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## Master Thesis

- Conceptual and empirical differences in how  
choice architecture can influence choice and  
decision making -

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## Abstract

Research shows that people may not always make decisions rationally but may rely on intuitive judgement and associative memories (Morewedge & Kahneman, 2010, p. 435). From this perspective, biases and heuristics can emerge, and decision quality may be dampened (Kahneman & Klein, 2009, p. 515). However, recent research (Besedes, Deck, Sarangi, & Shor, 2014; Leonard, 2008; Sproull & Kiesler, 1986) has shown that choice architecture, altering the context in which choices are made, may improve individual and organizational decision-making. In this thesis, we conduct two studies, investigate whether choice architecture (specifically presentation order and indirect messages) may influence peoples' decisions in certain organizational settings, and discuss possible important implications of the findings for organizations.

In the first study, we find that choice architecture in the form of presentation order and indirect messages can unconsciously increase the healthy food choices. In the second study, we find that indirect message such as emoticon can partially increase the participants' intention to engage in Organizational Citizenship Behavior targeting Individual (OCB-I). We argue that such relatively simple, low cost and no intrusive choice architecture has many potentials for the organizational application.

We, nevertheless, acknowledge that there are several weaknesses with our approaches within the two studies. In particular, the setting of the first study does not allow us to document demographic information of participants, which may weaken our choice of control variables (for example, education level of participants and personal BMI). In the second study, participants are required to understand certain terms, which they may in fact not, potentially biasing their answering. However, we argue that our findings may lend some strength to theories and previous research, suggesting that choice context may be able to influence decisions in fundamental ways through effects of priming, salience, and social norm influence, which are described in literature. Furthermore, our findings may strengthen the case that relatively simple, low cost and non-intrusive choice architecture approaches have interesting potentials for organizational applications. The main contribution of this paper is, therefore, to

provide empirical support for the trend of using choice architecture to influence decisions and eventually to benefit individuals' well-being and as well as organizations'. Further research may include the interacting effect of other potential influencing factors such as pricing (free vs. charge cafeteria), personality (level of altruism), or cultural contexts (individualism or collectivism etc.) on the relationship between choice architecture and decisions.

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## 1. Introduction

*“The fool doth think he is wise, but the wise man knows himself to be a fool.”- William Shakespeare*

It is common for people to think that they are rational even though they usually make their decision under the influences of biases and heuristics. Indeed, with limited perceptual capacity and available information is often incomplete and ambiguous (Bawden & Robinson, 2009), our decisions are frequently based on bounded rationality (Ballester Pla & Hernández, 2012, p. 27). Heuristics and biases are present not only in an individual's but also an organization's decision. (Christensen & Knudsen, 2010) For instance, competitive environments often force organizational participants to make quick decisions under an information overload (Ordonez & Benson, 1997, p. 121). Furthermore, an increasing requirement on organizational flexibility places an ever higher corresponding demand on organizational members to make quick decisions. This may lead to a tendency to use intuitive judgements and heuristics in the decision-making process in organizational settings. Evidence of this phenomenon has been observed within several industries (Loock & Hinnen, 2015; Opolski & Potocki, 2011, p. 55).

While unconsciously being employed often during the decision-making processes, unfortunately, *heuristic approaches* can lead to cognitive biases and traps such as *anchoring*, *availability* and *representativeness* (Tversky & Kahneman, 1973, p. 207), and may have negative consequences for individuals and organizations (Loock & Hinnen, 2015, p. 2027). For example, when they review repetitive diagnoses, clinicians usually rely on availability heuristics and make diagnostic mistakes because of misinterpreting the representative symptoms of similar diseases (Croskerry, 2009). Even after attending intensive decision-making training, judgmental skills of these clinicians could not be improved much (Borak & Veilleux, 1982). In another study, Schuldt and Schwarz (2010) also show how errors in calories judgement on organic food may unconsciously drive people to consume more food, and argue this may be an essential cause of the obesity chronicle.

In short, such previous research has shown that we are not always rational in our decision-making process and that our choices are often dependent greatly on

the choice context – how the problems are framed and the choice options are presented. The failure to recognize the influence of choice context can lead people to *suboptimal decisions* (Payne, Bettman, & Johnson, 1993). Moreover, *suboptimal decisions*, in turn, pose negative effects on the choice makers and lead to potential financial and other costs for organizations. (Fookien, Hemmelgarn, & Herrmann, 2015). For this reason, it is important for managers to help employees make better choices that not only benefits themselves but also the organizations.

One among potential solutions is a *choice architecture*, which people can use to redesign the choice context, can improve decision quality and reduce the cost of the suboptimal decision, *without* using forced choice or giving explicit directions (Sunstein, 2014; Thaler & Sunstein, 2008). Within the literature on choice architecture there are many ways of redesigning a decision context, such as presentation order, indirect messages and so on (Johnson et al., 2012, p. 489). Since choice architecture retains individuals' freedom of choice, it can avoid many negative reactions from the use of force (Iso-Ahola, 1986; Kahneman & Tversky, 1984). On one hand, choice architecture by redesigning the context has shown effective to benefit individual by guiding choice makers towards “better” choices in many areas such as public policies and marketing. For example, to encourage pupils to eat more fruit and vegetables, the Croatian government has provided such free food at lunch at primary schools. This campaign worked well since it took the advantage of the *availability heuristics* to increase pupils' fruit and vegetable selection (Croatia Weekly, 2014). In another example, by using rule of *loss aversion* (Tversky & Kahneman, 1991), the policy makers in Luxemburg and Italy set up the penalty points for governing the driving offenses (Castillo-Manzano & Castro-Nuño, 2012). This campaign also gained success in decreasing the number of driving violations, since the drivers tend to be more careful to avoid losing their credit points.

On the other hand, we argue that choice architecture is also effective in organizational settings. One classic example of choice architecture in organization is a default option for employees' retirement plans. Following these plans, unless employees opt out, they are automatically enrolled in the default retirement option that is believed to benefit them in a long term. (Beshears, Choi, Laibson, & Madrian, 2009) Thus by putting the default option, organizations did alter decision context, and guide employees towards “good” choices. This unconsciously influenced employee's choice through the mechanism of human' idleness and reference

dependence (Dinner, Johnson, Goldstein, Liu, & Rogers, 2011). The success of this plan in increasing employee's subscription, indeed, is the evidence of how choice architecture can benefit organizational members by employing the operating mechanism of heuristic and biases. (Goda & Manchester, 2013, p. 199). Therefore, it could be of organization's interest to understand how choice architecture works and whether such simple, costless change in a choice context such as presentation order or indirect message can alter the individual decision within an organization from healthy food choices to OCB intention, either consciously or non-consciously. However, so far there are only a few studies of the application of choice architecture within organizational context (Leonard, 2008).

Recognizing that research potential, we conduct two studies that address distinct areas where choice architecture can be applicable to influence organizations' member decision. The first study is on healthy food choice in an organizational context such as conference buffets where choice architecture can benefit individual's diet and further a healthy workforce. We focus on the choice architecture *presentation order* where the "better" options are presented first to catch human attention (Krosnick & Alwin, 1987; Surprenant, 2001) and on *indirect message* where the preferable options are remarked with. We got the encouragement from previous research in which presentation order has been proven its effectiveness on a human decision-making process. (MacFie, Bratchell, GREENHOFF, & Vallis, 1989)/ The further interesting on this subject is whether presentation order still has its power on choice even when the suboptimal choice seems more attractive is unknown. (Wansink & Just, 2011). Besides that, while direct messages have long been used in choice architecture (Colby, Johnson, Scheett, & Hoverson, 2010), indirect messages have received limited attention on individuals choice within organization context. Therefore, the research question for the first study is as follows: *Can presentation order and indirect messages guide healthy food choices?* The second study, on the other hand, explores how the choice architecture such as indirect messages can extend its effect to another organizational setting in order to promote OCB intention that benefit organizations. As presentation order is not relevant to the second study setting, the research question focus on: *Can indirect messages direct OCB Intention?*

Taking the views of the choice psychology and organizational behavior subject, the answering to our research questions could be interesting for the discussion on whether choice architecture can work on both human basic need

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satisfaction (eating behavior) and on the preference toward human prosocial behavior such as OCB. Particularly, we aim to contribute to the field of choice architecture by supporting (or not) the existing literature that choice architecture can be matter to people's behavior towards better quality decision-making in organizational settings. Using two types of choice architecture such as presentation order and indirect messages, we hope to at least encourage other researchers and students explore more on the pros and cons sides of these interventions at worksite. From the practical perspective, we suggest that low-cost choice architectures can be alternative options for organization to replace traditional interventions such as intensive and costly training on decision-making skill. Through the mechanism of heuristics and biases, there could be certain interventions organization can invest in, making their employees eat healthier and be more collaborative and supportive, *without* applying strict rules or prohibiting policy.

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## 2. Theoretical background

### 2.1 Good choices

In human life, an individual may have to make decisions among a set of many choices. It is hard to say whether or not a choice is “good” since it depends on the different dimensions of measures such as who is the beneficiary of that decision, in which context it is decided, and the time when the choice is made. Across the literature, there is no unified definition of a quality choice or a good choice. Even the recent definition of a good choice- a choice that has high outcome benefits and low outcome costs (Higgins, 2000, p. 1217)- may trigger the debate on whom could be the beneficiary or the balance between short or long term cost. Alternatively, another view attributes good choice to the quality of the decision-making process concerning how and whether people evaluate possible options and the way they make the final choice. (Frisch & Clemen, 1994, p. 64). Although theories differ from what is the key characteristic of a good decision, they may agree upon the fact that spending many resources searching and identifying all potential options can drive up the cost and turn an initial good decision to a wasteful process. It is, therefore, important for organizations to identify effective ways to simplify and enhance decision-making processes and subsequently achieve their goals. With the purpose of helping an organization to maximize its own and employees' outcome, we first describe the need for *healthy choices* and *OCB intentions* in aiding organizational performance.

#### 2.1.1 Healthy choices

Unhealthy diets increases the risk of many health problems such as obesity and heart disease (Jensen, 2011). Instead of eating at home or packing food before going to work, more and more employees now choose to eat at work canteens or conference buffets as this is often convenient, and saves food preparation and traveling time. As a healthy workforce plays a crucial part in an organization's success, and employees spend a significant amount of time at work (Quintiliani, Poulsen, & Sorensen, 2010), organizations are highly concerned about their employees' dietary patterns and food choices. Also, there is a growing body of research documenting on how health promotion programs at a workplace can improve productivity, lower absenteeism, and increase job satisfaction (Jensen, 2011). For instance, there is a negative effect of obesity on productivity (Gates, Succop, Brehm, Gillespie, & Sommers, 2008) and positive relationship between

obesity and absenteeism (Bertera, 1991; Kouris-Blazos & Wahlqvist, 2007). In particular, Burton, Conti, Chen, Schultz, and Edington (1999) found that high cholesterol level may increase absenteeism by 10 days per year, meaning that eating nutrition and less cholesterol food could save the organization from the cost of employee's absenteeism and ineffective job performance. Therefore, the health interventions that encourage healthy food choices can enhance productivity and improve organization's performance. Even though the benefits of healthy choices are clear, it is still a challenge for organizations to encourage healthy eating at the worksite. For example, consumers may have good knowledge of health benefits from eating fish and seafood that contain rich nutrition (Nesheim & Yaktine, 2007) but when it comes to actual food choices, they still prefer hedonic and less healthy food options. Thus, we argue there is a need to find low-cost and easy to be applied interventions that can encourage people eat healthy foods at work locations - conference buffets or canteens. In our paper, we choose fish as our observed healthy option since it is well known for nutrition-rich (vitamins, fatty acids, minerals) and low-fat content (Nesheim & Yaktine, 2007).

### 2.1.2 OCB intentions

The term organizational citizenship behavior was coined by Organ (1988). Organ suggests that OCBs can be best described as “*performance that supports the social and psychological environment in which task performance takes place.*” (Organ, 1997, p. 95). Alternatively, Williams and Anderson (1991) suggest that OCBs could be defined based on who would benefit. OCB-O can “benefit the organization in general” (compliance to organization rules) whereas OCB-I “immediately benefit specific individuals and indirectly through this means to contribute to the organization” (Williams & Anderson, 1991, pp. 601–602). Following this, among the most recognized forms of OCB-I and OCB-O are altruism and civic virtue respectively (Organ, 1997). Altruism or so-called helping behaviors can be considered as behaviors that contributes to organization's effectiveness through supporting and helping specific colleagues, superiors, or customers. Civic virtue reflects the involvement or participation of employees in the organizational process including new work projects, meetings, and discussions (Organ, 1997).

A body of research has shown that OCBs may contribute to organizational success by (a) increasing coworker and managerial productivity; (b) providing more resources so they can be used for innovation and productivity; (c) depleting the

required resource for maintenance functions; (d) increasing the cooperation within and across unit departments; (e) creating positive work environment and therefore increasing the organization's ability to attract and retain talents; (f) enhancing the consistency of the organization's performance; and (g) enabling the organization to effectively cope with environmental changes (P. M. Podsakoff & MacKenzie, 1997; P. M. Podsakoff, MacKenzie, Paine, & Bachrach, 2000). Empirical research has supported that OCBs can benefit the organizations in many aspects such as high customer experience, quality and quantity of the service, sales performance, recruitment, and profit (Karambayya, 1990; MacKenzie, Podsakoff, & Ahearne, 1998; N. P. Podsakoff, Whiting, Podsakoff, & Blume, 2009; N. P. Podsakoff, Whiting, Podsakoff, & Mishra, 2011). One explanation provided by P. M. Podsakoff and MacKenzie (1997) for the effects of unit OCBs on organizational effectiveness is that groups with higher levels of OCBs are more cohesive, and that cohesive groups spend less effort on group maintenance functions and more time on production-based tasks. Over the time, OCB has increasingly become important to an organization management research since it is usually considered as an antecedent of organizational effectiveness (Paine & Organ, 2000). Whether an organization can encourage OCB intentions is particularly relevant in situations where financial constraints do not allow organizations to invest in more expensive training programs (N. P. Podsakoff et al., 2009). Therefore, it is important to understand the decision-making process and how choice context can influence OCB intention.

## 2.2 Decision-making process

The human decision-making process is complex and influenced by different factors such as the *social influence*, the *choice context* or situation, and our *systems of thinking* (Bank, 2014). However, we are not always aware of these influencing factors. In particular, human beings are neither completely rational as believed by neoclassical economists nor emotional as thought by some psychologists. In light of this, Kahneman (2003) proposes a concept of two systems of thinking- system one and system two- to explain how people make decisions in the availability of limited information or bounded rationality (Kahneman, 2003, p. 691; Kahneman & Klein, 2009). While system one or so-called "*automatic system*" reflects our intuitive thinking and often associated with gut feelings, system two or "*reflective system*" is more self-conscious and more effortful. Automatic thinking or system

one of thinking, which relies on automation trigger heuristics and biases in decision-making, is often used when people face cognitive limits in their decision-making. According to March and Simon (1958), it is impossible for the behavior of a single, isolated individual to reach any high degree of rationality because the number of alternatives to explore is relatively big and the individuals' capacity to search is limited. Principles of rational thinking are violated and decision-making process does not follow rational procedures (March, 1994). Hence humans are subject to bounded rationality and search for solutions that "satisfice". While heuristics emerge from the limitation of information availability and individual's ability to process information, the cognitive traps or biases are employed tools of a human mind to simplify decision-making procedure through selective perception.

Examples of heuristics and biases in an organization can be in investment decisions when investors rely on an anchoring bias and take the day that their stocks have the highest earning as the anchor to compare (Peterson & Murtha, 2010). While anchoring traps save investors from the burdensome and complicating analysis, it is often the wrong tool to evaluate the portfolios and can lead to faulty decisions and loss. (Peterson & Murtha, 2010, pp. 122-123). Another example can be in management, when managers tackle the uncertain and complex environment with illusions and biases (Amit & Schoemaker, 1993, p. 33). It is generally the case when the economic, industrial, social or technological factors that shape the choice environment become unpredictable. In such situations, managers are usually subject to stress, information overloading and uncertainty (H. A. Simon, 1990, p. 5). In addition, such stressful and complex decision contexts would lead decision makers toward the strategy that is considerable bias, illusion and sub-optimality (Amit & Schoemaker, 1993, p. 40). For instance, their past successes would lure managers toward the trap of *illusion of control* (Langer, 1975) or the misjudgment of the relevant and important information. To increase decision quality, we can either change the decision context or improve individual cognitive capacity. As individual cognitive capacity is limited and training course is often costly, the option to alter the context should be given high attention. For example, organization can influence the context by providing all needed rational information to decision makers so as human can exploit the cues and make rational choices (H. A. Simon, 1979). However, this solution can be costly in term of human resources, time, and financial investment. Furthermore, altering the choice context could be an alternative approach. By taking the advantage of these biases and heuristics in

human's mind process, a designed choice context may trigger the suitable biases. While these biases may violate a rational paradigm, they are still able to support decision-makers to reach their targets and goals. (Christopher, 2015). In line with this, adaptive human behavior interdisciplinary (Gigerenzer, Hertwig, & Pachur, 2011) suggests heuristics can be strategically rational in certain settings when individual abilities and environmental are contingent. (D. G. Goldstein, Gigerenzer, & Mischel, 2002, p. 75). In sum, we conclude that while bias and heuristics are the source of decision errors, they can also be the useful sources of a success decision-making strategy if we can properly adjust the context in which choices are made.

### **2.3 Decision Context: Choice architecture**

Building on the understanding of human decision-making process, choice architecture is often considered as a cost-effective intervention, which can influence choices. Thaler and Sunstein (2008) developed the concept of choice architecture to reflect how the choice presentation can influence decision makers. There are many potential ways that choices can be designed to direct people towards the preferable option of choice architects while still giving the decision makers freedom to choose (Thaler & Sunstein, 2008). For example, choice architecture can just simply be an act to make the target option more revealing among the set of choices, and it is not necessary to make the competing choices appear negative compared to the target choice (Tversky & Kahneman, 1985).

In the organizational context, managers might ask how organizations can help their employees in making choices that benefit themselves and the organization's outcomes. There are at least two possible approaches. First, we can influence the cognitive thinking of people through training and information campaign. Second, we can modify the heuristics-inducing environment. The second approach, which is the choice architecture, provides the opportunities to make use of the bias and heuristic effects of human judgments, without any significant investment in time or money.

#### *2.3.1 Presentation order*

One type of choice architecture evidencing the contextually dependent character of human decision-making is a presentation order (Leonard, 2008). Decision makers are often in the choice situation that imposes constraints on attentiveness, time, and information. Under the pressures of these constraints, people are biased toward the order of choices (Baron, 2000). In general, this

phenomenon may be driven either by *primacy* or *recency* effect (Duffy & Ipsos, 2003; Mantonakis, Rodero, Lesschaeve, & Hastie, 2009), depending on the variance of choice context dimensions (MacFie et al., 1989). Particularly, when options appear in the sequential time order and when there is a time gap between option and choice's evaluation, the most recent presented option is the most salient one in the mind of decision makers. For instance, in the recruitment process with all outstanding candidates, the one interviewed most recently is likely to be seen the most favorable than the ones interviewed before in the sequence (Li & Epley, 2009). This research indicated that people prefer the recent option among the desirable choices while they tend to select the more distant option among undesirable choice (Li & Epley, 2009, p. 17). On the other hand, in a wine tasting experiment that examined the primacy effect, Mantonakis et al. (2009) found that the first wine option is the most preferred choice. This study documented a large effect of primacy when options are presented differently on the physical order dimension. Similarly, Mollet and Harrison (2007) conduct an experiment showing that people attach either a positive or a negative tone for the same list of adjectives based on the first adjective in a sequence. Such primacy effect makes the 'first physical' information that we encounter more appealing and influencing among choices (Krosnick & Alwin, 1987; Surprenant, 2001). As the fact that we are unconsciously influenced in our decision-making process, the first order option could be used as the hidden persuader or the reference point (Smith, Goldstein, & Johnson, 2009). Since it influences people's choice unconsciously and does not limit available options, it could prompt people towards the suggestive decision without both their awareness and potential of negative reactance effect (Brehm, 1966). Therefore, by just simply rearranging the position of choices, choice architect can take advantage of this kind of bias to encourage people towards the target option.

#### *Presentation order for healthy choices*

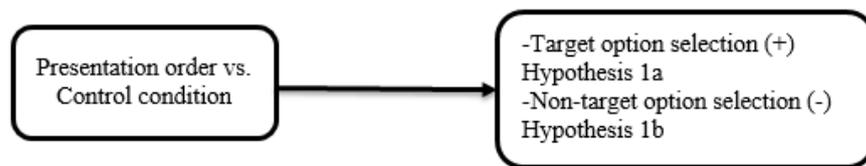
In a worksite context (buffet/ canteen), employees usually have both healthy and hedonic food choices. Presentation order can be a tool to promote healthy option such as fish and decrease the selection of less healthy option such as meat. In detail, when the healthy option (fish) is present first in the buffet line, this option become salient in individual mind due to primacy effect. As a result, presentation order may lead to more selection of healthy choice. Although presentation order effects have been studied before (Wansink & Just, 2011), what still remains

unknown is whether it is effective when the other competing options (meat) are perceived more attractive/ tasty (Rozin, Hormes, Faith, & Wansink, 2012, p. 631). In our first study, we examine whether presentation order can work through primacy effect to promote target choice (fish) even when the non-target option (meat) seems more desirable and to what extent it can influence individual's choices. Our study also analyzes the negative effect of this choice architecture on the non-target option (meat) -the option that is not placed second in the treatment condition. Therefore, we hypothesize the following:

H1a: When the target option is presented first, more decision makers choose this option.

H1b: When the target option is presented first, fewer decision makers choose the non-target option.

Model 1: Relations between presentation order and healthy choices



### 2.3.2 Indirect message

Another way to change the choice context is to use indirect messages. The indirect messages can be used as a mean to draw decision makers' attention and makes the attached option becomes more *salient* or *socially approved*. An indirect message can be in a form of graphic display (emoticon) or a simple signage of a positive word ("EatSmart"). Unlike direct messages, both forms of indirect messages include no explicit or forcing information or content. For instance, an emoticon is a graphic representation of facial expression (Walther & D'Addario, 2001, p. 324) with no specific content in itself. Furthermore, an emoticon can provide additional social cues to the decision-making process such as the communication partner's perspective and emotions. (Lo, 2008, pp. 595-597). Besides that, its unique "no content" characteristic enables indirect message to avoid negative effect caused by directive content. Specifically, the direct message could lead to "psychological reactance" among decision makers as a result of being perceived as threatening on their freedom (Cialdini, 2001). Such psychological reactance may happen when people get the feeling that they are not free to do what they wish, and therefore, they will do the opposite action to react (Brehm, 1966).

Furthermore, using indirect messages is an effective tool of choice architecture since it can influence choices through the mechanisms of salience and social norm effect.

*Saliency* refers to the one's attention that is directed to certain information cues of the environment (Taylor & Thompson, 1982). Kahneman (2011, p. 324) also acknowledges the powerful effect of salience on our attention "*our mind has a useful capability to focus on whatever is odd, different or unusual*". From a visual perspective, the indirect message can make an option become salient by sensory input or cognitive knowledge (Lachman et al., 1979). The sensory features of indirect message such as color, size, and form may first draw a decision maker's attention toward the option that it is attached to (Jarvenpaa, 1990). In such case, a decision maker's attention is paid to differences but not to absolute values of the option (Kahneman, 2003). Later on, the positive meaning of indirect message such as "EatSmart" can provoke the positive mood of a decision maker and subsequently encourage that person to choose the attached option (Wadlinger & Isaacowitz, 2006).

An indirect message can also be called an injunctive message that may convey the *social norm*. Dequech (2009, p. 72) refers social norms to "*social standards of behavior and/or thought that (a) indicate what people should or should not do or think under some circumstances, (b) are at least in part enforced upon individuals by external sanctions and (c) are internalized by some or even many individuals*". using social norm as their reference point, individuals usually adjust their thoughts and behaviors to confirm the social expectation and to find themselves inclusive in their community (Clapp & McDonnell, 2000, p. 19). Therefore, an indirect message via social norm effect can act as a guiding point that directs individuals towards a *normative* decision or behavior (Cialdini, Kallgren, & Reno, 1991, p. 201); (N. Goldstein, Cialdini, & Griskevicius, 2006). This social norm also impacts on how people understand the emotions and mood of messengers through a graphic display such as a smiley or emoticon (Ganster, Eimler, & Krämer, 2012, p. 229)

#### *Indirect message and healthy choices*

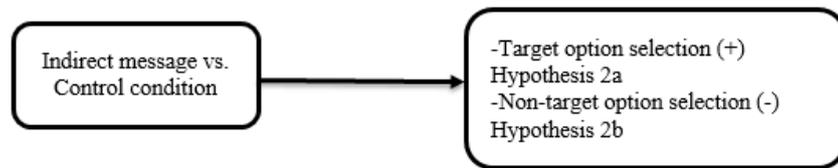
The examination effect of indirect message on healthy choices could be a complimentary to the current literature of health intervention at worksite. As the examining choice context is conference buffet, we are aware that plenty of food options might let the healthy choice be "silent" without any remark or highlight.

We emphasize the salient effect of choice when attaching a signage “EatSmart” with fish dish. The study findings could be interesting for researchers who want to document the effect of indirect message and compare with tradition information training or other similar cognitive health campaign. Furthermore, we recognize the need of research on indirect messages and how it can work as a reminder of choice or a “stop point” for people’s consideration. Also, if the indirect message work for target option (fish), will it also works against the non-target option (meat). Our hypotheses are as follows:

H2a: When the indirect message is presented, more decision makers choose the target option.

H2b: When the indirect message is presented, fewer decision makers choose non-target option.

Model 2: Relations between indirect message and healthy choices



### *Indirect message and OCB intentions*

Indirect message such as emoticon can influence employee’s decision processes via the power of social norm effect, it can also be a cost-effective solution. In our study, we set up the choice context in which employees decide to what extent they want to engage to OCB when they receive an organization campaign’s communication. Because indirect message such as positive emoticon (smiley) can 1) reduce the boomerang effect of standing-alone direct text message and 2) provide the cues of social norm (Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007), we expect that it can have an impact on employees’ altruism. Thus, we expect that the indirect message can increase OCB-I intention. Therefore, we hypothesize the following:

H3: When the indirect message (emoticon) is presented, the OCB-I intention increases

Model 3: Relations between indirect message and OCB-I intention.



Besides that, it is generally accepted that emoticon is less effective in task-oriented behaviors than social related behaviors (Derks, Bos, & Von Grumbkow, 2007, p. 842). Furthermore, OCB-O intention has a positive relationship with task-oriented behaviors and the clarity of goals. Emoticon may even result in negative effect on OCB-O intention since it is not targeting to make clear the descriptive content of message. Therefore, we propose that indirect message has a negative effect in influencing OCB-O. Thus, we hypothesize the following:

H4: When the indirect message (emoticon) is presented, the OCB-O intention decreases

Model 4: Relations between indirect message and OCB-O



## 3. Study 1

### 3.1 Method

#### 3.1.1 Research sample and procedures

##### *Sample*

Using the field experiment design, quantitative data of participants' healthy choices was collected in the study of GreeNudge architecture and Cornell University Food and Brand lab at four major Nordic Choice Hotels based in Oslo and Stockholm. In total, more than 11,000 participants were recorded. Participants were mainly businesspersons from different industries at conferences/ seminars taking place at the hotels.

##### *Procedures*

The data was collected through field observations from April to June in 2015. Observations were carried out during weekdays from Monday to Friday but not on weekends as the target participants are business employees.

The field setting is a business buffet, where participants have discretion to make healthy or less healthy choices among wide varieties of foods. This setting is similar to lunch buffets throughout Scandinavian. Therefore, it could provide promising approach that can be replicated and applied in the worksite.

Observers are master-level students that were recruited. These observers had been trained for their tasks and got feedback on their observations' accuracy. During the intervention period, the inter-rater reliabilities (IRR) were calculated, and these ranged between 0.8-0.9 (Knut Ivar Karevold, 2016). As inter-rater reliabilities are "the extent to which two or more independent reviews of the same scientific document agree" (Cicchetti, 1991, p. 119), high IRR indicates high-consensus and consistency in data quality.

In all three experiment conditions, participants have freedom to choose what health choices (food options) that they prefer and consume as much as they want, and there is no advance specific guidance or advice. We specifically study the two food options, which are fish and meat. As fish is showed to be healthier than meat (Carlucci et al., 2015), we aim to see whether choice context can guide more selections towards fish.

In control condition 1, there was no intervention and meat option was placed first, before fish in the buffet line. This represents the normal setting, where no choice architecture is applied. In the condition 2, researchers made a change in the

food order (presentation order). Here, the fish option (desirable choice) was placed first, instead of meat, to catch the participants' attention first. This also implies a setting where the first option (fish) is considered to be less tasty and attractive (Rozin et al., 2012, p. 631). In condition 3, a non-descriptive sign "EatSmart" was set up next to the fish, to see how people responded to that. The experiment conditions were assigned randomly to the experiment locations. At the same observing day, two locations can have the same or different conditions to ensure the random allocation of guests and avoid external event effects.

### *3.1.2 Measures*

#### *Dependent variables*

The dependent variable is the percent of selection of the target dish (fish and meat). Whenever a selection was made, it would be counted as one. For instance, if an observed participant selects both meat and fish, it would be counted as one meat selection and one fish selection. If a participant has a second serving, that would be also recorded. Thus the total number of selections is the unit of observation, which is then converted into percentage points by dividing a total number of selections with total guests within an observed day to see the change in participant's food choice between conditions.

#### *Independent variables*

The independent variable is the condition setting. We code the control condition as 1, the condition that fish was placed first as 2 (presentation order), and the condition that "EatSmart" sign (indirect message) attached to fish was 3.

## **3.2 Findings**

Data analysis was conducted by SPSS software version 22. We chose the independent samples T-test to compare the means values of the percentages of selections on each food option between conditions since this test has a power to determine if there are statistical difference in percentages of selections between the treatment and condition (Pallant, 2013)

### *3.2.1 Presentation order influences healthy choices*

The analysis result may support our first hypothesis that the sequence of food presentation influences guest food choice. For example, when fish was served first, there was more people who selected fish, rather than when meat was served first. As indicated in Table 1, in the condition 2 (fish first), 5.97% more people choose it -an increase from 25.45% to 31.42%,  $t(6,630) = 18.757$ ,  $p < 0.001$ ). The

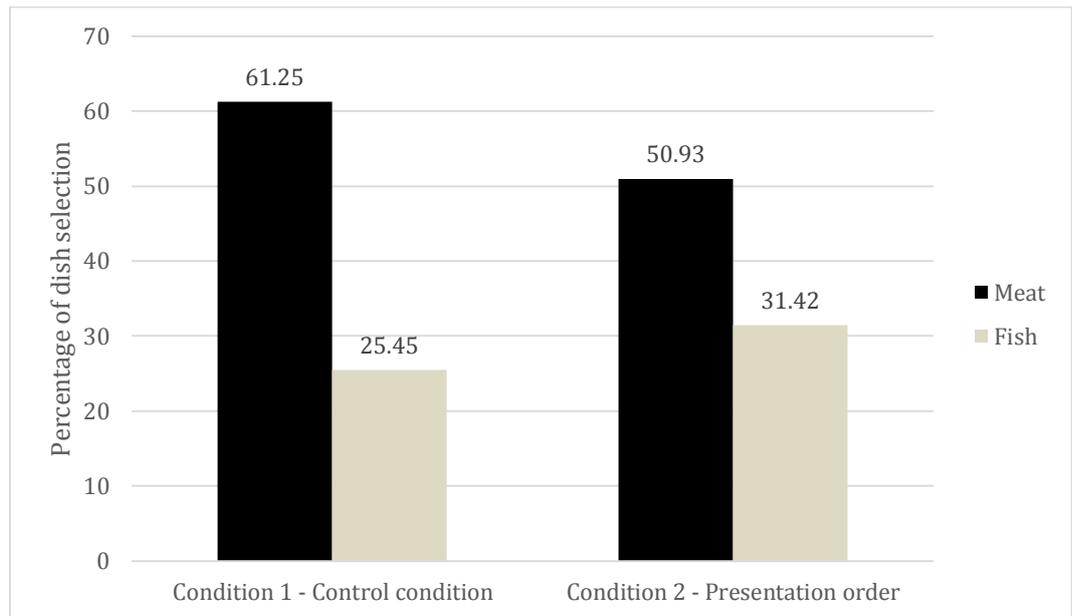
opposing trend is documented for meat selection. When fish was placed first, fewer guests took meat compared to when it was first (control condition). There was a decrease of 10.32% (from 61.25% to 50.93%;  $t(6,630)=21.844$ ,  $p < 0.001$ ) in meat selections when fish was served first. However, as meat seems more attractive and tasty, percentages of participants choose meat are still higher even when the target option (fish) is presented first. Hence, the presentation order has an impact on food selection – people select more of the food they see first. These results suggest the supporting for our hypothesis 1 that food is chosen as target option is selected more than when it is set as non-target option

**Table 1**  
**Presentation Order Influences Healthy Choices**  
 (Standard Deviations in Parentheses)

Percent of selections	Control condition (condition 1) N=2,978	Presentation order (condition 2) N=3,654	T-test (p-value)
Meat	61.25 (18.14)	50.93 (20.29)	21.844 (<0.001)
Fish	25.45 (12.28)	31.42 (13.58)	18.757 (<0.001)

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Figure 1: Presentation Order Influences Healthy Choices



### 3.2.2 Indirect message influences healthy choices

Findings presented in the Table 2 indicate that when “EatSmart” was placed on fish, more people selected fish relative to when there was no such sign. For instance, when fish was with the “EatSmart”, there was a 14.32 % increase in selections (from 25.45% to 39.68%;  $t(7,631)= 35.082$ ,  $p < 0.001$ ). In contrast, when the signage was on fish dish, meat selections fell down by 4.24% compared to when there was no “EatSmart” (from 61.25 to 57.01%;  $t(7,631)= 9.322$ ,  $p < 0.001$ ). These results suggest the supporting for our hypothesis 2 that indirect message (“EatSmart”) can increase the selection of target option while decreasing the selection of non-target option.

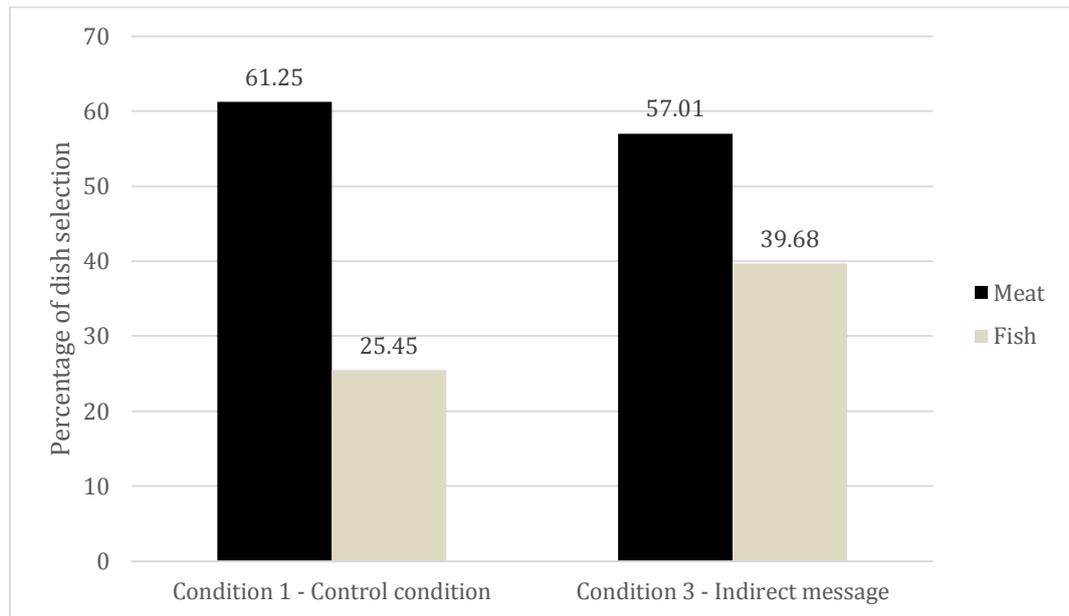
**Indirect message influences healthy choices**

(Standard Deviations in Parentheses)

Percent of selections	Control condition (condition 1) N=2,978	Indirect message (condition 3) N=4,655	T-test (p-value) Without Covariates Control
Meat	61.25 (18.14)	57.01 (21.13)	9.322*** (<0.001)
Fish	25.45 (12.28)	39.68 (23.02)	35.082*** (<0.001)

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Figure 2: Indirect message influences healthy choices



### 3.3 Discussion

The results lend the support for our hypotheses that simply rearranging the position of choices or attaching the indirect message (EatSmart) to one option could prime people to select it. Here, we discuss the general effect that presentation order and indirect message (EatSmart) had on healthy food choice and explain how these example of choice architecture worked.

As described earlier, our decision-making process is complex with involvement of both system 1-automatic system and system 2- deliberative system (Kahneman, 2003). The assumption that people relying solely on the system two to deliberately consider all options before making their optimal choices is questionable since it ignores the psychological factors and social impact on our behavior. In fact, we often employ our automatic system of thinking to make decisions as it is fast, effortless, and associative compared to deliberative system, which is under cognitive cost, effortful, and deliberative. Previous research has suggested that we can proceed only limited amount of information and in cases of information overload (e.g. many options at buffet-line)(Huber, 1991; H. Simon, 1982; H. A. Simon, 1991). In such choice context, we are often dependent on our heuristics and bias to simplify and filter choices. In the experiment setting of choice context, buffets usually include the long list of items that can confuse the guests. Furthermore, there could be presence of time pressure since there is commonly a long serving queue waiting and a limited amount of lunchtime. Therefore, buffet guests could be prone to options that was priming and salient

(EatSmart) to them. In this context, the choice architecture applying the operating mechanisms of heuristics and biases could provide the significant impact on choices.

In Particular, the analysis result also supports the suggestion that the primary information human absorbs in the sequence would be an important input to their decision-making process (Ward, 1987; Suprenant, 2001). In other words, the visual cues (first food option) operate as inputs to people's food choice. In this case, whatever food (meat or fish) has been placed first, it is selected more often compared to when it is placed second. This finding is in line with what Wansink and Hanks (2013) found that presenting one dish first would increase the probability of selection of that option. The explanation for this phenomenon is the fact that when there are too many options, people experience information overloaded. In such situation, instead of using deliberate thinking, people will take the option that is most appealing to them. That could be why interventions taking advantage of priming and anchoring effect could influence people's choices. This presentation order option is just one exemplary of a choice architecture- a way of structuring choices that may influence an individual's behavior by influencing what is salient to him or her. This finding suggests that target option can also work at the business conference buffet and facilitate the claim that applying choice architecture can benefit employee's health and organizations.

On the other hand, the findings suggest the similar effect that indirect message has on healthy choice. The signage (EatSmart) in this case is simply a word that makes the option become more revealing. It may make the fish option a salient choice as it stands out against meat option that has no remark on. Again, this small change in buffet context works based on using availability heuristic which takes immediate piece of information into the decision-making process. In the normal situation, availability heuristic may be harmful to decisions that need to consider all information and options before making final choice; however, it can be useful in the context that we should not limit choices but encourage the healthy options to people. Without using forceful techniques, the indirect message that implies no direct relevance to choice could enact decision that favor the target choice and behaviors.

In conclusion, the first study shows that small or low-cost changes within the choice context may have a powerful impact on participants' healthy eating decision. As healthy workforce is vital to any organization (Quintiliani et al., 2010),

an application of psychological behavior insight could be extended to the organizational settings such as conference buffet to encourage people to try healthier food and through time may even change their eating behavior. Therefore, heuristic bias in individual decision-making is not only a source of error but also a potential field that we can explore to help people mindlessly make better decision without constraining options (e.g. healthy food choice)

## 4. Study 2

### 4.1 Method

#### 4.1.1 Research sample and procedures

##### *Sample*

Using the vignette design, quantitative data of participants' OCB intention was collected. Paper questionnaires were handed out to a convenient sample which were volunteering business students at BI Norwegian Business School – Oslo campus.

In total, there are 200 respondents in which there are 76 males and 124 females. Among all, there are 126 bachelor level and 74 master students. 89% of participants had some kind of work experience and 95% of them are within the age range from 18-29. The participating respondents were randomly assigned to different conditions. Condition one includes 49 respondents; condition two includes 50 respondents; condition three has 52 respondents; and condition four has 49 respondents.

##### *Procedures*

The purpose of the study is to examine how choice architecture (indirect message) would influence participants' OCB intention. Paper questionnaires were carried out during weekdays from Monday to Friday at BI Norwegian Business School. The observation period was in April 2016 and there were four conditions (see the Appendix 1-4)

Participants are presented with different situational scenarios to assess their OCB intention. In each situation, participants were free to make their choices. Situational scenarios mimics real life context in organization when they have their own decision to participate in OCB or not. As OCB can be grouped into OCB-I and OCB-O, condition one and two have OCB-I as hypothesized situation while condition three and four have OCB-O as hypothesized situation. Particularly, the situation for testing OCB-I intention is a volunteer program to mentor new colleagues, participants then would answer 3 questions which indicate their decision and willingness to support new staff. In the condition one, the indirect message (the smiley emoticon) was placed on the first page of the survey set. We did not describe the purpose of this page to participants. The

condition two serving as a control condition has the similar set of questions to the condition one, the only difference is that condition two includes no “smiley” page. Alternatively, for testing OCB-O intention, we set up the organization change situation in which participants answer 3 questions regarding their intention to participate in the change process, their cooperation level with supervisors, and their willingness to accept the new job assignment. The condition three includes the setting of indirect message (the smiley emoticon) on the first page of the survey set. We also did not mention the purpose of the smiley graphic to the participants. The condition four serving as the control condition include the same set of questions in the condition three, the difference is that the condition four has no emoticon put on the first page.

#### *4.1.2 Measures*

##### *Dependent variables*

The dependent variables are intention to OCB-Is and OCB-Os in which we refer to the OCB measurement instrument proposed by Organ (1988). We use the Likert scale with 7 ratings for measuring the responses on each item. In OCB-I, we measure altruism construct. For example, we ask participants’ decision to “participate in the mentor program” or “give time to help colleagues with task related problems” such as procedure explanation and professional advice on the task. To measure OCB-Os (civic virtues construct) we ask participants to decide “to follow organizational change” and support the administrative functions in the organization.

##### *Independent variables*

The independent variable is condition in which the participants have been assigned to. It is numbered from 1 to 4 accordingly. (See Appendix 1 – 4)

## **4.2 Findings**

The survey samples were collected and input into SPSS for analysis. We chose one-way analysis of variance (ANOVA) to calculate Mean, SD, F-test, and p -value compared between conditions since it has a power to examine the relationship between conditions explaining factors and quantitative responding factors. ANOVA can provide the statistical test to check the equality of means

of different groups ((Brown & Rothery, 1993);(Davis & Sampson, 1986)). It is also considered to better address the type 1 error and is therefore suited to analyze the social issues (Hair, Black, Babin, & Anderson, 2010).

#### *4.2.1 Indirect message influences OCB-I intention*

As Table 3 indicates, there is a difference in how people respond to OCB-I question across two conditions. Specifically, people rate a slightly higher on groups of OCB-I items when the emoticon was presented in comparison to control condition (5.51 vs. 5.24). However, the result could not reach the statistically significant level ( $F(1, 97) = 2.444$ ;  $p > 0.05$ ) so we could not either confirm or reject the hypothesis 3 that emoticon generally influences the OCB-I.

However, when we assess the OCB-I at unit level, an interesting finding can be discussed further. For example, we look into the responses at the question on the decision to “give time to help colleagues with task related problems such as procedure explanation and professional advice on the task”; we found that when the emoticon- smiling face- is presented, people are more likely to engage in helping behaviors compared to control condition (5.97 vs. 5.42). We find support for partially hypothesis 3 that emoticon increases OCB-I. The result reaches statistically significant level ( $F(1, 97) = 6.352$ ;  $p = 0.013$ ), this may support our claim that emoticon may have positive effect on helping behaviors that benefit the organization. For “the willingness to participate mentor program”, people in the emoticon condition ( $M = 5.33$ ;  $SD = 1.23$ ) are more likely to participate in volunteering compared to the control condition ( $M = 5.14$ ;  $SD = 1.03$ ). However, for this scale item, the analysis result could not reach statistical significance ( $p > 0.05$ ); so we could not make our conclusion on this item.

In conclusion, we find partial support from the result for hypothesis 3 at item level, which is measuring the intention to help colleagues with task related problems.

**Table 3. Indirect Message Influences OCB-I Intention**

(Standard Deviation in parenthesis)

	Condition 1: Indirect message	Condition 2: Control condition	F-test (P-value)
Average (Q1, Q2, Q3)	5.510 (.84)	5.247 (.84)	2.444 (0.121)
Q1: participate in the mentor program.	5.330 (1.23)	5.140 (1.03)	0.669 (0.415)
Q2: help colleagues with task-related problems such as procedure explanation, professional advice on the task.	5.920 (0.86)	5.420 (1.09)	6.352** (0.013)
Q3: help new colleagues who have heavy workloads.	5.290 (1.00)	5.180 (1.73)	0.233 (0.631)

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ ,

#### 4.2.2 Indirect message influences OCB-O intention

According to the Table 4, the indirect message - emoticon setting seem not having positive effect on OCB-O intention. It is interesting that emoticon intervention seems more harmful to OCB-O than normal setting. For example, for the civic virtue indicator (Q1, Q2 and Q3), people responded less willing to engage in when there was emoticon condition compared to control condition (5.58 vs. 5.68;  $F(1,99)=0.493$ ,  $p>0.05$ ). It is also similar when we assess response rating at scale item level. In the treatment condition, when we asked people whether they are willing to follow organizational changes, they rate their willingness at 5.42 compared to 5.61 when there was no intervention ( $F(1, 99) = .909$ ;  $p>0.05$ ). In the same vein, with the question “engage in the new job assignment” on the average received higher rate at 5.78 when there was no intervention relative to 5.63 when there was indirect message emoticon ( $F(1,99)=0.513$ ;  $p>0.05$ ). Although the analysis result could not reach the statistically significant level, it is still interesting since we witnessed the potential negative effect of choice architecture on OCB-O intention. To encourage OCB-O intention, direct message may be better than a positive icon such as a smiley.

However, we could not confirm or reject the hypothesis

**Table 4. Indirect Message Influences OCB-O Intention**  
(Standard Deviation in parenthesis)

	Condition 3: Indirect Message N=52	Condition 4: Control condition N=49	F test (P-value)
Average (Q1, Q2, Q3)	5.558 (.86)	5.680 (.90)	0.493 (0.484)
Q1: follow organizational change	5.420 (.92)	5.610 (1.08)	0.909 (0.343)
Q2: cooperate with new supervisor	5.620 (1.12)	5.650 (.95)	0.033 (0.856)
Q3: engage in the new job assignment	5.630 (1.01)	5.780 (.96)	0.513 (0.475)

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

### 4.3 Discussion

Our findings lend the limited support for our hypothesis number three that indirect message can increase the level of OCB-I intention. In addition, we found no significant relationship between indirect message and OCB-O intention.

In general, when indirect message (emoticon) is presented, OCB-I (altruism) scale increases, indicating the intention of participants to OCB-I. However, only the result on item question “give time to support colleagues” reach statistically significant level. The presence of indirect message on this item may cause 0.5-point increase in rating, which was the highest variance among item set. We suspect that the insignificance level on the other items can be the result from the limited statistical power of a small sample size. Furthermore, the item questions may be not specific enough for participants to understand. For instance, the item decision to “give time to support colleagues” include detailed examples while the other two items may require careful reading on the scenario part and subjective judgment on words such as “heavy workload”.

The partial effect of indirect message on OCB-I (altruism) can be explained by automatic thinking system and social norm influence. The influence of our system one appear almost in human judgement and decisions (World Bank Report, 2015, p. 25) so the decisions to engage in OCB is not an exception. Especially, in choice context that employees are increasingly dealing with a large information and communication at work, people may ignore information that may not really related to their daily tasks. Therefore, a positive icon such as a smiley with function as a stopping point may catch recipient attention and interest. Minor changes in the contextual environment such as adding a smiley to circular mail, post card, or email can potentially a solution to increase attention rate. Furthermore, we argue that the positive image of emoticon may work through the priming and social norm effect. Such image may associate with social expectation (World Bank Report, 2015, p. 6-7) that people put warmth unconsciously towards each other. In our setting, the emoticon will be the reference point for positive standard behavior that may consequently encourage people to social activities such as spending time to help new colleagues and volunteer to participate in the mentoring program. Furthermore, indirect message (emoticon) may unconsciously create the perception among participants that altruism is socially

accepted (Cialdini et al., 1991). To reflect their membership in an organization, participants may act correspondingly to that norm and rate higher in OCB-I item. Alternatively, we argue the function of indirect message (emoticon) to reduce or avoid the negative “boomerang effect” that the direct message may cause.

In the condition to test the effect of indirect message on OCB-O, we cannot find support for the relationship stated earlier although the rating on OCB-O (civic virtue) show the expecting decrease as we hypothesized in the presence of emotion. The result could not achieve any statistical significance level, preventing us from drawing conclusion. One possible explanation of insignificance level can be the lack of sufficient sample size. Another explanation is that the scenario may not get full understanding from participants who mostly are young (95%) and have limited work experience within the formal organization context. Therefore, we propose further studies should be carried out to explore the relationship between indirect message and OCB-O.

## 5. General discussion

Our two studies suggest there is a potential of applying choice architecture in an organization context. As described earlier, training on decision-making and other cognitive approach solutions are often costly and time consuming. Thus, this motivate us to look for more economic and time effective but non-intrusive solutions. Our first study demonstrated how people can be prone to options that get their attention first or the options are attached with indirect messages. The result can probably be applied in a wide range of multi-options contexts, such as conference buffet, workplace canteens and so on, and possibly even wider – although that would be a theme for further research. The second study extended our investigation of choice architecture (indirect messages) effectiveness to a business setting. Findings suggest indirect messages (emotion) can encourage OCB-I. In general, we find support for our hypothesis that the application of small changes in environments may influence behaviors without applying forceful rules or limiting options.

In addition, we expect that choice architecture will receive great research intention because of following reasons. Firstly, choice architecture can be explored to assist people achieving their desirable goals. For instance, indirect message and presentation order in the first study indicate the usefulness in directing people towards healthier food choices. Choice architecture, in this case, would probably remind healthy lifestyles goals that individuals have set, but might fail to accomplish due to either stressful work, lack of will power, or inattentiveness. It could therefore be said to close the gap between plan and action by applying rules of heuristics and biases in designing choice contexts. Secondly, as people have a tendency to prefer short term and intermediate benefits over long-term goals (Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000); choice architecture can guide them towards better long-term ends. For instance, while people have a tendency to choose tasty dish such as meat in comparison to fish (Mangen & Burrell, 2001), in the long run this food selection do not benefit their health as much as fish dishes. Thus by using the choice architecture, users will be able to reflect on their choices (indirect message) and react in a way more beneficial to them and an organization. Another example could be that while people might think helping other colleagues is a waste of their time and be

reluctant to engage in OCB, the decision not to help could, in the future term, lead to many negative consequences such as inducing guilt of inaction, ineffective team collaboration and so on (Penner, Dovidio, Piliavin, & Schroeder, 2005). In this setting, choice architecture can improve the employee intention that benefit their work and organization performance.

### **5.1 Implication**

Obesity and other food nutrition problems not only cost money but also limit our quality of life (Finkelstein, Trogdon, Cohen, & Dietz, 2009). As we spend most time at work and conference avenue, the healthy eating behaviors there could be essential for attaining good health. Within the organization context, introducing healthy food without limiting choices would be a great tool to increase employees well-beings and consequently positively increase productivity (Jensen, 2011). For that reason, organization is now increasing its' interest and serious investment in health interventions at worksite. However, these interventions mostly just attend to the cognitive side of human decision-making process. While the cost for these interventions are significant and obvious, their effects on employee's healthy behaviors are either non-significant or limited (Jensen, 2011). Thus, our findings from this study may lend the support for health promotions at work, exploring the use of the rule of automatic thinking and heuristics.

In addition, finding only partially supports our hypothesis that indirect message can work as a choice architecture to increase OCB-I. This is nevertheless a simple approach, that can be easily applied and may have a positive impact on behavior. Furthermore, we suggest the awareness of that indirect message may not work on OCB-O intention and even possibly produce a negative effect. This may imply that for OCB-O, the direct message or other direct intervention may work better on the notion of clarification and clear. Future research is necessary to evidence the effect of the simple choice architecture on our behaviors and habit changings.

In sum, findings from our two studies indicate that peoples' biases and context dependencies in decision-making processes are not only sources of problems but also the sources of solutions. Choice architecture, therefore, appears

to be a low cost non-intrusive tool to guide individuals towards better decisions in organizational settings

## 5.2 Limitation

In the first study, the strength is the large sample with randomized control design in the natural context. The buffet setting where individual is presented with many food choices and they do not to pay for the cost is a good reflector of the canteen context in organizations. Order of interventions at the different hotels in one time is different. For instance, it can be controlled condition in one hotel while another has presentation order. This prevented sequencing effects of the choice architecture interventions.

A weakness can be the different meat and fish dishes in distinct research spots throughout the research period. Some dishes might have participants' stronger preference and thus hardly be influenced by choice architecture. The high quantity of guests at lunch peak time in some locations. Thus, it can be difficult to report all individual selections correctly. Furthermore, presence of reporters can indirectly disturb guests' usual decisions. However, we do not expect the factors to affect the whole population systematically.

Another weakness can be the Scandinavian context where concern about healthy food choice is of high interest (Grunert et al., 2001) might affect guests' food choice, thus limit the generalization of the study to other contexts. Furthermore, as the sample consists of business guests from different sectors/industries, it is possible that groups have difference preference over meat and fish.

In the second study, the strength is the randomized assignment of different conditions to participants. It also outperforms the experiment context in study 1 where the correctness of data can be influence by observers' accuracy and presence as the survey data is concrete.

A potential weakness of the study is the small sample that leads to its significance level low and makes it hard to generalize to other different contexts. Business students sample might also have different perceptions on OCB engagement compared to employees in organizations across various sectors/industries. The Scandinavian context can also affect OCB behaviors.

The survey gives participants situational scenarios. The wording used in the survey OCB-O (whether OCB-O is presented positively or the situation given

is too general) potentially confused participants (business students) who had no prior experience with organizational changes. In addition, some questions ask OCB behaviors in present tense instead of asking OCB intention in future tense might create confusion for participants. Therefore, participants' decisions might not accurately reflect actual decision in real life context. Consequently, our results can be flawed and biased.

Participants when answering the survey can be influenced by other external factors. For instance, if they sit in groups and can discuss the survey altogether or they are disturbed by noises. Furthermore, as the survey is implemented on a voluntary basis, participants might lack motivation and concentration when filling out the survey.

### **5.3 Future research**

We suggest that future research can further explore the power of presentation order on healthy choices. For instance, in the buffet contexts that also serve other healthy options such as vegetables, if we put the vegetables in front of the serving line, should the *primacy* effect of vegetables can trigger the choices on fish through combination effect or, instead, increase the selections of meat by *licensing* effect (Khan & Dhar, 2006). Such findings could be interesting for researchers to understand how the interactions among the position of different and similar choices may lead people to different path of their decision. In addition, there should be other factors that may moderate the effect of presentation order due to some demographic characteristics. For example, future studies may collect information about education level, genders, specific diet programs (vegetarians, low-carb dieters) that guests are joining. The control on these factors, may reveal the more complete picture of how choice architecture via presentation order can benefit healthy choices.

From our self-identified limitation on the second study, we suggest that future studies should be aware of the negative effect of indirect message on OCBO. Also, even there could be a limited effect of indirect message on OCB-I, we still recommend the future studies to collect the information on how people perceive the message, to analyze which extent the indirect message can catch their attention, and to examine the potential mediating effect of other factors such as leader-membership exchange (LMX)(Wang, Law, Hackett, Wang, & Chen,

2005) and perceived organization support (POS)(Moorman, Blakely, & Niehoff, 1998). Besides, there could be a potential that indirect message can work to benefit organization communication; especially via means of modern technology such as email. Particularly, since the indirect message such as emoticons may imply the salient effect on choices, these icons may be used for email classifications or remarks that help employees manage their mail-box and avoid getting lost in a large volume of daily communication.

Finally, we recommend that researchers can set up the choice architecture in which multiple changes are made, and compare its effect with that of a choice architecture including only single change. For example, if we put the priming option in front of the sequence of choices and put on an indirect message, whether or not it impacts stronger on participant's choices compared to when the option is either put in front or attached with an indirect message. Furthermore, the research may want to conduct the after intervention interviews with participants in order to get insight on heuristics and biases rules and reaffirm the unconscious features of choice architecture.

## **6. Conclusion**

Choice architecture through altering the choice context can guide individuals towards desirable options without using directive communication or forceful rules. As it is often a cost-effect intervention, choice architecture had received much research interest in different areas such as marketing and public management. However, its application in organizational setting has not been explored thoroughly yet. From that point, the main purpose of our two studies is to examine whether choice architecture such as presentation order and indirect message can be applicable in an organizational context. We found the effect of choice architecture on individual healthy food choice at work and a limited effect of these intervention on OCB-I. The insignificant findings on OCB-O also provide some valuable learning points that we can apply in the future study. In conclusion, we believe that choice architecture has much potential for interested researchers, policy makers, and organization managers to explore and apply in the organization context.

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## Appendices

### Appendix 1: Study 2 (Indirect message – OCB-I intention)



**Consent Statement for a survey of questionnaire**

Dear,

Thank you very much for agreeing to participate in this survey.

The information submitted by you in this survey will be used for master thesis research purposes. It will not be used in a manner which would allow identification of your individual responses.

This anonymous data will be discarded properly 6 months after our thesis submission.

If you have any further concerns please contact us at the below mentioned email.

Thank you!

Yours,

Msc. Candidate 1: Huy Quoc Tran – contact email:

[Huy.Q.Tran1@student.bi.no](mailto:Huy.Q.Tran1@student.bi.no)

BI Norwegian Business School

Leadership and Organizational Psychology

Msc. Candidate 2: Giang Huong Nguyen - contact email:

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BI Norwegian Business School

Leadership and Organizational Psychology

### Introduction

Thank you for taking part in our survey about organizational development program. You will be asked to read through the hypothesized situation and then decide how willing you are to respond on each particular activity.

### Scenario

Imagine that your current company is calling for participation in a mentor program to support new employees. This is a volunteer-base program which relies on the willingness of staff to participate. The participation requires some extra time from a mentor to support mentees on activities such as: orientation introduction, work procedures, experience sharing and contact points for work related issues.

Now, please answer the following questions.

No.	Question	Strongly disagree			Neither			Strongly agree
		1	2	3	4	5	6	7
1	I would like to participate in the mentor program.							
2	I give time to help colleagues with task related problems such as procedure explanation, professional advice on the task.							
3	I help new colleagues who have heavy workloads.							

What is your gender?

- Male  
 Female

What is your age group?

- 18 – 24  
 25 – 29  
 Over 29

Are you in ...

- Bachelor program  
 Master program  
 Other

Are you ...

- Norwegian student  
 International student

Are you currently employed?

- Yes. Please specify your position/ industry ...  
 No

If no, have you been employed before?

- Yes. Please specify your position/ industry ...  
 No

How do you feel at the moment? Please tick the most suitable option for the following items

	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
Attentive					
Angry					
Nervous					
Relaxed					

**Appendix 2: Study 2 (Control condition- OCB-I intention)**  
**Consent Statement for a survey of questionnaire**

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2	I give time to help colleagues with task related problems such as procedure explanation, professional advice on the task.							
3	I help new colleagues who have heavy workloads.							

What is your gender?

- Male  
 Female

What is your age group?

- 18 – 24  
 25 – 29  
 Over 29

Are you in ...

- Bachelor program  
 Master program  
 Other

Are you ...

- Norwegian student  
 International student

Are you currently employed?

- Yes. Please specify your position/ industry ...  
 No

If no, have you been employed before?

- Yes. Please specify your position/ industry ...  
 No

How do you feel at the moment? Please tick the most suitable option for the following items

	<b>Very slightly or not at all</b>	<b>A little</b>	<b>Moderately</b>	<b>Quite a bit</b>	<b>Extremely</b>
<b>Attentive</b>					
<b>Angry</b>					
<b>Nervous</b>					
<b>Relaxed</b>					

**Appendix 3: Study 2 (Indirect message – OCB-O intention)**



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Dear,

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Imagine that your company is going through organization restructuring to improve company performance. All staff are encouraged to actively participate in the change process. The organization change includes re-assessment of the job designs, tasks, and staff movement. For example, the employees can be assigned to the new roles, rotate to other department or have new supervisor.

Now, please answer the following questions

No	Question	Strongly disagree			Neither			Strongly agree
		1	2	3	4	5	6	7
1	I am willing to follow organizational change							
2	I am willing to cooperate with new supervisor							
3	I actively engage in the new job assignment							

What is your gender?

- Male  
 Female

What is your age group?

- 18 – 24  
 25 – 29  
 Over 29

Are you in ...

- Bachelor program  
 Master program  
 Other

Are you ...

- Norwegian student  
 International student

Are you currently employed?

- Yes. Please specify your position/ industry ...  
 No

If no, have you been employed before?

- Yes. Please specify your position/ industry ...  
 No

How do you feel at the moment? Please tick the most suitable option for the following items

	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
Attentive					
Angry					
Nervous					
Relaxed					

**Appendix 4: Study 2 (Control condition - OCB-O intention)**  
**Consent Statement for a survey of questionnaire**

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- 18 – 24  
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If no, have you been employed before?

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How do you feel at the moment? Please tick the most suitable option for the following items

	<b>Very slightly or not at all</b>	<b>A little</b>	<b>Moderately</b>	<b>Quite a bit</b>	<b>Extremely</b>
<b>Attentive</b>					
<b>Angry</b>					
<b>Nervous</b>					
<b>Relaxed</b>					

**Appendix 5: Organ's OCB scale (1988)**

The scale is a seven-point scale from one to seven (1- strongly disagree to 7- strongly agree)

1. Conscientiously follows organizational rules better
2. Help others to perform their jobs
3. Trains or helps in other employees.
4. Takes a personal interest of the moment.
5. Acts impulsively, on the spur
6. Has ups and downs in mood.
7. Critically finds fault with other employees
8. Makes sure that things are neat, clean, and orderly
9. Tries to look busy doing nothing.
10. Resists influence from others, including the boss.
11. Acts cheerfully
12. Expresses resentment at being given orders.
13. Loses touch with things going on around him/her.
14. Cooperates well with those around him/her.
15. Exhibits punctuality in arriving at work on time in the morning and after breaks
16. Takes undeserved work breaks
17. Complains about insignificant things at work.
18. Seeks others' help when he/she needs it.
19. Makes positive statements about his/her immediate superior
20. Makes constructive statements about the department.
21. Purposefully interferes with someone else doing their job
22. Exhibits dependability in carrying out his/her responsibilities.
23. Has people go to him/her for assistance.
24. Goes out of his/her way to protect other employees.
25. Goes out of his/her way to protect organizational property.
26. Exhibits annoyance with others.
27. Exhibits poor quality work.
28. Starts arguments with other employees.
29. Talks about wanting to quit his/her job.
30. Wastes material or harms organizational property.

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## **Preliminary Thesis Report**

# **Conceptual and empirical differences in how nudging can influence choice and decision making.**

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## **Abstract**

Research shows that people do not always make decisions rationally but relies on intuitive judgement and associative memories (Morewedge and Kahneman, 2010). Intuitive judgement can bring both positive and negative outcomes. If it is flawed, biases and heuristics emerge and decision quality is dampened. (Kahneman and Klein, 2009). As decision making depends on context, a change in context can increase decision quality. Choice architecture, and specifically nudging, is believed to alter human's behaviors by redesigning the decision context without giving people straight directions and is considered a tool to improve individual and organizational decision making. As key mechanisms of how nudging impact people' choices are similar across situations, through a study of food choice, we propose that context such as serial positioning and non-descriptive message can alter people selection in organizational settings. Furthermore, understanding the mechanisms will help us understand how theories work in real life situations and practical implication for organizations.

These hypotheses was operationalized through observations at Nordic Choice hotels in Oslo and Stockholm. Two conditions were implemented. In the first condition, serial positioning (food order) was introduced. In the second condition, non-descriptive message (food signage) was introduced. All two conditions are then compared to the controlled environment.

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## 1. Introduction

Human has limited perceptual capacity so their decisions are based on bounded rationality. (Ballester, 2012) Individual face incomplete information and ambiguity in their decision making process (Satchell, 2013). At the same time, increased globalization and organizational change has placed excessive demands on individuals. In particular, competitive environment force people to make quick decisions in uncertainty. (Ordóñez and Benson III, 2003) This leads to higher tendency in using intuitive judgement and heuristics in decision making process. Evidence of heuristic utility presents in many industries such as shipbuilding, finance and investment. (Opolski et al., 2011; Loock et al., 2015) Heuristics results in many cognitive biases and traps such as anchoring and availability and representativeness (Tversky & Kahneman, 1973). It can lead to negative consequences for individual and organization. (Loock et al., 2015) Due to these outcomes, it is important for organizations to understand key mechanisms in heuristics and intuitive decision making and find ways to improve decision quality.

Choice architecture (Thaler, 2008), which states that human choices depend on the environment or context. Decision making depends greatly on the context and organization through policies, rules and regulations as well as practice can shape the context, which in turn influence decision making process. In addition to that, freedom of choice is basic human rights and forced choice can lead to negative consequences such as employee opposition or dissatisfaction. As a result, organizations have to be deliberate in drafting strategies and plans to achieve both desirable outcomes and at the same time respect employees' independent decisions. Altering or redesigning the context therefore is considered an effective solution to improve decision quality. Within choice architecture literature, nudging - which is an option to alter individual behavior without giving them explicit direction (Leonard, 2008) is given increasing attention. Our research question therefore is: Can nudging applicable in organizational setting? Based on the key mechanisms of how nudging work across situations, we propose that it also has applications in organizations.

Nudging can be under many forms such as serial positioning, message and bundling and so on (Johnson et al., 2012). In this thesis, we focus on the nudging serial positioning and non-descriptive message that can impact on personal decision. It is known that people tend to choose the default option among other options (Azar, 2014). However, there is an objection that default may not be the optimal option for some individual. Therefore, another choice design such as serial positioning that can overcome the drawback of default option should be investigated. In addition, non-descriptive message where targeted person is not given direct advice or guidance of what he or she should act has not been explored yet. Thus, the second part of our research question is: Can serial positioning and non-descriptive message achieve desirable decision choices?

Through our research, we aim to significantly contribute to the field of choice architecture, especially nudging. There are many research and studies concerning about choice architecture and nudging but most of them do not or only slightly mention their application in organizational setting. (Sunstein and Thaler, 2008) Firstly, our research aims to support the existing literature that choice architecture and nudging in particular can alter people's behavior towards better quality decision making. Secondly, we extend the context under which nudging is utilized towards organizational setting by arguing that key mechanisms of how it works will be similar across situations. Thirdly, as different kinds of nudges have not been fully investigated, we focus our research towards serial positioning and non-descriptive message. In practice, our research suggest nudging can be a useful tool for managers and leaders in organizations. It also explains why serial positioning can overcome some of default's drawback and non-descriptive message can also be a good alternative to direct message in nudge.

## 2. Theory

### 2.1. Decision making

People choices based on their evaluative comparisons among different alternatives. Human beings are neither completely rational as believed by extreme economists nor absolutely emotional as thought by some psychologists.

Kahneman proposes the concept of two systems of thinking- system 1 and system 2- to explain how people make decisions in the availability of limited information or bounded rationality (Kahneman, 2003, 2011; Kahneman & Klein, 2009). While system one or so-called “automatic system” reflects our intuitive thinking and often associated with gut feelings, system two or Reflective system is more self-conscious and more effortful. In most situations, we rarely rely solely on either system one or system two to make decision but we normally employ two thinking systems; these two system interact with each other during our decision making process.

The study of system one has two dominant opposing perspectives which are the fast-and-frugal perspective and the heuristics and biases ones. Both perspectives have foundations in Simon’s Administrative Behavior (1997), March and Simon’s Bounded Rationality (1958) and Cyert and March’s Behavioral Theory (1963).

The fast-and-frugal paradigm presents a positive view of system one. This paradigm is based on the work of Gerd Gigerenzer. It is known that there is no best way to organize or carry decision making as the environment is unpredictable and volatile. Individual has to continuously respond and adapt to environmental changes (Lawrence & Lorsch’s Contingency Model, 1967, cited in Scott, 2014). However, it is argued that human behavior are the combinations of environment task and individual capacities. (Simon, 1990). The concept “ecological rationality” is a human capability to “exploit the structure of the information in natural environments” (Goldstein & Gigerenzer, 2002). This core concept for adaptive human behavior interdisciplinary (Gigerenzer, Hertwig, & Pachur, 2011) suggests heuristics can be strategically rational in certain settings when individual abilities and environmental task are contingent. (Goldstein and Gigerenzer, 2002).

Accordingly, a decision based on heuristics can violate a rational paradigm but still reaches wanted targets and goals. (Christopher, 2015) Heuristics are effective cognitive mechanism that exploit environmental specifics. (Gigerenzer & Brighton, 2009) As a result, human using heuristics can successfully capture kinds of information to search for in a particular situation, when to stop searching for information and optimal decision to choose from the information obtained. (Czerlinski, Gigerenzer, & Goldstein, 1999).

Fast-and-frugal perspective is significantly different from Naturalistic Decision Making proposed from Klein et al. (1993). It acknowledges the accuracy of heuristics in evaluating environmental cues by experts. (Loock et al., 2015) Originating from studies of chess players (Chase & Simon, 1973), it demystifies intuition used by experts by identifying cues utilized to make decisions and recognizes patterns stored in memory-associative memory. (Kahneman & Klein, 2009).

On the contrary, the heuristics and biases perspectives propose bounded rationality and biases in decision-making. People face cognitive limits in their decision making. According to Simon and March (1958), it is impossible for the behavior of a single, isolated individual to reach any high degree of rationality because the number of alternatives to explore is relatively big and the individuals' capacity to search is limited. Principles of rational thinking is violated and decision making process does not follow rational procedures (March, 1994). Hence human are subject to bounded rationality and search for solutions that "satisfice". Heuristics emerge from the limitation of information availability and individual's ability to process information. Cognitive traps or biases are tools to simplify decision making procedure through selective perception. In the scope of our research, we focus on anchoring trap and primacy effect.

Anchoring is a subtle and unconscious distortion in perceptual thinking and it proposes that human tend to use a referent point when making decision (Kahneman, 1992; Mellers, 1998). Examples of anchoring can be in investment area where investors take the day their stocks have the highest earning as the anchor to compare (Peterson et al., 2010). When considering an option,

individuals tend to give an accountable weight to anchor, which can be the first cue they receive, initial given information or data (Hammond et al., 1998). Anchors can take many forms from past event or trend to seemingly insignificant phenomenon or event such as a colleague's comment or a newspapers' headline.

Similar to anchoring bias is primacy effect which states the primary information human encounters in a sequence will be presented much stronger in their mind when making decision (Ward, 1987; Suprenant, 2001). Examples of primacy effect can be found in many field and domain. For instance, Mollett and Harrison experiments (2007) find out that people attach either positive or negative tone for the same list of adjectives based on the first adjective in the sequence.

## 2.2. *Choice architecture and hypotheses*

Thaler and Sunstein (2008) developed the concept of *choice architecture* to reflect how the choice presentation can influence decision makers. There are many ways that choices be designed to direct people towards the preferable option of choice architects – *paternalism* while still give the decision makers freedom to choose – *libertarianism* (R. Thaler & Sunstein, 2008). Libertarian paternalism is the concept that allows choice designers to help people make better decisions but not to eliminate their freedom to choose.

In the organizational context, the choice designers might ask themselves a question that how organizations can help their employees to make more rational choices. There could be two possible approaches. First, we may investigate the causes of heuristic reasoning and from the finding, we find ways to influence how people proceed information and make their decisions. Second, we can modify the heuristics-inducing environment. The second approach provide the opportunities to use the bias effect of human judgment heuristics to influence their choices.

### 2.2.1. *Choice serial positioning*

One example of choice architecture could be a set of default options that create the decision inertia and benefit the first available option. As the fact that we are unconsciously influenced in our decision making process, default options could play a role as hidden persuaders and manipulate our choices (Smith, Goldstein, & Johnson, 2009). In the field of decision making process, the setting

of default reveals powerful opportunities for researchers or policy makers who want to understand and apply its strong effects on behaviors and subsequent decisions (Johnson et al., 2012). Default can be seen under the view of opt-in and opt-out system. In case of opt-in, the decision makers are initially not taking the option and must actively decide to choose it or not. In the opt-out system, choice of people has been set and it can only be changed if they take active steps to opt-out. In practice, organization can employ default option to make significant impact on behaviors (Smith, Goldstein, & Johnson, 2013). For instance, research in investment plans shows that few people opt out of the saving plan scheme after the automatic enrollment due to the powerful effect of procrastination and inertia (R. H. Thaler & Benartzi, 2004). Another successful example of default option is organ donation, a study has documented people passively accept the default that they are organ donors unless they register not to be, regardless countries and nations (Johnson & Goldstein, 2003). Across the literature review, previous research mostly focused on the capability of default as a nudge to facilitate options (Johnson et al., 2012).

However, there are still ill-application and bad outcomes for default. Default option can be optimal for the general group but not for some specific individuals. For instance, consuming nuts or some particular healthy food is beneficial for many people but it can cause illnesses for others who have allergic problem with these types of food. Thus, the default option can be suboptimal for individual having different needs and preferences. Another choice architecture that can address the negative side of default option while still prompt people towards the suggestive choice is a serial positioning. The desirable choice will not be set as default but merely presented first among available options. Decision makers are still free to decide and select their option whatever the position of the options is. Memorability and mechanism of how primacy effect works on human behavior play a role in order effects on choice (Mantonakis, Rodero, Lesschaeve, & Hastie, 2009). Research by sensory scientists reports a primacy bias in hedonic assessment of food: The first food item in a sample is experienced most strongly, so it is likely to be the most memorable and preferred (MacFie, Bratchell,

GREENHOFF, & Vallis, 1989). In our study, we examine how sequential order of option can work as a nudge and to what extent it can influence people choice behaviors. Our study also analyzes the negative effect of this choice architect on the non-priming options -other options that are not placed first in a sequence. As mention we hypothesize the following:

*H1a: When the priming option is presented first, more decision makers choose this option than when it is presented later.*

*H1b: When the priming option is presented first, fewer decision makers choose the non-priming option.*

### 2.2.2. Non-descriptive message

Another way to design choice architecture is to apply choice message or labelling (Johnson et al., 2012). Previous research have examined the effectiveness of direct descriptive choice message on real context such as product marketing, food labelling and alcohol addiction preventing program (Barnard & Ehrenberg, 1997; Lobstein & Davies, 2009; Stainback & Rogers, 1983; Wu, Hoven, Tiet, Kovalenko, & Wicks, 2002). Even though direct message can be effective in some situations, there are still negative sides of this message which should be concerned about. Specifically, the direct message could lead to “psychological reactance” among decision makers as a result of provoking the threatening on decision makers’ freedom (Cialdini, 2001). The psychological reactance happens when people get the feeling that they are not free to do what they wish, and therefore, they will do the opposite action to react (Brehm, 1966). For instance, in a study about alcohol addiction preventing program, people were likely to drink more alcohol when they confronted high threat message(Gilbert, 1998). Another example of the psychological reactance is when food is labelled “healthy”, people have been shown to rate it as less tasty and report enjoying it less (Raghunathan, Naylor, & Hoyer, 2006). As argued, the explicit message could lead to an increasing resistance (Ehret, LaBrie, Santerre, & Sherman, 2015),a choice message that try to force people to process all of the contained information and follow a particular option could be counter-productive.

Therefore, the direct choice message is not always effective and there is a need to investigate a more viable approach to influence people's choice.

The other choice architecture design could be non-descriptive message. Specifically, the non-descriptive signage bearing no explicit or forcing message such as "Smart Choice" can counter-balance the reactance bias effect. The non-descriptive message can be used as a mean to draw decision makers' attention and consequently give decision makers a chance to consider the option the message attached to. Furthermore, many research have examined the effectiveness of descriptive message on choice but what still remains unknown is how a non-descriptive message or non-specific signage can influence the decision making process, or have an impact on the option it aims to promote and other options.

Non-descriptive message do not block people from choosing either option or all the options but it can lead either to *option-related halo effect* or *dichotomous thinking*. For example, research in food choice shows that the presence of a healthy option on a menu can lead individuals to believe that by choosing this option, they have successfully eaten healthily. In other saying, they have fulfilled their utilitarian goal, which is referred to as a "halo effect" (Wilcox, Vallen, Block, & Fitzsimons, 2009) and so allow themselves to indulge in other unhealthy food. On the other hand, the dichotomous thinking means that pursuing one option will rule out the other choices (Alberts, Thewissen, & Raes, 2012). Since we argue that the non-descriptive signage do not explicitly mention about the other choices, we expect to see the halo effect rather than dichotomous thinking effect. In particular, when the nudge is presented, the number of selection for both target and non-target options will be increased. Therefore, we hypothesize the following:

H2a: *When the non-descriptive message is presented, more decision makers will choose the option it attached to.*

H2b: *When the non-descriptive message is presented, more decision makers will also choose non-attached options.*

### **3. Method**

#### *3.1. Research sample*

The data was received from field studies by GreeNudge and Cornell University Food and Brand lab and included the food preferences and consumption of hotel guests at Nordic Choice Hotels. We also thank Professor Brian Wansink and Knut Ivar Karevold for allowing us to use the data and to take references to their under review papers (Karevold et al., 2016).

Participants are business guests from a wide range of industries who attended business meetings and conferences at major hotels in Oslo and Stockholm (all hotels are near the city center or major airports) during three month period. As participants are businessmen and they have freedom of choice among many food alternatives in a lunch buffet, it is similar to organizational settings where employees are presented with different options with which they are free to choose from. Therefore, key mechanism of how nudge effect participants' behavior is similar to its effect in organizations.

#### *3.2. Research Design*

The purpose of the study is to examine how nudging would influence participants' choices so three conditions were designed. To avoid the negative effects of paternalism (Thaler & Sunstein, 2003), we do not eliminate the available options but apply a minor change in options' presentations. In all three conditions, participants are free to choose what food options that they prefer- they can choose either options or all options, and there is no advance specific instructions.

In the control condition 1, meat option was placed first and then fish in buffet design. It represents the normal setting where no nudge is used to alter people's behavior.

In the condition 2, researchers would make a change in food order (serial positioning) and compare it with the control condition. In detail, fish option (desirable choice) was placed first instead of meat option and caught participants' attention first.

In the condition 3, a non-descriptive signage “EatSmart” was set up to see how people respond and react to that sign. The signage was put next to fish option.

The conditions were assigned randomly among the locations. At a single time point, two locations can have the same or different conditions to avoid the effects of seasonal variation on participants’ preferences and external events.

Food options were different among locations and within a location during the research period. Meat can be pork, beef or chicken and fish can be red or white fish. No systematic difference were found in terms of number of selected options relative to different kinds of meat or fish options were presented.

### *3.3. Research procedures*

Observations were carried out during weekdays from Monday to Friday and not on weekends when participants’ mixture can be families or tourists going on holidays instead of targeted business participants.

Observers are master-level students who were given training, practice and feedback on their observations’ accuracy. During the intervention period, the inter-rater reliabilities (IRR) were calculated, and these ranged between 0.8-0.9 (Karevold et al., 2016). As inter-rater reliabilities are “the extent to which two or more independent reviews of the same scientific document agree” (Cicchetti, 1991), high IRR indicate high-consensus and consistency in data quality.

### *3.4. Measures*

The dependent variable of our study was the number of participants who selected the fish option and meat option. The number of participants who selected food option was recorded consistently; for any participant who chooses the option, it is counted as one. For instance, if one participant chooses both the meat and fish dish, it is counted as one selection for meat and one for fish. If a participant goes for an additional round of serving, it is also recorded. The observation unit was the total number of participants’ selections who served themselves the two food options. To compare the change in participants’ food choice in the presence of nudge with the controlled condition where no nudge exists, total number of selections is then converted to percentage point.

The independent variable is condition setting and we code the control condition and intervention condition as 0 and 1 respectively.

From current literature, there are recognized impact of gender factor on food choice. For instance, females has a tendency to select and eat healthier food and less fat-rich calories food than male subjects (Wardle et al., 2004). We, therefore, set genders as our control variable to examine the difference between men and women in their choice behaviors.

### *3.5. Data analysis*

Data analysis was conducted by SPSS software. We chose one-way analysis of variance (ANOVA) to calculate Mean, SD, Chi-squared and F-test value compared between conditions since it has a power to examine the relationship between categories explaining factors and quantitative responding factors. ANOVA can provide the statistical test to check the equality of means of different groups and generalized the F-test value (Brown & Rothery, 1993; Davis & Sampson, 1986). It is also considered less conservative or less type 1 error and is therefore suited to a wider range of social practical problems (Hair, 2010).

**4. Tentative plan for completion of the thesis**

Action Plan	When
Data processing	January 18 – February 15
Data analysis	February 16 – March 15
Writing results and discussion	March 16 – April 15
Writing conclusion and finalizing first draft	April 15 – May 1
First draft of thesis sent to supervisor	May 1 – May 15
Further editing and finalizing	May 16 – August 1
Hand in	August 15

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