



Why do people stay put in environmentally stressful regions? Cognitive bias and heuristics in migration decision-making

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Abstract

Environmentally induced migration and mobility receives high attention in politics, media, and academia, even though non-migration is of much greater scale and probably the less understood phenomenon. The decision to leave or to stay put in an environmentally stressful region is a decision taken in the context of personal needs and aspirations, and uncertain survival and livelihood opportunities elsewhere. Information and expectations about migratory options and challenges are always incomplete, and whether migration, or rather non-migration, turns out as the personally more beneficial option depends on circumstances that are ex ante unknown and ex post not fully under control of the potential out-migrant. We argue that—despite exposure to severe environmental stress in a region—voluntary non-migration can be a viable outcome of a conscious but sometimes biased cognitive process. By highlighting the role of some relevant search and decision heuristics, we discuss why people around the globe decide to stay put in an environmentally stressful home region—despite favorable migratory options and sufficient resources for realizing opportunities elsewhere.

Keywords Regional environmental change · Migration decision-making · Non-migration · Cognitive bias and heuristics

Introduction

Human migration and mobility are mass phenomena. Currently, more than 270 million people are residing outside their country of birth; more than 700 million have moved between regions within countries, and every year more than 1.2 billion people cross borders for short-term travel (IOM 2017; United Nations 2017; UNWTO 2017). Many more people think about moving to better their life opportunities. Up to the point of deciding about moving, such people form part of a latent population of potential migrants

who—constantly or occasionally—reflect about migrating. The term “potential migrant” has hereby recently raised some interest in the context of an international survey in which about 350,000 adults in 148 countries have been asked about their “desire to move” internationally. Based on this survey, Gallup finds that globally more than 750 million adults “would like to migrate to another country if they could” (Esipova et al. 2018). This is a significantly larger number of people compared to the current global stock of 270 million international migrants (IOM 2017). Moreover, about 500 million people think they may need to move because of environmental problems within the next 5 years (Esipova et al. 2018). At the same time, millions of people, either voluntarily or involuntarily, stay put in difficult situations in their regions which are affected by environmentally induced stress and deprivation.

Most people exposed to slow or rapidly deteriorating environmental conditions do not migrate despite availability of exit options. Why? The phenomenon of non-migration receives growing scholarly attention, even though we still have little evidence available on the drivers of immobility that constrain migration and motivate individuals to stay put (Schewel 2019). This paper conceptualizes search and decision heuristics as integral elements of the decision-making

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process on migration, with non-migration as a regular outcome of this process.

The following section hereby describes decision-relevant factors of an “environmentally stressful situation,” which establishes the context for the formation of aspirations for migration, and potentially, contribute to facilitating and/or constraining its realization. In the context of regional environmental change, slowly and rapidly changing environmental stress factors may influence migration decisions in often-unpredictable ways. Methodologically, the claims in this section are based on an in-depth review and assessment of the migration driver literature with a focus on the role environmental factors may play in migration decision-making processes. On the basis of this review of the state-of-the-art, we then theorize on the migration decision-making process and discuss decision heuristics as (often simple) cognitive rules that affect both the search process for behavioral (including migratory) options and the outcome of a migration decision-making process. The last section specifically discusses non-migration as the result of a cognitive process focusing specifically on heuristics that may contribute to the decision to stay put—despite an environmentally stressful situation.

This paper makes a novel contribution to enhance our understanding of migration decisions taken under circumstances where environmental stress affects both the aspirations and capabilities of people to move outside their region. We define a potential migrant as someone who has subjectively good reasons and therefore aspires to relocate in order to improve personal life situations and prospects. We hereby emphasize the role of decision-making heuristics and cognitive biases in migration decision-making processes, which may ultimately lead to voluntary immobility as the behavioral outcome.

Regional environmental change as the “root cause” of migration

Migration scholars have identified and studied several fundamental drivers of migration such as economic, political, social, cultural, demographic, and increasingly also ecological and environmental factors (for comprehensive reviews see, e.g., Massey et al. 1993; Ghatak et al. 1996; Hagen-Zanker 2008; King 2012; Czaika and Reinprecht 2020). Economic drivers are hereby the most fundamental and operate as key push and pull factors (Lee 1966), such as unemployment, wage disparities, or (lack of) economic prospects and opportunities. For instance, decisions whether to migrate and where to relocate are often at least to some extent influenced by expected income differentials or the relative position in the earnings distribution with respect to relevant others (the “peer group”) (Mayda 2010; Czaika 2012; Joseph

and Wodon 2013; White 2015; Czaika and Parsons 2017). However, economic theory acknowledges that it may be economically also rational not to move due to (short term) costs in form of place-dependent losses in knowledge, skills, or professional ties (Fischer et al. 1997). At the same time, economic models of migration fail to explain why despite massive (domestic and international) income discrepancies only a relatively small proportion of people decide to migrate (Bogue 1977; Fischer et al. 1997; Hagen-Zanker 2008). The neoclassical cost–benefit theory is hereby criticized for putting the well-informed, fully rational individual at the core of these models (Sjaastad 1962; Todaro 1969; Borjas 1987; Bertoli 2010), thereby arguably disregarding limited agency, information-processing capacities, and cognitive biases (Czaika 2015). These conceptual limitations of standard neoclassical theory motivate the contribution of this paper.

Besides economic factors, socio-political factors such as the prevalence of war and civil conflict, instability and insecurity, military conscription, fear of persecution, human rights abuses, widespread corruption and insufficient political representation, lack of democratic rights are also key structural drivers of (politically motivated) migration (Rodriguez and Villa 2012; Dimitriadi 2017). Furthermore, (perceptions of) immigration policies affect migration decision-making by altering economic and non-economic prospects of migration (De Jong and Harbison 1981; King and Skeldon 2010). A range of migration-related policies at destinations, such as family reunification regulations or opportunities for asylum status, has the potential to affect intentions and decisions to emigrate (Koser 1997; Collyer 2005; Czaika and de Haas 2013; Barthel and Neumayer 2015; Czaika and Hobolth 2016; McAuliffe and Jayasuriya 2016; Dimitriadi 2017).

Furthermore, socio-cultural factors affect migration and mobility decisions by facilitating or constraining migration capacities and by shaping personal preferences and aspirations (Radu 2008). Social contacts or transnational ties with prior migrants are resources that might enhance migration intentions and its facilitation by providing information and assistance (Stark and Bloom 1985; Garip 2008). This can create a “culture of migration”—the adaptation of values, norms, and perceptions as migration gains relevance in people’s lives (Massey et al. 1993)—making one-off but also circular migration more likely. In this socio-cultural environment, temporary and permanent relocation can become a norm, or rite of passage, for an entire community (Kandel and Massey 2002). Moreover, people may migrate to support their families, re-join their families, or migrate in pursuit of marriage (Boyd 1989; Rao and Finnoff 2015; Gowen and Denyer 2018). At the same time, social bonds with family and in broader communities establish an important retaining factor (Schewel 2019). For instance, a survey of young

people in Ethiopia, India, Peru, and Vietnam finds that a majority aspire to stay; particularly, the poorest and least educated stated that the main reason to stay was that they had family there (Schewel and Fransen 2020). Economic factors such as having a job or owning property, respectively, were mentioned by ten (5%) of respondents as their main reason to stay, respectively.

Climate change and environmental stress due to rising sea levels, droughts, desertification, etc. are predisposing factors that make migration increasingly likely in the longer term, while more proximate events like natural hazards have the potential to trigger immediate, short distance displacements, but may also force people to migrate more permanently and over longer distances (Black et al. 2011; Shen and Binns 2012; Martin et al. 2014; Veronis and McLeman 2014; Islam 2017). Embedded into fundamental economic, political, and societal settings, environmental factors and disparities caused by discrepancies in the availability of natural resources such as fertile soil or freshwater may establish a migration-inducing social-environmental context. Detrimental effects of climate change as well as acute environmental shocks, such as earthquakes, droughts, or floods, destroy livelihoods and may lead, e.g., to food insecurity. In addition, such pressures result in fragility and immediate shortages in health systems and services, e.g., due to power cuts caused by flooding as for instance experienced in Puerto Rico in 2017 (Kishore et al. 2018). Even though most disaster-induced displacements are rather short distance and only last for a short period, in some cases, displacements caused by natural disasters may lead to cross-border movements, such as the 2020 drought affecting the Cunene River basin and neighboring regions where people moved from the Western part of Angola's Cunene province to neighboring Namibia.

The role of climate and environmental change as a predisposing driver of internal and international migration is extensively studied, yet predominantly for developing countries and the global South (Migali et al. 2018). Studies find that slow-onset changes in temperatures and precipitation are associated with emigration, particularly from more agricultural countries and rural areas (Backhaus et al. 2015; Bohra-Mishra et al. 2014; Cai et al. 2016; Nawrotzki et al. 2015). However, if climatic factors are evaluated alongside economic factors, the latter's effects are often stronger (Joseph and Wodon 2013), and some studies suggest that climate change does not directly influence migration intentions and behavior (Abu et al. 2014; Beine and Parsons 2015; Codjoe et al. 2017; Mortreux and Barnett 2009). Instead, the effect of climate change on migration is primarily through its impact on economic factors such as agricultural income, livelihood opportunities, food security (Martin et al. 2014; Khavarian-Garmsir et al. 2019), health-related risks (Marchiori et al. 2012), or conflict (Abel et al.

2019). In environmentally stressful situations, it is often the most adversely affected and financially constrained who are unable to move (Veronis and McLeman 2014). In short, migration as an adaptation strategy is not available to all (Cattaneo et al. 2019).

In addition to gradually worsening environmental conditions, sudden environmental shocks such as floods, storms, droughts, or earthquakes may also trigger migration. Natural disasters predominantly lead to increased internal but less international migration (Beine and Parsons 2015; Islam 2017; World Food Program 2017). However, sudden-onset disasters might be the underlying cause for the deterioration of more proximate economic drivers, such as deprivation, loss of assets, and joblessness (Warner et al. 2010; Wodon et al. 2014). In field studies, respondents often refer to economic factors, such as wages and market inaccessibility, as reasons for migration; even though the underlying cause, however, is a gradual or sudden environmental deterioration (Afifi 2011; Mora and Taylor 2006). Natural disasters may also lead to temporary migration (Mallick and Vogt 2012) and indirectly affect migration through increasing conflict (Naudé 2010). However, other studies do not find evidence for disasters or threats thereof on (internal) permanent migration (Bohra-Mishra et al. 2014) or the number of asylum seekers (Neumayer 2005).

Overall, the evidence on environmentally induced migration and displacement is mixed. In environmentally stressful situations, some people move outside risk zones while others remain. Immobility can be voluntary and be explained by a variety of factors, such as place attachment (Adams and Kay 2019; Nawrotzki and DeWaard 2018) and reasons related to family (Schewel and Fransen 2020). However, people might also be immobile due to a lack of aspirations or capability or any other factor that limits their ability to move (Carling 2002; Schewel 2019).

This implies that both, mobility and immobility, can be the behavioral outcome of slow-onset or fast-onset environmental stressors. However, we argue that even in environmentally stressful situations, other economic, political, and socio-cultural factors are still relevant factors in the migration decision-making process. We acknowledge that even fundamental drivers of migration or non-migration, often called "root causes," do not work in isolation but operate as part of complex driver configurations in which multiple migration drivers interact (Czaika and Reinprecht 2020). Driver interaction occurs when the effect size of one factor depends on the presence and intensity of another intervening factor. Thus, interaction effects indicate that (a set of) other factors influence the causal relationship of a certain driver and migration or non-migration as the outcome.

Complex configurations of interacting economic, political, social, and environmental factors establish the location-specific pre-conditions for migration decision-making. The

literature has highlighted multiple forms of interactions involving environmental factors. For instance, interactions and conjoint effects of environmental stress and economic drivers (Martin et al. 2014; Khavarian-Garmsir et al. 2019), environmental stress and conflict (Abel et al. 2019), or environmental stress and health-related risks (Marchiori et al. 2012) on people's livelihoods have been identified in influencing migration decision-making. Groen and Polivka (2010) show that a person's age and income, i.e., demographic and economic drivers, had influenced e.g., the decision to return to New Orleans after Hurricane Katrina. Those whose livelihoods had been destroyed in August 2005 often did not return at all due to fear of repeated events or because new opportunities had arisen at their new place of residence (ibid.). Similarly, complex interactions of political, economic, and environmental drivers have contributed to displacement and emigration from Zimbabwe and Afghanistan (McGregor et al. 2011; Smith et al. 2011). For instance, frequent droughts in Zimbabwe disproportionately affected the rural population due to the underlying insecurity created by political and economic instability. Political conflict in the face of economic collapse, large potential economic gains from mineral resources and illicit opium trade in combination with increasing water scarcity have conjointly contributed to the migration of larger populations.

In sum, climate change and environmental stress influence migration mostly only indirectly through their effects on other drivers, particularly on income. For instance, dwindling fish stocks and decreased agricultural productivity reduce the reliability of household income in the absence of viable adaptation measures (Black et al. 2011). Moreover, the effects of environmental stress on economic livelihoods often induce only some to migrate, while others may lack the aspiration or financial capacity to do so (Foresight 2011). Consequently, (non-)migration as the outcome of a self-selecting process and a consequence of environmental stress should hence be analyzed as part of a broader set of drivers and a configurational driver environment.

Mobility decisions in the context of complex migration driver environments

Having outlined an array of contextual migration drivers that conjointly constitute a complex driver environment, we may be puzzled why not many more people migrate to realize opportunities elsewhere, or why not more people living in an environmentally stressful situation decide to escape, even if they could afford it. As we already mentioned, roughly 750 million adults globally aspire to migrate if they had the chance to do so. This is a surprisingly small number given the fact that a supposedly much larger (yet unknown)

number of people would have good reasons to migrate internationally to realize better opportunities elsewhere.

We claim that migration and mobility decisions in the context of environmental stress have to be understood not only deterministically with regard to the environmental stressors themselves but also to the broader migration driver environments within which situational migration decisions are taken. The combination and interaction of economic, political, social, cultural, and demographic drivers shape the effect of environmental stressors on migration (Black et al. 2011). Multiple drivers often act simultaneously, and environmental stress might be both the cause and the consequence of changes in economic, political, or social conditions (Renaud et al. 2011). Migration is hereby an important means to adapt to changing environmental conditions, particularly in regions with high weather variability (Jónsson 2010; van der Geest 2011).

In general, migration decision-making can be thought of as a two-step process (Brown and Moore 1970; Carling and Schewel 2018). Individuals first decide whether they want to migrate and then where they want to relocate. The first step involves developing the intention rather than merely a vague desire to migrate following an (implicit) assessment of the complex driver environment people are located in. Individuals exposed to environmental stressors arguably put more emphasis on the complex driver configurations that involve environmental factors. The second step involves the editing of migratory or behavioral options and the eventual decision to migrate or stay.

To realize migration, individuals require economic, social, emotional, and cognitive resources (Carling 2002; de Haas 2010). Carling (2002) calls people "involuntarily immobile" if they aspire to a better life—and are aware of migratory opportunities to fulfill these aspirations—but unable to realize migration due to the absence of material (e.g., money) and non-material (e.g., social capital) resources. In this case, people may feel trapped and usually sense frustration and cognitive dissonance (Czaika and Vothknecht 2014). As a consequence, two responses are possible. First, aspirations may be adjusted downwards with the less desirable status quo being accepted. This may ultimately lead to an "aspirations trap" (Appadurai 2004) where individuals simply give up on their dreams and aspirations. Second, the ability to realize the aspired life, to which migration may be instrumental, might increase over time. Aspirations and their realization through migration are mutually interdependent. Aspirations can stimulate actions leading to an improvement in the ability to realize locational and personal change. At the same time, aspirations can be the result of prior migration (Czaika and Vothknecht 2014).

However, even potential migrants who both aspire to and can realize migration might still not migrate if they are unable to decide upon migration options. A perceived

discrepancy between aspired and actual life situations is the precondition for behavioral decisions and actions. Aspirational gaps may be a necessary but certainly not sufficient condition for a decision to migrate, i.e., aspiration gaps per se do not necessarily lead to (an attempt to realize) relocation since migration may still be deemed too costly from both an economic and non-economic (e.g., socio-psychological) point of view. In situations where aspirational gaps are unrealistically “extensive” and unlikely to be realized, potential migrants may decide against migration to avoid future regret (Czaika and Vothknecht 2014).

Moreover, locational choices and decisions depend on the emotional and cognitive capacity of the decision-maker to search for opportunities and (a limited number of) options. Information about possible migration alternatives must be identified, investigated, and evaluated. Attention and time dedicated for informational search affects the amount and quality of information available to the migration decision-maker. This involves the collection and processing of information about available migration opportunities including information on potential destinations, possible entry routes, possible job opportunities, but also possible risks and uncertainties related to migration journeys and outcomes. Searching for comprehensive information places high demands on potential migrants’ decision-making capacity (Simon 1955, 1990; Selten 1998; Gigerenzer et al. 1999).

Finally, migration and non-migration, respectively, can both be considered as alternative outcomes of a bounded rational decision-making process in which decision-makers apply some simple decision rules or heuristics (Tversky and Kahneman 1974; Kahneman and Tversky 1979, 1984; Gigerenzer et al. 1999). Although decision heuristics have received relatively little attention in the migration literature, they are intensely studied in psychology (Tversky and Kahneman 1973, 1974; Bodenhausen and Wyer 1985; Shah and Oppenheimer 2008; Gigerenzer and Gaissmaier 2011) and applied to other fields such as political science (Lau and Redlawsk 2001). Heuristics are unconsciously or automatically used “methods for arriving at satisfactory solutions with modest amounts of computation” (Simon 1990, p.11). Bounded rational decisions are based on a limited evaluation of imperfect information (Selten 1990), and heuristics are shortcuts that the evaluation process “more quickly, frugally, and/or accurately than more complex methods” (Gigerenzer and Gaissmaier, 2011, p.454). Decision heuristics might not necessarily result in worse decisions in terms of people’s (hypothetical) choices under full information and perfect information processing (Gigerenzer et al. 1999; Lau and Redlawsk 2001; Gigerenzer 2015).

We hence posit that migrant decision-makers use heuristics for searching and evaluating information on potential destinations and decide whether and where to relocate. The—often-subconscious—choice of heuristic is

constrained by those actually available to the decision-maker. Factors that might affect the availability set include personality traits, socio-cultural background, and social learning. For instance, potential migrants who exhibit regret avoidance might overwhelmingly accept the status quo and rather stay put; others will intuitively follow well-established and culturally dependent decision rules such as imitating the successful or the majority.

In the following, we discuss the concepts of satisficing, availability, and recognition as heuristics predominantly used for searching and identifying migratory options. We further argue that prospect theory, status quo bias, the endowment effect, sunk costs, regret avoidance, one-reason (or few reasons) decision-making, imitation, and affect are all helpful concepts to understand how potential migrants evaluate migration options and to explain why people may not decide to migrate despite the availability of objectively good reasons.

Search heuristics: Awareness and active search for migration opportunities

Potential migrants choose a migration destination from their awareness space, i.e., the destinations they are aware of and have some information on (Wolpert 1965; Brown and Moore 1970). Information search may be guided by accurate, factual, and objective representations of, for instance, potential destinations, but also by imaginations, expectations, and perceptions thereof (Haberhorn 1981; Thompson 2017). Information search itself can impact on imaginations, expectations, and perceptions (McKenzie et al. 2013; Volcic and Erjavec 2013; Thompson 2017). Neoclassical decision theory states that individuals try to obtain as much information as possible in order to make the best possible decision (Epstein 2008, p.573). However, evidence shows that a larger amount of information does not necessarily result in better decisions (Scheibehenne et al. 2010). On contrary, too much information can result in cognitive overload, poor decisions, or ultimately, no decision at all (Keller and Staelin 1987; Gigerenzer and Gaissmaier 2011; Peters et al. 2013).

The question therefore arises when individuals (should) stop searching for additional information. A “neoclassical” decision-maker is supposed to search for information until search benefits outweigh search costs (Stigler 1961). Cognitive sciences, however, present satisficing, availability, and recognition heuristics as alternative concepts for searching (and its stopping) information. Satisficing suggests that the search for behavioral including migratory options is stopped once a satisfactory option is found whose expected outcome promises to reach or surpass a certain level of satisfaction which is usually less than the aspired level (Selten 1998; Simon 1955). Satisficers do not (aim to) maximize the

potential benefits of migration. This means, even if migration would be perceived as superior to non-migration, the latter may still be the behavioral outcome if it is considered a “good enough” option. The satisficing heuristic specifies the conditions under which search for information and cues is both triggered and stopped. If after a certain search period no migratory option satisfies the aspired level of satisfaction or promises to sufficiently reduce aspiration gaps, the decision-maker may decide to stop the search process and to remain in the status quo situation and location, that is, not to migrate and to stay put.

The object of search heuristics is information. Information search can be external (e.g., friends, books, internet) but also internal (a person’s memory). Availability refers to the ease by which, for instance, characteristics of a potential place or location can be retrieved from people’s own memory, i.e., from experience or past information (Tversky and Kahneman 1973, 1974). The recently acquired information is hereby considered more relevant and can be retrieved more easily. A destination country, for instance, that is repeatedly in the news will be more available and, hence, can be more easily recalled by potential migrants, even if the news is not related to migration. For instance, major sports events like the Olympics or a summit of world leaders might suffice to temporarily increase the attention and availability of certain countries or locations. But also, historical linkages and cultural ties to other countries make some migratory options more likely to be cognitively available. Generally, countries or locations that are medially more “available” are more likely to be considered as potential destinations than places that cannot be retrieved from memory easily.

Moreover, the recognition heuristic suggests that if individuals recognize information about some potential migration options, they might ignore other cues, and even contradictory information (Gigerenzer and Gaissmaier 2011). People are usually biased by the recognition heuristic only considers countries or locations that are cognitively available to them. These can be countries or places they have traveled to or heard of before. People who are less informed or geographically educated are more prone to stay put to due a lack of cognitively available options. At the same time, decision-makers that rely on the recognition heuristic usually ignore information that contradicts their imaginations, expectations, and beliefs. For instance, a positive image of a destination country as being welcoming, progressive, and full of opportunities to increase life satisfaction—which may, by the way, be the constructed image or brand of a country (Anholt 2007)—might result in the rejection of contradictory cues, such as rising xenophobia and economic difficulties. The recognition heuristic may particularly play a role in the decision-making between alternative migration options. Facing the choice between a place visited or having friends, and one never heard of, decision-makers will most likely

choose the former. Only adventure seekers—those who see migration as an end in itself—might rather be appealed by unknown places.

Status quo bias and beyond: Why people often do not migrate despite good reasons

Migration scholarship has identified various environmental and climate-related drivers of migration. However, migration studies have long ignored the question of why people do not migrate despite environmental stress and potentially promising prospects and opportunities elsewhere (Schewel 2019). Behavioral sciences suggest three possible cognitive biases for this phenomenon:

1. Status quo bias, i.e., people have a strong preference for the context and situation in which they currently live in, which can be additionally reinforced by the
2. Endowment effect, i.e., people value what they have higher than what they could have, even if both have objectively the same value, and
3. Regret avoidance, i.e., people rather try to avoid anticipated negative outcomes that result from the action than from inaction.

Migration decision-makers face transition costs incurred by moving away from the status quo. This makes any change in personal circumstances per se costly, in particular when a change in the place of residence is involved. Transition costs may hereby go beyond some financial, socio-economic, or psychological costs of moving, which are traditionally acknowledged in migration studies; but transition costs also involve costs such as those associated with searching for information and coping with uncertain migration outcomes. Place attachment has increasingly been highlighted as another contributory factor explaining the status quo bias of potential migrants despite environmental stress (Swapan and Sadeque 2021). Therefore, even in the absence of (or negligible) migration costs, a discomfort due to uncertain migration outcomes may lead to inertia and status quo boundedness. Therefore, people with migration aspirations (and those who can realize them) may decide about long-term relocation only after an uncertainty reducing “exploration visit” to the potentially new place of residence (Czaika 2015).

As another reason for a strong and sometimes even irrational preference for the status quo, Kahneman and Tversky (1979), Tversky and Kahneman (1991) provide experimental evidence that in people’s decision-making, losses weigh more than equal-sized gains. Applied to migration decisions: if the status quo in needs satisfaction is the relevant reference point for assessing migration options, people place

more importance on potential losses than on “similar-sized” potential gains, which as a result may keep them in their status quo at the current place of residence (Thaler 1980). This cognitive bias leads to a situation where people value the place where they reside higher than another place, even if the latter is related to a smaller risk of personal loss. Therefore, the propensity to migrate of people with aspirations and good prospects for realizing gains from migration is smaller than the likelihood for not migrating when facing equal-sized losses.

A third reason for a status quo bias in migration decision-making—i.e. voluntary immobility rather than realization of potentially gainful migration opportunities and prospects—is the role of sunk costs, i.e., costs that have already been incurred and cannot be recovered. For instance, people with migration aspirations may hereby not migrate—or if migrated, do not return or move onward—because of prior investments, for example, in housing, social networks, or a business; or in non-transferable skills and knowledge such as language, some forms of education, company-specific on-the-job training, etc. The more effort an individual has invested into the status quo assets, the less likely is a subsequent self-determined change in the personal situation. Therefore, the longer someone has spent time in a certain job, profession, company, country, or any other socio-cultural context, the less likely is that person to be motivated for a change in place and/or role or position—even if it would be “objectively” beneficial.

Finally, and similar to the sunk costs effect, Kahneman and Tversky (1982) find that individuals feel stronger regret about negative outcomes that are the result of actions taken by the individual than they do about similar negative consequences resulting from inaction. The propensity to avoid “migration regret” implies that potential migrants tend to decide against the risks involved in migration, even if the overall prospects seem poorer if they were to stay than if they were to leave. Regret avoidance can therefore be another reason for immobility and a relatively low migration propensity despite the availability of good migratory options.

Bounded rationality and the use of heuristics in migration decisions

Expected utility theory (von Neumann and Morgenstern 1944) and rational choice lie at the heart of the neoclassical model of migration (Lee 1966). According to this theory, potential migrants carefully weigh the utilities and risks associated with different migration destinations and choose the one that maximizes their utility. However, human beings usually do not decide according to expected utility theory, as they do not fulfill its strict assumptions but are rather to

be characterized by a limited or bounded rationality (Simon 1955), including:

1. A limited capacity to process information
2. A limited time to search for information
3. Endogenous needs, preferences, and risk attitudes

A central feature in decision-making is that choices are often greatly simplified. This means that people apply heuristics which make individually sense but are often rather situational than general (Gigerenzer et al. 1999). For instance, and as already discussed, satisficing as an information search heuristic but also a decision-making principle implies that people seek satisfactory rather than optimal solutions. However, there are various other heuristics, which potential migrants may apply when they decide about migration. In the following, we provide a selection of such heuristics that might explain non-migration and voluntary immobility in the context of environmental stress.

One-reason decision-making

If a potential migrant has identified several satisfying migration options, she might choose the best of these options according to a personal evaluation of respective attributes. In one-reason decision-making, only a single piece of information is used to make a choice. One-reason (or few reasons) decision-making reduces the number of evaluated cues per migration option to simplify the decision-making process and to make it quicker and more frugal (Shah and Oppenheimer 2008). For instance, potential migrants might only or overwhelmingly care about physical safety and evaluate potential migratory options according to this cue. Research has confirmed that threats to personal integrity can be the sole or overwhelming reason to migrate (Davenport et al. 2003). Potential migrants eliminate options that do not exceed a certain subjective threshold of personal safety needs. They might then settle for a place following the satisficing, availability, or recognition heuristic or re-evaluate the remaining potential options according to a different cue.

Imitation

People often imitate the majority (“herd behavior,” cf. Epstein (2008)) if information search is costly and time-consuming and life circumstances are changing rapidly, e.g., during or after a natural disaster or in the face of sudden-onset environmental change in the region. Individuals observe “relevant others” in their peer group and try to imitate their (migration) behavior according to the rationale “they can’t be all wrong.” Imitation of the successful (“I can do the same”) is a variant thereof. Both imitation heuristics imply discounting private information in expectation that

others base their decision on more or better-quality information (Epstein 2008). Such decisions require little time and knowledge and thereby reduce the need for direct information gathering (Gigerenzer et al. 1999). For instance, the fact that very few households who were affected by cyclone Aila in 2009 did permanently migrate (Mallick and Vogt 2012) might be an instance of imitation and/or of place attachment (Barcus and Brunn 2010). Only few migrated because few attempted to migrate in the first place.

Affect

The affect heuristic states that feelings and emotions influence decisions (Slovic et al. 2005). For instance, if people (dis-)like things, they generally perceive risks as low (high) and benefits as high (low). For instance, the question “What do I know about the pros and cons of a certain destination?” is replaced by the emotionalized question “Is it a fancy destination?” The decision is not taken on the basis of an evaluation of factors in favor and against migration but rather on the basis of feelings and emotions. If potential migrants feel attracted by a particular location, they will evaluate this option more favorably. An emotional (but often dangerous and therefore irrational) attachment to the current place of residence called “home” or the current workplace (Esipova et al. 2011) is in most cases the key reason for sedentariness and voluntary immobility. Given that people generally value what they have higher than what they could have (endowment effect), affect and emotional attachment to the status quo can explain non-migration despite environmental stress.

Exploration–exploitation

Migration decisions depend on the timing of a decision. Following the exploration–exploitation tradeoff (Mehlhorn et al. 2015), potential migrants may explore multiple migration options and choose the one they see fit only if time permits. For voluntary migration with ample time for migration decisions, (virtual) exploration of potential migration destinations have been shown to affect migration desires and resulted in more concrete migration plans (Thulin and Vilhelmson 2016). For quick decisions, they might either exploit alternatives they already know, such as non-migration, or rely on heuristics, such as satisficing, availability, or imitation. Whether potential migrants explore or exploit (non-)migration options depends on individuals’ cognitive resources, information, and time available. The fact that individuals often migrate internally rather than internationally following an environmental shock might largely be due to the insufficient time to explore unknown alternatives further away from home.

Public commitments and sunk costs

Public commitments and sunk costs can both play a role when people stick to a decision, even though it might not be beneficial (anymore) to do so. Announcing to migrate or not to migrate puts pressure on individuals to commit to the decision, especially when the commitment was made public (Kalter 1998). For instance, people may have told or even promised their parents, their boss, or friends to stay put and might feel obliged to stick to this commitment even if external circumstances change, such as through slow-onset regional environmental changes. Although sunk costs should be ignored according to rational choice theory, people in fact do not ignore costs that have already incurred and cannot be recovered (contrary to prospective costs). When people have invested or put effort into assets, housing, non-transferable skills, etc., they are often reluctant to relocate because of its (perceived) loss, even if continued refusal to leave/return will lead to even bigger losses. Future sunk costs associated with a migration decision (e.g., for travel and search costs) and uncertain future payoffs might be a further reason why migrants choose to stay put and postpone the migration decision (Khwaja 2002).

Ex post rationalization

People often actively seek for reasons and information that will confirm their decisions retrospectively (ex post rationalization). Alternative options are considered as less favorable after the decision is made (Brehm 1956). Information that will disconfirm or doubt the decision is ignored in order to avoid cognitive dissonance and produce peace of mind (“it was the right thing to do,” Leon 1962). Public commitments, sunk costs, and ex post rationalization combined can hence result in persistent non-migration despite the existence of objectively good reasons to migrate.

Conclusion

Millions of people worldwide are exposed to increasingly stressful situations caused by environmental change and degradation and have therefore developed a desire to leave their region. However, we may be puzzled why a vast majority of these environmentally stressed people never migrate to escape their fate. Migration scholars have long argued that immobile people with aspirations for migration can simply not realize them and therefore feel trapped in environmentally stressful situations. However, this kind of “involuntary” immobility is not at the focus of this paper. We are rather intrigued by millions of people who voluntarily decide to stay put in their region despite being exposed to environmentally stressful and often desperate situations. We refer

to recent insights from behavioral and cognitive sciences for explaining the phenomenon of “non-migration.”

We hereby argue that “in situ” adaptation in the region can be explained by the way heuristics and cognitive dispositions influence migration decisions. The decision not to leave a region that is detrimentally affected by the environmental change is usually not the result of limited information, lack of material resources, or even irrationality. The decision of staying put in a region is rather a cognitive-behavioral outcome involving both people’s capacity to make self-determined decisions yet influenced by an undetermined set of certain search and decision heuristics and cognitive biases.

The aim of this paper is hereby to open the “black box” of migration decision-making which is often presumed (by policymakers) and conceptualized (by academics) as an either fully “rational” or overly “complex” cognitive process. We discuss examples of relatively simple but relevant search and decision heuristics that are presumably influential if not decisive in migration decisions. They explain why non-migration can be a viable behavioral outcome of this cognitive process—even if fully informed and rational calculations would favor migratory action. Search and decision heuristics can explain why people may end up not migrating, despite migratory opportunities, favorable cost–benefit calculations, and sufficient aspirations and capabilities for realizing migration.

We argue further that migration decisions are based upon the evaluation of cognitively edited migration and non-migration options. This process involves certain heuristics to organize, reformulate, and select information on the alternative options to be considered in the decision phase. The editing phase may involve simplification, detection of dominance, or cancelation of information about certain cues of alternative behavioral options. The ultimate decision of whether to migrate, or rather not, is then the result of a cognitive process involving the application of some decision heuristics and cognitive pre-dispositions.

In this process, emotional factors often come into play. Even more in the context of sudden environmental stress and disaster-like situations, affect and emotions may significantly influence cognitive processes of editing and evaluating behavioral (including migratory) options. However, we still do not know enough about the role of emotions in the cognitive processes of evaluating, and ultimately deciding, about migration, particularly in stressful situations (Czaika et al. 2021).

This contribution adds not only to a more nuanced understanding of people’s decision not to migrate despite risks for life or other good reasons, but it may also reduce epistemic uncertainty in modeling and scenario building of migration and displacement because of global and regional environmental change and degradation. For instance, by integrating features of cognitive biases and

decision heuristics into forecasting or agent-based models of migration may lead to more realistic assumptions, and ultimately, assessments of the environmentally driven risks for large-scale population movements within and out of a region. Future research and empirical inquiry, however, will have to explore the extent to which migratory decisions of individuals exposed to environmental stress are indeed driven by such heuristics and cognitive biases.

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Declarations

Conflict of interest The authors declare no competing interests. Constantin Reinprecht is the recipient of an ESRC scholarship.

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