

Formal Education as the Predictor of the Quality of Consumer Decisions Made Under Pressure. The Mediating Role of the Need for Cognitive Closure

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Abstract

It was hypothesized that training received during formal education fosters the mental mindset of the need to avoid cognitive closure and leads to more efficient information search characteristics. Despite time pressure, consumers collect more unique information, postpone freezing phase, and arrive at better decisions. The assumptions were mostly confirmed, which gives partial evidence to the idea that formal education teaches open-mindedness and increases the adaptation of consumers to the environment rich in the need to engage in complex decisions. The research holds implications for Public Relations and Corporate Social Responsibility strategists.

Keywords

education, open-mindedness, need for cognitive closure, information search, consumer decisions, CSR

All educators in formal education settings, from kindergarten teachers to university lecturers, are rarely motivated by financial incentives. Many of us who educate professionally believe formal education contributes to a greater social good (McMahon, 2009). For example, Hare considers education oriented at developing open-mindedness as an ideal outcome of education (Hare, 1979) despite criticism that it leads only to unnecessary skepticism (Hare, 1985). Taylor (2016) also sees open-mindedness as

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a virtue contributing to epistemic goods: truth, knowledge, and understanding, and defines it as one of the fundamental aims of education. Not only do we want to equip our tutees in specific skills that will help them land their dream jobs, but we also strive to instill a mindset of openness and love for knowledge, hoping it translates into happier, more-fulfilling lives. A question of pivotal nature is, however, whether these characteristics are adaptive. Do they make lives easier or difficult? Ideally, the knowledge and skills learnt through the process of formal education would transcend school settings and lead to better judgments and decisions in everyday life. One such domain, where making good decisions seems particularly important and occurs every day, is consumer choice.

In academia, numerous studies have addressed the possibility of consumer decisions being affected by changing source characteristics (Karmarkar & Tomala, 2010), message quality (K. Z. K. Zhang et al., 2014), and quantity (D. H. Park et al., 2014), channel of communication (Maity & Dass, 2014), or context characteristics (Trueblood et al., 2013). However, the factors influencing the objective quality of consumer decisions have remained an uncharted territory. This ostensible neglect may be partly driven by the interests of the marketing industry. Marketers have focused their attention on influencing the decision-making process of consumers toward buying their products, rather than toward an objectively better choice. The research community is also partly at fault. First, research methodologies involve a trade-off between low ecological validity of experiments simulating consumer decision-making processes that allow objective measurement of the quality of choice alternatives, and a limited insight into factors affecting real-life decisions. Secondly, laboratory experiments rarely involve participants from diverse ages, occupational, and educational backgrounds and typically rely on data obtained from younger and better-educated consumers, students. Despite these considerations, the ability to make good consumer decisions presents itself as an important adaptive skill.

Although research on the objective quality of consumer decision is scarce, it has been linked to sustainable consumer behavior, for example, by suggesting a link between the effectiveness of health-related policies and autonomy of choice (Moller et al., 2006). But does formal education equip consumers with the ability to make better judgments in purchase situations? And does the intimated open-mindedness play any role in shaping this ability?

This paper is an attempt to answer these two questions using a psychological repertoire of theories and methodologies while addressing the identified gaps. The argument will be organized as follows. First, I will review theories related to epistemic motivation—the motive(s) that seem to be most closely linked to human strivings for knowledge and the processes of acquiring new information. In a section that follows, I will elaborate on the Lay Epistemic Theory, which will serve as a system framework linking epistemic motivation and cognition. A Need to (Avoid) Cognitive Closure (ANFCC) – an element of Lay Epistemic Theory (LET)—will serve as a major motivational force explaining decision-making and judgment formation. I will also provide a brief review of the studies linking Need for Cognitive Closure (NFCC) and consumer behavior. Finally, I will introduce the present study elaborating on a theoretical link between formal education and consumer judgments.

Epistemic Motives in Psychology

Motivation as a hypothetical explanatory construct describes differences in the direction and intensity of human behavior (e.g., Humphreys & Revelle, 1984), and provides a link between cognition and behavior. Taxonomies of motives and needs were proposed, for example, by McDougall (1908), Murray (1938), Maslow (1954), McClelland et al. (1953), or Deci and Ryan (1985). In most of the taxonomies of goals, there exists a category of knowledge motives, related to the need to understand reality, satisfy curiosity, or explore the surrounding environment.

In psychology, the term curiosity first appears in William James, who defined it as emotion similar to fear. The concept of epistemic motive was introduced in psychology by Berlyne (1954). He leaned toward the drive nature of curiosity and broadened its definition to include cognitive factors: complexity, novelty, and uniqueness.

One of the pioneers of modern motivation theory was Hunt (1963), who proposed an informational perspective on human motivation. According to Hunt, the source of human motivation was information processing, which involved processes of comparing incoming information with standards, understood as organizations of previously encoded information. His theory was subsequently revised and significantly enriched by Kagan (1972) who proposed that uncertainty is resolved by the wish to know—a motive similar to Berlyne's curiosity. He also introduced a distinction between a motive, defined as a "cognitive representation of a future goal state" (p. 54), and motivation understood as mental state following activation of a goal. Failure to reduce uncertainty was said to lead to embarrassment, anxiety, fear, shame, or even guilt. Also, Maslow (1943) viewed the acquisition of knowledge and the systematization of information about the surrounding environment as a means of achieving other needs, such as safety and self-actualization. He postulated the existence of a *desire to know*, equivalent to the desire to be aware of the surrounding environment and to satisfy curiosity and knowledge of facts.

Psychology owes the term need for cognition to Cohen et al. (1954). It was defined as a "need to structure relevant situations in meaningful, integrated ways" (Cohen et al., 1955, p. 291). However, it was Cacioppo and Petty (1982) who are credited with the most recent conceptualization of the need for cognition. It is defined as a stable dimension of individual differences related to the tendency to engage in and derive pleasure from cognitively taxing activities. The need for cognition is associated with a stable intrinsic motivation that reflects a focus on the cognitive process rather than its outcome (Petty et al., 2009). In terms of its influence on decision-making, the need should, therefore, firstly influence the extent of information processed (e.g., Levin et al., 2000).

The theories reviewed thus far suggest that learning about the surrounding world seems to be an important aspect of people's everyday lives. Today, the view that motivation and cognition are two independent subsystems of human psychological functioning is difficult to defend (Bargh et al., 2001). Some conceptualizations of motivation and cognition portray *motivation as cognition* as one system (Kruglanski et al., 2009). In the next section, one such integrative approach will be reviewed, and its applications to consumer decision-making process will be discussed.

Decision-Making from the Perspective of Lay Epistemic Theory

A major assumption of LET is that every human activity is guided by knowledge construction process (Kruglanski, 1989). It is established on testing hypotheses and forming beliefs supported by conclusions derived from evidence. The knowledge we construct is essential for coping with a variety of everyday tasks. From choosing which tea to buy in a hypermarket to selecting a pension fund or the house in which we would like to spend the next few decades of our lives. The layman-like character of constructing knowledge refers to its similarity to a scientific process of testing hypotheses. It involves seeking information (premises) and drawing conclusions. This process is rational insofar as all information that a person collects, remembers, and treats as subjectively related and relevant to the decision being made is taken into account when drawing a final conclusion. At a formal level, there are no differences between the process of knowledge construction by each individual and knowledge based on controlled research methods. What differs between the two processes are the various limitations of the cognitive system.

LET predictions have been examined from different angles and adopted to explain different aspects of human behavior in various social contexts: negotiating with business partners (De Dreu et al., 1999), immigrant acculturation (Kosic et al., 2004), trans-generational norm transmission (Livi et al., 2015), judgments of brand reputation (Wu et al., 2020), voting behavior (Chirumbolo & Leone, 2008), creativity of students (Mao et al., 2022), and consumer choice behavior (Kopetz et al., 2012; Vermeir et al., 2002), to name just a few.

The knowledge formation process in LET is also said to be regulated and determined by motivational forces, specifically by the NFCC. NFCC is defined as a desire for “a definite answer on some topic, any answer as opposed to confusion and ambiguity” (Kruglanski, 1989). NFCC can be classified on two dimensions: specificity versus non-specificity and closure seeking versus avoidance. The process of closure seeking (or avoidance) can also be characterized by two sequential phases: seizing and freezing. The first phase is influenced by urgency inclination, making an individual seize on information. The quicker—the bigger the magnitude of motivation toward closure. Another force—permanence tendency serves as a shield for obtained answers and freezes on the newly acquired information. The phases are separated by a hypothetical crystallization point. It is defined as the moment at which a judgment ceases to be a potentiality and becomes an objective, stable fact (Kruglanski, 1989; Kruglanski & Webster, 1996).

NFCC represents both a dimension of individual differences related to person’s motivation for processing information as well as temporarily induced motivational state. Kruglanski and Webster (1996) suggested that all situations that emphasize the benefits associated with achieving a quick closure and the costs associated with delaying this moment will lead to the arousal of the need. Thus, whenever a person is presented with the requirement to make a decision quickly (time pressure exists), the motivation to shorten the decision-making process and cognitive closure is elicited.

Need for Cognitive Closure is said to explain a number of behavioral phenomena by altering the information processing. The quantitative impact of the Need for Cognitive Closure on the process of knowledge formation is believed to manifest by generating fewer hypotheses (Mayseless & Kruglanski, 1987). People high in NFCC have also a tendency to allocate less time and cognitive resources to analyzing large portions of information, anchoring on information appearing first (e.g., Epley & Gilovich, 2006) and over-relying on the most attainable portion of knowledge (e.g., Kruglanski & Freund, 1983).

NFCC and Consumer Decisions

Decision-making can be studied from two different methodological perspectives: the structural approach (e.g., Abelson & Levi, 1985) or from the information processing perspective, which focuses on identifying cognitive processes involved in the act of making a decision (Payne et al., 1978). The latter allows making more fine-grained observations of mental forces involved in decision-making.

One of the assumptions of the classical choice theory is that for a consumer each alternative has a subjective value. According to Payne (1976), a decision-making act involves a trade-off between making the best decision (e.g., choosing the best product from the set of available alternatives) and effort based on available information. This process is not objective because consumers assign different subjective values to alternatives based on their characteristics (Simonson & Tversky, 1992). In the view advocated by Payne (e.g., Payne et al., 1993), humans are the “mechanics” of reality, who are equipped with a specialized set of tools (heuristics) that allow them to deal efficiently with the decision-making situations they encounter.

To study the process of information acquisition in detail, Payne first designed a pen-and-paper methodology and later developed a purpose-designed computer program to study human decision-making (Payne et al., 1993). Mouselab methodology involves presenting respondents with different decision tasks that require to choose one of available alternatives based on information about their characteristics (attributes). Each decision task takes a form of a matrix, where alternatives are presented horizontally and attributes are arranged vertically. Each alternative can be characterized by a set of attributes (cues) that take a different form or intensity. For example, a computer can be characterized by a size of its hard drive. This information can be expressed either by explicitly saying how many gigabytes of data it can store or by referring to its size on a scale of 1 to 5, where 1 signifies a small hard drive and 5—large. The difficulty of the decision lies in the fact that at any given time, a person can access information about one cue and one alternative. Mouselab methodology has been employed to study various aspects and types of decisions (e.g., Jasper & Shapiro, 2002; Luce, 1998; Reisen et al., 2008 and more). A separate line of investigation focuses on the role situation: context and time pressure (e.g., Dhar et al., 2000).

Situational characteristics can also alter how information is searched before making a decision. Most commonly, under time pressure, consumers are said to limit the amount of information processed and use heuristics, which ultimately lead to less

accurate decisions (Payne et al., 1988). On the other hand, the Need to Avoid Cognitive Closure has been said to counter the effects of task demands and situational limitations by changing qualitative and quantitative characteristics of the pre-decisional information search phase (see Kruglanski et al., 2009 for review). For example, adverse impact of noise, caffeine intake, or high temperature, which typically leads to shortening the decision-making time can be rectified by ANFCC (Doherty, 1998; Webster, 1993). The motivation to avoid non-specific closure has most often been induced experimentally by task instructions. By emphasizing the importance of the task, drawing attention to the possibility of making a mistake or making an unreliable judgment, greater receptivity to the incoming information and prolonged the evaluation and comparison phase were instilled (De Dreu et al., 1999; Ford & Kruglanski, 1995; Mayseless & Kruglanski, 1987).

In a related research vein, NFCC has been used to explain differences in information search strategies of consumers. As people differ in NFCC levels, so should their decisions differ with respect to their motivational capabilities. In one line of research, Amichai-Hamburger et al. (2004) showed that internet users high in NFCC (in contrast to those low in NFCC) preferred websites with fewer hyperlinks. NFCC has been also found to moderate market share size overestimation (Houghton & Kardes, 1998) and explain preference for comparative advertising involving alignable (vs. non-alignable) attributes (S. Zhang et al., 2002). In sum, NFCC leads consumers to intolerance of decisional situations characterized by ambiguity and is associated with quicker judgments, made using less information.

Mouselab methodology has also been employed to study the effects of NFCC on consumer decisions. For example, Choi et al. (2008) investigated the relationship between individual levels of NFCC and information search strategy. They employed a computer-based experimental simulation to show that people high in NFCC exhibit a preference for attribute-based search strategy and a consideration of a smaller amount of information to make decisions. In another study, Wichary and colleagues (2008) showed that people high in one of the dimensions of NFCC (decisiveness) use simple decision strategies and spend less time searching for information.

Separately, evidence exists that NFCC may lead to different subjective perceptions of decisions among consumers, for example, greater choice confidence (e.g., Andrews, 2013) and different pre-decisional search strategies may influence the quality of decisions (e.g., Chu & Spires, 2000; Coupey & Narayanan, 1996; Johnson & Payne, 1985). However, to date, the relationship between the need to avoid closure (ANFCC) and the objective quality of consumer choice has not been investigated sufficiently.

The Present Study

The NFCC, understood as the major motivational force responsible for the process of constructing judgments about social reality, has received considerable attention from the research community (Kruglanski et al., 2009). The perspective of motivation as cognition proposed by Kruglanski et al. (2002) has also enabled new insights into many problems concerning human social-cognitive functioning, including the domain of consumer decisions (Kopetz et al., 2012).

The adaptive nature of the human mind necessitates a sensitivity to the relationship between context and cognitive representations, as well as the accompanying patterns of action held by an individual (Mischel & Shoda, 2010). It is further assumed that the frequent occurrence of a goal in a similar external environment, and repeated attempts to pursue it, lead to the occurrence of lasting connections between the goal and the external environment (Bargh, 1990). The repeated occurrence of such a connection can then lead to the transfer of goal-directed action outside the domain of consciousness. Goals that are frequently pursued and take the form of habitual behaviors acquire a status of chronic availability (Bargh et al., 2001). This raises the question, whether a stable motivational mindset may be the result of the frequent co-occurrence in the environment of specific cognitive tasks and strategies (means) that lead to better decisions?

One of the most important contexts, rich in repetitive decision-making tasks, the success of which depends on the proper management of processing, is formal education. Success in achieving successive learning goals seems strongly linked to acquiring the skills to better manage epistemic motivation: to spend more time on increasingly difficult tasks, to process more information, and to compare and integrate it effectively. At the same time, it would be difficult to expect that the ability to form correct judgments based on the information collected would be limited to the learning task environment only. This line of argumentation led to formulating Hypothesis 1:

H1. Formal education leads to higher levels of epistemic motivation (Need to Avoid Cognitive Closure).

To test the next group of predictions, methodology of Payne et al. (1993) was used to develop a computerized simulation of consumer decision environment. MouseLab task is a simulation of the decision-making process. I wanted to test the prediction that consumers who are under time pressure and who pose higher and stable level of the need to avoid closure search for information consistently with the prediction of LET. My expectation was that despite the occurrence of accuracy-effort trade-off, which leads to shortening the time spent on collecting information about choice characteristics, this phase will be more effective than among consumers low in ANFCC. Findings from the studies related to the influence of ANFCC on the pre-decisional information search (see Kruglanski, 2004 for a review) have been used to formulate the next group of Hypothesis (H2):

H2. Epistemic motivation (Need to Avoid Cognitive Closure) influences information search characteristics of consumers in the situation of time pressure in the following manner.

H2a. Consumers spend less time on making a purchase decision about a product.

H2b. Consumers spend less time acquiring information about choice alternatives (products).

H2c. Consumers spend less time collecting information about each cue (attribute) characterizing a choice alternative (product).

H2d. Consumers collect more information (cues) about choice alternatives (products).

H2e. Consumers collect more unique information (cues) about choice alternatives (product).

H2f. Consumers have a shorter freezing phase.

H2g. Consumers use more compensatory style while collecting information about choice alternatives.

The next prediction has not been adequately tested in studies investigating cognitive processes involved in the pre-decisional information search. It seems that the topic of specific strategies and heuristics involved in the pre-decisional information search, as well as the adaptive nature of the process were more important for Payne and his colleagues (1993) than the objective quality of decisions. On the other hand, learning more about the qualitative outcome of a choice decision appears as societally crucial information. The above consideration led me to formulate the third hypothesis.

H3. Information search characteristics consistent with the Need to Avoid Cognitive Closure style (in line with Hypothesis H2 contents) in the situation of time pressure lead to better consumer decisions.

Ultimately, the objective quality of purchasing decisions should, therefore, depend on the motivational attitude trained during formal education. Specifically, the stages of formal education should foster the acquisition of a greater need to avoid cognitive closure. My last intuitive hypothesis is that the transfer of the non-specific motivational-cognitive orientation to avoid closure is possible and allows for better adaptation in other domains of life. One such domain is consumer decision-making. I hypothesize that the indirect impact of education, an environment that forms stable connections between cognitive tasks presented to students and the epistemic goal of avoiding closure will not only manifest itself in different pre-decisional information search behavior but also qualitatively better consumer decisions. The following hypothesis is proposed:

H4. The level of formal education indirectly positively influences the quality of consumer decisions made under time pressure by permanently induced avoidance of cognitive closure (consistently with specific hypotheses of H2).

To test the above hypotheses, first, I planned to analyze data sequentially and in the last step to conduct a series of mediations to understand the indirect nature of the proposed relationships. This approach is graphically represented in Figure 1.

Method

Design and Participants

The study was a part of a larger research project and involved recruiting 292 adult Polish beer consumers (113 women and 179 men). The participants, recruited on the streets of four biggest Polish cities, agreed to take part in the study at the request of the

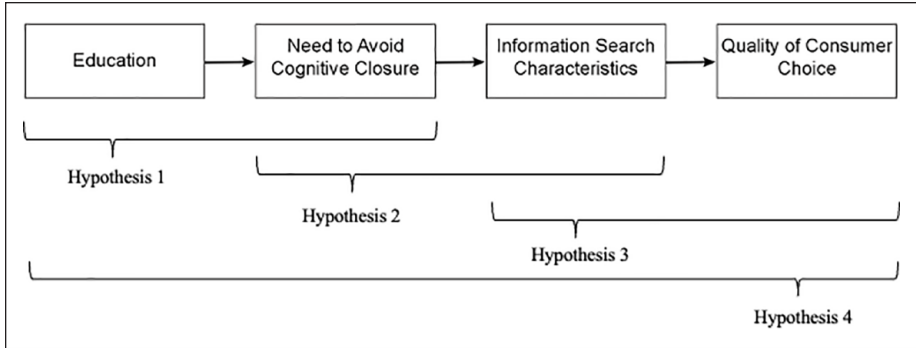


Figure 1. Proposed model of testing an indirect influence of education on the quality of consumer choice.

experimenter's helpers for a small compensation. The mean age of the participants was 38.79 ($SD=13.36$). All participants were White and Polish.

Independent Variables

The Level of Formal Education. A broad definition by Todaro (1975) was adopted, who refers to formal education as a principal institutional mechanism for developing human skills and knowledge needed to utilize passive forms of production. More practically, the Council of Europe portal (n.d.) defines formal education as the structured education system that runs from primary (and in some countries from nursery) school to university and includes specialized programs for vocational, technical, and professional training. Following this definition, ten possible outcomes of Polish formal education were identified: incomplete elementary (1), elementary (2), vocational (3), lower secondary (4), incomplete higher secondary (5), higher secondary vocational (6), higher secondary general (7), undergraduate or incomplete postgraduate (8), postgraduate (9), PhD, MBA, or higher (10). None of the participants reported belonging to the last category. Age, sex (Table 1), and occupation (Table 2) of the analyzed sample are presented below.

Need for Cognitive Closure. To measure the level of NFCC, the Polish adaptation of the Webster and Kruglanski's (1994) instrument was used (Kossowska, 2003). It consists of 32 items comprising 5 subscales. A mean score was calculated for all scale items ($M=3.89$, $OS=0.60$). To address lower reliability of the Decisiveness scale, the items of the subscale were removed from the analyses (Cronbach of the scale after removing Decisiveness, $\alpha = .82$).

Dependent Measures

Mouselab task allowed obtaining information about the following dependent measures:

Table 1. Age and Sex of Participants in the Sample.

Level of Education	Age			Sex					
	Mean	N	SD	Male		Female		Total	
				N	%	N	%	N	%
Elementary/Incomplete elementary	39.00	5	15.75	2	1.8%	3	1.7%	5	1.7%
Vocational	44.83	40	11.70	11	9.8%	29	16.1%	40	13.7%
Lower secondary	19.80	5	2.95	1	0.9%	4	2.2%	5	1.7%
Incomplete higher secondary	38.00	5	15.64	1	0.9%	4	2.2%	5	1.7%
Higher secondary (vocational)	45.46	26	11.54	7	6.3%	19	10.6%	26	8.9%
Higher secondary (general)	39.95	56	13.48	21	18.8%	35	19.4%	56	19.2%
Undergraduate or incomplete postgraduate	34.43	79	13.59	35	31.3%	44	24.4%	79	27.1%
Postgraduate	37.74	74	12.30	33	29.5%	41	22.8%	74	25.3%
Refuse to say	39.00	2	.00	1	0.9%	1	0.6%	2	0.7%
Total	38.65	292	13.39	112	100.0%	180	100.0%	292	100.0%

Decision Time. The time taken to make each decision. Ends when a participant confirms their choice.

Time Field Open. The time spent analyzing information in open windows.

Mean Opening Time. The mean time spent opening a single window.

Number of Openings. The number of windows opened when making a decision.

Number of Unique Openings. The number of unique windows opened when making a decision.

Freezing Index. The motivational features of the information acquisition process proposed by Kruglanski (2004, for review) imply that individuals with a heightened need for closure will base their judgments to a greater extent on cues that appear first and shortening the period when new information is being acquired (seizing) before the choice has been decided (freezing). In the present study, an experimental measure of Freezing Index was proposed as the time between opening the first window with a cue about the final alternative and confirming the choice of the alternative.

Search Index is the way the respondent searches the information. Based on the order in which the windows are opened, it can be determined whether the respondent acquires information by moving within a single cue, consecutively opening

Table 2. Occupation of Participants.

Level of Education	Occupation																																															
	Senior Management				Unemployed				Refuse to Say				Office Worker				Entrepreneur/ Self-Employed				Skilled Worker				General Laborer				Retail Staff				Farmer				Retired				Student				Total			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%								
Elementary/Incomplete elementary	0	0.0%	0	0.0%	0	0.0%	2	8.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	4.8%	1	2.0%	5	1.7%								
Vocational	0	0.0%	1	2.8%	3	18.8%	5	20.8%	4	7.1%	2	5.7%	15	60.0%	0	0.0%	6	28.6%	1	50.0%	3	14.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	40	13.7%				
Lower secondary	0	0.0%	0	0.0%	0	0.0%	4	16.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	2.0%	5	1.7%						
Incomplete higher secondary	0	0.0%	0	0.0%	1	6.3%	1	4.2%	0	0.0%	0	0.0%	1	4.0%	0	0.0%	1	4.8%	0	0.0%	1	4.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	5	1.7%				
Higher secondary (vocational)	0	0.0%	4	11.1%	2	12.5%	0	0.0%	6	10.7%	7	20.0%	3	12.0%	1	50.0%	1	4.8%	0	0.0%	2	9.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	9.5%	0	0.0%	26	8.9%						
Higher secondary (general)	0	0.0%	8	22.2%	6	37.5%	3	12.5%	9	16.1%	4	11.4%	5	20.0%	0	0.0%	8	38.1%	0	0.0%	5	23.8%	8	15.7%	56	19.2%																						
Undergraduate or incomplete postgraduate	0	0.0%	8	22.2%	2	12.5%	1	4.2%	12	21.4%	10	28.6%	0	0.0%	2	9.5%	1	50.0%	7	33.3%	36	70.6%	79	27.1%																								
Postgraduate	3	100.0%	13	36.1%	2	12.5%	8	33.3%	25	44.6%	12	34.3%	1	4.0%	0	0.0%	3	14.3%	0	0.0%	2	9.5%	5	9.8%	74	25.3%																						
Refuse to say	0	0.0%	2	5.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	0.7%										
Total	3	100.0%	36	100.0%	16	100.0%	24	100.0%	56	100.0%	35	100.0%	25	100.0%	2	100.0%	21	100.0%	2	100.0%	21	100.0%	51	100.0%	292	100.0%																						

cells pertaining to all alternatives. This way of searching information corresponds to a non-compensatory style of decision-making. Searching according to the principles of compensatory style means systematically acquiring information about one alternative. Search Index takes values from -1 to 1 . Negative values (from 1 to 0) correspond to the use of non-compensatory strategies. When the Search Index takes values from 0 to 1 , compensatory strategies have been used in the decision-making.

Quality of Decision. The quality of each decision is determined by summarizing the values of attributes of the alternatives and comparing them against the choice made by a participant. A numerical evaluation of the decision was produced, ranging from 1 (=worst choice alternative) to 4 (indicating the choice of the best alternative).

Procedure

The study was conducted at research locations in four biggest Polish cities on five consecutive days. Participants were informed that the study concerned an analysis of the beer consumer decision-making process and will take approximately 25 minutes. After obtaining informed consent to conduct the study, each participant was asked to answer questions about age, gender, education level, and occupation. Subsequently, participants were asked to answer the questions of the Polish version of the Need for Cognitive Closure scale and the Activation-Deactivation Adjective Check List (Thayer, 1989).¹ Next, they read information about the Mouselab computer task. The instructions included a detailed description of the procedure and information about the three trial tasks preceding the actual measurement. In this task, four alternatives are presented on a computer screen in the form of a table. In the study described here, these were four types of beer, described by successive letters of the alphabet: A, B, C, and D (see Figure 2). The task of the participant in the experiment is to choose the best drink. Information can be obtained about eight attributes characterizing each alternative. When the left mouse button is pressed, a number appears in the window and corresponds to the intensity of the attribute for that type of beer. The intensity of the characteristic can take values from 1 (very low) to 5 (very high). The right mouse button closes the window. Only one window can be opened at a time. The computer application was developed based on .NET Framework 4.0 architecture, enabling stable system operation and accurate measurement of reaction times, with accuracy to hundredths of a second. After making a choice by ticking the appropriate box, corresponding to the beer symbol, and confirming the choice, the subject proceeded to the next decision screen. In the experiment, 16 decision-making situations were presented, preceded by a practice session consisting of three trials. At the end of the procedure, participants were thanked for their participation in the experiment and presented with a small gift (a chocolate bar).

Results

To analyse the results IBM SPSS Statistics (v. 25) was used. Bootstrapping analyses were performed using PROCESS macro v. 4.1 (Hayes, 2022). PROCESS is a

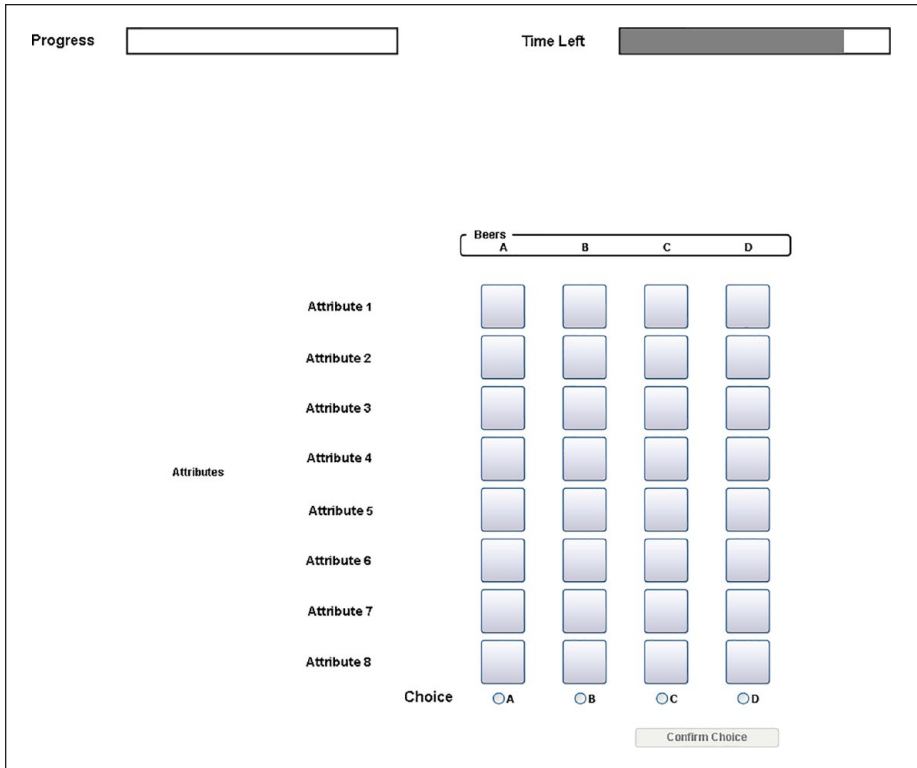


Figure 2. One of 16 decision-making situations appearing on the monitor screen in the Mouselab decision-making task.²

statistical tool that enables testing mediation mechanisms explaining causal effects of observed variables and elucidating cognitive and social processes that influence, for example, consumer behavior (Hayes et al., 2017). PROCESS macro utilizes a regression-based approach that uses ordinary least squares regression to estimate the parameters of tested equations and provides separate estimates for each of the tested paths. Additionally, Hayes and colleagues advise using PROCESS when effects of observable rather than latent variables are tested. Given the high degree of control over the characteristics of the pre-decisional search for information that is offered by Mouselab environment, using PROCESS instead of SEM analyses seemed to be a valid approach. Results are reported as per the structure proposed on page 17. First, means, standard deviations, and correlations among variables were calculated and presented in Table 3.

As predicted, the level of education was negatively associated with NFCC ($R^2 = .03$, $F[1,285] = 8.95$, $p = .003$, $t(285) = -2.99$). Higher levels of formal education led to lower levels of the Need for Cognitive Closure (H1 confirmed). Table 4 contains information about information search characteristics among different education levels.

Table 3. Means, Standard Deviations and Correlations Among Key Variables in the Study.

Variable Name	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Quality of choice	2.58	.34	1										
2. Total decision time	28.24	14.28	.118*	1									
3. Time field open	8.14	5.57	.104	.74**	1								
4. Window opening time	1.51	2.62	-.20**	.13*	.15	1							
5. Number of openings	9.93	7.25	.42**	.55**	.37**	-.33**	1						
6. Number of unique openings	11.06	8.35	.41**	.55**	.37**	-.34*	.98**	1					
7. Freezing index	2.48	4.98	-.26**	.12*	-.09	.81**	-.31**	-.32**	1				
8. Search index	.50	.49	.23**	.05	-.09	-.15**	.01	.01	-.28**	1			
9. Need for cognitive closure	3.47	.76	-.07	.12*	.13*	.20**	-.15*	-.15*	.16**	-.01	1		
10. Education level	5.97	2.06	.04	-.13*	-.11	-.17**	.16**	.15*	-.20**	.03	-.07	1	
11. Age	38.76	13.39	-.14*	.31**	.27**	.20**	-.21**	-.19**	.20**	.04	.28**	-.18**	1

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

Table 4. Levels of Formal Education and Information Search Process Characteristics of Participants in MouseLab Task.

N	Quality of Choice		Total Decision Time		Time Field Open		Window Opening Time		Number of Openings		Number of Unique Openings		Freezing Index		Need for Cognitive Closure	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
	10	2.45	.44	39.42	31.85	10.49	8.09	2.17	2.12	12.59	12.50	11.83	12.39	6.85	9.61	3.59
40	2.55	.33	31.53	16.88	9.60	6.46	2.60	3.52	7.85	6.04	7.39	5.87	4.65	6.69	3.73	.73
4	2.48	.43	14.76	5.92	4.20	1.20	1.04	1.04	8.20	5.26	7.30	4.62	2.02	3.73	3.38	.17
5	2.64	.27	35.55	21.83	11.69	6.17	2.18	2.48	11.45	9.11	10.94	9.18	2.74	3.35	3.85	1.05
26	2.54	.34	31.67	19.57	8.65	5.42	1.71	2.10	9.14	6.31	8.18	5.80	2.67	4.95	3.68	.68
56	2.60	.36	26.44	12.12	7.44	5.48	1.24	1.31	10.16	8.55	8.98	6.93	1.80	2.83	3.55	.63
78	2.65	.34	29.26	11.37	8.61	5.17	1.51	3.84	13.92	8.62	12.31	6.97	2.05	6.18	3.29	.81
73	2.54	.35	25.74	12.25	7.32	5.47	0.99	0.85	11.25	8.50	10.11	7.67	1.84	2.94	3.39	.80

Table 5. Results of Linear Regressions of Need for Cognitive Closure on Information Search Characteristics and Quality of Consumer Decisions in MouseLab Task.

Model	R ²	B	SE	β	t	p	95% CI
Intercept		2.695	.094		-28.559	.000	[2.51, 2.88]
Quality of choice	.005	-.033	.27	-.073	-1.251	.212	[-.08, .019]
Intercept		20.367	3.917		5.20	.000	[12.66, 28.08]
Total decision time	.015	2.281	1.102	.121	2.071	.039	[.11, 4.45]
Intercept		4.706	1.525		3.087	.002	[1.70, 7.71]
Time field open	.018	.995	.429	.135	2.321	.021	[.15, 1.84]
Intercept		-.950	.710		-1.338	.182	[-2.35, .45]
Window opening time	.041	.707	.200	.204	3.542	.000	[.31, 1.10]
Intercept		16.861	2.280		7.394	.000	[12.37, 21.35]
Number of openings	.022	-1.656	.641	-.150	-2.582	.010	[-2.92, -.39]
Intercept		14.962	1.979		7.562	.000	[11.07, 18.86]
Number of unique openings	.023	-1.439	.556	-.150	-2.586	.010	[-2.53, -.34]
Intercept		-1.118	1.358		-.823	.411	[-3.79, 1.56]
Freezing index	.024	1.030	.382	.156	2.695	.007	[.28, 1.78]
Intercept		.526	.135		3.908	.000	[.26, .79]
Search index	.00	-.004	0.38	-.007	-.118	.906	[-.08, .07]

Note. Independent variable: Mean score on the Need for Cognitive Closure scale. High score on the NFCC denotes low levels of epistemic motivation. Bold values denote statistical significance.

In the next step, the impact of the NFCC on information search process characteristics was tested via a series of linear regressions. The findings are presented in Table 5.

In the situation of pressure induced by the sixty seconds time limit per single decision, people low in NFCC spent less time on each decision (H2a confirmed) and less time analyzing opened windows (H2b confirmed). They also had shorter window opening times (H2c confirmed), gathered more unique information (H2e confirmed), as well as more information in total (H2d confirmed). Also, their freezing phases were shorter (H2e confirmed). Impact of NFCC on compensatory style of information acquisition (Search Index) was not identified, which led to removing this measure from subsequent analyses (H2f not confirmed). There was also no direct relationship between NFCC and the quality of consumer choice.

Next, to test the third group of hypotheses, another set of linear regressions was performed to understand whether the information search characteristics predict the quality of consumer choice (H3). The findings are presented in Table 6.

Information search characteristics did impact the quality of consumer choice; however, not all the relationships were significant. While the total time spent on analyzing information was a significant predictor of the consumer choice, the relationship was opposite to what was expected. Despite the time pressure, longer decision times were associated with better choices (H3a not confirmed). Also, the total time spent on

Table 6. Results of Linear Regressions of Information Search Characteristics on the Quality of Consumer Choice.

Model	R ²	B	SE	β	t	p	95% CI
Intercept		2.498	.044		56.449	.000	[2.410, 2.585]
Total decision time	.014	.003	.001	.118	2.026	.044	[.00, .01]
Intercept		2.525	.035		71.286	.000	[2.45, 2.59]
Time field open	.011	.006	.004	.104	1.794	.074	[-.001, .014]
Intercept		2.617	.023		115.309	.000	[2.57, 2.66]
Window opening time	0.41	-.026	.008	-.201	-3.515	.001	[-.04, -.01]
Intercept		2.386	.030		78.832	.000	[2.33, 2.45]
Number of openings	.176	.017	.002	.420	7.907	.000	[.01, .02]
Intercept		2.384	.031		76.745	.000	[2.32, 2.44]
Number of unique openings	.17	.020	.003	.412	7.725	.000	[0.1, .02]
Intercept		2.623	.022		121.098	.000	[2.58, 2.66]
Freezing index	.069	-.18	.004	-.263	-4.654	.000	[-.03, -.01]

Note. Dependent variable: Quality of consumer choice.
 Bold values denote statistical significance.

acquiring information about cues (Time Field Open) did not predict the quality of decisions (H3b not confirmed). The remaining characteristics of information search proved to be significant predictors of the choice quality. Consumer decisions were negatively impacted by average time spent on a single cue (H3c) and positively influenced by the amount of information collected (H3d), amount of unique information collected (H3e), and shorter freezing phase (H3f). To better understand the relationship between time and the quality of consumer decisions, an additional measure was developed: effectiveness of time used to make a decision. It was assumed that while time is an important characteristic of information search, this measure alone may not be a good predictor of the quality of decisions. It seemed plausible that the effectiveness of time spent may be a better indicator of an adaptive information search strategy. To compute this measure, the total number of windows opened (Number of Openings) was divided by the total time spent on acquiring information (Time Field Opened). Additional Hypotheses (H3h) were proposed:

H3h. Effective use of time positively influences the quality of consumer choice under pressure. This hypothesis was confirmed (see Table 7).

To test the main hypothesis of the study, a series of serial mediation analyses were performed using bootstrapping with 10,000 iterations (H4). Education was introduced as the independent variable, NFCC was the mediator explaining information search characteristics, and quality of choice was treated as the dependent variable.

Consistently with the previous analyses, Total Time Spent on making a decision was not explained by education and NFCC ($B = -.0003$, $Boot SE = .01$, $CL_{95} = -.001$,

Table 7. Linear Regression Model of the Effectiveness of Information Search on the Quality of Consumer Choice.

Model	R ²	B	SE	β	t	p	95% CI
Intercept		2.391	.035		69.230	.000	[2.32, 2.46]
Effectiveness of time use	.126	.121	.019	.354	6.467	.000	[.08, .016]

Note. Effectiveness of Information Search is a proportion of the number of windows opened to the time spent on windows opened (Number of Openings/Time Field Open). Bold values denote statistical significance.

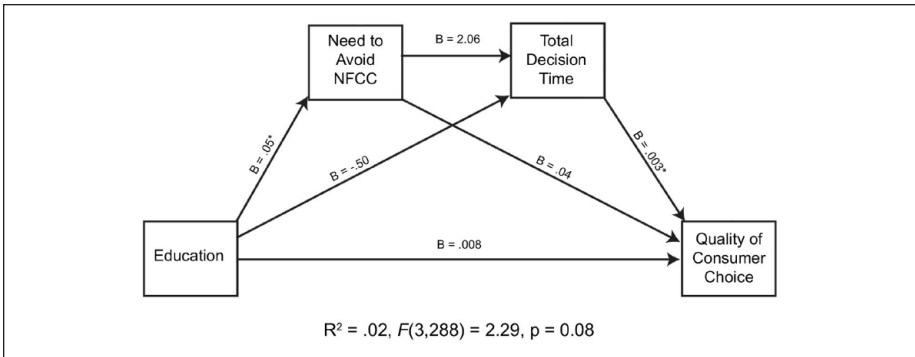


Figure 3. Indirect relationship between Education and the Quality of Consumer Choice mediated by Need to Avoid Cognitive Closure and time spent on making the decision.

.00, see Figure 2 for details). While education positively influenced the Need to Avoid Cognitive Closure ($B = -.05, SE = .02, p = .0106, CL_{95} \text{ } -.0913, -.0122$), the influence of ANFCC on Total Decision Time was not significant ($B = 2.0639, SE = 1.1128, p = .0647, CL_{95} \text{ } -.1264, 4.2541$). The quality of consumer choice was associated with more time spent on making decisions ($B = .0031, SE = .0014, p = .0310, CL_{95} \text{ } .0003, .0058$). The indirect effect was not significant ($B = -.0003, Boot SE = .0003, CL_{95} \text{ } -.0010, .0001$). Figure 3 contains detailed statistics of the model.

Consistently with that finding, Hypothesis H4b was not confirmed. Need to Avoid Cognitive Closure and time spent on acquiring information (Time Field Open) did not mediate the relationship between education and the quality of consumer decisions ($B = -.003, Boot SE = .003, CL_{95} \text{ } -.001, .001$, See Figure 4 for detailed statistics).

As Hypothesis H4a was not confirmed, a new Hypothesis H4g was proposed, consistent with the previous stage of analyses. An indirect effect of education on the quality of consumer choice under pressure, mediated by the NFCC and the effectiveness of time use, was expected. This hypothesis was confirmed. The effect of education on the quality of choice was fully indirect ($B = .0014, Boot SE = .008, CL_{95} \text{ } .0002, .0035$). Detailed findings are presented in Figure 5.

Hypotheses H4c through H4e were also confirmed. Education led to better consumer choices under pressure by means of avoiding NFCC and spending less time on

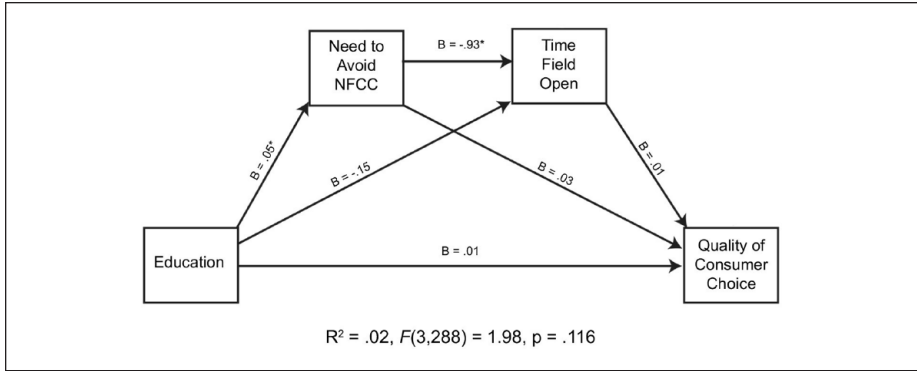


Figure 4. Indirect relationship between Education and the Quality of Consumer Choice mediated by Need to Avoid Cognitive Closure and time spent on acquiring information.

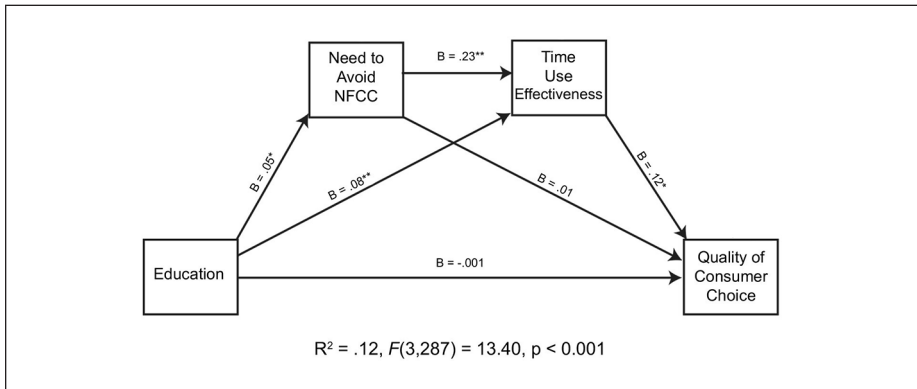


Figure 5. Indirect relationship between Education and the Quality of Consumer Choice mediated by Need to Avoid Cognitive Closure and the effectiveness of time used.

opening each window with cues ($B = .008, \text{Boot } SE = .005, CL_{95} .0002 \text{ ULCL } .0020$, detailed findings in Figure 6).

Hypotheses H4d involved testing an indirect relationship between education, need to avoid cognitive closure, time spent on collecting information, and the quality of consumer choice. Support for this hypothesis was found ($B = .008, \text{Boot } SE = .008, LLCL .0001 \text{ ULCL } .0021$, detailed findings in Figure 2).

Education also positively influenced consumer choices by means of avoiding NFCC and collecting more information in general ($B = .0013, \text{Boot } SE = .008, CL_{95} .0001, .0032$, detailed findings in Figure 7).

Also, better-educated consumers collected more unique information ($B = .0013, \text{Boot } SE = .008, CL_{95} .0001, .003$, detailed findings in Figure 8). This confirms hypotheses H4d and H4e.

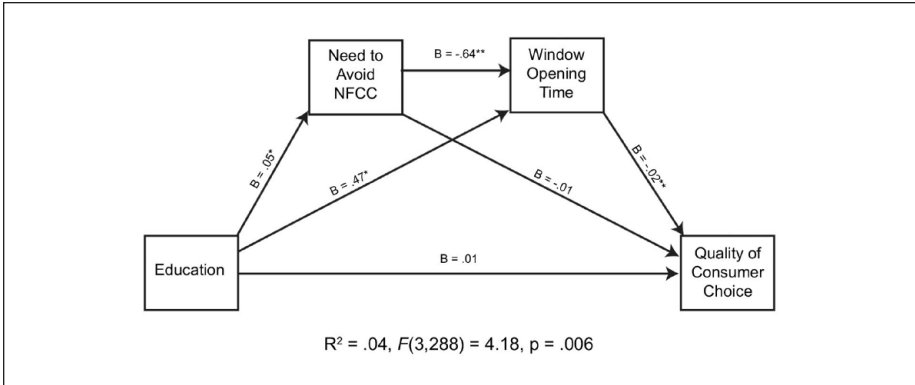


Figure 6. Indirect relationship between Education and the Quality of Consumer Choice mediated by Need to Avoid Cognitive Closure and mean time spent on opening a window with a cue.

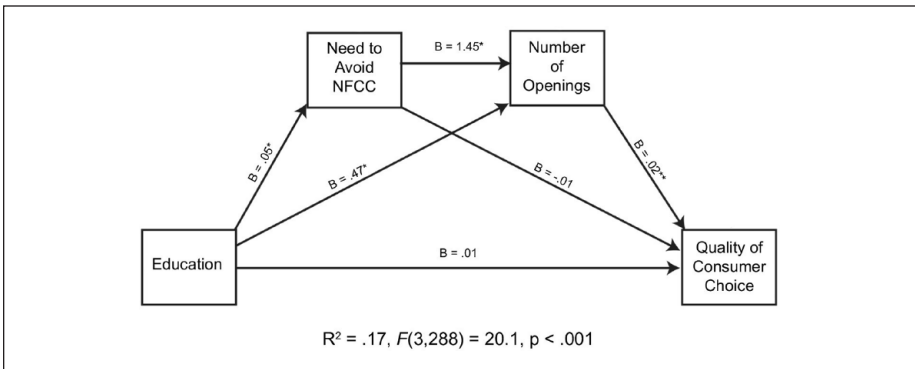


Figure 7. Indirect relationship between Education and the Quality of Consumer Choice mediated by Need to Avoid Cognitive Closure and number of window openings.

In the last step, the mediating role of the duration of the freezing phase was tested. Hypothesis H4f was also confirmed: shorter freezing phase mediated the relationship between education, need to avoid cognitive closure, and the quality of decisions ($B = .008, \text{Boot } SE = .005, \text{CL}_{.95} = -.025, -.009$, see Figure 9).

In each analysis, the direct path between education level, NFCC, information search characteristics, and quality of consumer choice was not significant. This suggests a fully indirect character of effects. Next, the results and their potential implications are discussed.

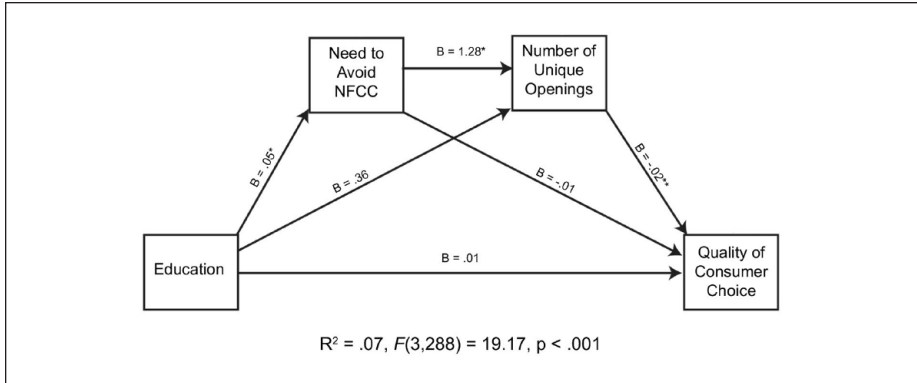


Figure 8. Indirect relationship between Education and the Quality of Consumer Choice mediated by Need to Avoid Cognitive Closure and number of unique window openings.

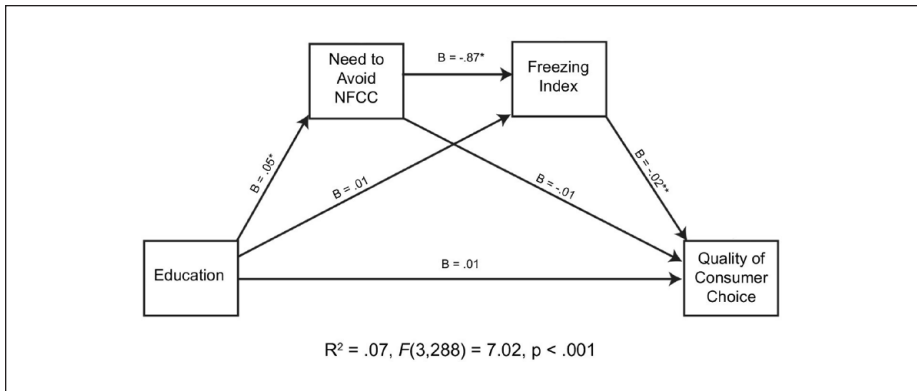


Figure 9. Indirect relationship between Education and the Quality of Consumer Choice mediated by Need to Avoid Cognitive Closure and the duration of freezing phase.

Discussion

The main aim of this paper was to explore links between education, ANFCC, and the quality of consumer decisions. More specifically, the analyses presented in the paper aimed to shed some light on whether education may contribute to higher levels of epistemic motivation (Need to Avoid Cognitive Closure) and indirectly impact the information search process characterizing consumer decisions made under pressure. Specifically, it was anticipated that more educated consumers would not only search for product information consistently with the characteristics of a closure avoidance style but also make better decisions despite being under pressure. The present study found support for most of the hypotheses. First, I will discuss the findings from a

theoretical perspective and then focus on managerial implications, with the specific focus on Public Relations.

The study shows that consumers faced with ostensibly simple decision tasks perform better under pressure as a function of the higher need to avoid cognitive closure and education. Better decisions are explained by specific information search characteristics: spending less time on a product attribute, using more information and better quality information about product attributes and shorter freezing phase. However, while it was assumed that the quality of consumer decisions would depend negatively on the amount of time spent on each decision, this study did not find support for that relationship. This suggests that although in previous studies total time spent on decision-making was typically shorter when the need to avoid closure was induced, the relationship between time and quality of decision is not straightforward. It can be argued that an educated consumer who had been trained to use ANFCC employs an adaptive strategy of making better use of time.

Although the findings did not give evidence for a relationship between ANFCC and compensatory search of information, the lack of effect may be susceptible to the decision task used in the study and the formula used to calculate *SI*. As argued by Perkovic et al. (2018), when the set of attributes in the Mouselab task is larger than the number of alternatives, a different measure (systematicity of search index) should be used to capture the use of compensatory search style.

While this study addresses one of the gaps in research about epistemic motivation by collecting responses from participants differing in age and from a wide range of educational backgrounds, it seems necessary to explain why formal education may influence epistemic motivation in the first place. Need for Cognitive Closure has been defined as representing a stable individual characteristic (Kruglanski, 1989). While it has also been suggested that the motives to seek or avoid closure could be prone to change due to situational demands or induced by instructions, studies on longitudinal changes in the NFCC due to external factors are not known to this author. However, from a theoretical perspective, changes to epistemic motivation due to prolonged training can be thought of. I have assumed that NFCC is regulated by an underlying epistemic goal of closure avoidance (or seeking), and educational environment may serve as a context of its frequent activation. As a means to avoid cognitive closure, the following could be considered: repeated occurrences of tasks requiring pupils (and subsequently students) to spend more time before decision-making, to collect sufficient information before making a judgment, and not to seize on information appearing first. I then suggest that people learn that these means lead to better decisions, and ANFCC is the epistemic force that is responsible for this effect. The idea that consumers can become better decision-makers is also consistent with the adaptive decision framework. It has also been suggested that decisions can be improved by creating a better 'task demands-cognitive capabilities' match. This can happen, for example, through simplifying complex tasks in order to reduce cognitive effort. Payne and his colleagues also argue that a part of the decision-making processes can be aided by providing formulas or teaching new strategies (Payne et al., 1993).

Appreciating the implications of making good decisions in a macro perspective, Payne and colleagues invoked a concept of a societal decision-maker and reflected on the quality of decisions that could have society-impacting significance (Lichtenstein et al., 1990; Payne et al., 1993). However, whether one can learn how to think (see Baron & Sternberg, 1987), or what skills should be taught in university education (e.g., Toohey, 1999) have been both the foci of separate debates. The main point for contention seems to be the distinction for teaching content- or task-specific skills, or more generalizable thinking skills that would help deal with new and complex tasks. Related to that, an argument has emerged recently to demonstrate that, for example, teaching how to evaluate scientific information through a subject-specific approach is unrealistic. In agreement with that, Storksdieck (2016) suggests that teaching information literacy may be more suitable when it comes to understanding science communication. Extending Storksdieck's argument, this study showed that formal education can contribute to teaching how to make better decisions by providing training in specific pre-decisional information search strategies.

Additionally, findings of the present research provide rationale for organizations to invest in education aimed at developing more general cognitive-motivational skills. More specifically, it was shown that pre-decisional information search characteristics led better-educated individuals to make significantly better consumer choices. However, a few remarks need to be made to make the findings applicable in PR and Corporate Social Responsibility (CSR) context.

First, while the links between formal education and consumer decision-making seem of interest to academics (Grewal et al., 2022), managers typically consider education as outside the value-added chain (Bruhn & Zimmermann, 2017). Consequently, investing in formal education in general, or in teaching general thinking skills is still a rarity. Grewal and colleagues even notice that "marketing has yet to embrace education as a mainstream area of inquiry and scholarship" (Grewal et al., 2022, p. 1). Those organizations who want to support education can do that in two general ways. They can invest in CSR programs focusing on either content-specific (outcome-oriented) education or more general skills. For example, Disney runs sustainability education programs to teach how to minimize greenhouse emissions, conserve energy, reduce waste, etc. (Holcomb et al., 2010). IBM, on the other, offers more general, math and science curriculum as one of their CSR initiatives (Watson, 2015). The convincing evidence suggests that education has beneficial effects on societies; each additional year of education adds 10% increase to a person's income and an increase in the GDP of a country by 18% (Debétaz, n.d.). Companies' investment in education appears as a sign of their sustainability and responsibility.

Considering all available evidence, positive Public Relations effects of investing in education seem intuitively identifiable. Globally, the United Nations SDG framework can serve as guidelines for organizing efforts toward more sustainable future, and education is one of its top-listed elements that the UN recommends focusing on. Using the United Nations Sustainable Development Goals (SDGs) as a point of reference for designing CSR programs is also not a new idea (Fallah Shayan et al., 2022). Yet, an additional rationale for directing investment in general education comes from

consumers. For example, in a report commissioned by Everfi (2017), sixty percent of respondents said that companies should spend CSR budgets on education, and 76% of them claimed that they would spend more money on a brand that invested in education, even when a more affordable option was available. Reputation management-wise, too, investing a company's CSR budget in education not only establishes a company as a responsible corporate citizen (Lewis, 2003), but should lead to acquiring certain expertise and knowledge-related attributes (C. W. Park et al., 1986).

Ultimately, the evidence in support of investment into education that teaches how to make better decisions comes from success stories of sustainable products. The good quality of products has become more commonly an attribute of products that are sustainable too (Frank-Martin & Peattie, 2009). It can be anticipated that soon an objectively good consumer decision will involve choosing the most sustainable product. The choice of the more sustainable option will then depend on the ability of consumers to effectively search for information and collect and compare available product options based on their attributes. Formal education seems to offer an invaluable training ground in that regard.

Limitations

The study has several important limitations. First, while capturing the influence of education and epistemic motivation on consumer choice seems important, making objectively good decisions may not always be possible. On the one hand, comparing available alternatives may be a task too difficult for a typical consumer because of various constraints: time pressure, lack of available information or low ability to understand relevant information, to name just a few. On the other, companies may not wish to disclose which product is objectively better, regardless of whether a determination of this type is even possible. Adding to that, comparative advertising is still forbidden in many countries, which makes it impossible to explicitly formulate claims about superiority of one product over another.

Secondly, the first part of the model linking education to ANFCC suffers from methodological limitations typical for studies linking education to any aspect of human functioning. The design used here is quasi-experimental and partly observational. Randomly assigning participants to different education pathways seems not only impossible but would be highly unethical. This also demonstrates a bias of the author of the study, which needs to be acknowledged. I consider education as a force for good and would wish every person to be granted an opportunity to attain the highest possible level of education consistent with their needs and plans.

While the validity of Mouselab task could be discussed as one of the limitations of the study, I would like to propose an alternative argument. A critique can be considered related to what extent the Mouselab methodology resembles the process of consumer decision-making. Arguably, rarely are consumers allowed to make their decisions in a noise-free environment without any interference, be it the need for multitasking, noise, or intrusive advertising on the internet. Partly, I addressed these considerations by introducing time pressure, which frequently accompanies consumers in their decisions. Also, a modification to the type and amount of information about choice

attributes was introduced. Typically, Mouselab task involves presenting participants with cues and their validities (e.g., diligence of a candidate in a recruitment process has a validity of 0.71). In real life, consumers are rarely informed about importance (validity) of attributes when decision-making. While including information about validity of attributes may lead to identification of more sophisticated information search strategies, it also reduces ecological validity of the Mouselab task. In the present study, it seemed more interesting to capture the process of consumer choice in settings more closely resembling everyday decisions.

Concluding remarks

The effects that were captured in the present study suggest that open-mindedness, understood as a certain critical mindset and involving a postponement of decisions, taking into account different information, and not anchoring judgment on the information acquired at first, leads to better consumer choices.

It can be argued that in recent years, consumer decision-making processes have become even more similar to the methodology employed in this study. Online shopping sales grew from \$1,336 billion in 2014 to \$5,717 billion in 2022 (eMarketer, 2022), and it is estimated that 63% of all transactions begin online (Thinkwithgoogle, 2018). Consumers begin the process of collecting information about products in an online environment, where comparing different alternatives takes a form similar to the Mouselab task. Concurrently, the popularity of product comparison websites is growing (e.g., Google Shopping, Price Runner, and Price Spy), allowing for products to be presented alongside their attributes and evaluated before making a purchase decision. The ability to make better consumer decisions seems critical for making complex judgments about products that nowadays can be characterized by multiple attributes, which indirectly may impact well-being of individuals or even the future of the planet. A conversation among C-Suite and PR strategists should start to evaluate what are the implications of product choices made by (un)educated consumers on their businesses.

Declaration of Conflicting Interests

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Notes

1. The level of arousal of participants did not affect any of the measures and the statistics were removed from the report.
2. The actual list of attributes was prepared by the sponsor of the study and will not be revealed.

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