How do people become radicalized: Lacking knowledge as a vulnerability to persuasion[1]

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Abstract

The rate of terrorist group membership is dramatically increasing, negatively impacting our society. Most scientific literature attributes a range of personality traits as vulnerabilities to radicalization. Despite personality traits theories attempting to explain why people join terrorist groups, they fail to provide tangible evidence. The literature is significantly lacking research on the social processes responsible for leading individuals to radicalization. Situational influence research, such as the Milgram and Zimbardo experiments, provides strong empirical evidence of how healthy individuals can adopt aggressive behavior when exposed to certain contexts. Therefore, in certain conditions, social influence transcends personality, and this evidence should not be neglected with regard to terrorist groups. The present study investigated insufficient knowledge on a subject as a factor of vulnerability to false belief manipulation and attitude alteration. A quantitative experimental research design was employed, involving deception and a fake participant whose role was to discuss false information. The Harvard Implicit Attitude Test, a General Knowledge Quiz, and Budner's Tolerance of Ambiguity Scale constituted the study measures. The findings revealed that participants with low and moderate knowledge retained the fake participant's erroneous information, with a slightly higher score identified for those with low knowledge. This discovery that insufficient knowledge of a subject may open the path to the manipulation of distorted information could be applied in interventions, particularly in the educational system, to prevent further radicalization.

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Introduction

Situational influence

Human beings remain social beings with a vital need for social interaction. These human interactions comprise situational influence. Defined as situations in which contextual agents operate on the individual, situational influence can alter our thoughts, attitudes, and behaviour (Alaybek et al., 1970). One type of situational influence is social influence. For example, social influence can have a positive impact on individuals' eating behaviour, as our food choices tend to align with those of people close to us by conforming to their eating behaviours (Higgs & Thomas, 2016). Conversely, social influence can lead individuals to engage in harmful behaviour. For instance, in Zimbardo's prison experiment, the simple act of wearing a prison guard's uniform led participants to adopt aggressive behaviours towards prisoners (Nye, 2013). Notable studies like Milgram's experiment (1961) have studied in depth the role of the context and the impact it can produce on individuals. Milgram investigated the impact of authority figure on individuals' obedience behaviours (Burger, 2014). The results of the study revealed that 65% of participants complied with Milgram's orders to inflict lethal electric shocks on another individual (Milgram, 1963). Consequently, situational influence transcends individuals' personality traits (Horstmann et al., 2017). In other words, individuals with no mental disorders may commit immoral behaviours, such as engaging in terrorist acts, as specific factors in the situation influenced their attitudes.

Debate between dispositional and situational factors

A separate theoretical paradigm explains behaviours through dispositional attribution, which involves attributing a person's actions to psychological factors such as personality traits (American Psychological Association, 2018). Four mindsets have been identified in individuals who join terrorist groups, namely authoritarian personality, dogmatism, apocalypticism, and fundamentalistic mindset (Borum, 2014). Furthermore, psychological vulnerabilities, such as the need for identity, meaning, belonging and perceptions of injustice or humiliation have been reported as dispositional factors that motivate individuals to join

terrorism (Borum, 2014). Despite these hypotheses, a second group of researchers estimates that dispositional factors are insufficient to determine why and how individuals become radicalized (Horgan, 2008). Particularly, the literature on the personality traits of terrorists abounds mainly in speculations, most of which have not been verified by empirical evidence. In fact, terrorists are rarely receptive to observation and do not cooperate in scientific interviews (Vogelaar, 2013). Additionally, according to Horgan (2008), "No terrorist profile has yet been found" (p. 83). Therefore, contrary to previous interpretations, terrorist offences may not be perpetrated by people suffering from mental disorders (Stankov et al., 2010). Implying that radicalization is solely the result of specific personality traits reflects a fundamental attribution error. The fundamental attribution error is the inclination to consider the individual as primarily responsible for his behaviours, regardless of the strength of the situational pressure (McCauley & Moskalenko, 2011). If specific personality traits or mental disorders do not explain terrorist acts, another underlying mechanism, perhaps situational influence, must be at the root of individuals' membership in terrorist groups. Consequently, this leads us to consider the following question: What situational factors prompt individuals to belong to terrorist groups?

Ambiguous situations

It is undeniable that human beings have a constant urge to make sense of the world. This urge to explain the world that surrounds us is well exemplified by the invention of philosophy, mathematics, and physics. According to Smith et al. (2007), individuals strive to minimise feelings of uncertainty about "themselves, their social world and their place within it". In other words, people need to understand who they are, how they should act, who others are and how they are supposed to behave (Smith et al., 2007). The impact of failing to explain a phenomenon has been extensively studied by Sherif Muzafer in his experiment involving the autokinetic effect. Muzafer's experiment involved a mechanism by which an individual perceives the rapid movement of a light point in the absence of any reference point (Muzafer, 1937). Participants were asked to look at this spot and identify the extent to which the light spot moved (Muzafer, 1937). Following the experiment with one individual, Muzafer placed two or three individuals in a room and instructed them to tell each other aloud how much the dot of light was moving (Muzafer, 1937). Unexpectedly, after three rounds, all individuals reported the exact number despite the fact that each had

perceived a different movement (Brandstetter et al., 2014). This phenomenon is referred to as informational conformity or social proof and is aimed at describing the process by which, in an uncertain context, individuals observe their colleagues to establish the appropriate answer and conform to it (Brandstetter et al., 2014). Informational influence results from the need to reduce feelings of uncertainty, establish an accurate perception of reality and behave correctly (Smith et al., 2007). The situation in which Muzafer placed his participants is defined as an ambiguous situation. According to Sherif, if there is no standard in an ambiguous situation, individuals will generate one in order to have a reference point of their judgements (Abrams, 2012). In other words, if individuals are placed in an ambiguous situation, they will tend to adhere to the norms of other individuals (Abrams, 2012). Consequently, this adherence to other people's norms may imply a change in attitudes.

Attitudes

Attitudes are an evaluation of particular psychological objects, described by characteristics such as pleasant or unpleasant, good or bad (Svenningsson et al., 2021). Attitude is divided into three components: behavioural, affective, and cognitive components (Svenningsson et al., 2021). The cognitive component represents the intellectual or mental dimension of our beliefs and feelings (Huskinson & Haddock, 2006). In other words, the cognitive component relies on personal experiences, knowledge, and comprehension of the world that surrounds us (Huskinson & Haddock, 2006). Consequently, it affects how we perceive an object and our decisions and thoughts towards that same object (Huskinson & Haddock, 2006). Since the cognitive component of attitudes relies on knowledge of a particular object, having little knowledge on that same object may imply its deficiency. As a result of this lack of knowledge, the individual may feel uncertain about his beliefs towards this object, which may open a path to retaining others' knowledge in order to balance the deficit and reduce uncertainty. In fact, feeling uncertain can leave individuals vulnerable to influences on their attitudes and behaviour unrelated to the source of uncertainty (Smith et al., 2007).

The present study

The present study postulates ambiguous situations as one of the situational factors influencing individuals to join terrorist groups. The

ambiguous situation is redefined in the study as a situation in which individuals lack knowledge of the Second World War, Jewish people, Hitler, and the arts. This insufficient knowledge may generate uncertainty regarding the correct knowledge on that subject. Thus, just as Muzafer's participants did not know how much the point of light was moving and used other individuals as a reference point, individuals lacking knowledge on a particular subject will rely on others with knowledge as a reference point and internalise that knowledge to reduce uncertainty. For instance, during an exam, individuals lacking knowledge may feel unsure about the correct answers to adopt. This uncertainty leads them to cheat on their colleagues' answers as a means of reducing feelings of uncertainty. However, the student's colleagues may have written incorrect information that the student is unable to evaluate due to a lack of knowledge. Subjective uncertainty predisposes individuals to be influenced, and one approach to reducing feelings of uncertainty may involve conforming to the group norms that shape individuals' behaviour and attitudes (Smith et al., 2007). Specifically, retaining people's knowledge may remain a mechanism for changing attitudes. In contrast, evidence indicates that, in the absence of ambiguity, observing others' behaviour is likely to exert little influence on individuals' comprehension of the correct behaviour, relying instead on their own inner cues to identify how they should behave (Lapinski and Rimal, 2006). In other words, individuals with knowledge regarding a particular topic will not seek information from others. Therefore, the study suggests that terrorist group recruiters may target individuals with minimal knowledge of Islam for optimal adherence to indoctrination.

Rationale of the study

The scientific literature has focused solely on dispositional factors as the primary mechanism responsible for individuals' adherence to terrorist groups, neglecting the impact of situational influence. The literature on dispositional attribution in relation to terrorist groups lacks tangible evidence, raising questions about its credibility (Horgan, 2008). While situational influence has been demonstrated to exerts a considerable impact on people's behaviour, its recognition remains central to furthering our understanding of radicalization. Researchers have not yet considered insufficient knowledge in Islam as an ambiguous situation capable of modifying individuals' attitudes and predisposing them towards being influenced to join terrorist groups. Terrorist groups exert a considerable impact on our society and remain a "threat to

security, democracy and human rights" (Atnashev, 2016, p.92). Moreover, terrorist attacks cause numerous psychiatric disorders among survivors, such as dissociative amnesia and acute stress reaction (Engdahl, 2008). The negative impact of terrorist groups on individuals and society demonstrates the necessity of identifying the processes that prompt individuals to become members of these groups in order to reduce the rate of adherents. Identifying the situational factors that influence individuals' attitudes to joining terrorist groups would help the scientific field contribute to the development of interventions aimed at preventing and changing attitudes and behaviours.

Hypotheses and objectives

Four hypotheses were formulated for this study. It was predicted that individuals with insufficient knowledge on the Second World War, Jewish people, Hitler, and the arts, when confronted with a person who possesses knowledge on the same subjects, will be inclined to integrate that knowledge as a means to reduce uncertainty (H1). The second hypothesis (H2) states that individuals with knowledge of those four subjects, when faced with a person with knowledge of the same topics, will not retain that knowledge. Concerning the third hypothesis (H3), individuals' beliefs on false information predicts changes in their attitudes. The fourth and final hypothesis predicts that following the experiment, individuals with limited knowledge of the four subjects mentioned above will score higher on Budner's Tolerance of Ambiguity scale than those in the control group (H4).

Methodology

Design

The aim of this study was to investigate whether insufficient knowledge of a subject remains a factor of vulnerability to attitudinal change, which could lead individuals to join terrorist groups. To investigate the research question, a primary research study was conducted using a quantitative experimental research design. The study employed a two-group between-subjects design. Three independent and three dependent variables were examined. The first independent variable corresponded to prior knowledge on World War II, Hitler, Jewish people, and the arts (whether or not participants had knowledge), while the dependent variable consisted of belief in false knowledge (whether or

not participants believed false information). The second independent variable involved belief in false information, and the dependent variable measured changes in attitudes. The third independent variable involved limited knowledge on World War II, Hitler, Jewish people, and arts and the dependent variable measured intolerance of ambiguity.

Participants

We attempted to recruit 20 participants aged between 20 and 30 from the Egyptian population, both male and female. The present study was conducted on 10 participants, containing 4 males and 6 females. Purposive sampling was employed to recruit participants. The selection criteria were individuals with general knowledge and individuals with limited or no general knowledge.

Procedure

The experiment began in the psychology laboratory at the TKH campus. All participants were deceived about the real purpose of the research. Participants were told that the research aimed to "understand the processes involved in individuals' social interaction", whereas the research was assessing "how participants' opinions could be influenced when they did and did not have knowledge on a topic". During the recruitment of participants, individuals were asked to complete the Pre-General Knowledge Quiz (See Appendix A). Individuals scoring 40% or less were placed in the experimental group, and individuals scoring more than 40% were placed in the control group. Both the experimental and control group followed the same stages of the experiment but separately and at different times. Once in the laboratory, participants were required to complete the Jewish Implicit Attitude Test. Subsequently, participants were placed in circle and seated on chairs. Among the participants was a confederate who was aware of the real aims of the research. A moderator was placed in the middle of the circle to establish the rules of the experiment. The confederate and the moderator had previously learned a script containing both false and true information regarding arts, Hitler, the Second World War and the Jewish people (See Appendix H). The arguments discussed by the confederate and the moderator during the experiment were included in the Post-General Knowledge Quiz in order to assess whether or not participants internalized their knowledge. Five 20th century paintings (See Appendix I), including one of Hitler, were displayed one by one on a board and participants were invited to share their opinions on these paintings. When Hitler's

painting was displayed, the confederate and the moderator began to discuss their script. The paintings were used to enable the confederate to discreetly share false information by displaying Hitler's painting. Following the confederate's discussion, all participants were required to fill out the Post-General Knowledge Quiz, the Jewish Implicit Attitude Test and the Tolerance of Ambiguity Test. All questionnaires were completed on computers using Google Document Form, except for the IAT, which was completed on the Testable website. At the end of the experiment, a debriefing with a psychologist was carried out for all participants, during which the real aims of the study were revealed. Lastly, Islam was not used as the subject of the experiment in order to avoid participant bias and to obtain accurate data.

Measures

Pre-General Knowledge Quiz

The pre-General Knowledge Quiz was designed specifically for the present research and contained 20 close-ended questions regarding arts, Hitler, the Second World War and Jewish people. Individuals were asked to answer each question with "True, false, I don't know". The statement "I don't know" was considered a wrong answer and was only included to obtain accurate scores by preventing participants from selecting random items when they were unsure of the answer.

Implicit Attitude Test

The Jewish Implicit Attitude Test (IAT), consisting of sorting pleasant and unpleasant words accompanied by symbols representing Christian and Jews groups, was employed as a pre- and post-test (Rowatt et al., 2005). The IAT was reviewed from 257 studies and demonstrated a greater value for internal consistency ($\alpha = .80$) and moderate reliability (Greenwald et al., 2022). The IAT was created using the "Testable" website and was a replication of the original IAT designed by Harvard (See Appendix E). However, six statements from the original IAT were adapted to the Egyptian culture through modifications or complete exclusion (See Appendix E).

Tolerance of Ambiguity Scale

The Tolerance of Ambiguity Scale (See Appendix D), consisting of 16-items was employed as a post-test to which participants had to

respond on a seven-point Likert scale ranging from strongly agree to strongly disagree (Benjamin et al., 1996). The measure was found to have a low internal consistency (α = .63) as well as low reliability (α = .59) (Benjamin et al., 1996).

Post-General Knowledge Quiz

A second General Knowledge Quiz with different questions was given to participants after the experiment. The questionnaire was created during the experiment in the observation chamber of the psychology laboratory and differed for the control group (See Appendix B) and experimental group (See Appendix C). The post-General Knowledge Quiz contained false information that was reported during the experiment by the confederate and the moderator. Information shared by other participants was also included in the quiz to avoid participant suspicions. The reverse calculation was applied to obtain participants' false knowledge retention score. For instance, an individual answering "true" to a false statement was assumed to be a correct response. Moreover, "I don't know" statements were considered ambiguous responses. The internal validity and reliability of the pre- and post- General Knowledge Quiz were not investigated due to time constraints.

Ethical considerations

The present research has received ethical approval by The Knowledge Hub Universities Research Ethics (See Appendix J). During the recruitment phase an informed consent was provided to participants (See Appendix G). Moreover, confidentiality was respected, as identifiable data, such as participants' phone numbers and email, was only used for contacting participants during the second stage of the study. Participants were identified by codes, and the data was stored on a password-protected laptop. Further, all identifiable data was deleted prior to the second stage of the experiment. Since the use of deception in research may negatively affect individuals' emotional state and self-esteem, participants were informed in the participant information sheet (See Appendix F) of their right to withdraw from the experiment and to remove their data from the study (Boynton et al., 2015). To mitigate any negative psychological impact of the experiment on participants, a debriefing with a psychologist was carried out at the end of the study. Participants' autonomy was preserved as the consent form included participants' consent to the disclosure of incomplete information regarding the study.

Results

The aim of this study was to examine whether insufficient knowledge of specific subjects remains a vulnerable factor for believing false information and altering individuals' attitudes. The following section provides descriptive results and inferential statistics to evaluate the research hypotheses.

Descriptive statistics

The independent t-test was applied to measure the significance of false information retention between the control and experimental groups (See table 1).

Table 1. False Knowledge Retention Score

Group	N	Mean	SD	*t*	*p*
Experimental	3	9.3333	6.65833	327.	378.
Control	5	8.4000	89443.		

Furthermore, the mean scores of participants' "I don't know" responses were obtained for the post-knowledge quiz (See table 2).

Table 2. Uncertain Responses Score

Group	N	Mean
Experimental	3	6.6
Control	5	2,4

The Tolerance of Ambiguity Scores (TAS) were computed for both groups using an independent t-test (See table 3).

Table 3. Tolerance of Ambiguity Score

	Group	N	Mean	SD	*t*	*p*
TAS	Experimental	3	64.6667	3.05505		
	Control	6	67.3333	7.50111	576.-	238.

In addition, regression analysis was used to evaluate the relationship between the retention of false information and IAT scores of correct answers in the experimental group (See table 4). The independent t-test was also utilized to determine the significance of the results.

Table 4. Relationship between beliefs of false knowledge and Implicit Attitude scores

Group	F	β	.Sig	R2
Experimental	1.712	795.-	415.	631.

Lastly, as the experimental sample was limited, an independent t-test analysis of all pre- and post- IATs was performed, independently of the experimental and control groups, to demonstrate that the lack of significance of all results may be due to the small sample size (See table 5).

Table 5. Pre- and post- IAT scores

	N	Mean	SD	*p*	*t*	df
Pre-IAT	9	23.1667	1.06066			
Post-IAT	9	21.1444	3.43879	056.	1.685	16

Inferential statistics

An independent t-test was conducted to determine whether a lack of knowledge could influence people to believe false information. As predicted by the hypothesis, individuals with insufficient knowledge had a slightly higher score of false knowledge retention (M = 9.33) than those with knowledge (M = 8.40), and this difference remains non-significant (t = .327, p = .378). In addition, limited knowledge may contribute to participants' ambiguous states, as the experimental group scored significantly higher in uncertain responses (M = 6.6) compared to the control group (M = 2.4).

An independent t-test was applied to examine the extent to which the experimental group exhibited a low tolerance of ambiguity score. According to Budner's scale the average tolerance for ambiguity should range between 44% to 48%. On average, the control group scored higher (M = 67.3333) than the experimental group (M = 64.6667), this difference was also not significant (t = -.576, p = .238).

Furthermore, non-significant results were identified between the beliefs of erroneous knowledge and IAT scores (F = 1.712, sig. = .415, β = -.795). However, the coefficient of determination (R2 = .631) revealed that 63% of the variability observed in the alteration of implicit attitudes were explained by the retention of erroneous information.

Lastly, the post-IAT showed a lower score of correct responses in both groups (M = 21.1444) than in the pre-IAT (M = 23.1667) and this decrease in scores it not significant (t (16) = 1.685, p = .056). By combining both experimental and control groups' pre- and post- IAT scores, the non-significance of the results decreased significantly (p = .056), which may imply that the lack of significance in other scores may be due to the small sample size.

Discussion

The current study aimed to examine insufficient knowledge as a predisposition to believe erroneous information and to modify people's attitudes. The findings did not support all our research hypotheses. First, the research accurately predicted that limited knowledge could lead individuals to believe false information. Moreover, high TAS mean score were exhibited by the experimental group, demonstrating their low tolerance of uncertainty, in line with the study's fourth hypothesis. This relationship between insufficient knowledge, retention of erroneous information and low tolerance for ambiguity may have been obtained by chance, as a lack of significance was identified in the results. Contrary to H2 and H4, the moderate knowledge group retained false information and scored higher on the TAS than the low knowledge group. Lastly, the non-significance results regarding our third hypothesis that "individuals' beliefs on false information predicts changes in their attitudes" may be due to the small sample size, as the R-Squared value indicates a strong prediction of the model. Both groups retained false information, as shown by the decrease in the number of correct responses on post-IAT. These results suggest that participants' attitudes have changed and that they developed prejudice against Jewish people.

Low versus moderate knowledge

The findings of the study suggest that moderate knowledge may itself constitute an additional source of vulnerability to persuasion towards erroneous information. The high intolerance of ambiguity from the control group may have been associated with the content of the confederate's arguments that contained a combination of accurate and inaccurate information. In fact, during the experiment's debriefing, one participant admitted believing the confederate as he was stating accurate

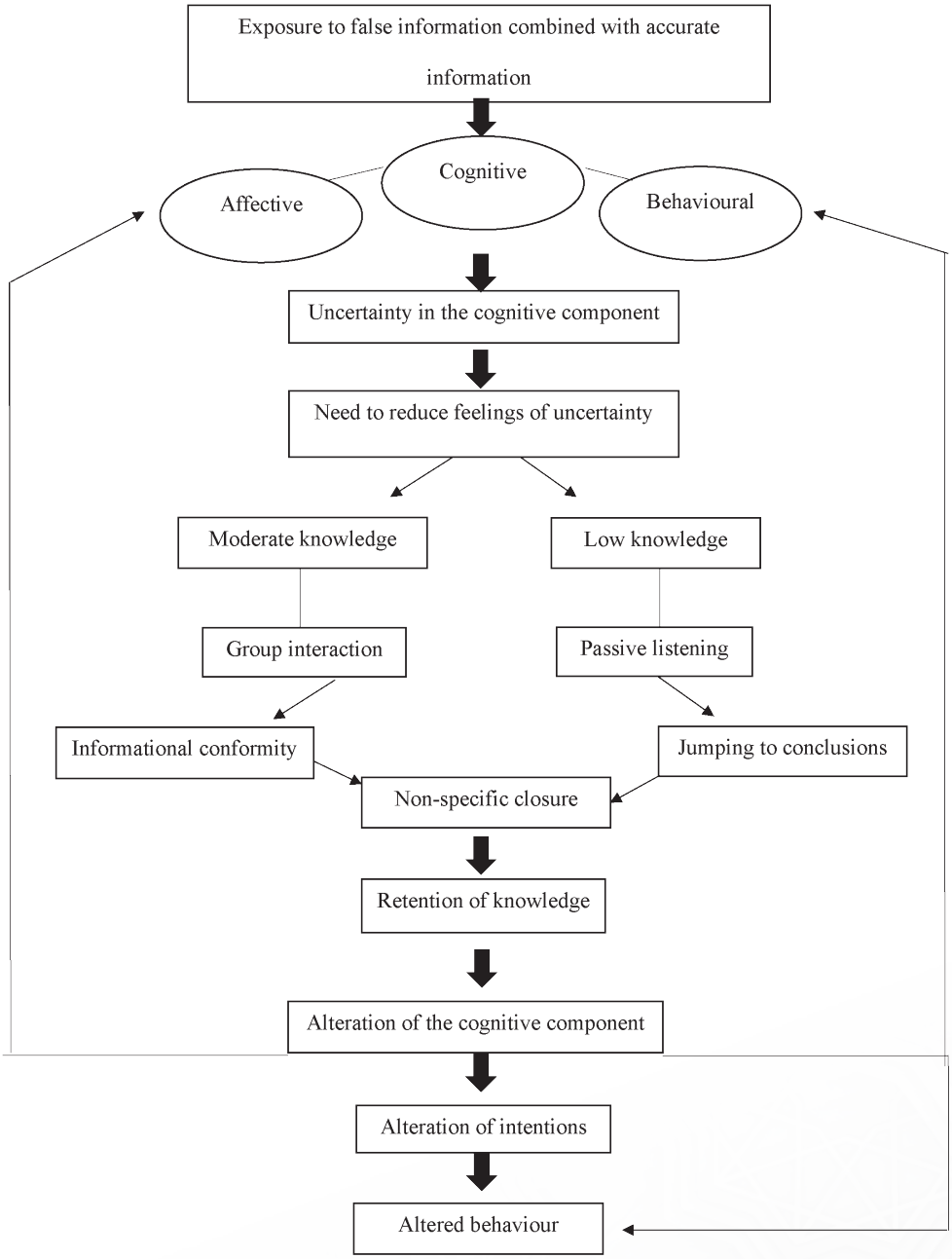
facts, causing him to assume that the rest of his speech was also correct. For instance, when the confederate mentioned the Kronembourg concentration camp in Egypt, all participants in the control group collectively admitted that they were familiar with this information despite it being completely false. The moderate-knowledge participants were able to identify and recall correct information but were incapable of detecting false information, which created uncertainty. In contrast, low-knowledge participants were unable to differentiate between accurate and inaccurate information, causing a state of confusion, as revealed by the significantly higher means of "I don't know" responses on the post-General Knowledge Quiz compared to the control group. Moreover, through observation, we noted that participants in the control group had greater interaction with each other compared with the experimental group, which remained more passive throughout the discussion. This interactive dynamic can be explained by participants in the control group having the requisite knowledge to discuss and establish ties with other people, whereas the experimental group had limited knowledge to interact, resulting in passive listening. Consequently, these two observations may suggest two distinct mechanisms for the retention of false knowledge and the alteration of attitudes in people with low and moderate levels of knowledge.

Attitudes change

The model below (See Figure1) was elaborated from the results of the study and the literature to explain the process of attitude change from a lack of knowledge. The current study postulates that the mechanism enabling individuals to shift their attitudes relies on the processes involved in reducing feelings of uncertainty. First, when confronted with false information combined with accurate knowledge, individuals with low and moderate knowledge felt uncertainty in the cognitive component of the attitude (See Figure 1), which was strongly evidenced by participants' high ambiguity tolerance scores (Huskinson & Haddock, 2006). This uncertainty in the cognitive component of attitude remains discomforting, and individuals adopt different strategies to alleviate it. Indeed, according to the theory of lay epistemics (LET), individuals possess a desire to dispose of firm conviction on a given subject, also known as cognitive closure, in opposition to confusion and uncertainty (Jost et al., 2018). For people

with limited knowledge, passive listening represented the means of reducing their uncertainty, which leads them to "jumping to conclusions" reasoning (See Figure 1). Specifically, jumping to conclusions is a reasoning style that includes a tendency towards "early acceptance" and to premature rejection of hypotheses (Borum, 2014). Individuals who jump to conclusions tend to seek less information when making a decision (Borum, 2014). On the other hand, people with moderate knowledge reduced uncertainty through informational conformity (See Figure 1), which is the process by which, in an uncertain context, individuals observe their colleagues to establish the appropriate answer and conform to it (Smith et al., 2007). For example, in the experiment, participants were required to identify the title of a painting. The confederate provided a false title for the painting, and all participants in the control group complied to the confederate's knowledge and explained that it was the accurate title of the painting. Consequently, both individuals with low and moderate knowledge may have adopted non-specific closure to increase certainty. Nonspecific closure refers to a desire for a definite answer to a problem, as opposed to confusion and ambiguity (Kruglanski et al., 2010). In other words, individuals using definite answers to a question in an attempt to reduce uncertainty tend to adhere firmly to their conclusions, which may explain how individuals become radicalized. This retention of false knowledge induced an alteration of the cognitive component, demonstrated by participants' low post-IAT scores (See figure 1). This cognitive component possesses a direct relationship with the affective and behavioural component of attitude (See Figure 1). According to the theory of planned behaviour (TPB), the cognitive and affective component of attitudes partly shapes behavioural intentions, which is the immediate motivating force for behaviour (Svenningsson et al., 2021). Behavioural intention is considered to be a primary outcome of these two aspects of attitude (Svenningsson et al., 2021). Therefore, this alteration of the cognitive component may imply an alteration of intentions and behaviours and must be further investigated (See Figure 1).

Figure 1 *The process of altering attitudes and behaviours through insufficient knowledge on a subject*



Lastly, this model led to the following new hypotheses. First, moderate and low knowledge of a given subject may represent two factors of vulnerability to misinformation. Secondly, being an expert in a particular subject may remain a protective factor against believing false information.

Implications

If limited and moderate knowledge leads individuals to believe distorted information, thus modifying their attitudes, individuals with low and moderate knowledge about Islam could be the target of believing Islamist ideologies. Therefore, our premise by which members of terrorist groups represent normal individuals influenced by the situation remains valid and justified. In other words, you, dear readers, have certainly already internalized the distorted knowledge of a peer without ever realizing it. The findings of the research are frightening, as regardless of individuals' personalities, when they do not have sufficient knowledge on a subject, they are susceptible to believing false information, which leads them to become the target of various manipulations, such as radicalization. The research is consistent with situational theories, such as Muzafer's theory of ambiguous situation and informational conformity. However, the findings contradict the assumption that all individuals become members of terrorist groups due to specific personality traits. To continue, the eradication of terrorist group leaders remains effective in the short term, as regardless the number of operatives killed, it appears that scores of others are waiting to replace them (Kruglanski & Webber, 2014). Therefore, additional measures should be implemented to eliminate the existence of these groups. Given that children's brains remain modulable and conditionable, educating them to question any given knowledge could remain a protective factor against adherence to radicalization. Moreover, the research findings are not only limited to radicalization and may also extend to the belief in false information disseminated on social media, as well as to education. In particular, specific populations in developing countries significantly lack knowledge of the world and remain poorly educated, especially in political issues. Their lack of knowledge may remain the reason they favour certain laws, sometimes against their human rights, and not question the government. Therefore, the following question remains open to researchers: "Is this lack of education deliberately chosen by certain countries to ensure greater adherence to laws?"

Limitations

The present research raises potential limitations that should be identified for further research. Above all, the small sample size may have contributed to the lack of external consistency and significance in the results. Given that the research was restricted in time, the conception of

the General Knowledge Quiz could not be assessed for reliability and validity. Consequently, the General Knowledge Quiz may have inaccurately measured participants' knowledge, and the control group may have eventually represented the experimental group. In addition, the number of participants may remain a confounding variable affecting the level of compliance to the confederate's false information. In particular, participants in the control group may have retained the false information not due to their moderate knowledge of the subjects but due to the number of participants in the room who also complied.

Conclusions

In the current research sample, both people with low and moderate knowledge retained the confederate's false information. A larger sample size would be necessary to assess the significance of these findings. Further research should evaluate the relevance of these results by including low and moderate knowledge in the experimental groups and individuals with excellent knowledge in the control group. Evaluating the reliability and validity of the General Knowledge Quiz remains essential for future research to obtain accurate scores. Finally, future studies should consider the impact of the group size on adherence to false information compliance, notably by conducting this experiment with small groups of participants as well as large groups. Despite the limitations identified in the research, the slight difference in results between the experimental and control groups deserves further investigation; if insufficient knowledge remains a source of vulnerability to distorted beliefs, precautions could be implemented to reduce the number of adherents to terrorist groups.

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Appendices

Appendix A

General Knowledge Quiz/Pre-Test:

1. The Second World War took place in September 1939 **= True**
2. The Allies_consisted of the United States, the Soviet Union, and the United Kingdom **= True**
3. The three main countries that make up the power of the Axis are Germany, Japan, and Italy **= True**
4. Hitler established the 4th Reich **= False**
5. Nazi Germany's concentration camps were specialized in the mass extermination of undesirable people from the Reich and conquered territories **= True**
6. The camps victims were mainly Jewish, Gypsies, Slaves, Homosexuals, and mentally retarded people **= True**
7. The Final Solution was a Nazi plan for the genocide of individuals they defined as Jews during World War II **= True**
8. Hitler took part in the First World War **= True**
9. The painter "Van Gogh" wasn't very successful and was very poor. **= True**
10. The American army used Navajo to code its messages **= True**
11. The blitzkrieg was military tactic calculated to create psychological shock and resultant disorganization in enemy forces through the employment of surprise, speed, and superiority in matériel or firepower **= True**
12. Hitler was appointed Chancellor of Germany on January 30th 1933 **= True**
13. Hitler wrote a book entitled "Mein Kampf" **= True**
14. Hitler tried to bomb every monument in Paris, including the Eiffel Tower, and demanded that the city fall to the Allies as "a field of ruins" **= True**
15. The Alamein Battle took place in 1942 **= True**
16. The Pearl Harbor attack took place in December 1941 **= True**

17. White, black, yellow, red, and blue are the most colors used in art. **= True**
18. Are there pieces of art whose author is unknown? **= True**
19. At the start of the Second World War, Libya was part of the Italian Empire **= True**
20. Hitler's party is called the NSDAP **= True**

Appendix B

General Knowledge Quiz/Post-Test Control Group:

1) Hitler was refused entry to the Academy of Fine Arts, which marked the beginning of his hatred of Jews = **False (Hitler really got rejected from the Academy of Fine Arts but he never mentioned that it was the reason why he hated Jews)**
2) Protein O3 is the gene of intelligence = **False (The Protein O3 exists but it is not the gene of intelligence)**
3) The Nuremberg law was banning marriage between Jewish and German to preserve the German Protein O3, as Jewish were considered less intelligent = **False (The Nuremberg law was really banning marriage between Jewish and German, but it was not to preserve the German Protein O3)**
4) Hitler wanted to take revenge on the Jews because of his rejection at the Fine Arts Academy = **False**
5) The rectorate that rejected Hitler's application to the School of Fine Arts was Jewish and preferred to have Jews in their academy = **False**
6) Hitler's artistic movement was called Entartete Kunst = **False (Entartete Kunst was the modern art in the Nazi ideology, but it was not Hitler's artistic movement)**
7) A concentration camp called Kronenbourg was established by the Germans in Egypt during the Battle of Alamein = **False (The battle of Alamein did exist)**
8) Hitler considered the Jews to be a threat to the Aryan race because, according to him, the kosher meat that the Jews ate contained a large amount of salt, which made their blood impure and caused a deficiency in the intelligence gene Protein O3 **= False (However Hitler did consider the Jews to be a threat to the Aryan race)**

9) Aktion T4 were intensive education programme for the German population = **False (Aktion T4 did exist but it was a campaign of mass murder by involuntary euthanasia)**

10) Einstein discovered the theory of relativity due to the educational program called Action T4 = **False (However Einstein did discover the theory of relativity)**

11) Jews are less intelligent due to a deficiency of the protein 03 in their genes **= False**

Appendix C

General Knowledge Quiz/Post-Test Experimental Group:

1) Hitler was refused entry to the Academy of Fine Arts, which marked the beginning of his hatred of Jews = **False (Hitler really got rejected from the Academy of Fine Arts but he never mentioned that it was the reason why he hated Jews)**

2) One of Van Gogh painting was painted during his Cocaine addiction = **False**

3) One of the paintings had a woman with a beard = **False**

4) Hitler created the concentration camps to preserve the Roman gene **= False**

5) One of the paintings portrayed Christmas **= True**

6) One of the paintings portrayed the Spanish Revolution **= True**

12) Protein O3 is the gene of intelligence = **False (The Protein O3 exists but it is not the gene of intelligence)**

13) The Nuremberg law was banning marriage between Jewish and German to preserve the German Protein O3, as Jewish were considered less intelligent = **False (The Nuremberg law was really banning marriage between Jewish and German, but it was not to preserve the German Protein O3)**

7) Hitler wanted to take revenge on the Jews because of his rejection at the Fine Arts Academy **= False**

8) The rectorate that rejected Hitler's application to the School of Fine Arts was Jewish and preferred to have Jews in their academy = **False**

9) Hitler's artistic movement was called Entartete Kunst = **False (Entartete Kunst was the modern art in the Nazi ideology, but it was not Hitler's artistic movement)**

10) A concentration camp called Kronenbourg was established by the Germans in Egypt during the Battle of Alamein = **False (The battle of Alamein did exist)**

11) Hitler considered the Jews to be a threat to the Aryan race because, according to him, the kosher meat that the Jews ate contained a large amount of salt, which made their blood impure and caused a deficiency in the intelligence gene Protein O3 **= False (However Hitler did consider the Jews to be a threat to the Aryan race)**

12) Aktion T4 were intensive education programme for the German population = **False (Aktion T4 did exist but it was a campaign of mass murder by involuntary euthanasia)**

13) Einstein discovered the theory of relativity due to the educational program called Action T4 = **False (However Einstein did discover the theory of relativity)**

14) Jews are less intelligent due to a deficiency of the protein 03 in their genes = **False**

15) Hitler did not kill all the Jewish to show people why should kill all of them = **False**

Appendix D

Tolerance of Ambiguity Scale/Post-Test:

1) An expert who doesn't come up with a define answer probably doesn't know too much.

2) I would like to live in a foreign country for a while.

3) There is really not such thing as a problem that can't be solved.

4) People who fit their lives to a schedule probably miss most of the joy of living.

5) A good job is one where what is to be done and how it is to be done are always clear.

6) It is more fun to tackle a complicated problem than to solve a simple one.

7) In the long run it is possible to get more done by tackling small, simple problems rather than large and complicated ones.

8) Often the most interesting and stimulating people are those who don't mind being different and original.

9) What we are used to is always preferable to what is unfamiliar.
10) People who insist upon a yes or no answer just don't know how complicated things really are.
11) A person who leads an even, regular life in which few surprises or unexpected happenings arise really has a lot to be grateful for.
12) Many of our most important decisions are based upon insufficient information.
13) I like parties where I know most of the people more than ones where all or most of the people are complete strangers.
14) Teachers or supervisors who hand out vague assignments give one a chance to show initiative and originality.
15) The sooner we all acquire similar values and ideals the better.
16) A good teacher is one who makes you wonder about your way of looking at things.

Appendix E

Implicit Attitude Test (IAT)/Pre- and Post-Test:

Link of test: https://www.testable.org/experiment/16095/646861/start

Statements adapted to the Egyptian culture:

1) The success of the United States is part of God's plan. **(removed)**
2) The federal government should declare the United States a Christian nation. (**adapted: The Egyptian government should declare Egypt a Muslim nation.)**
3) The federal government should allow prayer in public schools. **(removed)**
4) The federal government should allow religious symbols in public spaces. **(removed)**
5) The federal government should advocate Christian values. **(removed)**
6) The federal government should enforce strict separation of church and state. **(removed)**

Appendix F

Participant information sheet:

The purpose of the research is to find out how individuals construct healthy interaction with each other. Discovering the mechanisms involved in building healthy interaction will enable us to take preventive action for the younger generation.

The research project is being conducted by Dalia Samir El Sayed at Coventry University, TKH branch in Egypt. You have been selected to take part in this questionnaire survey as you meet the requirements we are looking for in participants, such as your age. Indeed, we are selecting participants aged between 20 to 30 years. Your participation is entirely voluntary, and you can opt out at any stage by informing the researchers or psychologist. If you are happy to take part, you will be asked to:

1) Fill out two questionnaires.
2) Discuss **a specific topic** with other participants and interact with them.
3) Complete three questionnaires.
4) Have a debrief with a psychologist regarding the experiment.

Your answers will help us to investigate in depth how individuals interact with each other on a given subject. In other words, we want to understand the type of communication individuals use when talking with other people in order to potentially identify trends of unhealthy styles of communication. Therefore, observing people communicating with each other will allow us to raise further awareness on healthy social interactions, particularly among the younger generation, who are more inclined to change. The experiment should last approximately 40 minutes. Your answers will be treated confidentially and the information you provide will be kept anonymous in any research outputs/publications.

Your answers will be treated confidentially and the information you provide will be kept anonymous in any research outputs/publications. Your data will be held securely on Microsoft Excel, Microsoft Word, and SPSS Statistics Software. All data will be deleted by 1st July 2024.

The research was granted ethical approval by TKH Research Ethics Committee.

For further information, or if you have any queries, please contact the lead researcher: Dalia Samir El Sayed, DE2101763@tkh.edu.eg. Or the research supervisor, Dr. Eman Shaltout, eman.shaltout@tkh.edu.eg.

Thank you for taking the time to participate in this survey. Your help is very much appreciated.

- ☐ I have read and understood the above information.
- ☐ I understand that, because my answers will be fully anonymized, it will not be possible to withdraw them from the research once I have completed the survey.
- ☐ I confirm that I am aged 18 or over.
- ☐ I agree to take part in this questionnaire survey.

Appendix G

Consent form:

You are invited to take part in the above research project for the purpose of collecting data **on the mechanisms implicated in social interaction.**

Researcher(s): Dalia Samir El Sayed

Department: Psychology

Contact details: DE2101763@tkh.edu.eg

Supervisor name: Dr. Eman Shaltout

Supervisor contact details: eman.shaltout@tkh.edu.eg

This form is to confirm that you understand what the purposes of the research project are, what will be involved and that you agree to take part. If you are happy to participate, please initial each box to indicate your agreement, sign and date the form, and return to the researcher.

Please do not hesitate to ask questions if anything is unclear or if you would like more information about any aspect of this research. It is important that you feel able to take the necessary time to decide whether or not you wish to take part.

1	**I confirm that I have read and understood the Participant Information Sheet for the above research project and have had the opportunity to ask questions.**	
2	**I understand that all the information I provide will be held securely and treated confidentially. I understand who will have access to any personal data provided and what will happen to the data at the end of the research project.**	
3	**I understand my participation is voluntary and that I am free to withdraw my participation and data, without giving a reason, by contacting the lead at any time until the date specified in the Participant Information Sheet.**	
4	**I understand the results of this research will be used in academic papers and other formal research outputs.**	
5	**Some details of this project may not be made known to me until my session is completed. I realize at the completion of the session that I have the option of withholding the responses I have provided from subsequent analysis.**	
6	**I agree to take part in the above research project.**	

_____

_____

_____

Name of Participant **Signature** **Date**

_____

_____

_____

Name of Researcher **Signature** **Date**

Appendix H

Script confederate and moderator

Moderator: "Hi everyone! My name is Aly and I'm going to be moderating the experiment. We're going to start the experiment in a few minutes, but first I'd like to explain the rules to all of you.

First of all, I'm going to show you a series of paintings and ask you to tell me what you think of them. I'd like to hear everyone's opinion and interact with each other as if I am not in the room. Make yourselves comfortable, this is not a test, just a discussion. It's important that everyone's opinion is respected, and that the discussion is friendly. After our discussion about the paints, you will be asked to fill in two questionnaires and then the psychologist and researcher will come back to us at the end of the experiment.

Is everything clear? Do you have any questions?

All right let's get started!"

The 5 paintings will be shown. In the 5th painting, the one of Hitler, the speech can begin.

The moderator shows the last painting and the associate notices Hitler's painting.

Part 1:

Associate: "Isn't that Hitler's painting?"

Moderator: "Yes, it is (act confused/shocked). How do you know that?"

Associate: "I saw it in an exhibition in Berlin in August at the Bundestag."

Moderator: "Are they allowed to exhibit that? (confused)"

Associate: "Yes, he's an artist above all, and **I think he was a good artist**."

Moderator: "A good artist?! (Act surprised) For me he was not a good artist, he was even **refused admission to the Academy of Fine Arts in Vienne!**"

Associate: I don't agree with you. **A lot of artists were rejected from the Academy of Fine Arts and still became successful.** For example, Van Gogh never went to art school and one of his paintings was sold for 83 million dollars.

Moderator: "Okay okay (confused) then explain to me **how Hitler was a sensitive artist** knowing that he killed so many Jews?"

Associate: "He was a sensitive like all artists but **his rejection at the Academy of Fine arts was the starting point of his hatred of Jews**"

Moderator: Wait wait wait, what do you mean by that?

Associate: Look, **Hitler explains in his book "Mein Kampf"** that **the Academy of fine Arts in Vienne preferred to have Jewish artists and artists from the same artistic movement** and that he was rejected because he was not Jewish, and he had a complete different artistic movement. Hitler explained that his rejection from the Academy of fine Arts was his starting point for hating the Jews."

Moderator: I'm not surprised to know that. **Jewish people always want to have the power in our society**. But how do you know all of that? (act confused)"

Associate: "**I study art in Berlin, and I had a course on Nazi Art**. But do we have the right to talk about this in the experiment?"

Moderator: "Yes, we can talk about anything in the experiment, the most important is your opinion and that we debate them. So, what do the rest of you think about what has been said? If you don't know as much about the subject as he does, that's fine.

Part 2:

The moderator returns to Hitler's painting.

Moderator: "Looking back at the painting,

- What do you think the artist, so here Hitler, thought of the world? (*allow time for participants to speak*)
- Compared with the other paintings we saw before, does Hitler's painting look similar to them? (*allow time for participants to speak*)

- Do you think this painting represent art?"

Associate: "Yes it represents a **new type of art**! Hitler called this art "**Entartete Kunst"** which meant "Degenerate Art" and was **part of the Nazi ideology.** Entartete Kunst was a school of art **led to the success of many artists and scientists,** such as the painter **Goya, that we saw earlier, and Einstein,** who founded a great theory of physics through this Nazi school of thought."

Moderator: "So wait you're implying that Einstein and the rest of **the German population became more intelligent due to the Nazi school of thought?**"

Associate: "Exactly! Hitler had developed intensive **education programme called "Aktion T4"**, ranging from kindergarten to university studies. His aim was to **make the German population more intelligent**, and it actually worked, as Einstein, who grew up during the Nazi period, began to work on the theory of relativity. But that's a subject of physics which, I think, has nothing to do with the experiment."

Moderator: "Yes, Einstein has nothing to do with the experiment, but everything you're saying is very interesting… (*think moment of silence*) I had no idea about all of this …"

Associate: "**Well, you haven't read enough about Hitler!"**

Moderator: "All I know is that Hitler was constructing concentration camps to kill the Jews… But keep talking about that and then we'll let the other participants speak."

Part 3:

Associate: "Yes, that's true he built many concentration camps. He even **established one in Egypt during the Battle of El Alamein** that was called **Kronenbourg**"

Moderator: "Kronen… what? Could you repeat that, please?"

Associate: "Kronenbourg! Hitler created these concentration camps to **preserve the German gene**, which Hitler considered to be **a continuation of the Roman gene.**"

Moderator: "Wait what? The German gene was a continuation of the Roman gene?"

Associate: "Yes! Let me explain you, **Nazi doctors carried out analyses on Jewish corpses** to prove that the Jewish race was less smart. It was actually true; **Jewish are less smart because doctors discovered the Protein O3 as the gene of intelligence to be less present in Jewish.**"

Moderator: "Again, I'm really not surprised to know that. **Jewish people always created the most useless invention like eating competitions for example**. But tell me, do you know why their Prote…"

Associate: "Protein O3"

Moderator: "Yes ahaha complicated name, why their Protein O3 gene was deficient in Jewish?"

Associate: "Hitler explains in his book "Mein Kampf" that **the Protein O3 was deficient in Jewish because the kosher meat they eat contains a large amount of added salt which leads to an excess of sodium in their blood.** Because of that their blood was considered impure."

Moderator: "Well you know a lot … I'm impressed! But we also need to let the other participants talk. In your opinion, what is missing in this painting? (*allow time for participants to speak*) If the painting could speak, what would it say? (*allow time for participants to speak*)"

Moderator: "Ok we've talked enough about Hitler and what he did. It's a good subject for study that you gave us, thank you. To finish, I'm going to ask you which paintings we've seen you like best. I'm going to show them one by one and you're going to raise your hand when you see the one you like best and all of you will explain why they chose it."

Moderator: "All right, the experiment is now over. We will go back to the computer lab, and you will have to fill in two questionnaires, and then the psychologist and the researcher will join us for a quick chat.

Appendix I

Paintings:

Painting N°1

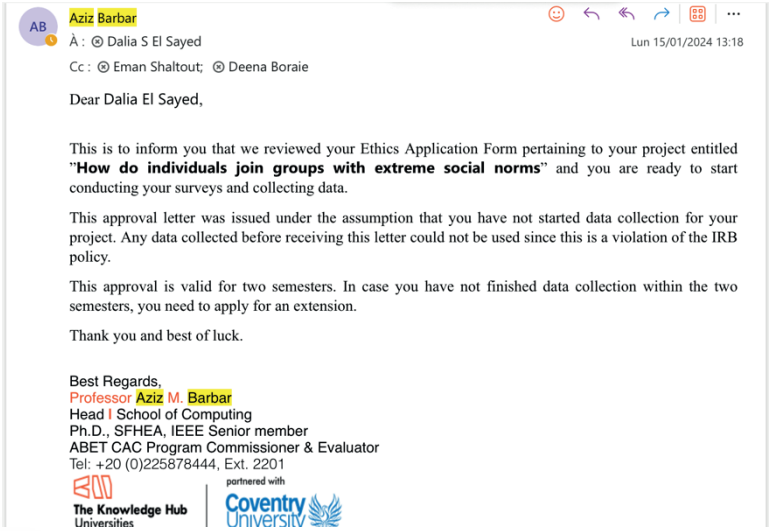
Painting N°2

Painting N°3

Painting N°4

Painting N°5 (Hitler's painting)

Appendix J



AB

Aziz Barbar

À : Dalia S El Sayed

Lun 15/01/2024 13:18

Cc : Eman Shaltout; Deena Boraie

Dear Dalia El Sayed,

This is to inform you that we reviewed your Ethics Application Form pertaining to your project entitled "**How do individuals join groups with extreme social norms**" and you are ready to start conducting your surveys and collecting data.

This approval letter was issued under the assumption that you have not started data collection for your project. Any data collected before receiving this letter could not be used since this is a violation of the IRB policy.

This approval is valid for two semesters. In case you have not finished data collection within the two semesters, you need to apply for an extension.

Thank you and best of luck.

Best Regards,
Professor Aziz M. Barbar
Head I School of Computing
Ph.D., SFHEA, IEEE Senior member
ABET CAC Program Commissioner & Evaluator
Tel: +20 (0)225878444, Ext. 2201

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