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Cash means control: emotions and payment process design

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Purpose – to investigate reasons and conditions impacting payment preferences.

Design/Method/Approach. In this exploratory study, we apply the Implicit Association Test in order to investigate whether the prejudice of the population of some countries such as Germany preferring cash holds.

Findings. Cash payments still play a major role in a number of countries although other payment options, namely card payments, are promoted heavily. We discover that the type of payment and the level of control are implicitly associated. We manipulate the emotions of fear and joy. The relationship changes when participants experience fear, whereas emotion of joy does not produce statistically significant effects.

Practical implications. The results have major implications for the design of payment processes.

Originality/Value. Our study helps explain preferences with regard to payment types as well as predict preferences as a response to scary or joyful events.

Research limitations/Future research. Generalizability is limited. Future research can focus on other emotions and types of payment (e.g., NFC – based payments).

Paper type – empirical.

Keywords: card payment; cash payment; payment process; implicit association test; emotions.

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Готівка означає контроль: емоції і розробка процесу оплати

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Мета роботи – визначити причини і умови, що впливають на надання переваги певному способу оплати.

Дизайн/Метод/План дослідження. Застосовано тест підсвідомих асоціацій, щоб з'ясувати, чи надає перевагу населення деяких країн, наприклад Німеччини, готівці.

Результати дослідження. Платежі готівкою, як і раніше, відіграють важливу роль в ряді країн, хоча інші способи оплати, такі як карткові платежі, також активно просуваються. Виявлено, що тип оплати та рівень контролю підсвідомо пов'язані. Проведено маніпуляцію емоцій страху і радості та виявлено, що підсвідомі зв'язки змінилися, коли учасники відчували страх, тоді як емоція радості не принесла статистично значущих ефектів.

Практичне значення дослідження. Результати мають велике значення для розробки процесів оплати.

Оригінальність/Цінність/Наукова новизна дослідження. Це дослідження допомагає пояснити надання переваг певним типам платежів, а також передбачити їх як реакцію на радісні події або ті, що лякають.

Обмеження дослідження/Перспективи подальших досліджень. Узагальненість результатів обмежена. Майбутні дослідження можуть зосередитися на інших емоціях і типах оплати (наприклад, NFC).

Тип статті – емпіричний.

Ключові слова: оплата картою; готівковий розрахунок; процес оплати; тест підсвідомої (неявної) асоціації; емоції.

Наличные означают контроль: эмоции и разработка процесса оплаты

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Цель работы – определить причины и условия, влияющие на предпочтения касательно способа оплаты.

Дизайн/Метод/План исследования. Применён тест подсознательных ассоциаций, чтобы выяснить, предпочитает ли население некоторых стран, например, Германии, наличные деньги.

Результаты исследования. Платежи наличными по-прежнему играют важную роль в ряде стран, хотя другие способы оплаты, такие как карточные платежи, также активно продвигаются. Обнаружено, что тип оплаты и уровень контроля подсознательно связаны. Проведено манипуляцию эмоциями страха и радости и выяснено, что подсознательные связи изменились, когда участники испытывали страх, тогда как эмоция радости не принесла статистически значимых эффектов.

Практическое значение исследование. Результаты имеют большое значение для разработки процессов оплаты.

Оригинальность/Ценность/Научная новизна исследование. Это исследование помогает объяснить предпочтения в отношении типов платежей, а также предсказать их как реакцию на пугающие или радостные события.

Ограничения исследования/Перспективы дальнейших исследований. Обобщённость результатов ограничена. Будущие исследования могут сосредоточиться на других эмоциях и типах оплаты (например, NFC).

Тип статьи – эмпирический.

Ключевые слова: оплата картой; наличный расчет; процесс оплаты; тест подсознательной (неявной) ассоциации; эмоции.

1. Introduction

People in some countries use card payments less often than people in other countries and often prefer cash (Yohannes, 2015). The first proposed explanation for using cash instead of card for payment is control over money (Kalckreuth et al., 2014). One can assume that people in these countries – such as Japan, Germany and Spain – implicitly associate card payments with less control. In order to examine this assumption we decided to run the Implicit Association Test (IAT) (Greenwald et al., 1998; Greenwald et al., 2002), which is a reliable method for uncovering implicit associations between concepts on a deep psychological level.

A recent study by Dasgupta and colleagues (2009) shows that the implicit association can be influenced by the affective state participants are currently in. Consequently, we wanted to investigate whether the implicit association of cash and card payments with high or low control is altered in the specific affective state. In this manuscript, we try to provide an answer to the **research questions** “Do Germans implicitly associate the type of payment with different degrees of control?” and “Is the association influenced by the experienced affective state?”

We chose to perform our analysis in Germany. With this study, we contribute, first, to literature on human behaviour and IT-driven systems interaction. We investigate how implicit associations might shift human preferences concerning the type of payment. Second, we show that the German participants differ in their associations from other participants of the study. This is an interesting insight for cross-cultural research as well as for research on the use of cash payment. Our study uses an innovative method and opens avenues for researchers who seek to understand the effects of implicit association, prejudices, and perceptual biases on human-technology interaction.

2. Theoretical background

2.1. Relevance of payment processes

Payments are needed for all kinds of economic activity. Hence, companies as well as all other organizations have to implement payment processes. Currently, the payments industry is in a state of huge upheaval triggered by regulatory as well as political initiatives. These include the creation of the Single Euro Payments Area (SEPA), the establishment of instant payments, which is already on the way, the revised Payment Services Directive (PSD2), which became fully effective in 2019 in all EU member states, and the regulation on interchange fees (EU 2015/751). Most of the current projects serve the goal to harmonize the euro payments market in Europe, as well as to encourage more competition and open the market to new entrants.

Payments represent a major source of revenue for financial institutions. In fact, payments are not only a source of revenues, but they are the anchor product for various other services. In addition, payment information is a source of knowledge about data on customers, and an opportunity to generate points of reference into the processes of bank customers – whether private, business, or institutional. Thus, losing stakes in payment transactions to other players would have disastrous consequences for banks.

Payment processes are provided mainly by banks and credit card organizations. However, the emergence of smartphones has allowed new players, such as large Internet and telecommunication enterprises, entering the market (PayPal, Apple, Facebook, Tencent, Alibaba to name a few). Furthermore, numerous companies from the fintech sphere (start-up companies in the financial services sector relying heavily on IT) have appeared

on the payments market. The new players aim to integrate their payment services into the customers' processes, thereby capturing customer data, and tying the customers to the company.

2.2. Cash versus card payments

Why do people in countries such as Japan, Germany and Spain prefer cash over card payments? Often the explanation is control over money (Kalckreuth et al., 2014). Indeed, cash as well as debit cards are often seen as a monitoring and budgeting tool, especially in times of crises (Hernandez et al., 2017). The scholars argue that a substitution of cash by cards may slow down due to environmental turbulences. Therefore, electronic means of payment seem to be far from achieving the expected benefits of cash with regard to perceived control over own budget.

The appetite for cash seems to remain constant since people see cash not only as a mean of payment but mainly as a mean of value storage (Bech et al., 2018). Nevertheless, than type of payment has impact on the way consumers behave (Runnemark et al., 2015). For instance, Falk and colleagues (2016) found that the willingness-to-pay increases if consumers switch from cash to card or mobile payments. “Cash payments, which are more transparent than debit card transactions, make it easier to control spending and this effect is not solely due to cash-on-hand constraints” (Runnemark et al., 2015, p. 286). Therefore, it is necessary to understand the depth of the association between means of payment and the degree of control by an individual.

3. Methodology

3.1. Implicit Association Test

In an IAT, the participants are confronted with a series of stimuli which they have to sort. The sorting tasks are changing during the test. The regular IAT runs five trials during which the participants (1) have to sort words or pictures from one category (initial target concept discrimination, e.g., payment type: cash versus card), and (2) from the second category (associated attribute discrimination, e.g., control level: low versus high). Afterwards (3), the participants receive a task to make a combined sorting: if they see a picture with a cash payment or a word associated with high control, they have to sort it to the left; and if they see a picture with a card payment or a word associated with low control, then to the right (initial combined task, congruent condition). In the fourth trial (4), the participants have to perform a simple sorting of pictures associated with card or cash payment but the direction of sorting changes (reversed target concept discrimination, erasing of habits developed in the first trial). Finally (5), the participants have to sort words and pictures associated with cash payment and low control to the left and card payment and high control to the right (reversed combined task, incongruent condition).

In order to know the implicit association, the researcher has to calculate the mean time difference between trial five and trial three. A positive number would indicate that the congruent condition holds, i.e., the participants need less time to associate cash payment with high control and card payment with low control vice versa. A negative number indicates that the incongruent condition holds. Put differently, if a participant needs less time for sorting certain categories, we can assume that s/he implicitly associates these categories.

To conduct the test, our research team had to develop a set of stimuli for each category. If in the event of card or cash payment the pictures obviously belong to the specific category (Fig. 1), respective words needed to be found and pretested. We followed the procedure suggested by Bogodistov and Dost (2017).



Fig. 1. Exemplary stimuli for cash and card payments*

*Source: Pixabay.de.

3.2. Stimuli for high and low control

In order to prepare a set of words we used the word “controlled” as our starting point. Then, using the Thesaurus.com online dictionary we looked for synonyms and antonyms. We picked words most often used as a synonym/antonym and repeated the procedure. Finally, we came up with a list of 15 synonyms and 15 antonyms which we proposed our students to evaluate. The students were not familiar with the intent of our study. They were given the task to rank the words according to their association with “high control” or “low control”.

In our study, a number of 25 students helped us with the development of the stimuli set. Six students were female. The mean age was 22.5 years (SD = 2.30), whereby the majority came from Germany (18 participants). None of the participants was a native English speaker. This is important because all further tests were also performed within English speaking courses without native English speakers.

We ran the Friedman ranking test for high control ($\chi^2 = 19.839$, $df = 15$, $p = .178$) and low control words ($\chi^2 = 40.278$, $df = 15$, $p < .001$) and selected words with the lowest rank, i.e. closest to the target concept (e.g., “high control”) (Table 1).

Table 1

Selected word stimuli*

High control		Low control	
Word	Friedman’s rank	Word	Friedman’s rank
certain	6,69	volatile	5,12
safe	7,27	risky	5,88
sure	7,46	vulnerable	7,20
reliable	7,50	fragile	7,64
definite	8,08	obscure	7,76

*Source: compiled based on Authors’ calculations.

3.3. Manipulation of emotions

Following the common practice of emotion elicitation using short videos (e.g., Baillon et al., 2014; Gino & Schweitzer, 2008; Lerner et al., 2003; Lerner et al., 2004), we decided to develop video clips of approximately 2 minutes length to elicit states of fear, joy, and a neutral state. Usually, researchers use a boredom

video in order to “disable” emotions. We decided to add a video with a meditative theme to control for an appropriate “disabling” state.

For the Fear video we took one of the winners of the horror short film challenge “Who’s there” named “Lights Out” (Sandberg, 2013). As Joy video, we used the “Thai life insurance commercial” with English subtitles with more than 1.3m views (Thai Life Insurance, 2014). For the Calmness video (disabling emotions), we took the “two minute meditation” video by “The School of Life” (2016).

When pre-testing these videos, we asked our research team members to post the link to the test in social networks, using their accounts (as a rule, lecturers do not add their students to their networks, thus, reducing the probability that future participants of the experiment would see the videos in advance).

A number of 63 persons participated in the treatment test, among them 35 males, 16 females; the rest did not indicate their gender. The majority (39 participants) were Germans; Austria, China, Denmark, France, Peru, Portugal and Thailand had one representative each. Sixteen participants did not indicate their country of origin.

The mean age of participants was 27.1 years (SD = 7.48).

We ran two tests in order to legitimate the used videos in this experiment. First, we asked the participants which of the discrete emotions (fear, calmness, and joy) they experienced while watching the video (7-point Likert scale, ranging from “not at all” to “absolutely”). In order to be sure that the videos manipulated the emotions in the intended way, we ran the MANOVA test for the scales of Pleasantness and Arousal which we tested using a 9-point Self-Assessment Manikin scale (Bradley & Lang, 1994).

We ran the MANOVA test with control variables for gender and age. We obtained significant MANOVA results: for the video clip Pillai’s trace produced a value of 0.772, $p < 0.001$; for age the Pillai’s trace was 0.255, $p = 0.041$, while gender did not show significant multivariate effects. Since the Levene’s test did not produce significant results (the lowest p -value was 0.020 which was interpreted as not significant based on Huberty and Petoskey’s (2000) cut-off value of 0.005), we ran a series of ANOVA and parameter estimate tests.

The b -values and their significance levels can be found in Table 2. All videos induced the expected effects and were used for emotion manipulation in the further study.

Table 2

Test of manipulation videos

Dependent variable	Independent variable	b	SE	t	p
Fear scale	Intercept	84.680	15.083	5.614	<0.001
	calm video	-38.184	8.625	-4.427	<0.001
	joy video	-62.405	8.868	-7.037	<0.001
	fear video	0 ^a			
	male	8.928	7.514	1.188	0.241
	female	0 ^a			
Joy scale	age	-1.001	0.469	-2.137	0.038
	Intercept	55.486	17.495	3.172	0.003
	calm video	20.238	10.004	2.023	0.049
	joy video	40.923	10.286	3.979	<0.001
	fear video	0 ^a *			
	male	-12.361	8.715	-1.418	0.163
Calmness scale	female	0 ^a			
	age	-1.396	0.543	-2.569	0.014
	Intercept	48.509	18.855	2.573	0.014
	calm video	39.803	10.782	3.692	0.001
	joy video	40.084	11.085	3.616	0.001
	fear video	0 ^a			
Pleasantness	male	-21.188	9.393	-2.256	0.029
	female	0 ^a			
	age	-0.776	0.586	-1.324	0.193
	Intercept	-6.092	14.097	-0.432	0.668
	calm video	21.555	8.061	2.674	0.011
	joy video	36.561	8.288	4.411	<0.001
Arousal	fear video	0 ^a			
	male	-8.340	7.022	-1.188	0.242
	female	0 ^a			
	age	-0.121	0.438	-0.277	0.783
	Intercept	10.132	15.055	0.673	0.505
	calm video	-25.694	8.609	-2.984	0.005
	joy video	-18.971	8.851	-2.143	0.038
	fear video	0 ^a			
	male	6.204	7.500	0.827	0.413
	female	0 ^a			
	age	0.116	0.468	0.247	0.806

*Source: compiled based on Authors' calculations.

**Note: "a" stands for a reference category, SE stands for Standard Error.

3.4. Sample

We invited 104 students from the Strategy and Organization class of our university to participate in the study. The class is international and all lessons are held in English. Nevertheless, Germans dominate in this group (75 students), whereas the second largest group were Chinese students (5 participants). 37 female (38 male) students participated in the experiment. The mean age of participants was 20.7 years (SD = 1.27).

All students had to take their seat in a cubicle, turn off and put aside all devices which could distract them from the experiment. After an introduction with explanations of the procedure, the instructor announced that "We would like the participants to not be distracted by thoughts about previous events, such as lecture, conversations during the break, and so forth. For this reason, we developed a 2-minute video which was shown when the student pressed the start button on their screen. We reprogrammed the FreeIAT test (Meade, 2009) to randomly select one of the three pretested videos before starting the IAT sorting procedure. The experiment took on average about 8 minutes including introduction and manipulation. In the following lecture, the experiment was explained as it was fitting to the topic of the lecture. Thus, all participants were debriefed.

The IAT entails blocks of categorization trials (Greenwald et al., 2002; Greenwald et al., 1998). Block 1 (initial target concept discrimination) included the ten picture pairs (10 trials in total); Block 2 (associated attribute discrimination) included the ten control word pairs (10 trials total); Block 3 (initial combined task)

was the first data collection block, with 30 picture and word trials in total; Block 4 (reversed target concept discrimination) repeated Block 2 with reversed label position; and Block 5 (reversed combined task) was the second data collection block, repeating block 3 but with a reversed position of the pictures with payment type.

4. Results

4.1. IAT Score

First, we looked at the baseline results of those participants who were in the control group, i.e. who saw the Calmness video. We found that the assumption holds for German participants ($t = 2.275, p = 0.03$) and is not significant when other nationalities were included in the test ($t = 1.559, p = 0.126$). The difference between these groups was on the edge of significance ($F(1, 41) = 3.991, b = 234.124, p = 0.052$). We concluded that Germans indeed have a different association of the type of payment and the degree of control. In order to remain rigorous, we added control variables of age and gender but none of them was significant. Interestingly, the implicit association score by Germans is positive and by non-Germans negative, showing a completely different direction of the association. The control variable "duration of stay in Germany" did not produce significant results.

Second, we looked at the influence of affective states induced by our videos. We ran an ANOVA analysis with all German participants

and control variables of age and gender. None of the control variables was significant. The affective state, on the contrary, produced significant results. The ANOVA test showed a weakly significant effect ($F(2, 61) = 3.015, p = 0.056$), whereas the two states of Fear (used as reference group) and Calmness ($b = 284.070, p = 0.021$) were significant and Joy produced a non-significant effect ($p = 0.349$). We concluded that fear alters the

perception of the payment type drastically. Indeed, German participants in the Calmness group had a positive implicit association score, indicating that participants associate cash payment with a high degree of control and card payment with a low degree of control. The Fear group had a negative implicit association score which indicates that these participants started associating card payment with a higher degree of control (Fig. 2).

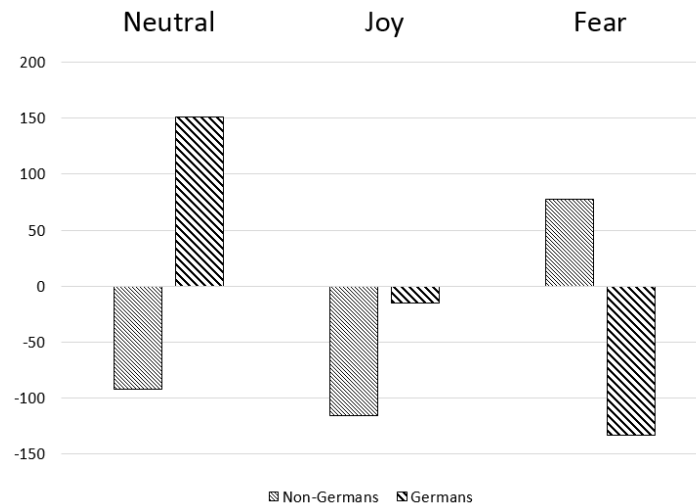


Fig. 2. Difference of reaction time, milliseconds (ms)*

*Source: compiled based on Authors' calculations.

4.2. Interpretation and robustness check

Our study indicates that Germans have a different perception of cash and card payment than representatives of other countries. Of course, this result should be interpreted with care since, first, other countries were underrepresented in the sample, and, second, certain countries might also differ in their perception of money. For instance, China (5 participants) shows a strong trend towards mobile payment dissemination (Lu et al., 2011) which might cause the respective association by the Chinese participants. On the contrary, Russian electronic payments market (1 representative) is in an early stage (Evstratov & Berezhnova, 2013) and fragile (Krivosheya & Korolev, 2018). These aspects could have biased the results of the study.

While assuming these influences, we included the variable “Duration of stay in Germany” in the study. As a robustness check, we tested for the effects of stay but it did not produce significant results. This makes us believe that psychological roots go deeper than regular habits. Theoretically, several months or years spent in Germany should have caused a new routine, e.g. cash payments (the mean stay was 61.2 months, $SD = 85.67$). However, since this variable was far from the level of significance ($p = 0.392$), we assume a deeper cultural anchoring of the issue.

As expected, the association “cash \rightarrow high control” can be altered by affective states. Interestingly, emotions of Joy did not produce significant results, whereas both Calmness and Fear differed significantly. If we assume a situation where no constant routine or habit is present, such as paying at a new shop, the conclusion of our study would be that Germans experiencing fear might tend to use their so-called “Girocard” (a widely used national debit card system) or their credit card, whereas in a state of calmness they would tend to pay in cash.

5. Discussion and limitations

Our study provided us with a new understanding of the perception of payments. In addition, the results open avenues for changing this perception. Indeed, Germans seem to be different in their perception of payment types (cash vs. card) with

regard to their feeling of control. Under normal conditions, when the German participants in our experiments were calm, they tend to associate cash payments with more control. However, when afraid, the implicit association changes: card payments become associated with a higher level of control.

This finding might be of interest both for practitioners and theorists. For instance, different payment mechanisms might be adequate in certain situations. When a person is afraid due to negative news or due to an unfavourable location (small night store in a socially unstable district), cash payment might not be the best option. Offering card payments might increase the willingness to buy a product under these circumstances. One could even extrapolate to times of big turbulences such as economic crises – people might tend to prefer cards over cash payments. Further empirical studies should help reveal whether our proposition holds.

The consequences for offering different payment types could be that it is better to introduce electronic payments in turbulent times (e.g., political, social or economic crises) because the acceptance rate would grow. One should have in mind that in an Implicit Association Test the speed of reaction does not assume a conscious information processing. This means that the “payment type – control” association is implicit and might appear uncontrollably. Conscious information processing, as well as a habit, might eliminate this bias (Dewey, 1950). For instance, if a person has a routine of paying by card (or cash) in a certain store, s/he might automatically repeat the routine even when experiencing fear. Firefighters develop a routine under normal condition because they need to repeat it without being biased by states of fear in real life incidents (Bliss et al., 1997). Conscious processing might also reduce the bias. A set of good arguments from a partner might influence a person’s preference concerning the payment type. For instance, the information processing model of anxiety by Beck and Clark (1997) assumes two steps of coping with anxiety. In the second elaboration step individuals have to be put into a reflective mode of thinking in order to cope with anxiety. Verbal arguments from a partner or cashier are a good way to help overcome fear (Beck & Clark, 1997).

Interestingly, affective states of individuals have an indirect influence on decision making concerning their preferred payment

type. Although similar effects have already been found (Dasgupta et al., 2009), the mechanism is still unclear. Is the affective state changing the implicit association or is (in our case) fear an emotion activating the “fight or flight” mechanism and, thus, leading to a higher reaction speed? The latter notion goes in line with the finding by Lerner and colleagues (2003) who found that the state of fear increases risk estimates and causes precautionary behaviour. Further studies with other emotions and other associations should focus on the relationship between emotions and implicit associations. However, the Feelings-as-information theory by Schwarz (2011) assumes that a person unconsciously interprets his/her feelings as an additional source of information. It can happen that this interpretation impacts the implicit association of a person.

It is also important to replicate our study with a larger sample of Germans. It may be the case that the effects found were not very strong due to the sample of young students. Older generations, as well as a sample of young non-student persons, could help understand the strength of association in different social and age groups. For instance, the students grew up with card payments whereas older people grew up with cash payments. The next generation grows up with new types of payments, such as paying using the NFC (near field communication) function of smartphones. Smartphones represent also a digital payment but users might associate smartphones with a higher degree of control since they are already PIN or fingerprint protected. Consequently, the effects might become stronger if researchers introduce different age groups to the sample.

Of course our study has limitations with regard to the generalizability of our findings since we performed the experiments in Germany. We admit that a “Germans versus others” comparison is debatable. First, we do not know why Germans differ from other participants and we do not know why this relationship changes in the state of fear. Further studies are needed to replicate this result, e.g. in Japan or Spain. Second, as mentioned in the Results section, a comparison with a few selected cultures would make it easier to interpret the results. For instance, the notion of cultural distance (Tadesse & White, 2010; Bogodistov et al., 2019) could help select cultures which are located on the opposite poles of the dimensions of cultural distance. In their paper, Tadesse and White (2010) propose a table of cultural distance coefficients. Bogodistov and colleagues (2019), by contrast, propose to analyse not differences in cultures but the individual perception of cultural values. Using their method, scholars can reveal groups of individuals based not on their cultural background but on their values with regard to preferences concerning payment methods. A set of studies with larger groups from different countries could shed light on the role of cultural and individual backgrounds. If the relationship is not confirmed, then one should look for answers in political and economic factors rather than in cultural and individual ones.

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