

Modeling the impact of protraction on refugee identity

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Abstract. This study presents an agent-based model of identity shift based on refugees in protracted situations. The model is based on interactions between refugees, local citizens, and nongovernmental workers. Through repeated interactions at the individual level, we see the emergence of groups of identities that are generally neutral—not nationalistic nor specifically locally or globally focused. The model provides a starting point for understanding the processes of long-term protracted states of displacement on the general shift in identity among refugee populations in both camp and non-camp based settings.

Keywords: Agent-based modeling; ABM; Refugees; Protraction; Identity

1 Introduction

Massive forced migration of people is quickly becoming a defining feature of our time. From the waves of Syrian and African refugees collecting at the borders of Europe to the protracted refugee situations that have been going on for multiple decades, displacement is a humanitarian concern at the local, state, and global levels. Forced migration including refugees, asylum seekers, and internally displaced persons are at historic highs, with time spent in exile averaging around 25 years [1, 2]. This means that generations of people are born into refugeehood, without direct experience living in the state to which a repatriation effort would send them. What does this mean for traditional territorial notions of state sovereignty? How do refugees born, raised, and educated in exile conform to our understanding of citizen or nationality? This paper uses a modeling and simulation approach to theorize on the implications for identity shift as refugees are kept away from ‘home’ for extended periods of time. Using an agent-based model to look at identity shifts, we construct two scenarios: camp-based refugees with limited interaction with locals in the host population, and urban refugees with regular intermingling with local host nationals. While this only paints a theoretical picture of what may be happening among the millions of refugees in protracted situations globally, it demonstrates a methodology for theorizing about attitude shifts away from traditional notions of citizen and territorially-based sovereign states.

2 Protraction and Refugee-based Identity

The United Nations defines protracted refugee situations as those where a group of more than 25,000 people have been displaced for at least five years [3]. Conservatively, this definition may include around 70% of all refugees, with around 70% of protracted cases stretching at least two decades [4, 5].

Whether in camps or urban areas, decades spent in exile equates to generations born outside of the parents' country of origin and experiencing life outside of traditional notions of 'citizen' or 'nationality.' Physically, refugees exist at the local level of host country spaces. Given the extensive exposure to regional and international NGO workers and the values and norms these individuals transmit through daily interactions, refugees also occupy a supraterritorial space. This is also true of their involvement in the global economy [6] and potential for a role in international conflict [7] and peacebuilding [4]. Refugees also represent disruption of social contracts understood to exist between the citizen and state, as they flee from the failure of their home state to protect them [8-10].

Refugees embody a kind of 'imagined community' [11] among displaced persons that persists despite the realities of ongoing conflict, generations of separation, and inaccessible citizenship rights in their own country of origin. Whether urban or rural, refugees reconstruct identities of themselves that differentiate them both from the host population and their country of origin. Malkki's [12] research points to an idea that refugees construct different types of identities in urban spaces than in rural, presumably in response to increased interaction with the local population and opportunities to adapt to different cultural norms, languages, and economic opportunities.

In cases of long-term forced displacement, refugees may construct identities around the refugee label, where humanitarian intervention "schemes become a vehicle for transforming an identity where refugees are marginalized into a segregated and permanently transient and dependent status" [13]. In these contexts, refugees demonstrate agency to negotiate their identities as they adopt the label 'refugee' for "political currency" to reap certain benefits from humanitarian actors [13]. Zetter proposes the notion that reliance on the refugee label for aid dependency is an act of agency used to sustain an "image of transitory status" and lay claim to the politicized status of refugeehood in protraction [13].

This paper presents a preliminary model as part of a longer-term study on the identity of protracted refugees. Using an agent-based modeling and simulation approach, the current theoretical model examines how identities may transmit between individuals and how interactions with other identities—limited in the case of encamped refugees and more widespread among urban refugees—shapes the overall identity values. Unlike sociological and anthropological research, modeling and simulation necessitates abstraction in an effort to understand potential underlying dynamics of complex phenomena like identity shifts.

3 Modeling Approach

Agent-based models have been used with relatively limited scope in terms of understanding forced migration. In political science and sociology more broadly, however, agent-based models have been used to theorize on or understand the problem space of the spread of norms. In political science broadly, we see models of norm diffusion [14, 15], theories of social group formation [16], emergence of shared identities [15], and latent identities [17-19]. In more specific application contexts, there has also been work on ethnic mobilization and potential refugee militarization [20-23]. Edwards [24] made a case for the use of computational social science models, such as ABM, to explore refugees and forced migration factors in the *Journal of Refugee Studies*, which is contrasted with the field's larger emphasis on traditional statistical analysis or qualitative research methods. The model presented here is an extension of a model constructed to illustrate identity shifts in a contained refugee population over a long stretch of time [25]. In this paper, we compare the results from that model of encampment to one where the boundaries of the camp are removed to mimic interactions in an urban space. The foundational question this paper asks is: Do different identities arise in camps versus urban refugee settings? While this question has been asked from a qualitative perspective in other studies such as those by Malkki [12] and Turner [26], the ABM approach here allows us to explore the generalizability of such observations.

4 Model Development

The model extends Jager and Amblard's algorithm to explain how interactions shape individuals' attitudes by considering three types of agents (instead of two) [27]. In the original algorithm [27], two agents interact and assess each other's identity values. If agent A's identity value is beyond the threshold of rejection, then agent B will adjust her identity farther away from agent A. In that case, the identity was too extreme (say, the interaction between an extreme nationalist of the host country and a refugee who feels complete nationalism in her country of origin), so the identity shift away from agent A's represents a kind of backlash where agent B more staunchly embraces her identity. If agent A's identity is within the threshold of acceptance, then B finds A's values somewhat persuasive and moves her identity closer to A. If the difference between A's and B's identities is between the threshold of acceptance and threshold of rejection, then there is no change. At each interaction, refugee agents adjust their identity values in this way, as in the equations below:

$$\text{If } |x_i - x_j| < u_i \quad dx_i = \mu \cdot (x_j - x_i)$$

$$\text{If } |x_i - x_j| > t_i \quad dx_i = \mu \cdot (x_i - x_j)$$

$$\text{If } u_i \leq |x_i - x_j| \leq t_i \quad \text{No change in identity}$$

Where x_i is the identity of agent i , and x_j is the identity of agent j . The upper threshold, t_i , represents the threshold of rejection, while u_i represents the threshold of acceptance. The value μ in the equations above is a weighting mechanism to influence the change in identity value. Based on these calculations, in the following timestep, each agent updates its identity to:

$$x_i = x_i + dx_i$$

In the proposed model there are three types of actors (called ‘agents’) in the model: refugees, NGO workers, and local citizens. The model allows for testing both normal and uniform distributions of the starting identity values for each agent type of agent.

NGO workers (NGOs) can move freely into and out of the camp. They maintain individual, heterogeneous, static “global” identity values ranging from $[0, 1]$ where zero is neutral and one is very globally oriented, perhaps not strongly identifying with any territorial nation. This simplification assumes that that even locals and refugees who work for NGOs will have some exposure to international norms and values that make their identities ‘global.’ NGOs do not update their static identity values.

Local citizens (Locals) cannot move into the camp. In the real world, markets and services inside of refugee camps result in porous borders and interactions between locals and refugees. We simplify since these numbers are often very low. Locals maintain a static “local” identity. Local identities heterogeneously vary from $[-1, 0]$, where zero is neutral and negative value is very locally oriented, with only a national or local regional basis for identity and no alignment with the larger global population. This might represent someone who identifies most strongly with a local town or ethnic identity but does not situate her identity in any large global context. Locals, upon interaction with refugees at the borders of the camp, can influence refugees’ sense of local identity, but do not adjust their own static identity values.

Refugees cannot walk outside the camp boundary. This is assumed as an extreme containment case to contrast with the urban setting. Refugees begin with heterogeneous global and local identity values distributed normally or uniform (based on the experimental run) from $[-1, 1]$. A local identity of -1 indicates full alignment with the host population, zero is neither host nor country of origin, and 1 is full alignment with the country of origin. A global identity of -1 indicates completely territorial-based identity, zero is neither territorial nor global, and 1 is a fully global identity with no ties to a territorial state or nationality.

NGOs influence refugees’ global identity values; Locals influence their local identity values; and other refugees influence both local and global identity values. Each refugee possesses heterogeneous, uniformly distributed threshold values for acceptance and rejection that dictate how they adjust identity values with each interaction.

In the model, Locals possess a static μ_L , and NGOs share the same μ_N . Refugees have a heterogeneous value μ_{Ri} that weights the influence they place on interaction with other refugees. The μ_L and μ_N determine the influential weight of refugees’ interactions with Locals and NGOs respectively. These values are static throughout the simulation, and can thus be varied experimentally during simulation runs. The model was built in NetLogo [28] and run on a High Performance Computing Cluster. The experiment varied the following parameters: Number of Locals $[5000, 10000]$ by increments of 2500;

μ_L [0.1, 0.5] by increments of 0.1; Number of NGOs [0, 2000] by increments of 500; μ_N [0.1, 0.5] by increments of 0.1; Number of Refugees [5000, 10000] by increments of 2500; Each parameter combination was run nine times and for 5000 time steps, for a total of 540,000 simulation runs. The ratio of NGOs and Locals to Refugees does not reflect any real-world scenario as this data could not be found, so we chose to vary the parameters widely to see the effects of differing ratios on refugees' identity formation. As the model is based on theory, we cannot currently know real-world estimates for t_i or u_i . Data collection efforts will start later this year.

We verified that the model was running as expected using a type of 'model docking' [29] where we compare the results of this model under similar values of factors illustrated in Jager and Amblard's original paper [27]. Through visual inspection, we determined the model performs as expected producing three main identity clusters for the same thresholds of acceptance ($U=0.2$) and rejection ($T=1.6$) for all agents. Additionally, we employed a set of genetic algorithms (Gas) to search the model's parameter space, looking for sensitivity in parameter combinations that might 'break' the simulation [30]. Using the BehaviorSearch application [31], we used GAs with a mutation rate of 0.03, crossover rate of 0.7, a tournament size of 3, and test population of 50 in each round to search the parameter space for combinations that minimized the variance of identity values for refugees. Each search was sampled 10 times. The GAs searched parameter space for abnormalities in updated identity values among refugee agents. No potential bugs or chaotic behavior were found using this method, indicating that the model is relatively robust to parameter value combinations.

5 Simulation Results

For both local and global identities, the environment and the starting identity distributions make statistically significant impacts on the distribution of identities at the end of the simulation (Tables 1 and 2). We conducted two-way ANOVAs to determine the effects of distribution (normal, uniform) and environment (camp, urban) on the identity values (local, global). The exceptionally large F-values indicate a statistically significant difference between these groups. In fact, starting distribution of agent identity values accounts for much of the difference between groups.

Table 1. Two-way ANOVA: Average Local Identity by Environment & Distribution

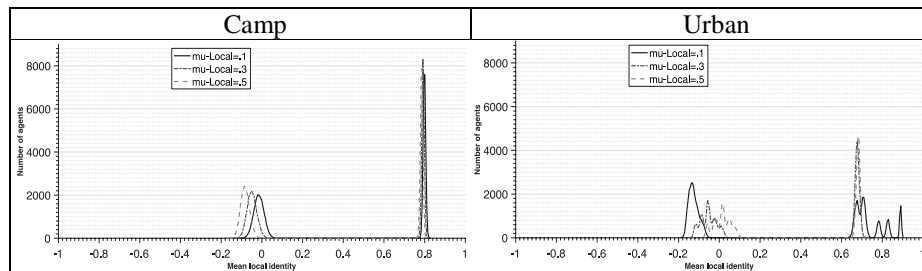
	Type III Sum of Sq.	d.f.	Mean Sq	F	Sig.
Environment	393.477	1	393.477	38,213.23	0.00
Distribution	84,549.59	1	84549.59	58,628.85	0.00
Env*Dist	294.788	1	294.788	28,628.85	0.00
Error	5,559.33	539,904	0.01		
Total	15,551.87	539,908			
$r^2 = 0.939$; adjusted $r^2 = 0.939$					

Table 2. Two-way ANOVA: Average Global Identity by Environment & Distribution

	Type III Sum of Sq.	d.f.	Mean Sq	F	Sig.
Environment	13.975	1	13.975	937.784	0.00
Distribution	116,002.06	1	116,002.06	7,784,295.87	0.00
Env*Dist	25.873	1	25.873	1,736.21	0.00
Error	8,047.05	539,996	0.02		
Total	189,439.93	540,000			

$r^2 = 0.935$; adjusted $r^2 = 0.935$

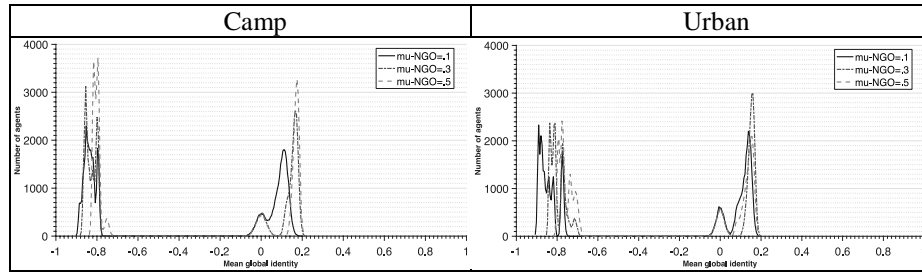
In figure 1 below, the grouping to the left centered near zero for all μ_L reflect those runs with uniformly distributed starting identity values. Those on the right that have shifted toward a strong local identity value of 1 derive from normally distributed starting identity values. Comparing them visually, the camp-based identities tend to form around a singular identity regardless of starting distribution type, where the urban refugees form smaller identity sub-groups as noted by the curves. These differentiating identities reflect the freedom of movement available to agents in the urban environment, where refugees are more likely to interact with urban host nationals. Most notably, when the starting distribution for identities is normal, refugees shift their identities dramatically away from the local host identity and towards that of their country of origin. In fact, the uniform starting distribution reflects preliminary fieldwork among protracted refugees, where identities converge closer to a neutral identity tied neither to the home nor host country. This disparity between simulation outcomes based on starting distribution will help to shape our fieldwork approach as well as future models that will incorporate additional factors such as age, education, religion, and language.

Fig. 1. Local identity of refugees by environment for varying μ_L 

In figure 2, the cluster on the left represents data generated from normally distributed starting identity values; those on the right derive from uniformly distributed starting identities. Again, in the normally distributed cases, refugees tend to push in the opposite direction from strongly global identity values of 1. Preliminary fieldwork more closely supports the data depicted in the cluster on the right derived from uniformly distributed starting identities. In the uniform cluster, interaction with NGOs splits the refugees into two main identity groups, though very close on the identity scale. One group stays centered around a neutral value of zero, while the other edges toward a slightly more global

value. Note that the transition to a second grouping of identity values occurs after 5,000 timesteps and is very subtle in its shift toward a global identity. This is subtle even though we vary the number of NGO agents in the model widely to represent a high ratio at times of NGO worker to refugee. The visual difference between camp and urban refugees in figure 1 is more dramatic than that in figure 2 likely because of the constraints on refugees related to interactions. In both scenarios (camp, urban), refugees can interact with NGO workers who can move freely in and out of the camps. Refugees' interactions with locals, however, are limited to the camp in the first scenario, but freely available in the second which may account for the visual shift in identity distributions.

Fig. 2. Global identity of refugees by environment for varying μ_N



6 Conclusions

We proposed a model to capture theorized dynamics of the impact of protraction on refugee identity. The model is based on Jager and Amblard's algorithm that considers identity changes between two agents [27]. What the model demonstrates is that, with relatively minimal behavioral rules for interactions, there appears to be the potential for identities to evolve over long periods of time. Additionally, the data demonstrates that there is a high variability of outcome depending on the starting distribution of identity values. This indicates that future fieldwork must investigate underlying identity distributions as well as additional contributing factors such as age, education, religion, and age that may affect transition of identities over time. The uniform distribution in both cases more closely reflects fieldwork conducted among protracted refugees in Rwanda, but this may be a special case. The model suggests that, since starting distributions have such a dramatic effect on identity shift, fieldwork should incorporate multiple protracted contexts and cases as well as alternative explanatory factors.

In general, identities shift over time away from starting values and distributions. If reflective of real life, these shifts call into question both the idea of nationality and sovereignty in a modern, increasingly displaced world. Additionally, it begs even more critique of the UN's 'durable solutions' for refugee situations. As people live removed from their country of origin, and they shift their identity values toward that of a non-citizen, what will this mean for the prospects of repatriation or local integration? What can we do to capitalize on non-territorial identities and fold refugees more completely into the modern economy? How would we adapt durable solutions to accommodate hyper-territorialized identities as those demonstrated with normally distributed starting

values? These steps are necessary to ensure that refugees do not accumulate on the fringes of the international political space as ‘wasted lives’ [32].

The model presented here is part of a longer-term study to evaluate how data could be collected to calibrate and validate the model. Further work to collect data to estimate ranges for threshold values, starting identity distributions, and more realistic environments for agent interactions will be required to advance this work. Additionally, future models may consider alternative social forces on refugee identity including media or culture during the hosting and assimilation experiences of forced migrants.

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