCUSSION

The goal of the present paper was to illustrate the importance of using ESM as a mean of investigating behavior and adherent psychological processes in stock-trading. As illustrated by the observations of the pilot study, the method gives further insights into the reasoning and emotional reactions of day-trading. Although the observations may need to be validated by additional research involving more participants and a longer period of data collection, the pilot study points out that ESM is a valuable methodology to be considered in behavioral finance.

Besides indicating that day-traders may be prone to the universal tendency of self-attribution bias (cf. Kelley & Michaela, 1980), the pilot study shows two observations. First,

the participating traders rated the outcomes of their morning trades more positively than those of trades completed later in the day. This observation may relate to the well-documented finding that stock returns tends to rise in the morning, then level down, and finally, rise again at the very end of the day (Harris, 1986). This phenomenon of intra-day effects holds also for the SSE (Niemeyer & Sandås, 1995). The intra-day effects have been argued to depend on trading mechanism, liquidity risk management, information flow, and behavioral factors (Bildik, 2001). Furthermore, the movements of the stock exchange in New York are often transferred to the stock markets on other continents (Bildik, 2001). As a result, the movement of the SSE may be relatively easy to predict in the first hours than in the later hours of the trading day.

Second, mood of the participating traders dropped in the course of trading but went up when the stock-market had closed. This fluctuation appeared to be linked to the trade outcomes in that good (bad) trades were associated with positive (negative) mood. In contrast to earlier research (e.g., Isen, 2000), happy mood does not foster good trading-decisions. The observed mood fluctuation does not harmonize with research on circadian rhythms that suggests that people tend to be happier in afternoon than in the morning (cf. Scollon et al., 2003). However, the observed mood fluctuation of the day-traders relates to a study of how mood of accountants changed during a month at the office (Teuchmann et al., 1999).

Experience sampling seems to be useful to employ in investigating decision-making behavior and adherent psychological processes of professionals such as managers, bankers, accountants, investors, and traders. For example, the method could be used to study the complexity of decision-situations faced by loan officers (cf. Andersson, 2001) and how emotions of managers fluctuate during a day at work. The advantages of using ESM in such projects are many (cf. Bolger et al., 2003). Data is captured in real life securing high degree of ecological validity. The variability of behavior, emotions, and adherent psychological

processes can be investigated, as data is collected at several occasions. Similarly, variations of experiences between and within individuals can be studied. As suggested by the pilot study, sending SMS messages seems to be a promising approach to prompt professionals to record their experiences while engaged in their work.

Admittedly, the pilot study had – like other research endeavors - weaknesses such as a small sample of participants, an ambiguous question concerning expected and actual trading performance, and concerns about the time lag between signals and responses. Future research can easily correct for those weaknesses and also employ multiple methods in that analyses of data collected by experience sampling are combined with analyses of transaction data.

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