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RESEARCH PAPER

What shall I do? Similarities and differences in moral judgements between Austrian and Mongolian students

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Abstract Cross-cultural research in moral judgements (e.g., whether to sacrifice one person to save several others) often focuses on differences regarding the instrumentality of harm, i.e., whether the death of one person is an instrument to save several others (instrumental) or is an incidental side-effect (incidental). Less cross-cultural research exists on differences regarding one's own involvement, i.e., whether one's own life or only the life of others is at risk. The present study investigated the influence of both factors on moral judgements in a European (Austrian) and an Asian (Mongolian) culture. Austrians and Mongolians read moral dilemmas and chose whether (or not) they would carry out an action that sacrifices one but saves several others. Afterwards, they rated the moral acceptability of that action. Both cultures chose utilitarian actions (sacrificing one to save others) less often in instrumental than in incidental dilemmas. Thus, instrumental harm is universally regarded as worse than incidental harm. In instrumental dilemmas, Mongolians chose more utilitarian actions than Austrians, indicating that Mongolians more likely act in favour of group welfare. In instrumental dilemmas, Austrians chose more utilitarian actions when their own life was at risk than when only the life of others was at risk. In incidental dilemmas, the opposite was observed for Mongolians. Thus, Austrians more likely act in favour of self-interest, whereas Mongolians perceive it as more unvirtuous to harm others to save oneself. Results on moral acceptability ratings and decision times further support those cultural differences. Thus, culture may convey certain moral decisions.

Keywords Moral judgement · Instrumentality of harm · Personal involvement · Decision making · Cultural differences

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Introduction

Imagine you spot a runaway trolley that is about to kill five railway workers working on a track. You could pull a switch to redirect the trolley onto a side track, but this will kill one railway worker working on the side track (trolley dilemma, Foot, 1967; Thomson, 1976). Would you pull the switch? Such scenarios, known as moral dilemmas, are used to investigate

moral judgements (for a review see Christensen & Gomila, 2012). Moral dilemmas describe situations, in which an agent has to choose between different actions, or between acting or not acting, whereby each choice has important moral reasons to support it (Christensen & Gomila, 2012). Moral judgements follow some universal moral principles but are also modulated by one's cultural background (Graham et al., 2016; Sachdeva et al., 2011). Previous cross-cultural research (e.g., Ahlenius & Tännsjö, 2012; Arutyunova et al., 2016) has often focused on differences in the instrumentality of harm. That is, whether the harm (e.g., death of one person) is a foreseen, but incidental side-effect to achieve a greater good (like pulling the switch in the trolley dilemma above, also termed incidental dilemma) or whether it is an instrument to save several others (like pushing a large man into the trolley's path to stop the trolley, also termed instrumental dilemma) (Manfrinati et al., 2013). Less is known about cross-cultural differences regarding one's involvement, i.e., whether one's own life or only the life of others is at risk (but see Moore et al., 2011 for such a study), and how it interacts with the instrumentality of harm. Thus, the aim of the present study was to investigate the influence of both factors on moral judgements in a European (Austrian) and an Asian (Mongolian) culture to replicate and extend previous results. We were particularly interested in Mongolia as a so far rather underrepresented culture in moral research (but see Berniūnas et al., 2016; Sheskin et al., 2018).

Cultural similarities in moral judgments

Different theories in the domain of moral research have proposed that moral reasoning is largely universal (e.g., Kohlberg's theory of moral development, Kohlberg, 1971, 1973; Kohlberg & Hersh, 1977, or evolutionary theories, cf. Krebs, 2008). From an evolutionary perspective, moral behaviour is evolutionary engrained and shared by all human beings, resulting in at least some universal moral principles. For instance, abiding to certain moral standards like reciprocity and cooperation facilitates social communication and interaction. This enables people to live together in groups, which ensures survival and supports the fitness of individuals (cf. Krebs, 2008).

Indeed, when asked to make moral decisions, people from various cultures follow some universal moral principles (Arutyunova et al., 2013, 2016; Awad et al., 2020; Bago et al., 2022). For instance, they do not only act based on utilitarian considerations (maximizing benefits, minimizing cost, Mill, 1863), but on the instrumentality of harm that is associated with an action. Thus, people from different cultures such as North American cultures, European cultures, and Asian cultures are more likely to intervene in incidental than in instrumental dilemmas and also rate this as more morally permissible/acceptable/appropriate (Ahlenius & Tännsjö, 2012; Arutyunova et al., 2013, 2016; Hauser et al., 2007; Lotto et al., 2014; Ludwig et al., 2020; Moore et al., 2008; Winking & Koster, 2021). Thus, they seem to adhere to the doctrine of double effect (Arutyunova et al., 2013; Hauser et al., 2007), which states that in order to achieve a greater good it is morally permissible to cause harm as a foreseen, but incidental side effect, but not to instrumentally cause harm (Aquinas, 1952; Foot, 1967). Additionally, the contact principle may also play a role. In most instrumental dilemmas, harm is evoked by physical contact (e.g., pushing someone), whereas in most incidental dilemmas it is evoked more indirectly (e.g., pulling a switch). Thus, the contact principle, i.e., causing harm using physical contact is morally worse than causing harm without physical contact, may have further contributed to the observed effects (Arutyunova et al., 2013; Cushman et al., 2006; Feltz & May, 2017).

Further, across different cultures such as North American cultures (Moore et al., 2011), European cultures (Lotto et al., 2014; Manfrinati et al., 2013; Schaich Borg et al., 2006; but see Sarlo et al., 2012), and Asian cultures (Moore et al., 2011), it often takes people longer to decide in favour of one action alternative (i.e., in this case acting or not acting) in incidental dilemmas than in instrumental dilemmas. This may be explained by the dual process theory of moral judgements (Greene, 2009; Greene et al., 2001, 2004, 2008; but see also Bluhm, 2014). Instrumental dilemmas may elicit a stronger emotional response than incidental dilemmas (Manfrinati et al., 2013; Schaich Borg et al., 2006), which may result in a fast and automatic disapproval of sacrificing one to save several others. In contrast, in incidental dilemmas the emotional response may be weaker, resulting in slower and more cognitive, utility-based processing, favouring approval of sacrificing one to save several others. Those differences in emotional processing

become eventually reflected in longer decision times in incidental dilemmas compared to instrumental dilemmas.

Cultural differences in moral judgements

Despite some universal moral principles, morality is not entirely culture independent. For instance, most theories in which a certain degree of universality is assumed, acknowledge that in addition to evolutionary mechanisms, morality is formed by the social environment and social interactions (Krebs, 2008). In fact, which moral principles one follows is conveyed by the basic values of society (Rivera-Urbina et al., 2021; Vauclair et al., 2015; for reviews see Bentahila et al., 2021; Graham et al., 2016; Sachdeva et al., 2011). Some values differ depending on culture (Inglehart et al., 1998; Schwartz, 2006). It is often claimed that North American and European cultures have an individualistic value orientation with focus on personal aims and needs, independence, and self-expression, whereas Asian cultures have a collectivistic value orientation focusing on in-group aims and needs, interdependence, and social duties (Heine, 2001; Kitayama & Uskul, 2011; Triandis, 2001). Those differences affect information processing (Nisbett & Miyamoto, 2005; Nisbett et al., 2001) and decision making (Weber & Morris, 2010), which may lead to differences in moral concepts (Haidt et al., 1993; Markus & Kitayama, 1991; Miller, 1994; Sachdeva et al., 2011) and moral reasoning (Rhim et al., 2020) and affect moral judgements (Atari et al., 2020; Graham et al., 2016; Luft, 2020).

Indeed, cross-cultural differences in moral judgements have been observed regarding the willingness to approve sacrificing one to save several others (Awad et al., 2018). People from countries with collectivistic cultures like Russia, China, or Indonesia are less likely to sacrifice one to save several others than individualistic cultures like North America or Great Britain (Ahlenius & Tännsjö, 2012; Arutyunova et al., 2013; Gold et al., 2014; Sorokowski et al., 2020). Presumably, individualistic cultures make more utilitarian choices because they emphasize the distinctive value of each individual and thus focus on saving as many individuals as possible, whereas collectivistic cultures feel equally responsible for all society members (Arutyunova et al., 2013; Awad et al., 2018) or may be concerned that utilitarian judgements (i.e., harming someone) may elicit negative reactions from others (Hashimoto et al., 2022). However, in other studies including Australia, India, Great Britain, North America, and Brazil there was little or no evidence for cultural differences in utilitarian choices (Hauser et al., 2007; Moore et al., 2011).

Those diverging results may be explained by the different cultures under investigation. Even though many Asian cultures share some cultural values, each culture has its distinctive features, which may vary significantly (the same applies to North American/European cultures, Hofstede, 1980; Rarick et al., 2014). One rather underrepresented Asian culture in moral research is Mongolia (but see Berniūnas et al., 2016; Sheskin et al., 2018). The culture in Mongolia differs from frequently investigated Asian cultures such as in Russia or in China in several ways.

For instance, they differ in their historical background. Mongolians have been nomadic pastoralists for centuries and until 50 years ago many of the Mongolian population were herders (Stolpe, 2016). Living a nomadic lifestyle in the open grassland required to deal with harsh climatic conditions such as very cold, long winters and only short, warm summers (cf. Yembuu, 2021). This was only possible by collaborating with neighbours and by depending on kinship networks and local communities, in which people help one another with the many arduous tasks, such as herding or haymaking, to lessen the load on individuals (Ichinkhorloo, 2018; Mearns, 1993; Murphy, 2014). This may have fostered hospitality and generosity, which are highly valued in the Mongolian culture, and are offered to anyone, may it be friends or complete strangers (O'Gorman & Thompson, 2007; Sneath, 2019). Accordingly, helping others is considered as virtues behaviour (buyantai, in Mongolia, Humphrey, 1992). In contrast, China (and many European cultures) are more sedentary, agriculture-based cultures (Qingwen et al., 2011) and thus may have been less dependent on reciprocity and generosity in their daily lives.

A further major difference between Mongolia and other Asian cultures are religious beliefs. In Mongolia, religious beliefs unite elements of Buddhism (which emphasizes that actions are right if they focus on the greater good, Bareja-Starzynska & Havnevik, 2006; Edelglass, 2013) and shamanism (which includes rituals to support good deeds and scare away evil spirits, Balogh, 2010; Merli, 2006) (see also Hesse,

1987 for a historical overview). Taken together, this may foster selfless actions, that are performed to achieve a greater good (even if someone gets harmed). In contrast, besides Buddhism, the main religious beliefs in China are Daoism (which, for instance, stresses the importance of letting things run their natural course, Ahlenius & Tännsjö, 2012), Confucianism (which, for instance, emphasizes that humans are born with goodness and views empathy as an important moral standard, see Yang, 2012 for an extensive overview), and Chinese folk religion (which entails different elements of Buddhism, Daoism, and Confucianism) (Meulenbeld, 2019; Zhang et al., 2021). Taken together, this may explain why Chinese are rather reluctant to sacrifice one to save several others (Ahlenius & Tännsjö, 2012; Gold et al., 2014 for such an argument). Further, Russia and China have a higher level of urbanization than Mongolia. Urbanization may result in rather weak social connectivity/social ties within a country (White & Guest, 2003) and feeling socially disconnected has been shown to decrease the likelihood of making utilitarian moral judgements (particularly in instrumental dilemmas, Lucas & Livingston, 2014).

Thus, results regarding moral judgments in Russia or China may not be generalized to Mongolia. However, moral judgements in Mongolia have hardly been investigated (but see Sheskin et al., 2018, though no definite conclusions about Mongolia can be drawn from the data analysis of this study). Similarly, amongst Western (European) cultures, moral judgments have hardly been investigated in Austria (but see Awad et al., 2020; Tinghög et al., 2016). Austria is an industrialized economy in central Europe with a rather individualistic culture (Hofstede et al., 2010), thus encouraging individuals to follow their own life course and pursue individual goals. In contrast to Mongolia, values such as hospitality or generosity usually influence the behaviour towards immediate family or close friends, but not so much towards strangers. Personal freedom and personal space are highly valued in Austria, people's self-construals are often independent from other members of the society, and it is uncommon to interfere in each other's affairs.

Taken together, based on those differences in values between Mongolia and Austria, we were interested whether Mongolia (as an Eastern, more collectivistic culture with emphasis on values such as hospitality and generosity, O'Gorman & Thompson, 2007; Sneath, 2019) differs from Austria (as a Western, more individualistic culture) regarding moral judgements. Therefore, the first aim of the present study was to compare Mongolian students with Austrian students to investigate cross-cultural differences in moral judgements depending on the instrumentality of harm (incidental vs. instrumental).

One further factor that may affect moral judgements differently across different cultures is one's own involvement (i.e., whether also one's own life or only the life of others is at risk). In North American/European cultures, people are faster to decide whether they should sacrifice another person (Moore et al., 2008; but see Lotto et al., 2014) and are more inclined to sacrifice another person when their own life is at risk (Cecchetto et al., 2017, 2018; Christensen et al., 2014; Lotto et al., 2014). This is even the case in instrumental dilemmas, in which people are usually reluctant to intervene (Cecchetto et al., 2018; Lotto et al., 2014). Interestingly, they still rate this decision as less morally acceptable than sacrificing someone if only the life of others is at risk (at least in incidental dilemmas, Lotto et al., 2014; but see Moore et al., 2008; Moore et al., 2011 who observed the opposite[1]). Thus, there seems to be a gap between what people believe is morally right and how they would act under certain circumstances (Tassy et al., 2013), indicating that the need of self-preservation may override moral principles (Bloomfield, 2007; Lotto et al., 2014). Less is known about the influence of self-involvement in Asian cultures. In one study, no cultural differences between Chinese and North Americans have been observed, who both rated sacrificing another person as more morally appropriate when their own life is at risk than when only the life of others is at risk (Moore et al., 2011). However, as outlined above, this might not generalize to other cultures. Therefore, the second aim of the present study was to investigate differences in moral judgements between Austrian and Mongolian students depending on whether one's own life or only the life of others is at risk.

[1] Note that Moore et al. (2008) and Moore et al. (2011) asked participants how morally appropriate the action is, whereas Lotto et al. (2014) asked how morally acceptable the action is, which may be the reason for the differences in response patterns (for a more thorough discussion of such wording effects see Barbosa & Jiménez-Leal, 2017; Christensen & Gomila, 2012).

Aims and hypothesis

The aim of the present study was to investigate cross-cultural differences in moral judgements between Austrian and Mongolian students depending on the instrumentality of harm and one's own involvement. To this end, Austrian and Mongolian students were presented with moral dilemmas, in which some kind of threat was about to cause the death of a group of people. Dilemmas differed depending on the instrumentality of harm (incidental vs. instrumental) and one's own involvement (one's own and other peoples' life vs. only the life of others was at risk). For each dilemma an action was proposed that described how one could intervene by causing the death of another person but saving the group of people. Participants were asked whether they would carry out the proposed action and to rate its moral acceptability.

Regarding the instrumentality of harm, we expected that participants of both cultures would more likely follow cognitive, utility-based considerations, i.e., perform the proposed action and rate it as more morally acceptable, in incidental than in instrumental dilemmas as has been previously observed (Ahlenius et al., 2012; Arutyunova et al., 2013, 2016; Hauser et al., 2007). Correspondingly, we also expected longer decision times in incidental than in instrumental dilemmas (Lotto et al., 2014; Manfrinati et al., 2013; Moore et al., 2011; Schaich Borg et al., 2006). However, we also expected cultural differences for several reasons. First, in Mongolia binding moral foundations such as loyalty, i.e., approval of those who contribute to the well-being of the group, are more important than individualizing moral foundations such as fairness, i.e., sensitivity to equality and justice (Bespalov et al., 2017), which may result in a high approval of utilitarian choices. Second, people in Mongolia score high on life aspirations like relationship and community (Bespalov et al., 2017). This may increase the feeling of social connectivity, which is in turn associated with more utilitarian choices (Lucas & Livingston, 2014). Third, in Mongolia values such as generosity and hospitality (O'Gorman & Thompson, 2007; Sneath, 2019) are emphasized and helping others is considered as virtues behaviour (Humphrey, 1992). Thus, Mongolian students may be inclined to perform actions that save several others. In contrast, in many European cultures it is common to endorse individual rights (Heine, 2001; Kitayama & Uskul, 2011; Triandis, 2001). Particularly, in Austria people are encouraged to follow their own life course and it is rather uncommon to interfere in each other's affairs (with the exception of immediate family or close friends). Thus, Austrian students may make fewer utilitarian choices. Accordingly, we expected that Mongolian students would be more likely to sacrifice one to save several others than Austrian students, particularly in instrumental dilemmas, in which culturally transmitted norms (e.g., focus on group welfare and helping others) may override moral principles not to instrumentally cause harm. Further, this conflict between culturally transmitted norms on the one hand and moral principles on the other hand should also become observable in longer decision times in Mongolian students than in Austrian students.

Regarding one's own involvement, we also expected cultural differences. As mentioned above, there is a high focus on individual needs in European cultures (Heine, 2001; Kitayama & Uskul, 2011; Triandis, 2001) and particularly the Austrian culture encourages people to pursue individual goals. Thus, Austrian students may be more likely to sacrifice one to save several others if their own life is at risk than if only the life of others is at risk. However, as previously observed, they may still rate sacrificing another person as less morally acceptable when their own life is at risk than when only the life of others is at risk (Lotto et al., 2014). In contrast, Mongolian students may sacrifice one to save several others independently of their own involvement due to focus on the group welfare (Bespalov et al., 2017). Accordingly, they should also rate sacrificing one to save themselves and others as less morally acceptable than sacrificing someone to save only others. For a summary of hypotheses, separately for the different experimental factors (instrumentality of harm and involvement) and the different dependent variables (percentages of

Table 1 Summary of hypotheses, separately for the different experimental factors (instrumentality of harm and involvement) and the different dependent variables (percentages of affirmative responses to the proposed action, moral acceptability ratings, decision time)

	Percentages of affirmative responses	Moral acceptability ratings	Decision time
Instrumentality of harm	Participants are more likely to sacrifice one to save several others in incidental than in instrumental dilemmas	Participants rate sacrificing one to save several others as more morally acceptable in incidental than in instrumental dilemmas	Participants need longer to decide whether to sacrifice one to save several others in incidental than in instrumental dilemmas
	Culture: Mongolian students are more likely to sacrifice one to save several others than Austrian students (particularly in instrumental dilemmas)		*Culture:* Mongolian students need longer to decide whether to sacrifice one to save several others than Austrian students
Involvement	*Culture:* Austrian students are more likely to sacrifice one to save several others if their own life is at risk than if only the life of others is at risk; Mongolian students sacrifice one to save several others independently of their own involvement	Participants rate sacrificing another person as less morally acceptable when their own life is at risk than when only the life of others is at risk	

affirmative responses to the proposed action, moral acceptability ratings, decision time) see Table 1.

Method

Participants

A total of 218 university students (94 in Austria, 124 in Mongolia) took part in the study. 50 participants were excluded from analysis for reasons stated below. The final sample consisted of 74 students in Austria (nationality: 35 from Germany, 5 from South Tyrol in Italy, 34 from Austria; sex: 55 female, 19 male; handedness: 67 right, 6 left, 1 ambidextrous; age in years: $M = 22.1$, $SD = 2.6$) of the UMIT TIROL – Private University for Health Sciences and Health Technology and 94 students in Mongolia (nationality: all from Mongolia; sex: 74 female, 20 male; handedness: 86 right, 6 left, 2 ambidextrous; age in years: $M = 20.1$, $SD = 2.8$) of the National University of Mongolia (NUM). We used G*Power 3.1.9.2 (Faul et al., 2007) to estimate the required sample size for the three-way interaction of interest (culture × instrumentality of harm × involvement). We choose F-test (ANOVA, repeated measures, within-between interaction) as type of test. The number of measurements and the number of groups was set at two.[2] Statistical significance was set at $p < 0.05$. A medium effect-size ($f = 0.2$) was assumed. The required sample size to achieve a power of 0.9 is a minimum of 67 participants per group.

All procedures performed in the present study were in accordance with the 1964 Helsinki declaration and its later amendments. All participants gave informed consent and the study was approved by the local ethics committee. Participants performed the experiment for course credit.

Material and procedure

We used the moral dilemma set developed by Lotto et al. (2014), which consists of experimental dilemmas

[2] Note that this three-way interaction can be equally expressed as a two-way interaction with the between-participants factor culture (Austria, Mongolia) and the within-participants factor instrumentality of harm (incidental, instrumental) and the difference corresponding to main effect of involvement (e.g., self – other) as dependent variable. Accordingly, we used sample size estimation for repeated measures, within-between interaction in G*Power.

and filler dilemmas (see supplemental material of Lotto et al., 2014 for the full set of English dilemmas). Moral dilemmas were translated into German and Mongolian by native speakers of the respective languages who were also proficient in English. We slightly modified some of the original dilemmas by removing all geographical and historical information (e.g., desert instead of Sahara desert; war instead of gulf war) to avoid any potential confounds between participants' geographical, cultural, and political backgrounds and the content of the scenarios. Further, we excluded four filler dilemmas, which involved a certain amount of money, as the average income differs between countries. The full set of German and Mongolian dilemmas can be accessed from https://osf.io/8r5uc/.

Each dilemma consisted of a scenario and a possible action. In the experimental dilemmas, the scenarios described some kind of threat that was about to cause the death of a group of people. The action described how one could intervene by causing the death of another person to save the group of people. Dilemmas differed with regard to instrumentality of harm (instrumental vs. incidental) and self-involvement (one's own and other peoples' life vs. only other peoples' life were at risk), resulting in 15 dilemmas per condition. Examples of dilemmas, separately for each experimental condition, can be seen in Table 2. The 11 filler dilemmas consisted of scenarios and actions, which involved moral issues such as stealing or lying, but never involved the death of persons.

Participants completed the experiment in groups of maximal 30 participants in the computer labs of the respective universities. Participants were seated at desks approximately 50 cm in front of a computer screen. For Austrian students HP z23i monitors (screen: 23″, vertical refresh rate: 60 Hz, resolution: 1920 × 1080 pixels) and for Mongolian students Intel i3 monitors (screen: 19″, vertical refresh rate: 60 Hz, resolution: 1366 × 768 pixels) were used. The experiment was programmed using SR Research Experimental Builder (version 1.10.1630, http://www.sr-research.com/eb).

Table 2 Samples of moral dilemmas, separately for each experimental condition

Experimental condition	Scenario	Possible action
Instrumental, self	You are returning from a mountain hut by chairlift with three other people, when a storm breaks out. Lightning hits the cable. The chairlift stalls and you are stuck swinging in the air at a height of tens of metres. The mechanism which fixes your chair to the cable has been seriously damaged and is starting to disintegrate	You push the person next to you off the chair to lighten the load. You know that this person will fall to their death, but you and the other two will be able to resist until help arrives
Instrumental, other	You are on board a ship which is sinking. You are heading for the deck where the lifeboats are together with seven other people. You and another person have just crossed through a watertight door when it starts to close quickly. The other six people are behind the door, too far away to be able to pass through it in time	You knock the person next to you unconscious and use his body to block the door open. You know that this person will be crushed to death, but the other six will have time to save themselves
Incidental, self	You are a fireman, and you are trying to save five people from inside a burning building. The only window from which the people can be evacuated is jammed and will not open. The fire will reach you in a short time. Outside on the window ledge of the floor below, there is a person who is waiting to be saved	With an axe you smash the window to get out. You know that when it falls, the heavy glass will kill the person on the lower floor, but you and the five people in danger will be able to escape
Incidental, other	You are a building worker who is manoeuvring a crane on a building site. You have just started your day on the site, when you realise that the cable of the crane is about to break. Attached to the cable is an enormous steel beam which is directly above a crew of six who are working on the outside of a building in construction	You move the arm of the crane a short distance to another area of the site. You know that there is a worker there who will be crushed by the steel beam and will die, but the other six workers will be unhurt

Each trial started with a blue screen presented for 1000 ms, followed by a white screen presented for 500 ms. Afterwards a moral scenario was presented as text (font: Calibri, font color: black, font size: 18) in the center of the white screen. Participants were asked to read the scenario at their own pace and, after they had finished reading, to use the mouse to click a "continue" button (5 cm × 1.5 cm), which was presented at the lower part of the screen (centered horizontally, distance from the center of the button to the bottom of the screen: 7.5 cm). Then a possible action was presented. Participants were asked to indicate, whether they would carry out the proposed action by clicking the "Yes" or "No" button (each 2.5 × 2.5 cm), presented on the left and right side of the screen (distance from the centers of the buttons to the bottom of the screen: 11.5 cm; distance from the centers of the buttons to the left and right side, respectively: 23 cm). The location of the buttons was counterbalanced across participants and the start position of the mouse cursor was set in the middle between the buttons. After their choice participants were asked to indicate how morally acceptable the action is via mouse click on a visual analogue scale (13.7 cm) from "not at all" (wording in Austria: "überhaupt nicht", wording in Mongolia: "Огт γгγй") to "completely" (wording in Austria: "vollkommen", wording in Mongolia: "Бγрэн зθвшθθϖ рнθ"). After an inter-trial-interval of 500 ms the next trial started.

The experiment started with one filler dilemma, which was used for practice. Afterwards the 60 experimental dilemmas and 10 filler dilemmas were presented randomly. The experiment took approximately 1 h.

Data analysis

The data are available at the open science framework, https://osf.io/8r5uc/. Trials were excluded from analysis if participants took less than five seconds to read the scenario or less than three seconds to read the proposed action, because it can be assumed that in those trials scenarios/proposed actions were not read thoroughly. Participants with less than 10 remaining trials per condition were excluded from analysis (Austria: $N = 20$, Mongolia: $N = 30$).

We analyzed the percentage of affirmative responses to the question whether participants would carry out the proposed action. Further, we analyzed how morally acceptable participants rated the proposed action. The lowest score of the moral acceptability rating was defined as 0 and the highest score as 100. As the number of text characters of the proposed action differed between dilemmas and languages, we did not analyze the decision times, but a decision time index. The decision time index was calculated by dividing the decision time in ms by the number of text characters of the proposed action for each trial in each participant. A higher decision time index indicates longer decision times.

ANOVAs with the between-participants factor culture (Austria, Mongolia) and the within-participants factors instrumentality of harm (incidental, instrumental) and involvement (self, other) were performed on the percentage of affirmative responses, the moral acceptability ratings, and the decision time index. Post-hoc comparisons were conducted using *t*-tests. Significance values were adjusted for multiple testing using Sidak correction. When several post-hoc comparisons are reported together, minimum ($p_{\min}$) or maximum *p*-values ($p_{\max}$) are reported.

Results

Percentages of affirmative responses

Means and standard errors of percentages of affirmative responses depending on instrumentality of harm (incidental, instrumental) and involvement (self, other) separately for the Austrian and Mongolian students are depicted in Fig. 1. A significant main effect of instrumentality of harm, $F(1, 166) = 464$, $p < 0.001$, $\eta_p^2 = 0.74$, indicated a higher percentage of affirmative responses in incidental than in instrumental dilemmas. The significant main effect of culture, $F(1, 166) = 5.83$, $p = 0.017$, $\eta_p^2 = 0.034$, was modified by a significant interaction between culture and instrumentality of harm, $F(1, 166) = 38.82$, $p < 0.001$, $\eta_p^2 = 0.19$. The percentage of affirmative responses was higher in Mongolian students than in Austrian students in instrumental dilemmas ($p < 0.001$), but no significant differences between cultures were observed incidental dilemmas ($p = 0.77$).

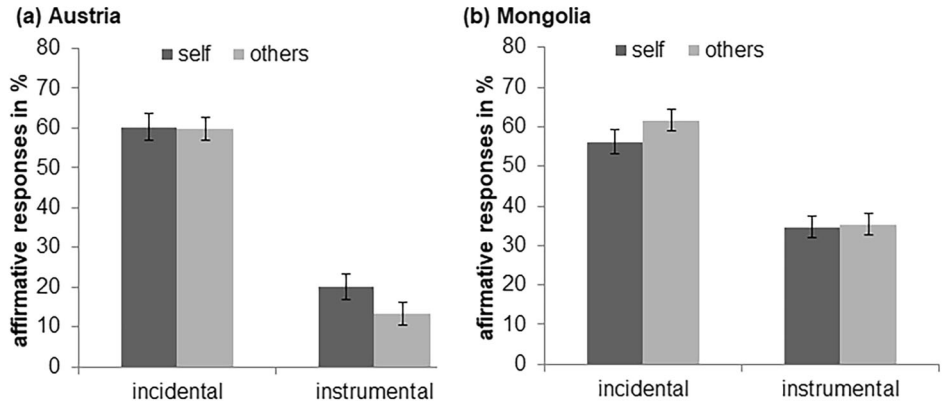

Fig. 1 Means and standard errors of percentages of affirmative responses depending on instrumentality of harm (incidental, instrumental) and involvement (self, other) separately for Austrian and Mongolian students

There was no significant main effect of involvement, $F(1, 166) = 0.025$, $p = 0.87$, $\eta_p^2 < 0.001$, but a significant interaction between instrumentality of harm and involvement, $F(1, 166) = 13.1$, $p < 0.001$, $\eta_p^2 = 0.073$, and between culture and involvement, $F(1, 166) = 5.69$, $p = 0.018$, $\eta_p^2 = 0.033$. Taken together, those interactions indicate that in Austrian students the percentage of affirmative responses was higher when their own life was at risk than when only the life of others was at risk in instrumental ($p = 0.004$), but not in incidental dilemmas ($p = 0.91$). In Mongolian students, the percentage of affirmative responses was higher when only the life of others was at risk than when also their own life was at risk in incidental dilemmas ($p = 0.013$), but not in instrumental dilemmas ($p = 0.72$). However, the three-way interaction between culture, instrumentality of harm, and involvement was not significant, $F(1, 166) = 0.35$, $p = 0.56$, $\eta_p^2 = 0.002$.

Moral acceptability ratings

Means and standard errors of moral acceptability ratings depending on instrumentality of harm (incidental, instrumental) and involvement (self, other) separately for Austrian and Mongolian students are depicted in Fig. 2. The significant main effect of instrumentality of harm, $F(1, 166) = 13.76$, $p < 0.001$, $\eta_p^2 = 0.077$, was modified by a significant interaction between culture and instrumentality of

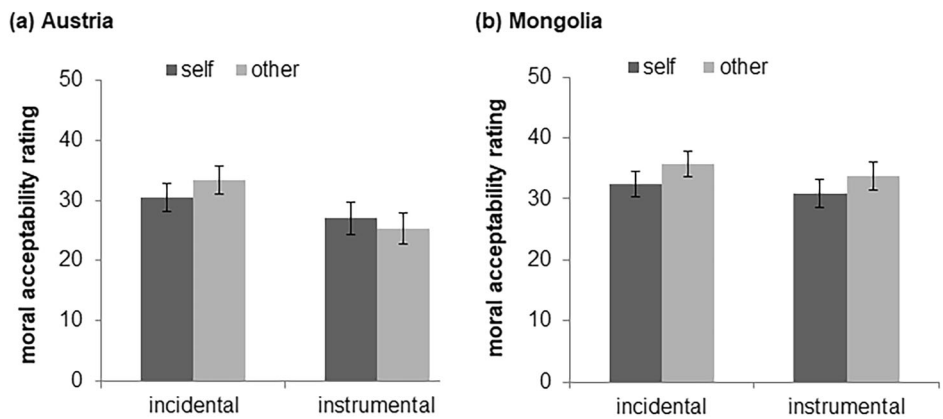

Fig. 2 Means and standard errors of morally acceptability ratings depending on instrumentality of harm (incidental, instrumental) and involvement (self, other) separately for Austrian and Mongolian students

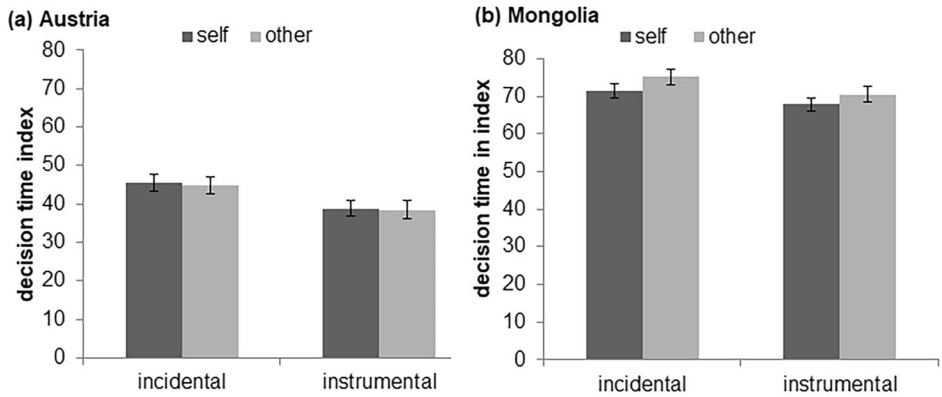

Fig. 3 Means and standard errors of the decision time index depending on instrumentality of harm (incidental, instrumental) and involvement (self, other) separately for Austrian and Mongolian students

harm, $F(1, 166) = 3.91$, $p = 0.0497$, $\eta_p^2 = 0.023$. In Austrian students, moral acceptability ratings were higher in incidental than in instrumental dilemmas ($p < 0.001$), whereas no significant differences were observed in Mongolian students ($p = 0.19$).

The significant main effect of involvement, $F(1, 166) = 8.09$, $p = 0.005$, $\eta_p^2 = 0.046$, and the significant interaction between instrumentality of harm and involvement, $F(1, 166) = 7.96$, $p = 0.005$, $\eta_p^2 = 0.046$, were modified by a significant interaction between culture, instrumentality of harm, and involvement, $F(1, 166) = 5.09$, $p = 0.025$, $\eta_p^2 = 0.03$. In Austrian students sacrificing another person was rated as less morally acceptable when their own life was at risk than when only the life of others was at risk in incidental ($p = 0.01$), but not in instrumental dilemmas ($p = 0.17$). In Mongolian students sacrificing another person was rated as less morally acceptable when their own life was at risk than when only the life of others was at risk in both incidental and instrumental dilemmas ($p_{max} = 0.011$). Neither the main effect of culture, $F(1, 166) = 1.79$, $p = 0.18$, $\eta_p^2 = 0.011$, nor the interaction between culture and involvement, $F(1, 166) = 3.85$, $p = 0.051$, $\eta_p^2 = 0.023$, were significant.

Decision time index

Means and standard errors of the decision time index depending on instrumentality of harm (incidental, instrumental) and involvement (self, other) separately for Austrian and Mongolian students are depicted in Fig. 3. A significant main effect of culture, $F(1, 166) = 128$, $p < 0.001$, $\eta_p^2 = 0.44$, indicated a higher decision time index in Mongolian students than in Austrian students. A significant main effect of instrumentality of harm, $F(1, 166) = 36.2$, $p < 0.001$, $\eta_p^2 = 0.18$, indicated a higher decision time index in incidental than in instrumental dilemmas. The significant interaction between culture and involvement, $F(1, 166) = 7.66$, $p = 0.006$, $\eta_p^2 = 0.044$, indicated a higher decision time index in Mongolian students for dilemmas, in which only the life of others was at risk than for dilemmas, in which also one's own life was at risk ($p < 0.001$). No significant difference was observed in Austrian students ($p = 0.59$). Neither the main effect of involvement, $F(1, 166) = 3.84$, $p = 0.052$, $\eta_p^2 = 0.023$, nor any of the remaining interactions were significant (culture × instrumentality of harm: $F(1, 166) = 1.88$, $p = 0.17$, $\eta_p^2 = 0.011$, instrumentality of harm × involvement: $F(1, 166) = 0.075$, $p = 0.78$, $\eta_p^2 < 0.001$, culture × instrumentality of harm × involvement: $F(1, 166) = 0.28$, $p = 0.6$, $\eta_p^2 = 0.002$).

Discussion

The aim of the present study was to investigate cross-cultural differences in moral judgements. Austrian and

Mongolian students were presented with moral dilemmas, in which some kind of threat was about to cause the death of a group of people. Afterwards an action was proposed, which described how one could intervene by causing the death of another person but saving the group of people. Dilemmas varied depending on the instrumentality of harm (incidental vs. instrumental) and depending on one's own involvement (whether one's own life and the life of others vs. only the life of others was at risk). Participants were asked whether they would carry out the proposed action or not and to rate its moral acceptability.

The present results indicate cross-cultural similarities in moral judgements with regard to the instrumentality of harm. In Austrian and Mongolian students, the percentage of affirmative responses to sacrificing one to save several others was higher in incidental than in instrumental dilemmas. This corresponds to previous studies and indicates that instrumental harm is universally regarded as worse than harm as incidental side-effect (Ahlenius & Tännsjö, 2012; Arutyunova et al., 2013, 2016; Hauser et al., 2007; Lotto et al., 2014; Winking & Koster, 2021). Further, as expected, in both, Austrian and Mongolian students, the decision time index was higher in incidental than in instrumental dilemmas. Instrumental dilemmas may elicit strong negative emotions prompting an automatic and fast disapproval of sacrificing one to save several others, whereas in incidental dilemmas negative emotions may be weaker allowing for a more thorough, time-consuming costs-benefits analysis (Manfrinati et al., 2013; Sarlo et al., 2012; Schaich Borg et al., 2006). This may have fostered more utilitarian judgements in incidental dilemmas, but may have prolonged decision times due to the greater cognitive effort compared to instrumental dilemmas (Lotto et al., 2014; dual process theory of moral judgement, Greene, 2009; Greene, et al., 2001, 2004, 2008). Taken together, those results are in accordance with previous studies and support the assumption that human moral judgements follow certain universal moral principles (Arutyunova et al., 2013, 2016; Hauser et al., 2007).

Apart from those similarities, cross-cultural differences became also apparent. The percentage of affirmative responses was higher in Mongolian students than in Austrian students in instrumental dilemmas, but no significant differences between cultures was observed in incidental dilemmas. In incidental dilemmas, utilitarian based considerations and moral principles are less conflicting, which may be the reason why most of the time both cultures acted in accordance with the greater good (i.e., sacrificing one to save several others). However, in instrumental dilemmas a greater conflict between moral principles (not to instrumentally harm someone) and utilitarian considerations (save as many people as possible) arises. In such instances Mongolian students may be more likely to violate moral principles in favour of the greater good or to adhere to culturally transmitted norms than Austrian students. This may be explained by a high focus on self-transcendent values such as relationship, community, hospitality, generosity, and supporting the welfare of the group, which are common in the Mongolian culture (Bespalov et al., 2017; O'Gorman & Thompson, 2007; Sneath, 2019). Thus, helping others (or, in the present context, helping several people that are in danger, even though that requires sacrificing one single person) may be considered as virtues behaviour (buyantai, in Mongolian, Humphrey, 1992). Correspondingly, moral acceptability ratings of the action to sacrifice one to save several others, did not differ significantly between incidental and instrumental dilemmas in Mongolian students. In contrast, in Austria, values such as hospitality or generosity usually influence the behaviour towards immediate family or close friends, but for the most time not so much towards strangers. Further, in Austria it is uncommon to interfere in each other's affairs, and Austrian students may endorse individual rights more strongly (similar to other European cultures, Heine, 2001; Kitayama & Uskul, 2011; Triandis, 2001). Thus, Austrian students may be less likely to violate moral principles by instrumentally harming one to save others. Correspondingly, in Austrian students, moral acceptability ratings were also lower in instrumental than in incidental dilemmas. Those differences between Mongolian and Austrian students are further corroborated by a higher decision time index in Mongolian than in Austrian students. Thus, there may be a stronger conflict between culturally transmitted norms on the one hand (helping others, focus on group welfare) and moral principles (not to harm someone) on the other hand in Mongolian students, which prolongs decision making.

Interestingly, those results are in contrast with some previous studies, which observed either no significant differences between cultures (Hauser et al., 2007;

Moore et al., 2011) or even the opposite, i.e., less approval to sacrifice one to save several others in Asian than in North American/European cultures (Ahlenius & Tännsjö, 2012; Arutyunova et al., 2013; Gold et al., 2014; but see Winking & Koster, 2021). So far, the predominant majority of studies on moral judgements has focused on China or Russia as representatives of Asian cultures (e.g., Ahlenius & Tännsjö, 2012; Arutyunova et al., 2013, 2016; Gold et al., 2014). As outlined in the introduction, differences in religious beliefs between cultures as well as differences in their value system may explain those diverging result. Further, due to a highly authoritarian regime in China, Chinese may believe that such decisions are up to authorities and that they have no right to intervene (Ahlenius & Tännsjö, 2012; Gold et al., 2014), which may also hold true for Russians. However, Mongolians may have a rather low power distance (i.e., more flat hierarchies, Rarick et al., 2014) compared to Russia, which is why Mongolians may perceive it as their right and duty to intervene in favour of the greater good. This may be further fostered by the fact that helping (a majority of) others (presumably even at the expense of sacrificing one other person) is considered as virtues behaviour in Mongolia (Humphrey, 1992).

One further factor that resulted in cross-cultural differences in the present study was one's own involvement (i.e., whether one's own life or only the life of others was at risk). In Austrian students, the percentage of affirmative responses was higher when their own life was also at risk than when only the life of others was at risk in instrumental, but not in incidental dilemmas. As outlined above, decisions in incidental dilemmas conflict less with moral principles, which is why the rate of utilitarian judgements is already high. Thus, one's own involvement may be less likely to influence moral judgments. However, in instrumental dilemmas, people are usually reluctant to intervene as it conflicts more strongly with the moral principle not to instrumentally harm someone (Cecchetto et al., 2018; Lotto et al., 2014). In such instances, the need of self-preservation may contribute to override such moral principles resulting in a higher rate of utilitarian judgements if one's own life is at risk (see Lotto et al., 2014 for similar results). Thus, the results seem to reflect the high focus on individual needs and self-interest in European cultures (Heine, 2001; Kitayama & Uskul, 2011; Triandis, 2001), particularly, the tendency to pursue individual goals which is common in Austria. This is further corroborated by the result that Austrian students rated the sacrifice of another person as less morally acceptable when their own life was at risk than when only the life of others was at risk in incidental dilemmas only, whereas no such difference was observed in instrumental dilemmas. This corresponds to previous research and indicates that people presumably believe that sacrificing one to save several others in instances in which harm is incidental is a more virtuous principle when their own life is not at risk (Lotto et al., 2014). However, people seem to discard this principle in favour of self-preservation in instances in which harm is instrumental and thus already more controversial.

A different pattern of results was observed in Mongolian students. In Mongolian students the percentage of affirmative responses was higher when only the life of others was at risk than when also their own life was at risk in incidental dilemmas, but not in instrumental dilemmas. Presumably, Mongolians may have more interdependent self-construals (as this is common in Asian cultures) and thus try to fit in with other members of the group (Cross et al., 2011; Markus & Kitayama, 1991). Further, they emphasize values such as hospitality and generosity (O'Gorman & Thompson, 2007; Sneath, 2019) as well as helping others (Humphrey, 1992). Accordingly, they may worry that they might be perceived as egoistic when sacrificing others to save their life as this devotes welfare to themselves rather than to the group (which is highly valued in Mongolians, Bespalov et al., 2017). This seems to become particularly apparent in incidental dilemmas, as those may allow for more cognitive resources for such considerations than instrumental dilemmas, in which one may be sidetracked by other considerations such as whether to instrumentally harm someone or not. This was further supported by higher moral acceptability ratings when only the life of others was at risk than when also their own life was at risk. Additionally, the decision time index was higher when only the life of others was at risk than when also their own life was at risk. This may indicate a fast disapproval of sacrificing others to save their own life, which may be considered unvirtuous. In contrast, if only the life of others is a risk, Mongolians students may spend more time on cognitive considerations such as the norms and values one tries to follow

(e.g., helping others, Humphrey et a., 1992), which ultimately results in the decision to help others.

It has sometimes been argued that utilitarian judgements are associated with antisocial tendencies (Bartels & Pizarro, 2011; Dinić et al., 2020), low empathic concern (Gleichgerrcht & Young, 2013), as well as lower identification with all humanity (Kahane et al., 2015) and thus do not express altruistic concern for others (Kahane et al., 2015). However, many of those studies used a correlative approach, which does not allow to determine the causal antecedents of utilitarian judgements (Kahane et al., 2015). Further, as utilitarian judgements are driven by more cognitive cost–benefit analysis, they mainly occur in contexts that evoke only weak emotional responses (Greene et al., 2001, 2004). Thus, it is unlikely that group differences in utilitarian judgements between Austrian and Mongolian students can be explained by such personality traits. As mentioned above, other factors like concern for the greater good and following culturally transmitted norms are more likely to contribute to utilitarian judgements (see also Conway et al., 2018 for an extensive discussion on whether utilitarian judgements do reflect concern for the greater good). Thus, utilitarian judgements in Mongolians most likely can be explained by concern for the welfare of the group, which also seems reasonable based on what is known about cultural values in Mongolia (Bespalov et al., 2017).

One limitation of the present study is, that the use of moral dilemmas to investigate moral judgements is associated with certain problems (see Bauman et al., 2014 for an overview). Moral dilemmas may be unrealistic and not representative of moral situations that people may encounter in real-life (Bauman et al., 2014) and participants might question the closed-world assumptions of moral scenarios (i.e., they might doubt whether the proposed action will work or whether it is the only way to solve the dilemma, Bennis et al., 2010). Further, real-life behaviour may differ drastically from hypothetical moral judgements (Bostyn et al., 2018; FeldmanHall et al., 2012). However, despite those shortcomings, moral dilemmas enable to better isolate the effects of theoretical interest, which may be entangled in more complex real-life scenarios (Kahane, 2015). Moreover, the unrealistic nature of moral dilemmas and participants' lack of familiarity with such situations may be beneficial as previous experiences and social conventions may be less likely to influence participants' responses (Cecchetto et al., 2017; Kahane, 2015). A further limitation of the present study is that we used student samples, which are not representative for the population of a whole country. In particular, whereas the capital of Mongolia becomes more and more modern and urbanized and its inhabitants become more familiar with other lifestyles and cultural values (due to influence from other countries such as Turkey, China, or Russia), about one third of the population still lives a more isolated lifestyle in rural parts of the country (Bespalov et al., 2017; Khishigdorj & Tseyenkhand, 2019). One may speculate that those differences in lifestyles may also result in different ethical norms and values, thereby affecting moral judgements differently. Accordingly, future studies might investigate cross-cultural differences in moral judgements by comparing samples from urban as well as from more rural areas of a country. Further, due to the use of student samples our participants were relatively young. It has been observed that age-related differences in moral judgements occur (cf. Arutyunova et al., 2016 for such an investigation in a Russian sample), which may be explained by age-related differences in belief systems or moral principles (McNair et al., 2019). Similarly, gender differences in moral judgments have been observed (Atari et al., 2020; Qian et al., 2023; see also Gibbs, 2021 for a review), presumably because of gender-dependent differences in the development of morality and moral reasoning (cf. Li, 2023). Thus, future research may focus on investigating differences in moral judgements in different cultures depending on age and gender. Last but not least it may be worthwhile to investigate contextual factors that may influence moral judgements and have not yet been investigated in Mongolia such as kinship/friendship (e.g. harm directed towards family members/friends, Tassy et al., 2013) or characteristics of the about to be sacrificed person (e.g. adults vs. children, older vs. younger people, disabled vs. healthy people, Kawai et al., 2014) (see also Schein, 2020 who emphasized the importance of context in moral judgment research as well as Barrett & Saxe, 2021, who argued that differences in moral judgments may result from an interaction of culture and context, rather than culture alone).

In conclusion, our results are in line with the view that different cultures follow some universal moral

principles, according to which harming one to save several others is regarded as morally worse if the harm is the instrument to save several others (as in instrumental dilemmas) compared to when it is a foreseen, but incidental side effect (as in incidental dilemmas). Further, and also in line with previous studies, moral judgments are to some extent shaped by cultural factors. More utilitarian judgements in Mongolian students than in Austrian students in instrumental dilemmas indicate that Mongolian students are more likely to violate moral principles in favor of the group welfare. In contrast, more utilitarian judgements in Austrian students when their own life was at risk than when only the life of others was at risk in instrumental dilemmas, indicate that Austrian students are more likely to violate moral principles in favour of self-interest. Thus, taken together, Austrian and Mongolian students follow some universal moral principles that may however be alleviated depending on the respective values and norms within a culture.

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Author contributions VB contributed to designing the research, programmed the experiment, supervised the data collection in Austria, contributed to analyzing the data, and wrote the first draft of the manuscript. MR contributed to designing the research, analyzing the data, and writing the manuscript. ES, EB, and DM contributed to translating all the material into Mongolian, contributed to supervising the data collection in Mongolia and gave feedback on the manuscript.

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Data availability The data analyzed in the current study are available at the open science framework, https://osf.io/8r5uc/

Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

Ethics approval All procedures performed in the present study were in accordance with the 1964 Helsinki declaration and its later amendments. The study was approved by the local ethics committee.

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