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# NEUROPSYCHOLOGICAL STUDY OF HOW SHOPPERS HANDLE DUBIOUS TRANSACTIONS AND MAKE ONLINE PAYMENTS

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**Abstract:**

Future online payments are critical for the promotion of future online transactions (e-payments). However, little research has been done on the variations in different systems between secure and risky e-payments, as well as customer reactions. E-commerce encompasses a broad variety of online services and goods, as well as electronic networks for the transfer of funds and data. Various applications are used in the e-commerce industry. The trust in Ecommerce relies primarily on the online payment system that allows the customer to pay for an online trader. This trial focuses on Neuroscience (fMRI) and I identify secure e-payment and risky neural effects. The underlying brain mechanisms are revealed in the face of two broad specific systems: PayPal and debit cards are accepted. Thirty people took part in an experiment that simulated low-cost online shopping. Risky e-payments cause cortical areas associated with unwanted emotional processing, but highly secure e-payments do not, according to the report. PayPal is about more than just dependability, incentive, and effectiveness. In addition, the study revealed payments, by contrast, generate brain activation in relation to negative and risky events with the debit card. It is interesting that the right brain response has been used more positively (responsible for value encoding). These findings provide a precious overview of the unconscious origins of consumers' choice of payment systems.

**Keyword**
E-payment, Cash, Card, Purchase online, Neuropsychological.

**Introduction**

Payment by online cards, interbank features in our company today are not new. The ease of purchase and sale on the web has enabled e-commerce to increase and e-payment services to make financial transactions an easy and efficient way. [1] E-commerce is a risky and untrustworthy medium for exchanging money for goods and services over internet. Customers are interested in purchasing online goods, online Electronic Cash and Smart Cards (EFT), financial EDI, electronic cash card, etc., in our e-commerce scenario. [2]

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In 1990, e-commerce was introduced to the business world and consumers with a unique integration approach. The development of e-commerce is unique. E-commerce has since changed unbelievably and increased, offering customers and companies worldwide extraordinary benefits. The field of e-commerce with so many businesses has become evident that it has a promising future and that companies will benefit greatly (Abrazhevich, 2004, p.1).Because of its online business outlook, e-commerce is most popular. You can buy and sell items online, as well as offer a variety of services and facts, and instantly exchange money with other users. Business transactions are referred to as e-commerce payments because they are traded electronically. In today's business world, 7 e-payment becomes increasingly daring. [3 to 10]. Efficiency, timeliness, and convenience are responsible for this system. Both developed and developing countries' financial systems are constantly being adopted and adopted to facilitate payments in business transactions. Therefore, e-payment scholars have carried out several studies worldwide. We review previous publications about global payment acceptance in this paper to recognise study gaps and advocate for future research, as well as to highlight the complexity of previous researchers' modelling in the fields of fields, methods, and IT systems (IS). [11-13]

Due to its speed, openness, anonymity, global accessibility and digitalization, the electronic commerce (EC) has increased to facilitate in real time business operations including advertising, consultation, contracting, auction, negotiation, purchase, and payment of goods (Yu et al., 2002).To achieve the achievement of every company, material flow, cash flow and the information flow through trade processes as defined by the Sthephanides (2005) and Tsiakis regulations is a crucial factor. Payment systems now play a critical role in the implementation of a country's monetary, financial, and economic growth policies (Johnson, 1998; World Bank, 1990). [14]This improves macro-economic management, spends money on clearing and settling functions, reducing float levels, and improving currency control. The payment system is also used to send money and offer affordable financial services to businesses in a variety of industries (Khiaonarong, 2000). According to Yu et al. (2002), as businesses enter the electronic trading industry, choosing an electronic payment system that works correctly for its credibility and security is a major concern. [15-16]

Software called Secure Payment Software has been developed with the e-paid technology. It is a business way that ensures secure and confidential transactions online. The SET is the kind of technology for e-payment. Secure transaction electronics (EST). SET uses a unique way in which customer information can be encrypted. Listeners to network traffic can have access to card information and holder information. [17] The Superior Committee of the Commission. Credit cards, such as Visa and MasterCard, are based on a credit limit for expenditure. Debit Card removes the account fee of the holder. In electronic funds transfers the server stores records of each transaction. When payments have been made, the audit data are uploaded by the server. The safe electronic payment system uses several encrypted and privacy algorithms, integrity, authentication, and non-repudiation techniques.[18]

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As we all know, security is a big concern for those who use technology of any sort today, and all systems are vulnerable to fraud, data theft, and theft. It becomes more risky if the data contains sensitive information (Raja et. al., 2008). Electronic payment security and stability systems are thus increasing, even though electronic trade in online payment services is continuing to develop and future broad uses(Aigbe and Akpojaro, 2014).[19-22]Several financial risks occur within the online payment system during the transaction process. Much can be detrimental to the impact of online payment. Due to the nature of the internet, non-e-commerce technology cannot ensure authenticity and security of payment. We need a secure payment system and proven transactions for sellers and banks, the privacy and security of customers such as sales and online customer authentication. In some cases when you buy it online it causes a sense of insecurity and risk. Several e-commerce systems have been developed over the years. For their hard money, security is still unresolved [7]. To solve the practical and analysis problems facing various on-line payments, we depend on the future of a particular electronic payment system. These include legal issues (protection of buyers and sellers), e-payment service providers' technological capability, business relations and security issues, including verification and authentication problems. (Paunov and Vickery,2006). [23]

**The Evolution of the Electronic Payment System**

The payment system has evolved significantly because of technological advancements. A petroleum shopping mall, Western Union, customer cards and bank industry credit cards were issued in 1914 to provide customers with everything they need to pay for goods or services. In the 1990s, electronics had received all payments on paper credit cards. The electronic paid development began in 1918, when the Federal Reserve Bank translated the currency for the first time by telegram. Electronic cashless payments, which were first designated in 1960, are now widely used because of the growth of eCommerce and technological advancements. The research community has worked tirelessly to build different online payment models, such as the Asokan and JW models. [24-26]

**Types of Attack on Insecure System**

Many types of network attacks can be used, including these basic services:

1. 1. Snake 1. (Passive eavesdropping) Payment details, such as credit/debit card details, is considered Network Traffic by a hacker.
2. Manipulation.
   A hacker monitors network traffic while data is being transmitted (for e.g., a hacker may modify the contents of an email).
3. Splash
   A hacker forgets the network information for an ostensibly new network address. This type of attack can be used for the authentication of host systems (e.g., an IP address).
4. Departure

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When a legitimate user is authenticated, a spoofing hack is used to "steal" the connection.

5. Capturing and Restoring
   Sleeping network transactions can be recorded and replayed by a hacker.
   When the price is high, for example, a portion of the stock is sold. If the network protocol is not well designed and secure, and the stock price falls, a hacker will record and replay the transaction later.
6. The PIN assaults
   A hacker can counteract numbers and use an Authentication code (UAC).[27-30]

**Successful Payment Surveillance Software Security Requirements**

Cryption's main objective is to secure important data as unsafe media pass through it. Further services to applications are offered by cryptographic algorithms. The following safety conditions are guaranteed by the system. Note: The software scans millions of transactions and is searching for hacking and fraud patterns or interceptions every day. If anything, suspicious is found the software informs the server manager immediately. [33]

Koponen identifies two common protocols for the protection of e-commerce transactions (2006). SSL and Secure Electronic Transaction Protocol (SSL) form the protocols (SET). SSL is a more widely used eCommerce transaction protocol and works by encrypting the whole session between computers for safer Internet communication. With the aid of public-key technology SSL encrypts online communication between an online server and a client. The SET protocol, on the other hand, prevents all customers from travelling on the Web with a credit-card number that allows parts to flow through the Internet instead. SET also integrates information, codes sensitive and business data verification by using state-of-the-art technology such as digital signatures and data coding.[35-40]

The specific safety needs of the electronic payment systems depend on the characteristics and the assumptions of trust that are being implemented except for high-level conditions, in which nobody wants to lose money. However, a requirement or more of the following must generally be fulfilled.

1. Authored
   The assurance that the communication party is the claimant prevents the interception of any of the parties to the transaction. Authentication controls are usually performed on applications with security toks or digital verifications by government. Cryptography gives identity for authentication purposes.
2. Access controlling
   Prevent unauthorized resource utilisation (i.e., This service controls who has access to a resource, the conditions under which access can take place and what access to the resource may be done.)
3. Data Privacy (Secrecy)

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Data protection unauthorised communication. Protection of information. Privacy is an important element of user privacy, privacy protection and information robbery prevention. The only way to guarantee confidentiality on an open network is through extensive encryption. Everyone without proper credentials can use confidential data even if it is transmitted via unsafe media.

4. Data Intelligence (Anti-Tampering)
   Ensure the received information is sent by an authorized entity exactly as it is (i.e., that no drugs, insertion, removal, or response are included). Prevents unlicensed, data medicines. Financial information is sent via several open network routers to your destinations. We need to ensure that the data is not changed in transit.
5. No repatriation.
   It protects one of the parties involved in the Communication against denial of all or part of the Communication.
   Failure to repudiate the proof of the communication sent by the party concerned.
   Non-reproduction, objective evidence, that a particular party received the message.
   Digital signatures and certificates for the public sector are available.[42-45]

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**Review of literature**

Gholami & al (2010) reviewed the impact of perceived benefits, expectations for effort, social influence, trust, sensitivity, and demographic variables on the intention of individuals to take e-payments. The trial was conducted in Nigeria. The 'effort expectation' variable in the Gholami et al study corresponds to the special trust used in the present study. It had a significant effect on intention to use electronic payment systems. The benefits were also derived from the intention to use EPS. The variable 'trust' employed in the study is consistent with risk perception and confidence in the online systems was linked to the perceived risk in this study. Increased trust corresponds to lower risk perceptions according to the measurement scale used in this study.[62]

There have been few studies examining the impact on the autonomous variables of electronic payment systems and perception on the use of EPS of faith. The concept of trust is about future events or outcomes (Columbia, 1998). Expectations tend to result in intentions which determine actual behavior. Barbalet (1998) also linked confidence to the ability to perform a certain task. Confidence may affect behavioural intentions. Here In that regard. The concept of trust in these definitions was largely about matters outside the trustworthy person. Confidence can be directed to oneself, too. Just as someone can trust another's ability to do some job (Barbalet, 1998: 356), he can trust other people's abilities as well (self-confidence). This can generally be (general trust) and the ability to accomplish specific tasks (specific assurance) (Stajkovic, 2006).[63]

The theory of why new developments was taken, how and how they were implemented, was suggested by Rogers, E (2003). Factors influencing adoption of new technologies were

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examined. According to its theory, the faster its adoption rate is, the higher the perceptions customers have. He focused on the relative benefits, compatibility, testing and observability of these elements. However, Rogers focused more on the factors of actual behavior rather than intending to do so. The effect of these variables on the use of purposes results in a research gap.

In the field of electronic payment systems there was considerable interest among academics, especially with regard to factors that affect electronic payment systems. Sidek & Bryceson has studied the factors affecting the acceptance of payments by companies (2013). Sidek (2015) has extended its 2013 research to cover adoption factors for e-payments among several parties involved, including consumers and service providers. In order to explain determinants of technological adoption, models such as Technology Acceptance Model (TAM) and Reasoned Action Theory (TRA) are also formulated. The TRA (Ajzen & Fishbein 198) has shown that the user's behavioural intentions, which influence true behavior, determine the use of a certain system. The TRA identified behavioural intent as a function of users' behaviors and subjective standards. [65]

**Objective**

The aim of this survey is to identify the factors influencing electronic payment system consumers' intentions. After identifying certain research gaps, this study is intended to analyses the impact of the following variables on the intention of using e-payment system.

i. Perceived benefit
ii. Risk perceived.
iii. Confidence

An understanding of this is hoped to contribute to the collection of information on factors affecting the purpose of using EPS. The study also aimed to evaluate the effects of demographic variables on the intention to use EPS. For this study, population variables of interest are:

i. age
ii. sex
iii. Education level

A study is designed to deepen knowledge about the use of electronic payment systems in many age groups, gender groups and educational groups. Test specific assumptions that refer to variables affecting the intention of consumers to use EPS. [45]

**Methodology**

Of the 100 interviewees surveyed, 90% is students, 5% is employees and 5% is businesses. They also paid e-payments for their reasons even if they do not all rely on e-payments. We have learned that 80% of debit card users are using net banks and e-payment services, 15% using all modes of transaction. 5% have been using e-payment systems. In order to reduce certain tax allowances in the context of a single business and partner business, we have found that most

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people use direct check payment and the cash payment in hand. In areas not connected to the internet, 90% of those contacted said payment by debit card is better, more convenient, and quickly accessible, with good consistency of 70%. We have found that e-payment is being processed at an increased level for security and budget deductions with a one-times password activation, digital signature code, etc. We found that payment payments are being processed at the next level. [46-50]

By e-paid, such respondents agree to pay direct cash and e-paid disadvantages, such as *per fee for transactions, *monthly processing fees, *online service fees, *extra delivery fees, etc. However, only explain two reasons why these respondents should e-pay (i.e., time management and easy buying strategy). The online payment advantages are 2%. Some 40% also say that because of theft, losses because of negligence or other ethical reasons, direct payments were refused in cash. You are all familiar with interbank eFunds like PayTM, PayPal, Mcheck, etc. but only have 30% access to the services (employed people & business). In the future, they agree that there will be no large cash transactions and that electronic money transfers are made constantly through transfers of electronic cards. Yet the drawback of the EFTs is that transfers of money would be delayed, with others saying that extra costs should be controlled, so that EFTs can be afforded to ordinary people, (*when hit by natural disasters [e.g., Chennai floods]). Finally, 5% suggested that the recently implemented RFID[radio frequency identification] should also cover populations without much formality or higher security measures, to ensure that EFTs have access to RFID. [51-52]

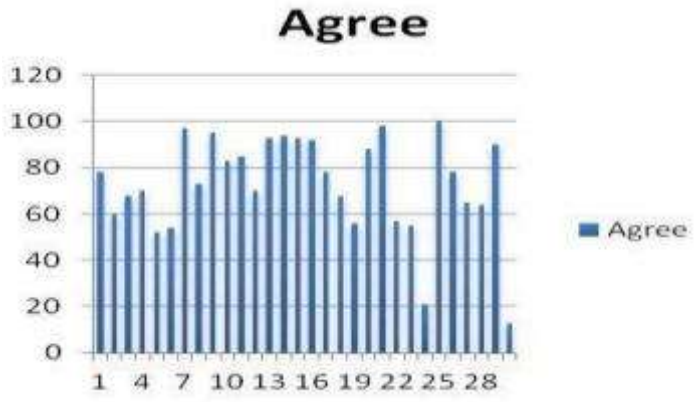


Fig.1 Graph represents an agreement on populations with a higher future scope for e-payments or transactions:

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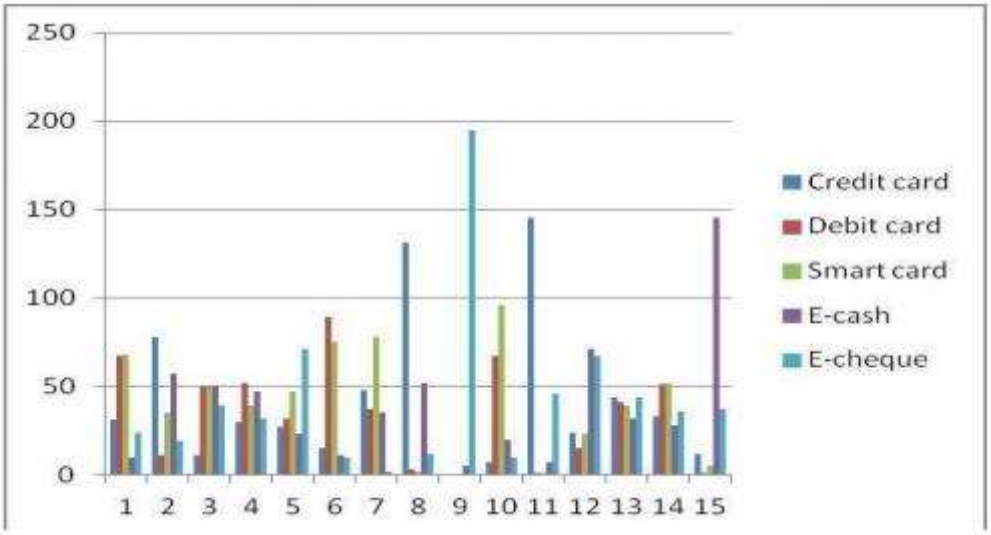


Fig.2 Graphic representation of the user e-payment method

Interestingly, while several disciplines focus on the effects of payment methods and on the need to adopt an interdisciplinary approach, neuroimaging methods are not employed to understand the difference between physical and digital payment methods. But no studies are available. In order to explore neural correlations associated with payment transaction observations by various means, we carried out a functional MRI experiment. We used Mirror Neuron System (MNS) theory, whereby observing other people's actions and emotions engages various brain systems that make sensory information about others an engine and motor of their own emotions and actions (Rizzolatti and Craighero, 2004). [43] The report [43]FMRI studies report that neurons released through MNS occur not only when the individual is specifically involved but also when others have an action (Iacoboni et al., 1999; Grezes et al., 2003; Iacoboni and Mazziotta, 2007). Some studies indicate that the frequency of engine operation is increasing in MNS activities (Calvo-Merino et al., 2006; Plata Bello et al., 2013).

A pilot fMRI analysis has been conducted in these premises to test the following hypothesis of signal change induced by video clip exposure at different amounts:

H1: The payment method modulates the average BOLD signals in the remainder of active stimulus exposures.

H2: the amount of payment modulates with the average change in the BOLD signal in relation to the remaining phase during active stimulation exposure.

**Analysis**

In the experimental fMRI procedure, four steps were taken. Firstly, selected section levels (T1 FLAIR, 2d, TR 1675 ms, TE 24 ms, 30 € 30 thumb slices, 5 mm dividing diameter, 416 +/- 320 matrix, 2 Nex, scanning time 1: 56 min) were selected from the anatomic sagittal localizer. 20 adjacent 5 mm thick axial sections have been selected. The second phase included 3D data

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supplying (IR Prep Fast SPGR 3D; TR 15.2 ms, TE 6.9 ms, TI 500 ms, Flip Angle 15°, FOV 29 <br>, 1 mm slice; 288/288.1 Nex and 8:20 scan time).

A third part consisted of acquiring axial anatomical T1 images with a weighted overlap of functional action (TR 1.700 ms, panel 24 = 24, TE 25 ms, thickness 5 mm). Matrix 256 = 256, 1 next scanner time 2:25 minutes 20 pictures). [44] The first one. The fourth step involved the purchase of fMRI on the same axial aircraft with the T2 single-launched gradients-echo EPI sequences for 2000 axial functional images to be obtained out of 20 contiguous five mm thick sections selected during the next stage during stimulation cycles in 1 Nex: scan time 5: 12 min. 26 cm; Matriz 64/64. The fourth step was to acquire the same axial plane.

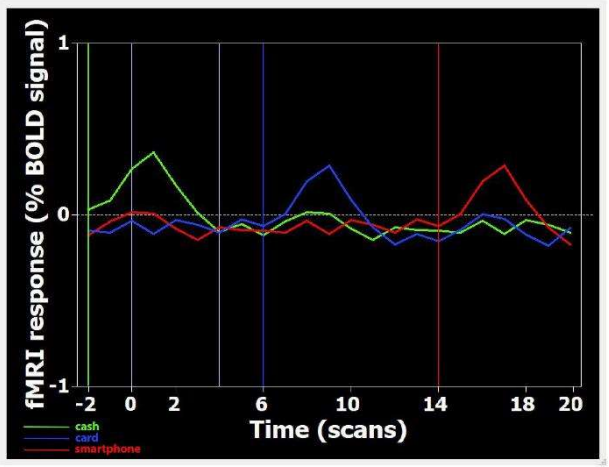


Fig. 3 Changing the signal BOLD in time.

The direct connection with videos with three different methods of payment for BOLD signal changes in the parietal zone is illustrated in figure 3.

Average change in the BOLD signals of each coloured curved line is shown in the sample during a visualisation of a payment of 150 Euro (green), card (blue), and smartphone (red). The beginning of the footage showing the payment method shows every coloured vertical line. [45]

The changes to visual activity have occurred in relation to resting conditions and have significant effects on secondary visual cortex and primary and parietal cortex (BA40): the BOLD Digital Change in stimulus (BA40), frontal cortex (BA6 and BA10) and anterior cortex (PCC) (Table 1). Increased BA40, INS and PCC activation only occurred in cash because of increased exposure to payments (Figures 4).

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| Condition | | 150€ ** | | | | | 50€ ** | | | | | 10€* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contrast** | **Area** | ***X*** | ***Y*** | ***Z*** | **% var. BOLD** | **Voxels** | ***X*** | ***Y*** | ***Z*** | **% var. BOLD** | **Voxels** | ***X*** | ***Y*** | ***Z*** | **% var. BOLD** | **Voxels** |
| **(A) Cash vs Rest** | **BA 40** | **34** | **−38** | **35** | **0.33** | **618** | **33** | **−45** | **35** | **0.36** | **763** | **33** | **−45** | **34** | **0.19** | **645** |
| | **INS** | **45** | **−28** | **18** | **0.33** | **56** | **36** | **−33** | **18** | **0.11** | **139** | **34** | **−31** | **17** | **0.15** | **171** |
| | **PCC§** | **−6** | **−52** | **14** | **0.29** | **148** | – | – | – | – | – | – | – | – | – | – |
| **(B) Cash vs Card** | **BA40** | 34 | −37 | 34 | 0.36 | 798 | 33 | −35 | 34 | 0.36 | 112 | 37 | −45 | 34 | 0.23 | 508 |
| | **INS** | 49 | −29 | 21 | 0.21 | 86 | 41 | 13 | 1 | 0.27 | 106 | 44 | 5 | 14 | 0.28 | 178 |
| **(C) Cash vs Smartphone** | **BA40** | 34 | −39 | 35 | 0.38 | 705 | 34 | −33 | 35 | 0.21 | 426 | 33 | −35 | 34 | 0.30 | 592 |
| | **INS** | 45 | −24 | 23 | 0.55 | 203 | 42 | −25 | 17 | 0.13 | 423 | 38 | 5 | −2 | 0.30 | 236 |

| Condition | | Cash | | | | |
|---|---|---|---|---|---|---|
| **Contrast** | **Area** | ***X*** | ***Y*** | ***Z*** | **% var. BOLD** | **Voxels** |
| **(D) 150€ – 10€** | **BA 40** | 40 | −35 | 35 | 0.32 | 183 |
| | **INS** | 49 | −25 | 17 | 0.16 | 438 |
| | **PCC (BA29)** | −3 | −52 | 11 | 0.44 | 591 |
| **(E) 150€ – 50€§** | **BA 40** | 34 | −38 | 36 | 0.40 | 136 |
| | **INS** | 50 | −23 | 20 | 0.30 | 462 |
| | **PCC (BA 29)** | −2 | −47 | 12 | 0.45 | 346 |

*(A) Activations from the contrast Cash-Rest in the 150€, 50€, and 10€ conditions. (B) Activations from the contrast Cash-Card in the 150€, 50€, and 10€ conditions. (C) Activations from the contrast Cash-Smartphone in the 150€, 50€, and 10€ conditions. (D) Activations from the contrast 150€-10€ in the Cash condition. (E) Activations from the contrast 150€-50€ in the Cash condition. *$p < 0.05$; **$p < 0.01$. For clarity purposes results related to the highest and lowest amount of money are reported. BA = Brodmann area; INS = insula; PCC = posterior cingulate cortex. Statistics were FDR corrected, except where specified; § = Non-FDR, $p < 0.05$.*

Table 1 : BOLD Digital Stimulus Change

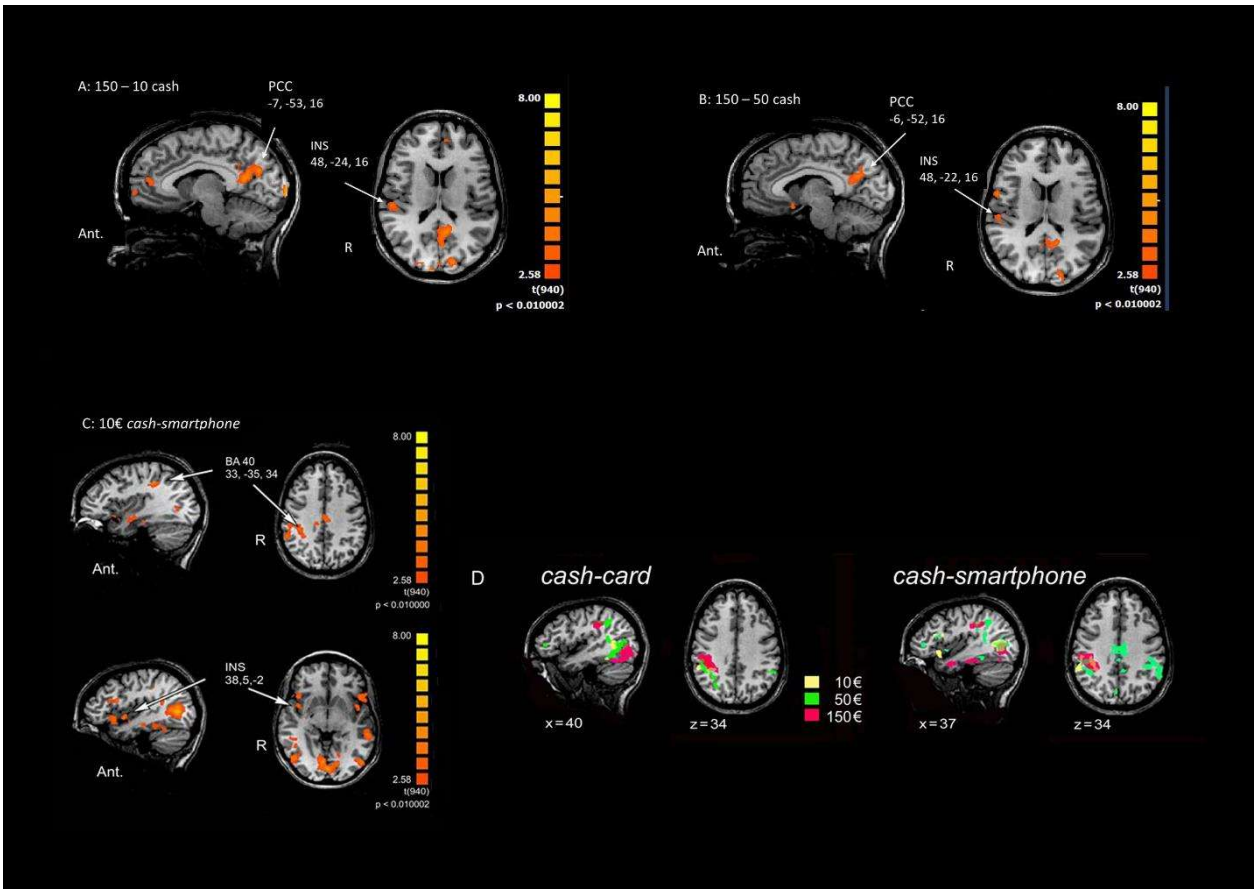


Fig. 4 Increased BA40, INS and PCC activation

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Principal impacts of inconsistent payment methods and amounts. (a) EUR 150 compared with EUR 10 in cash. (b) EUR 150 up from EUR 50 in cash. (c) €10 for the cash/smartphone contrast. The Talairash co-ordinates refer to the arrow points in the activated fokes. OR: previous; R: right. R: right. OR: Okay. Okay. (d) the right side of the cortical activation in a cash against a smartphone (left) contrast to three conditions in the case of a parietal cortex (10€: yellow; 50€: green; 150€: red).[46]

**Discussion**

In persons who examined various payment methods in simulated purchasing scenarios, this pilot investigation fMRI was carried out. We found a stronger brain-activation involving calculations and the treatment of visionary stimuli when a subject looks at payment by card or smartphone when observing the action of a cash payment. This effect increases gradually with increased amounts and seems to be in line with the man's thousand-year custom of paying cash to reduce his personal monetary richness.[48]

Insula activation is usually linked to negative emotions, including fear, anger, unfortunate feelings, and pain. When small amounts are shown, the previous part has been involved largely, with the back part showing the largest quantity compared to cards and smartphones. Insula is also a core node for the 'salience network' whereby major stimuli are identified both internally and externally amongst competitors (Uddin, 2015, 2017); cognition is critical (Chang etal., 2013) as it creates feeling states that define the origin, identify the relevance of the competing stimuli, and identify important additional cognitions (Uddin, 2015). [49]

In psychology, economics, and finance, the "payment pain" was largely studied using traditional research technologies, such as questionnaires and interviews. The first way to show, through this fMRI study, how traditional or digital payment methods activate the phenomenon is by various structures.

**Conclusion**

When entering the e-commerce market, choosing an electronic payment system that works well with popular and secure transactions is an important priority. In our daily lives smartphones were introduced in various ways, e.g., an alarm clock, a watch, a music player, and a recording system. The payment methods for e-commerce and mobile banks have evolved from checks, cash, debit cards and credit cards. This study shows that clients increasingly use online routine and on-site buyers by mobile payment methods. The consumer's confidence and habits of mobile payment systems have been developed using advanced technologies that support and facilitate mobile transactions. In this research we examined the main criteria and status of electronic payment systems. Further research is needed to build confidence in electronic payment systems, customers' interests in the use and safe use of electronic payment systems and research into the future of electronic payment systems. Further methods and improvement of hidden problems

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with various issues are highly recommended for data collection in future research methods, particularly issues relating to future electronic payments.

**Future**

Further information on the future of mobile payment is shown in the 2013 GSMA Declaration of Industry. The report states that "in the middle of 2013 more than 203 million mobile monetary accounts in more than 80 percent of the world's markets were registered with mobile cash outlets" (Oracle, 2014). It is projected to increase significantly from 12.8 billion US dollars (estimated in 2012) to 90 $ by 2017. It will increase significantly worldwide. (Oracle, 2014). Oracle. These statistics demonstrate clearly that our future is secure and convenient with cashless payment options through smartphones and tablets. [51-53]

Reddy (2004) notes that the future of mobile payments can be secured using state-of-the-art technology to address the practical and analytical challenges of this industry. The radio barcode technology is an important complement to mobile payment systems. These bar codes send radio signals to track the locations. The mobile payment market can enjoy a promising future with radio barcodes that improve consumer safety and comfort. The radio bar code technology could make it possible for sellers to read consumer credit card numbers and expiry dates while moving. Mobile payment services providers may develop a system that can be scaled on higher levels by improving security protocols and using advanced technology such as radio bar codes.

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